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A correlation between quality management metrics and technical performance measurement

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THESIS

A CORRELATION BETWEEN QUALITY MANAGEMENT METRICS AND TECHNICAL PERFORMANCE MEASUREMENT

by

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March 2007

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13. ABSTRACT (maximum 200 words)

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The author administered the QMM questionnaire to measure the perceptions of program managers that have the responsibility for software development programs within the U.S. Army. The author then gathered TPM data using an informal verification and validation of the same programs used for the QMM questionnaire, and compared the results and found an inconclusive correlation between them.

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A CORRELATION BETWEEN QUALITY MANAGEMENT METRICS AND TECHNICAL PERFORMANCE MEASUREMENT

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ACRONYMS AND ABBREVIATIONS

ACE	Advanced Collaborative Environment
ACI	Actual Cost Incurred
ACWP	Actual Cost of Work Performed
ARV-A (L)	Armed Robotic Vehicle–Assault (Light)
BCT	Brigade Combat Team
BCWP	Budgeted Cost of Work Performed
BCWS	Budgeted Cost of Work
BICC	Brigade Intelligence and Communications Company
C4ISR	Command, Control, Communications, and Computers, Intelligence, Surveillance, and Reconnaissance
CA	Cost Account
CAIV	Cost As an Independent Variable
CAM	Cost Account Manager
CCB	Change Control Board
CDMP	Configuration and Data Management Plan
CDR	Critical Design Review
CPI	Cost Performance Index
CSEPF	Common Systems Engineering Process Framework
CTD	Concept and Technology Development
CV	Cost Variance
DoD	Department of Defense
DS	Distributed Systems
EBCT	Evaluation Brigade Combat Team
EPM	Estimation/planning metric
EVM	Earned Value Management
FCS	Future Combat Systems
FoS	Family of Systems
HLA	High-Level Architecture
I&AM	Issue & Action Management
ICB	IPT Change Board

IMS	Intelligent Munitions System
IPT	Integrated Product Team
IS&T	Integration, Simulation and Testing
KPP	Key Performance Parameter
LSI	Lead System Integrator
MATREX	Modeling Architecture for Technology and Research Experiment
MGV	Manned Ground Vehicle
MIS	Management Information System
MULE	Multifunctional Utility/Logistics and Equipment vehicle
NLOS-C	Non-Line-of-Sight Cannon
ORD	Operational Requirements Document
PD	Program Directive
PDR	Program Design Review
PI	Prime Item
PICL	Program Impact Coordination List
PIDS	Prime Item Detail Specification
PM	People Management Metric
PM	Program Management
PMBP	Program Management Best Practices
PMM	Program Management Meeting
PMT	Performance Measurement Techniques
POC	Point of Contact
QMM	Quality Management Metrics
RAA	Responsibility, Accountability, Authority
RCCA	Root Cause Corrective Action
RGM	Requirement Management Metric
RKM	Risk management Metric
RM	Risk Management
RQM	Requirements Management
RSTA	Reconnaissance, Surveillance, and Target Acquisition

SBA	Simulation Based Acquisition
SDD	System Design and Development
SEMP	Systems Engineering Management Plan
SEPM	Systems Engineering Process Manual
SEWG	Systems Engineering Working Group
SME	Subject Matter Expert
SoS	System of Systems
SPI	Schedule performance Index
SSEI	System of Systems Engineering and Integration
SUGV	Small Unmanned Ground Vehicle
SV	Schedule Variance
TACOM	US Army Tank Automotive Command
TARDEC	US Army Tank Automotive, Research and Development Engineering Command
T&E	Test and Evaluation
TBD	To Be Determined
TPM	Technical Performance Measurement
TPMs	Technical Performance Measures
TRADOC	Training and Doctrine Command
TRL	Technology Readiness Level
UA	Unit of Action
UAS	Unmanned Aircraft System
UAV	Unmanned Air Vehicle
UGS	Unattended Ground Sensors
VAC	Variance at Completion
WBS	Work Breakdown Structure

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I. INTRODUCTION AND BACKGROUND

A. PROBLEM

The U.S. Army is faced with the challenge of what are the best possible management tools to use for developing a more responsive, and a more dominate combat force to meet today's needs and all future threats.

The U.S. Army is presently developing an advanced family of networked air-based and ground-based vehicles that are used in maneuver; maneuver support; and sustain program systems including manned and unmanned platforms.

These systems are networked by a Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) architecture which includes network communications, network operations, sensors, battle command systems, manned/unmanned reconnaissance and surveillance capabilities to enable levels of situational understanding and synchronized operations. The vehicle platforms are a fraction of the weight of the current weapon systems, and are just as lethal and survivable.

The lightweight and smaller sizes are critical to meeting the Army's future force deploy-ability goal, of transporting vehicles using C-130 aircraft. The technical challenges are unprecedented plus the time constraints are formidable for this program.

One of the major technical challenges is the development of a first-of-a-kind communication network. This endeavor includes developing data for 18 advanced systems, with 53 critical technologies, employing 157 complementary systems, and 34 million estimated lines of software code.

Traditionally the U.S. Army usually allows only 5.5 years for development of a single major system (between program starts and the production decision). The programs are tasked to compress development time even though this U.S. Army system of systems is comprised of several systems including: the network; an Abrams Tank replacement; Bradley fighting vehicles replacements, and a Crusader replacement.

The U.S. Army has been given the challenge to proceed with the strategy of using a timetable where over 75 percent of the critical technologies are immature. If the U.S. Army assumes everything goes as planned, the program will begin production most likely before all of its systems have been demonstrated. This is the kind of strategy the Army plans on going forward with for production and fielding of its systems.

The U.S. Army is now in the System Development and Demonstration (SDD) phase. The U.S. Army's acquisition program was approved by the Defense Acquisition Board in May 2003. Also there has been designated a joint Services program with the Army and Marine Joint Program Office. On July 22, 2004, Army officials announced plans to accelerate the delivery of selected vehicles to the current force. The plan expands the scope of the program's SDD phase by adding four discrete "spin outs" of capabilities at two year increments for the current forces.

Spin out one will begin fielding in 2008 and consist of prototypes fielded to the Evaluation Brigade Combat Team (EBCT). Following successful evaluation, production and fielding of spin out one will commence in 2010. This process will be repeated for each successive spin out. By 2014, the EBCT will be equipped with all new core systems. Other Brigade Combat Teams will have selected embedded new capability.

This is the Army's strategy for the main modernization program in the 21st century. It will ensure that the Army retains the combat advantage in critical capabilities plus having net-centricity, mobility, and a more efficient use of material and personnel. When fielded to the force, the U.S. Army will have replaced 40 year old equipment designed to win against Cold War enemies. This effort will benefit the Army, Marine Corps, and Special Operations Forces, and the Nation as a whole.

Since software development is a major part of this new U.S. Army system of systems, it is imperative that the software development be managed effectively in order to assure that the Army's strategy is successfully implemented. Effective management of the software development, in turn, requires that the requirements for effective management be understood, measured and monitored.

B. SOLUTION

The author has in the following sections, of this thesis examined U.S. Army software programs to determine how well Quality Management Metrics (QMM) correlate to Technical Performance Measurement (TPM). The author administered QMM questionnaire surveys to software Program Managers (PM) in software acquisition, and compared data from TPMs within the same programs. The thinking behind this research was to explore the data of TPM and QMM to see if there is a good working relationship between the metrics of each and how a software program might benefit the U.S. Army in managing these enormous developmental projects that can have tremendous political ramification and unwanted consequences. However, what the author did not do and has left for future research work was to address the relationship between Earned Valued (EV) and QMM.

C. RESEARCH QUESTION

This thesis focuses on answering the following question:

1. How well does the quality management metrics (QMM) correlate to the technical performance measurement (TPM)?

D. SCOPE, LIMITATION, AND ASSUMPTIONS

This thesis describes how quality management metrics (QMM) correlates to the technical performance measurement (TPM). It has been argued successfully that the quality of software management can have an affect on the degree of success or the possible failure of a software development program. This argument was presented by Martin J. Machniak, his thesis developed metrics for measuring the quality of software management along four dimensions: requirements management, estimation/planning management, people management, and risk management. This QMM used in software development for program managers consists of a composite score obtained from a questionnaire administered to the program manager and their peers. The QMM reflects the success in the quality of software management, plus, it can be used as a template for possible improvement in software management performance. The author administered the same questionnaire survey to measure the conceptual performance of the individuals

responsible for Army software development programs on the government side of the house. The author also identifies, how the Technical Performance Measures (TPMs) are applied, and how (TPMs) are reported. The author will provide data how this process utilizes TPMs: (a) as key measures for indicators of whether or not a program is a success technically; and (b) in evaluating a program's ability to meet requirements. TPM metrics are used to track and compare performance estimation, predictions, and actual measurements against specified and allocated goals over time. The author feels that the correlation between QMM and TPM can provide Program Managers (PM), Integrated Product Team (IPT) leaders, and customers, with good objective evidence in achieving design quality with approved requirements, and quality program management using QMM and TPM as tools for program success.

E. METHODOLOGY

The author is employed at the U.S. Army Tank Automotive, Research and Development Engineering Command (TARDEC). The author was placed on a developmental assignment to provide software quality engineering support to the developing combat systems in an Integrated Product Teams (IPT) in areas of Integration and Simulation Testing, Modeling and Simulation, and Training.

The author conducted research in developing this thesis from various Army programs by a study of strategy used in the areas of Technical Performance Measurement (TPM), and administration of the Quality Management Metrics (QMM) questionnaire surveys. The surveys were given to the software development Program Managers (PM) in software acquisition, to determine if a correlation could be drawn between the two metrics.

The major challenge encountered and overcome during the completion of the thesis was the consolidation of all information through the study of the various programs, plus research, and arranging interviews with very busy Program Managers working under tremendous pressure to do it right the first time. The internet provided the author with good reading material on the methodology in software project management and in software project management strategy in general for industry as a whole. The author

found that interviews provided insight to what worked, what didn't work, and what was too costly to include in some projects.

F. ORGANIZATION

The chapters that follow describe what the author found during his study of the various programs, which included administration of the Quality Management Metrics (QMM) and Technical Performance Measurement (TPM).

CHAPTER I: Introduction: problem, solution, research questions, scope, limitation, and assumptions, methodology and organization for the author's thesis.

CHAPTER II: The components of QMM, TPM and data from both metrics.

CHAPTER III: Informal Verification and Validation.

CHAPTER IV: Conclusions, Recommendations and Future Work.

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II. METRIC METHODOLGY OF QMM AND TPM

A. MOTIVATION

The author felt that there was something missing in the software program management equation that might have been over looked in the current quest for cost-effective, high-quality software. The possible missing part may be the correlation between QMM and TPM. QMM has been proven by Machniak that the quality of software program management can be and is measurable, and available for input in costing and scheduling tools. The results can be provided to program managers so that they may pinpoint such areas in software program management where improvements are needed, and can be made. The capability to measure the quality of management of software projects objectively allows for accurate cost models where impact in management quality, including cost factors, will provide a means for software project management improvement using assessment by feedback and correction.

Technical Performance Measures can be used to develop a plan of expected technical achievement to which the actual progress is compared using periodic measurements or tests. The TPMs are indication of compliance in design to requirements captured in specifications and to present management with quantitative data to determine whether action is required. The TPM approach, using various techniques of risk analysis and probability, offers a promising method that incorporates technical assessments, resulting systematically from technical parameter measurements to derive more discrete management data sufficiently early to allow for cost avoidance. Therefore, providing needed information that allows the managers enough time for making informed decisions on schedule, cost, and a review of technical requirements early in the program.

In this thesis, the author examines the possibility of a correlation between TPM and QMM in each of the four areas covered in the QMM questionnaire survey. The author's intent is to discover if any of the four areas of the QMM survey have a stronger correlation to TPM than others, in identifying contribution to management quality and possible project success.

B. STRATEGY

The method developed in approaching the correlation between QMM and TPM included but was not limited too reviewing recommended practices, textbooks, on-line publications, and having interviews with various personnel from senior program managers to system developers. The QMM and TPM metrics measured the quality of management plus the technical performance on three specific software programs.

The author's goal is to draw an objective correlation between QMM and TPM to which program management can be compared and ranked thus giving a baseline for quantifying improvement. In the next few paragraphs an explanation will be given for QMM and TPM metrics.

C. QUALITY MANAGEMENT METRICS (QMM)

The QMM developed by Machniak in response to these concerns consists of various survey questionnaires covering these four areas: Requirements management; estimation and planning management; people management; and risk management, see Machniak thesis on QMM [REF 25].

The QMM survey is a questionnaire designed to be given to software project managers, and software developers who have global impact on software projects. Mackniak applied the survey on three software programs at the Space and Naval Warfare Systems Command initially, and then Grossman validated the QMM on ten software programs at Edwards Air Force Base, proving furthermore that there is a correlation of good quality management and the success of a software project.

1. Requirements Management

Software requirements management focuses on managing the process of extracting, developing, defining, and refining the requirements of a software program [REF 25]. It is the current belief that quality management of a program's requirements must have established procedures and structure to ensure that requirements specifications are complete; consistent; understandable to the reader; lacking ambiguity; having a known origin; and not having vague design stipulations [REF 25]. Also, requirements

need to present one idea per requirement, and address the requirement attributes. Good requirement management provides current status by tracking the dates, versions, relationships to other requirements, and the priority rationale behind such decisiveness.

2. Estimation/Planning Management

The use of software estimations are basically one of the main methods in which planning is performed in software programs. The QMM estimation/planning management section will not give a specific estimation technique as being the right one over others used. However, the QMM estimation/planning management section will seek to quantify management's efforts in the estimation/planning process. In other words the questions in the survey are used to determine if the choice of a technique is appropriate and how well that technique is implemented in the program.

3. People Management

In QMM quality people management covers the need for organizational management providing a good atmosphere with proper working conditions with all environmental efficiencies maximized.

In QMM, quality people management has the work flow aided by delegation and task ownership with management monitoring those activities and processes. Questions QMM ask: Are the roles well defined for all team members? Do the team members' have a part in the project planning and decision making process? Is there effective communication being given from top down, and bottom-up with good customer or team communication occurring? Also, it would be best that the program managers have a good working knowledge in the technology being managed.

4. Risk Management

The QMM references a proactive approach on quality risk management. The use of a formal risk management plan is developed usually before the program begins with a list of risks identified by the team members, and customers through assessments and the use of checklists. Throughout the life of the development risks are assessed and tracked by management. The prioritization of risks is based on the probability of occurrence and

negative consequences. A risk strategy is formulated to mitigate risks with a plan developed to allocate needed resources in reflection of risk priorities. Risk data is to be shared [REF 25].

The author notes that the QMM was developed to reflect the management needs of large projects and tests through the questionnaire survey, and formal methods are used for the management of requirements, performing estimations and planning, managing people, and managing risk.

D. QMM SURVEYS

Software program managers on software development programs at U.S. Army TACOM were asked to complete the QMM survey. These individuals were selected because of their complete understanding of the program and the fact that they had a good understanding of the management practices which were implemented throughout the software program. The software program managers used a specific point in time in the program for the evaluation of the program management, so that the individual team members were able to identify the selected point in time and evaluate the program. Also, the TPM evaluation was selected during the same point in time.

In the best interest of the program and to maintain confidentiality of the survey the programs are identified as programs A, B, and C.

The interviewees, after completing the survey, were asked to rate the success of that period or selected point in time using an evaluation scale of zero to ten. The score of zero corresponded to program failure and ten corresponded to a completely successful program. A score of ten meant that the software program produced a product on time, and within the budget allocated as well as complete customer satisfaction with the quality product.

Part I of the QMM questionnaire survey:

This part of the survey questionnaire is the pair-choice questions. It consists of two questions placed side by side on a single line within a column next to each question. The interviewees were asked to check a box next to the question or statement which

closely reflected what was happening on the evaluation program at the specific point in time. The interviewees made choices of the two for each line of the survey questionnaire. The question or answer that most likely reflected the evaluation program need not be an exact match. There were two different ideas for each pair-choice question. This was done in an effort to find a tendency of the interviewee in the area of interest by way of formal requirements documentation versus informal requirements or documentation. Most often the pair-choice questions were repeated with different wording to confirm the earlier choices and measure the strongest tendency. The format of the questionnaire survey using the proper mix of questions, plus a variation with repetitions, was designed to reach a consensus on issues, measure tendencies, and show strengths [REF 25].

Part II of QMM Questionnaire Survey:

This part of the survey questionnaire is basically yes or no questions that consist of one question per line with three columns next to it giving the person a possible "yes," "no," and "N/A" answer [REF 25].

The interviewee answering the questions, would answer as it pertains to a program manager and the program during a specific point in time on the program by a "yes," "no," and "N/A" in the box next to each question, with the use of the "N/A" box discouraged unless the program manager has no say in such issues.

In the requirements management pair-choice section, a score of zero to two is possible having different upper bounds on the score of each question. This is based upon the relative weight and importance of each question in the section. However, in the estimation/planning management, people management and risk management sections the possible scores were zero to one.

The questions that answer either yes or no have a score that ranges from minus four to plus four. This score is based upon its relative weight and importance in the upper and lower bounds of the survey questionnaire.

This was determined by Machniak [REF 25] and stated as such [Q,M,M&G]. The QMM equation is given by:

QMM=0.92RQM+0.67EPM+0.55RKM+1.86PM, where:

RGM is the requirements management metric,

EPM is the estimation/planning metric

RKM is the risk management metric;

PM is the people management metric

Having coefficients ranging from 0.92, 0.67, 0.55 and 1.86 as the importance coefficients of the requirements, estimation/planning, risk and people management metrics respectively. As the importance coefficients have been determined through focus groups, interviews with one-on-one experienced software professionals [REF 25].

Data Analysis

Program	Program A		Program B		Program C	
Participant	A_{PM}	A_1	B_{PM}	B_1	C_{PM}	C_1
QMM score	509.65	522.63	569.03	559.44	314.83	229.21
QMM percent	77.35	79.32	86.36	84.91	47.78	45.36
Success score	8	8	9	8	6	6
Mean success score (0-10)	8		8.5		6	

Table 1. Results of Informal QMM Validation

Table 1 is the summary of the three programs included in this analysis using data from the program manager and independent development team members. In all of the following tables QMM percentage score, requirements management, estimation/planning management, people management, and risk management scores have all been adjusted to a scale of zero to ten. The zero score in Table 1 corresponds to zero percent of the points found possible in the section where as a score of ten corresponds to a possible 100 percent or 100 points in the section.

Program	PM Program Score	PM QMM Score	PM Requirements Management	PM Estimation Planning	PM People Management	PM Risk Management
A	8	7.7	88	66	169	56
B	9	8.6	101	80	193	64
C	6	4.8	49	70	6	60

Table 2. Program Manager Summary Data

Table 2 is a summary of the Program Manager Data. The first column from left to right identifies the program, the second column provides the program managers subjective program score, the third column provides the QMM score based on the program managers questionnaire survey, while columns four through seven provides the program managers QMM requirements management, estimation and planning management, people management and risk management scores reflecting the questionnaire survey.

E. TECHNICAL PERFORMANCE MEASUREMENT (TPM)

Technical Performance Measurement (TPM) is, in its most basic form a plan of expected technical achievement to which the actual progress is compared using periodic measurements or tests, see [REF 20].

Technical performance measures are engineering and physical measures, such as computer throughput, radar detection range, number of possible users and programmatic metrics used by a program in gauging effectiveness in developing designs to ensure that a design meets the performance specified by the customer. The TPMs are indicative of compliance in design to requirements captured in specifications and presents management with quantitative data to determine whether action is required. The TPM has been integrated with requirements management issue and action management, baseline management, and risk management. TPMs evaluate the adequacy in evolving solution through engineering changes and trade studies to identify deficiencies that impact the systems ability to meet the performance requirement. Technical characteristics are evaluated to identify problems through engineering analyses and should indicate if performance is being met as specified in contracts or other requirements. As the system concept is being developed the TPMs are initially defined, and are formalized during contract start through requirements definition. Existing TPMs can be modified per program needs, and new TPMs can be added to the system at any time during the program.

Technical Performance Measurement (TPM) supports the Army's objective and strategy by establishing adaptive and affordable processes. It also supports the monitor

and control process area in the system engineering process. In the government systems program managers and their teams, find themselves in an environment that creates pressures that can be translated into products being delivered using best value analysis with cost as the overriding determinant. (The TMP approach, using various techniques of risk analysis and probability, offers a promising method that incorporates technical assessments, resulting systematically from technical parameter measurements to derive more discrete management data sufficiently early to allow for cost avoidance.) Therefore, this, in essence, provides needed information that allows the managers more time for making informed trade-off decisions early in the program.

A few recent initiatives are breaking new ground in the development of sophisticated techniques for TPM planning, integration with cost and schedule, in such manner to be reflected in Earned Value Management (EVM) data.

Earned Value Management:

a. Earned Value Management (EVM) is an integrated system of project management and control which has enabled the contractor and their customer to monitor the progress of a project in terms of integrated cost, schedule and technical performance measures, see Appendix B.

Integrated Product Team (IPT) Ownership:

b. EVM system is created, owned and managed by the Prime Contractor, but the customer has full and timely visibility of the information at any time. From this perspective this means that there is greater equality of information between the contractor and the customer which is fundamental to true partnering.

EVM function:

c. EVM provides a reference point which is an objective view of the status of the contract such that the value to the end or goal reflects work completed to date. This needs to be compared with both the planned expenditure and the actual

costs to determine the performance to date and to give early indications of problems. Now EVM may also be used to enhance cost forecasting, risk management and as the basis for payment against the contract.

EVM data requirement:

d. The way in which EVM is implemented, the contractor must have a validated system that can accurately measure the following three fundamental factors:
    1. The Budgeted Cost of Work (BCWS) or what is known as planned costs.
    2. The Actual Cost of Work Performed (ACWP) or what is known as the actual cost of progress made.
    3. The Budgeted Cost of Work Performed (BCWP) or earned value.

Earned Value Management system:

e. The heart of EVM is the Work Breakdown Structure (WBS). The WBS is a product oriented family tree structure of all of the goods and services to be built or supplied. The WBS is a consistent and visible framework that displays and defines the products as elements that relate to the end product.
f. The WBS needs to be defined down to at least the level at which EVM reporting will be applied, and within a WBS that adequately meets their data requirements.
g. The schedules that are produced for the lower elements of the WBS should be planned to the greatest possible detail in that the resulting activities are of manageable duration and can be assigned to a single part of the organization.
h. Earned value is based on assigning a value at the activity level to the achievement of project work. Ideally, to determine non-subjective achievement such as milestones and deliverables, one would need to have them based on the planned cost (in money or hours) for achieving the goal.
i. The control sometimes called Cost Account (CA) coincides with the level at which EVM reporting will be applied. The CA has a dedicated manager

appointed. This individual is empowered to plan and deliver within time and cost, those constraints set forth within the CA.

EVM is generated:

j. This begins once the project is underway –the contractor will start to earn value by the commencement and completion of individual activities. The summation of the values earned in a particular control account gives the earned value of the CA to date.

EVM data is presented:

k. The earned value is plotted against the planned and actual costs over time. This is a very clear way to show the status of the project. The progress report has a basic tabulation of the three basic data elements, the estimate at completion and the budget, and their derived data elements, or variances, which are measured in terms of resources such as man-hours or cost. The derived data elements are:
    1. Cost Variance (CV) – The difference between the planned and actual resource usage for an element of work. A negative variance means that more money was spent for the work accomplished than was planned. Cost Variance is obtained by comparing actual cost with earned value:
    2. Cost Variance = Earned Value – Actual Cost
    3. CV = BCWP – ACWP
    4. Schedule Variance (SV) – The difference between the budget and the earned value for an element of work is called the schedule variance.
    5. Schedule Variance = Earned Value – Budget
    6. SV = BCWP – BCWS
    7. Variance at Completion (VAC) – The difference between the total budget allocated for a piece of work and the project manager's estimate of the actual resource cost at completion.

An example of the way EVM data may be presented in the form of a graph is shown in Figure 1. This can be available at the total contract level and at all WBS levels down to the lowest level set within the contract.

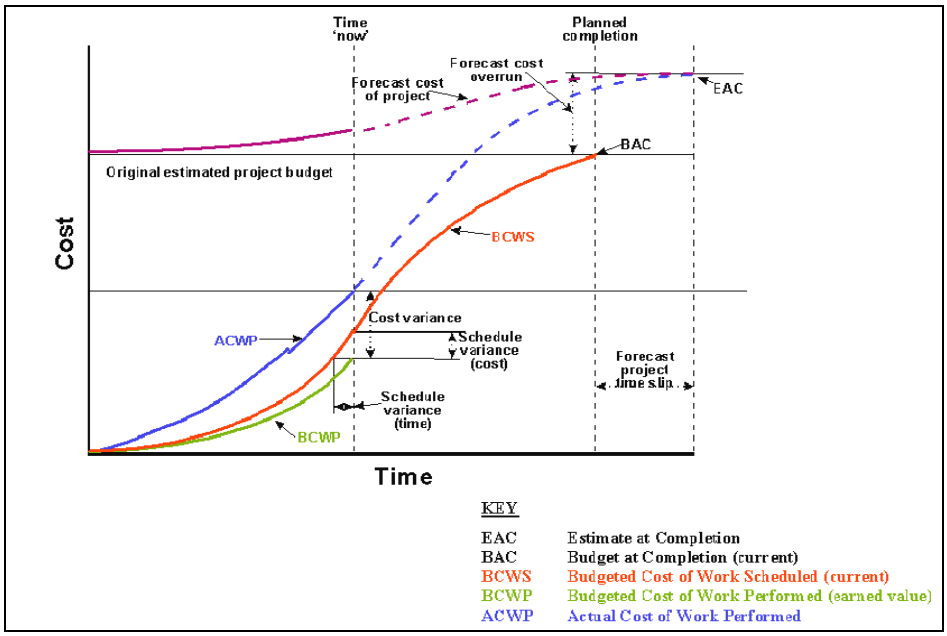

Figure 1. EVM Graphical Representation

EVM data in graphical representation:

l. These graphical representations are useful management information tools. For example, in Figure 1, the graph may represent a project or task that appears to be underachieving in terms of both cost and schedule. Now if corrective action is not taken, the project/task will be completed behind schedule and over budget.

m. As well as the derived performance indicators mentioned above, there are two measures of efficiency which are also useful for determining the status of the project: (a ratio of less than one implies that work is underachieving against the plan, and above one implies better than the plan).

1. Cost Performance Index (CPI) = How much it really costs to earn one pound of budget or the "value for Money" report.
2. Cost Performance Index = Earned Value / Actual Cost
3. CPI = BCWP / ACWP

4. Schedule Performance Index (SPI) - The Schedule Performance Index is the ratio of Earned Value and the Planned Achievement.
5. Schedule Performance Index = Earned Value / Budget
6. SPI = BCWP / BCWS

Reporting Cycle:

n. The reporting cycle should as a minimum tie in the contractors and customers internal accounting periods (usually monthly – although on the high risk projects the reporting cycle is weekly).

Cost & Schedule Performance Index Chart:

o. The CPI/SPI trend chart in (Table 3) provides a summary of the three programs A, B and C that are included in this analysis using data from TPM presented though EVMS:
    1. SPI = (BCWP/BCWS) and CPI = BCWP/ACWP.
    2. The (BCWS) Budgeted Cost for Work Scheduled, which is distributed cost for all the work that is realistically time-phased based on schedule, scope and resources.
    3. The (BCWP) Budgeted Cost for Work Performed; also referred to as Earned Value. The budgeted cost for all the work actually accomplished in a given period of time, as a measurement of work progress.
    4. The (ACWP) Actual Cost of Work Performed; also referred to as (ACI) Actual Cost Incurred and can mean actual cost as recorded in the accounting system for all the work associated with a given period of time.

Prog	Mth.	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AVG	COE
A	SPI	98 %	100 %	100 %	121 %	117.5 %	114.5 %	100%	100%	100%	100%	105	1.05
	CPI	108.5 %	107 %	101.5 %	123.5 %	113.5 %	114%	113.5 %	113.5 %	113.5 %	113.5 %	112.5	1.13
B	SPI	100 %	100 %	100 %	100 %	100%	100%	100%	100%	100%	100%	100	1.00
	CPI	100 %	100 %	100 %	100 %	100%	100%	100%	100%	100%	99.9 %	99.99	1.00
C	SPI	98.5 %	98.2 %	98.2 %	98.2 %	97.1 %	97.1 %	96%	97.5 %	97.5 %	97.5 %	97.37	.974
	CPI	95 %	96.2 %	96.1 %	97.1 %	101%	100.5 %	104%	104.5 %	105%	104.5 %	100.2	1.00

Table 3. SPI/CPI Trend Chart

In Table 3, the author took the average of each program's SPI and CPI over the ten month period, and then the coefficient.

F. SUMMARY:

In section II the author presented the metrics that are to be used to answer the question… "Is there a correlation between Quality Management Metrics (QMM) and Technical Performance Measurement (TPM)."

1. The quality of software management has an effect on the degree of success or failure of a software development program, this statement has been argued successfully by Martin J. Machniak in his thesis Development of QMM Measuring Software Program Management Quality. The QMM metrics can be used both to characterize the quality of software management and provide a template for improving software management performance [REF 25].
2. TPM uses engineering data that physically measures: computer throughput, radar detection range, number of users and other programmatic metrics such as EVMS. This helps the program manager gauge the effectiveness of a developing design in meeting the performance specifications developed for the U.S. Army. The TPM is used as an indicator for compliance of a design to requirements or specifications and presents management with quantitative data that can be used to determine if corrective action is needed. TPM is

integrated with EVMS reflecting cost and scheduling, design requirements, issue and action management, baseline management, and risk management for impact assessment [REF 20].

The author administered the QMM questionnaire to measure the perceptions of program managers from programs A, B, and C that have the responsibility for the software development within each of the said programs for the U.S. Army. The author then gathered TPM data using a metric methodology from the same programs given the questionnaire, and developed the data tables for possible correlation between them if any.

In Section III the author presents the informal verification and validation.

III. INFORMAL VERIFICATION AND VALIDATION

A. MOTIVATION

The methodology and structure for evaluating the possible correlations between Technical Performance Measurement (TPM) and Quality Management Metrics (QMM) have been laid out in the previous chapter, with the informal verification and validation presented in this section.

Informal verification and validation being necessary ensuring that both metrics TPM/EVM and QMM reflect a positive correlation between each other having measured the cost and scheduling with TPM/EVM and the quality of software program management in a fashion as accurately as possible using QMM.

B. STRATEGY

The verification and validation approach is informal. The evaluation was of three software programs using the QMM survey score and the TPM/EVM metrics from the same three programs during the same time period. The program manager and one program developer from the same team evaluated program A, and such was the case for programs B and C, using the program manager and one program developer.

In developing a frame of reference for which a correlation can be established from the QMM survey results, two measures were used. The two measurements are the 1) QMM percentage score, and 2) the overall program success score.

1. The QMM percentage score is derived by first taking the surveys minimum QMM score and normalizing it to zero. This can be done by adding 130.86 to the minimum score of -130.86 in doing so makes it zero. The maximum QMM score possible from the survey is 528.00, adding 130.86 for normalization, the survey maximum possible score is now 658.86.

2. The QMM percentage score is obtained by dividing the minimum normalized score by the maximum normalized score, and multiplying the results by a hundred.

The equations taken from Martin J. Machniak thesis:

QMM (min) + 130.86 = 0.00 = QMM (min normalized)

QMM (max) + 130.86 = 658.86 = QMM (max normalized)

QMM (score) + 130.86 = QMM (score normalized)

(QMM score normalized / QMM max normalized) X 100 = QMM % score.

The participant taking the survey assigns an overall program success score based on how they feel the program is doing from their perspective and is totally subjective. However, for the most part the success of a program is measured by the final product performance and whether or not it meets the user's satisfaction and the stakeholder's expectation.

A comparison is made between the QMM survey score and the individual overall success score, and to the mean overall success score of the program.

The mean overall success score of the program is based on surveys from the project manager and other individuals capable of judging the overall success of the program. The scale used to measure the overall success of a program by the individual taking the survey is presented by a score from zero to ten. The best program would be given a score of ten, with a zero score being a program failure. However, the author would like to make it clear that an overall success score of ten is defined as having perfect software product and program execution, and that success or failure of a software program is not always due to the actions of program management.

The comparison of the three, QMM percentage score, the individual score, and the mean overall success score of the program will establish any correlation between them for each program. The example, given by Martin J. Machniak in his thesis, dated December 1999, stated that the possible overall success score of seven corresponded to a QMM percentage score of 70 percent plus or minus 5 percent would indicate a strong correlation. An overall success of seven to QMM percentage greater than a plus or minus five percentage points of 70 percent, and less than plus or minus 15 percentage points of 70 percent can be considered a fair correlation. However, in a program where 8 is the

overall success score, with relationship to a QMM percentage score of 40 percent, the correlation is considered weak.

The Technical Performance Measurement (TPM) metrics was evaluated based on the Earned Value Management (EVM) data which is an integrated system to monitor the progress of a project in terms of integrated cost, schedule and technical performance measures. The author would like to note that traditional project management practices tend to compare the actual costs with planned expenditures, and sometimes confuses actual known costs with actual known progress. In as much as actual costs are not necessarily in some cases good measures of progress, the EVM can provide a third reference point which is an objective view of the project status; an example would be the value to the end goal of the work completed to date. Using EVM, problems can be indicated early by comparing both the planned expenditure and the actual costs to determine the performance to date of the project.

The project manger, in order to implement EVM, needs to have a validated system that accurately measures the: 1) planned cost of work, also known as the Budgeted Cost of Work Scheduled (BCWS); 2) the actual cost of the progress made, also known as the Actual Cost of Work Performed (ACWP); 3) The earned value, also known as the Budgeted Cost of Work Performed.

The author states that the Work Breakdown Structure (WBS) provides a sort of family tree where all the goods and services are to be supplied. This family tree gives a visible framework to display, and define the products and elements that make up the end product. Ideally Earned Value is assigned value at an activity level to an achievement of project work; and is non-subjective; based on milestones; deliverables; and based on planned costs, such as money or hours of achieving that milestone or deliverable. The Earned Value techniques are numerous and can be applied to various activities with the guidance from a specialist in that particular activity.

The author was given TPM/EVM data that was available from Control (sometimes called Cost) Account (CA) in programs A, B & C. The programs appointed managers from each program A, B and C provided two indicators:

1. Cost Performance Index (CPI) which is how much it really costs to earn one pound of budget or the "Value for Money" report: Cost Performance Index = Earned Value/Actual Cost, CPI = BCWP/ACWP.

2. Schedule Performance Index (SPI) that shows the schedule Performance Index as the ratio of Earned value and the Planned Achievement: Schedule Performance Index = Earned Value/Budge, SPI = BCWP/BCWS.

C. RESULTS

In the following paragraphs are the results of the QMM surveys and the TPM/EVMS data.

1) The scores form the QMM survey presented in Table 4 summary for the A, B, and C programs. The QMM was determined for each of the three programs A, B, and C using QMM score as a percentage of the QMM maximum possible score of each program. The percentages of each program were compared to the scores given by survey participants for a comparison. This provides a mean success score for each of the programs too include both the Project managers and other associates within each program that have the insight for judging program success.

Program	Program A		Program B		Program C	
Participant	A_{PM}	A_1	B_{PM}	B_1	C_{PM}	C_1
QMM score	509.65	522.63	569.03	559.44	314.83	229.21
QMM percent	77.35	79.32	86.36	84.91	47.78	45.36
Success score	8	8	9	8	6	6
Mean success score (0-10)	8		8.5		6	

Table 4. QMM Results Summary Comparison.

The author notes that the survey results for all programs reflect a correlation between the QMM percentage ranking, the overall success ranking of the program, individual success ranking scores, and the mean ranking scores.

All QMM survey summary sheets for programs A, B, and C are enclosed and presented in Appendix C.

a. The examination of the survey summary sheets for program A, found that there was a slightly lower score in the areas of people and requirements management. But, the end product was good due mostly to experienced personnel with a history of working together both as stakeholders, users and technical staff.

b. The examination of program B reflected very good scores in all four areas of the QMM survey, and provided an excellent product with a timely delivery. Once again the program had experienced personnel in all areas of requirements management, people management, risk management, estimation/planning management, and supported by an excellent technical staff. However, the author would like to point out that a program where people are this experienced may have the attitude that they have seen it all before and the Project Manager needs to have very strong leadership skills with a reputation of known success in order to guide them.

c. Program C scored poorly in two areas of the QMM survey, and this was reflected in the QMM score, QMM percentage score, the success score given by the participants, and the mean success score. The first was requirements management, and second was people management. In requirements management the problem issues stem from not having very well defined technical goals and constant changing program requirements. The changes made in the technical goals without communicating with all the stakeholders and the users left the technical part of the program unable to establish TPM's or EVM's. The lack of well defined requirements and immature technology caused personnel to request a transfer from the program. The level of frustration in all areas of the program made the turnover of personnel very common and to the point where training was done by new hires for other new hires.

The author found the self enhancement bias stated in Martin J. Machniak thesis to be true. In all interviews with program managers most felt that they could always solve the other program managers program problems. But, when asked about their own

program problems stated simply theirs were unique only to their program. The need for a QMM survey administrator to explain the intent is a must, and, interviewing the people before and after the QMM survey is necessary in order to have everyone become aware of the differences as perceived in what is thought to be happening in a program and what is actually taking place and what is required in the program. The after actions review with all participants of the survey discussing questions and answers, for the most part was the biggest benefit of the QMM process. All QMM summary sheets for programs A, B, and C for all survey participants are found in Appendix C.

All copies of the completed survey from each of the three program managers and other program participants are included in Appendix A. Also, QMM survey questionnaire templates with points and ranking of each response can be found in Appendix A.

2) The data from the TPM/EVM is presented in Table 5 summary for A, B, and C programs. The CPI and the SPI average plus, coefficient of each program over a ten month period included in this analysis using data from TPM presented though EVMS. All EVM summary sheets for programs A, B, and C are enclosed and presented in Appendix C.

The EVM performance goal was determined for each of the three programs A, B, and C using a ratio of less than one implies that work is underachieving against the plan, and above one implies better than the plan.

Prog	Mth.	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AVG	COE
A	SPI	98%	100%	100%	121%	117.5 %	114.5 %	100%	100%	100%	100%	105	1.05
	CPI	108.5 %	107%	101.5 %	123.5 %	113.5 %	114%	113.5 %	113.5 %	113.5 %	113.5 %	112.5	1.13
B	SPI	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100	1.00
	CPI	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.9 %	99.99	1.00
C	SPI	98.5 %	98.2 %	98.2 %	98.2 %	97.1 %	97.1 %	96%	97.5 %	97.5 %	97.5 %	97.37	.974
	CPI	95%	96.2 %	96.1 %	97.1 %	101%	100.5 %	104%	104.5 %	105%	104.5 %	100.2	1.00

Table 5. CPI & SPI Results Summary Comparison

The author reviewed the data from Table 2, which provided a summary of the CPI and the SPI average plus, coefficient of each program. Earned value is a means of placing a dollar on project status, in this way provides project manager's a way to compare budget versus actual costs versus what the project status is in dollar amounts. In order to have a proper analysis of the project the following items will be needed: budget, earned value, actual costs, and forecasts. A reference to Figure 2 indicates it is without earned value, it shows actual costs as less than what has been budgeted, and it is impossible to tell if the actual costs are less or if work is progressing at a slower rate than planned or actual costs are less than what was budgeted. Earned value can be defined as the sum of the budgets for the work that is complete, and earned value for completed project activities is equal to the total budget. However, for activities not started, the earned value is equal to zero. Objective judgments or Performance Measurement Techniques (PMT) refers to multiplying the budget by the percentage complete to get the earned value. The author notes that work performed by a project manager and quality control inspector is referred to as "level of effort" and value is as budgeted. Plus, as long as the task is completed the value is earned. Figure 2 gives the Schedule Variance (SV) minus the difference between the earned value and the budget minus the Cost Variance (CV) minus the difference between the earned value and the actual costs.

D. TPM/EVM DATA DID NOT TRACK WITH QMM DATA

The author finds an inconclusive correlation between QMM and TPM/EVM. The data given in Table 3 for TPM/EVM did not track with the data in Tables 1 &2 for QMM survey questionnaires, even though software programs A & B provided data that might lead one to believe that there is a correlation between QMM and TPM/EVM. However, when it came to software program C the data proved to be inconclusive for a correlation to be present. The QMM survey questionnaires in program C reflected a very poor score of less than 70%, and their EVM/TPM score presented an acceptable score of 100% or one according to the requirements of large software programs.

The author noted that the possible causes could be in the way the data is gathered, calculated and presented for TPM/EVM. This is based on the fact that TPM/EVM data is processed, calculated and presented during meetings that are held weekly by Project

Managers for project status. Then the weekly TPM/EVN data is summarized and presented for the monthly general staff presentation. This gives the Project Managers time so they can make adjustments each week reflecting an acceptable status for the monthly general staff presentation. Also, new requirements or changing requirements constantly being placed on a project make TPM/EVM goals difficult at best.

The author noted that the QMM questionnaire surveys gives better details of where in the program the Program Managers are possibly having difficulties. QMM concentrates on four basic areas in the questionnaire surveys such as: requirements management, estimation/planning management, people management and risk management. The TPM/EVM data gives a yes or no answer to Program Managers on weekly and monthly status in meeting the projects technical goals.

E. SUMMARY

In this Section III the author presented the data from QMM questionnaire surveys to measure the perception of program managers from programs A, B and C that have the responsibility for the software development within each of the said programs for the U.S. Army. The author then gathered TPM/EVM data using a metric methodology from the same programs given the questionnaire surveys, and developed both sets of data tables for review of possible correlation between them. The author noted during his review of these data tables that the TPM/EVM data did not track with the QMM data presented. Therefore an inclusive correlation between QMM and TPM/EVM was presented.

In Section IV the author presents Conclusions, Recommendations, and suggestions for Future Work based on his findings.

IV. CONCLUSIONS, RECOMMENDATIONS AND FUTURE WORK

A. CONCLUSIONS

This thesis provided an initial evaluation of QMM and TPM for a possible correlation between the two when evaluating software management and technical performance on specific software programs. The software programs evaluated varied considerably and played a significant part in the overall success of a larger software program. The decisions and policies that program managers make using QMM and EVM/TPM could provide the advantage given if there were a correlation between them. However, Earned Value Management (EVM) did not track with QMM as test data reflected. Also, the author notes that EVM/TPM did not indicate the program as successful or non-successful as QMM provided in test data reflected in section III showed an inconclusive correlation between QMM and TPM/EVM.

1. QMM Survey

The author used the survey format provided from Martin J, Machniak thesis, Development of a Quality Management Metric (QMM) Measuring Software Program Management Quality December 1999. The format of the QMM survey, and the individual questions and the TPM data was unchanged. The intent of this thesis was to find out if there is a correlation between QMM and TPM. This thesis achieved the goal by surveys and EVM data taken from three software programs found on a major Army software program. The surveys were done in an acceptable amount of time by the dedicated participants in programs A, B and C. The survey completion time was on average approximately 90 minutes. The time needed to take the survey ranged from 60 to 121 minutes approximately.

2. QMM Scores

All three programs A, B, and C, having QMM percentage scores in comparison to the individual overall program success scores reflected a strong correlation between them. However, the author felt that the program managers in answering the survey

questions needed to be told not to answer the survey on how they think a program should be managed but how their program is actually run. All but one of the three programs had an overall success score of seven, which corresponded to the QMM percentage score of 70 percent plus or minus 5 percent points, and indicated a strong correlation according to Martin J. Mackniak QMM standards defined in his thesis. QMM scores compared to the QMM Standard scores show a strong correlation. Two out of three survey participants recorded QMM percentage scores within 5 points of the mean success score for their respective programs. The only exception was program C where it fell below the QMM standard of 70 percent. However, this program was dealing with very immature critical technologies and constant change in requirements of which the program manager did not have control over such changes.

3. TPM DATA

The TPM data was taken for a ten month period using EVM which was reported monthly using the SPI and CPI data. The performance processes of the TPM/EVM should be measured, recorded, and scheduled on a regular basis for full effectiveness of the process. The TPM reports that are not reported or have been ignored can be considered proof that the TPM process is not being used and is a possible example of a non-valued added activity. However, if indicators for ignoring one particular TPM are justified then it should be closed out and no longer reported. The reportable SPI and the CPI of the TPM should go to the program manager and IPT keeping everyone fully up-dated. Three out of the three programs that participated recorded EVM percentage scores within the set standard. In the EVM the standard is set at a ratio of less than one which implies that work is underachieving against the plan, and above one implies better than planned, where 100 percent is equal to one. This is the acceptable standard set for large software programs within the U.S. Army.

4. TPM DATA DID NOT TRACK QMM DATA

The author notes that in the case of program C which had constant changes in their TPM/EVM technical requirements gave an inconclusive correlation between the QMM data and TPM/EVM data in section III.

B. RECOMMENDATIONS

The author feels that by using both the TPM (in the EVM format), and the QMM survey questionnaires as possible tools, software program management performance can be improved through complete evaluation of EVM data, and QMM survey questions data. The dichotomies found in the QMM questionnaire survey by participants in the same software program during the same time period need to be discussed. When the program manager notes a change in the EVM data where the TPM does not meet the goals set-up in the program, the QMM survey should be given and meetings will need to be called to discuss differences in survey questions, and change in TPM status.

1. Evaluation of the Survey Sections

As new changes present themselves to the software engineering field, new techniques, followed by different strategies become the norm. The need to re-evaluate the survey sections to reflect and refine the need for better software quality is a must. The Program Manager can read the survey questions having a view of the past and present performance of their software program, and then look for sections that score the lowest as possible areas for improvement.

There is a need to have an administrator for the survey to help with the explanation to various levels of program management, plus to help uncover any misperceptions and possible pre-bias that can exist in giving survey results.

Also, there is a need to focus on survey questionnaire development to reflect the continuous changes in software management and philosophy as an on-going process: a) Concept clarification with keeping current program condition as the object of each survey question; b) Survey question replacement to reflect new trends in quality software management; c) Giving upper program management the option to change the sectional point value of the questions in order to help determine software management quality; and d) Keeping the survey length and time to complete to a minimum.

2. Evaluation of TPM/EVM Sections

Using EVM/TPM as a performance management tool can ensure a project is provided the best possible cost and schedule impact with the potential to offer organizations significant benefits around monitoring and managing software programs. However, the difficult part is to ensure that the EVM approach focuses squarely on the right software projects and monitors them at the right level, because EVM solutions have failed in the past by becoming too complicated, and therefore cannot be maintained by the organization. Having experienced EVM and TPM personnel on staff would help to establish an understanding of what a successful EVM solution would look like in their dynamic environment. Also, by reviewing the core topics such as: a) determining the strategic priorities of the software project; b) ensuring that the EVM analysis focuses on the right aspects of the projects; c) designing and building the EVM solution that suits your project needs and provides the appropriate level of detail; d) reporting EVM finding in a way that everyone can understand them; e) building EVM right into the software program budgeting process.

3. TPM and QMM Metrics

In this thesis the author provided an informal verification, validation, and evaluation of only three software programs for the QMM and the TPM/EVM scores. All three of these programs fell under the Department of the Army. The author felt that due to the nature in which software programs are managed in this environment and not in the civilian work place many more software programs of various sizes and variety need to be considered before establishing a statistically sound correlation between QMM score to overall software program success and TPM using EVM data. The metric formulation in scoring will require possibly different coefficients, and should be based on the software program size, complexity and environment, whether commercial or government.

As tools for measurement improve and are developed and what is considered a quality software program is defined, improvements will continue to come forth whether as QMM or TPM. The author noted that the data between QMM and TPM/EVM, even

though it gave an inconclusive correlation in this thesis, may be developed further in the future as we search how to make a successful software program.

4. Metric Scoring of QMM and TPM/EVM

In this thesis informal verification and validation, provided evaluation for three software programs for a correlation between QMM and TPM/EVM of which all of the programs were Department of Defense systems. The author suggested a larger sample should be taken of software program managers and key team members, plus a greater variation of software programs need to be evaluated using QMM surveys and TPM/EVM data before a well defined correlation can be established between the QMM score and the TPM/EVM data with respect to overall success of a software program. The author noted that to establish a template to evaluate improvement in software management performance may involve repetition of a computational procedure. This replication of a cycle of operational procedure may result in an approximate desired outcome that is closer to the set goals. The formulation of coefficients for the QMM surveys and EVM/TPM data may need to vary according to top management's overall program goals, for example, taking size, use and complexity of the software being developed into consideration. Software Program Managers must customize their approach with respect to any use of available measurement software tools such as QMM surveys and TMP/EVM data, keeping project goals as flexible as possible for directional changes by top management.

C. FUTURE WORK

In this section the author would like to make it clear to the reader that he did not address the relationship between Earned Value (EV) and QMM. This, the author has left as possible future work as stated within the sections of this thesis.

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APPENDIX A

A. PROGRAM A – PROGRAM MANAGER

1. QMM Summary Score Sheet

QMM Scoresheet	Part One		Part Two		Total		Importance		Weighted
Category	Score		Score		Score		Coefficient		Score
Requirements Management	a	47	e	49	96	X	0.92	=	88.32
Est./Planning Management	b	39	f	59	98	X	0.67	=	65.66
People Management	c	45	g	46	91	X	1.86	=	169.26
Risk Management	d	55	h	46	101	X	0.55	=	55.55

QMM SCORE	378.79

Max. QMM score possible **528.00**
Min. QMM score possible **-130.86**

QMM percentage score: **77.35%**

Objective/Subjective view of the overall success of program A on a scale of 0 to 10 (0 being total failure, 10 being perfect program total success)
Survey Participant: Program Manager
Success Score: 8

2. Requirements Management Questionnaire Responses

No.	Requirements Management Questionnaire - Total: Block e	Yes	No	N/A	
1	PM chose to have a formal requirements list	X			
2	Requirements recorded in some way	X			
3	Written requirements were part of some formal document	X			
4	Written requirements were informal		X		
5	At least some requirements were oral only		X		
6	All stakeholders were identified		X		
7	All stakeholders participated in the requirements extraction	X			
8	Some stakeholders participated in the requirements extraction	X			
9	Management extracted requirements, no stakeholder involvement		X		
10	Management passed requirements to development team	X			
11	Stakeholders not involvved in Management extraction, but approved		X		
12	Management gets inputs from stakeholders, then develops requirements	X			
13	Developers work informally with users to arrive at requirements		X		
14	Same as 13, but management oversees and formalizes		X		
	If a waterfall or sequential development strategy:				
15	All requirements complete before design		X		
16	Some requirements left incomplete prior to design	X			
17	Requirements informal prior to design effort		X		
18	Requirements serve as input	X			
19	Length of time for requirements work greater than development work		X		
20	Requirements developed in parallel to design	X			
OR	***If a prototype, throwaway, or other development strategy:***				
15	Learn about requirements through development efforts				
16	No coding until all requirements are defined				
17	Requirements formal prior to design effort				
18	Requirements serve as output				
19	Requirements definition work in parallel to development efforts				
20	Requirements developed in parallel to design				
21	Are requirements frozen at some phase	X			
22	Change management exists	X			
23	Change management is formal	X			
24	Project strategy is consistent throughout development	X			
25	Requirements are updated	X			
26	Configuration Management (CM) exists	X			
27	CM is formal	X			
28	Requirements are testable	X			
29	Requirements testing considered/implemented during extraction	X			
30	Requirements testing plan exists	X			
31	Requirements testing is formal	X			
32	All requirements have priorities		X		
33	All requirements must be implemented	X			
34	Requirements are tested	X			
35	All requirements are equally important	X			
36	At least some requirements have priorities		X		
37	All requirements are traceable	X			
38	Traceability not important		X		
39	Each requirement has an author	X			
40	Who authored requirement is not important	X			
41	Initial set of requirements to be implemented, no requirements creep		X		
42	Structured and tracked changes to requirements only		X		
43	Change is inevitable, changes allowed at all times		X		
44	Change is inevitable, but changes limited	X			
45	Requirements control funding	X			
46	Requirements history kept	X			
47	Baseline established for requirements at some point prior to develop	X			Total
	TOTAL SCORING	31	16		49

3. Estimation/Planning Questionnaire Responses

No.	Estimation/Planning Questionnaire - Total: Block f	Yes	No	N/A	
1	A volume product metric used (LOC, # of files, # of screens, pages of doc)	X			
2	Measure used for various product elements (modules, components, CSCI)	X			
3	Product measures made by phase (amt at implementation, LOC changed at unit test)		X		
4	Other product attributes measured (FP, throughput, mem cap, cyclomatic complexity)	X			
5	Product matrics tracked and updated hroughout program execution	X			
6	Event count process metric used (# defects in test, reqmt changes, milestones met)		X		
7	Time measure process metric used (cycle time)		X		
8	Process metrics tracked and updated throughout program execution		X		
9	Program cost estimations made from product or process metrics	X			
10	Program cost extimations tracked and updated to reflect progress/changes	X			
11	Factor analysis performed on program		X		
12	Program's primary purpose, including major functions and deliverables known	X			
13	Work breakdown structure developed	X			
14	Task estimated with realistic expectations of productivity probabilities	X			
15	Schedules developed based on realistic expectations	X			
16	Schedules tracked and updated based on new information	X			
17	Detailed activity lists used for clearly defined completed/not completed tasks		X		
18	Quality assurance plan or similar to aid in detecting defects early in program	X			
19	COCOMO estimates performed	X			
20	CSCI clearly defined and tasked	X			
21	Estimates completed ad hoc		X		
22	Gantt charts used and updated	X			
23	Resource estimations (working hrs, job categories, task activities) done	X			
24	Earned value established	X			
25	Earned value tracked throughout program	X			
26	Quality expectations established for product with users and stakeholders	X			
27	Critical path for program tasks developed and tracked	X			
28	Measure of effectiveness (MOE) or Figure of merit established and tracked		X		
29	Estimates are updated routinely	X			
30	Schedules are updated routinely	X			
31	Estimations are made by program management (top-down)	X			
32	Estimateions are made by program team members (bottom-up)	X			
33	Automated program tracking used		X		
34	PM usually thorough in tracking and reporting schedules and financials	X			
35	WBS developed only as data call		X		
36	Earned value used to track program progress	X			
37	PM insists on prioritizing work reduction as schedule/funding compromised by stakeholders	X			
38	Estimations are done using both top down and bottoms up approaches	X			
39	All program team members involved in planning process	X			
40	Hardware also considered in estimaation process	X			
41	Program history compiled		X		
42	System upgrades (SCR) software changes requests estimated individually	X			
43	Management duties apart of each team member's responsibilities		X		
44	PM dictates schedules to program team		X		
45	Code reviews planned in schedule	X			
46	Defined tangible milestones established for program tasks	X			
47	Test planning done at the start of the program	X			
48	Estimations are completed by those performing the tasks	X			
49	Sensitivity analysis performed for program choices		X		
50	Software deployment planning completed	X			Total
	TOTAL SCORING	35	14		59

4. People Management Questionnaire Responses

No.	People Management Questionnaire - Total Block g	Yes	No	N/A	
1	PM is accessible in person by each team member		X		
2	PM is accessible via email (memo, letter) by each team member	X			
3	PM is accessible via phone by each team member	X			
4	PM not only considers a person's suitability, not also desire to be on a team	X			
5	PM consults with each team member regarding their career goals	X			
6	PM regularly holds meetings to inform team of program progress	X			
7	PM solicits opinions from team members before making decisions	X			
8	PM lets teams make decisions affecting their work		X		
9	PM freuently makes decisions without any consultation with members		X		
10	PM understands the technology/language of the program	X			
11	PM is able to communicate with other the technical issues in the program	X			
12	PM prioritized problems or conflicts within the program	X			
13	PM assists team members in developing/advising of career path				
14	PM empowers program members to recommend hiring new team members	X			
15	PM empowers program members to recommend firings of other members		X		
16	PM specifically assigns work to each program member		X		
17	PM sets communication protocol	X			
18	PM allows unrestricted communications	X			
19	PM encourages or requires training for each individual	X			
20	PM takes control in difficult/roblem areas	X			
21	PM looks ahead to new programs, new upgrades of existing program	X			
22	PM maintains regular communications with all stakeholders	X			
23	PM maintains regular communications with users		X		
24	PM encourages program team communication with users	X			
25	PM encourages program team communication with stakeholders	X			
26	PM facilitates horizontal communication within program	X			
27	PM facilitates communication during integration	X			
28	PM holds meetings without clear objectives		X		
29	PM must approve all decisions within the program		X		
30	PM must approve all interactions with stakeholders		X		
31	PM must approve all interactions with users		X		
32	PM makes all presentations to stakeholders/users		X		
33	PM is considered "flexible" in terms of program members personal issues	X			
34	PM, at least occasionally, schedules/promotes outside work team activities	X			
35	PM is readily willing to listen to program prblems and complaints	X			
36	PM takes action to resolve program problems and complaints	X			
37	PM is generally respected by stakeholders, users, and organization	X			
38	PM sometimes fails to grasp important technical issues in program			X	
39	PM recruits program team members from outside organization			X	
40	PM participates in technical reviews	X			
41	Program personnel have clearly defined specific tasks	X			
42	Although individual's tasks are specific, each exposed to the "bigger picture"	X			
43	PM has clearly defined his/her expectations for each individual	X			
44	PM delegation of duties is usually seemless in execution	X			
45	PM acts as facilitator to solving personnel conflicts	X			
46	PM attempts to motivate individuals on the program team	X			
47	PM clearly spearates technical from managerial roles for individuals		X		
48	PM directs how he/she expects the task to be accomplished		X		
49	PM directs what needs to be done, but does not direct how	X			
50	PM attempts to spotlight individuals in the program for positive exposure	X			Total
	TOTAL SCORING	34	13		46

5. Risk Management Questionnaire Responses

No.	Risk Management Questionnaire - Block h	Yes	No	N/A	
1	Risk Management (RM) is specifically an activity in the program		X		
2	RM is formal and documented		X		
3	A specific RM lan exists		X		
4	RM is required in the program, but not used during the program		X		
5	RM is done prior to the program execution		X		
6	RM is done by an outside entity to the development		X		
7	RM is done internally only	X			
8	RM is both internally performed and externally assessed		X		
9	RM planning occurs during or after major milestones in the program	X			
10	Risk Assessment is only a management function	X			
11	RM is informal or non existent		X		
12	There is a RM plan, but it is not updated or tracked		X		
13	Risks are only generalized	X			
14	Each risk is delineated		X		
15	Each risk has a consequence		X		
16	Each risk has a likelihood rating of some sort	X			
17	Each risk has a mitigation strategy		X		
18	Risk Management is automated		X		
19	Risks are tracked		X		
20			X		
21	Regret analysis performed		X		
22	RM drives decisions in the program		X		
23	Risks have probabilities	X			
24	Risk Management is ad hoc	X			
25	RM information is shared with all stakeholders (as appropriate)	X			
26	Risks are weighed relative to other program risks	X			
27	Risk Assessment is a program team activity		X		
28	Risk Assessment done prior to program start		X		
29	Risk Assessment includes personnal risk	X			
30	RM uses tools, but depends on human decisions	X			
31	Risk assessment includes cost risks	X			
32	Risk Assessment includes schedule risks	X			
33	Risk Assessment includes technology risks	X			
34	Risk Assessment is briefed organization structure above program manager		X		
35	Risk Assessment includes requirements risks	X			
36	Risk Assessment includes user risks (too little involvement of user)	X			
37	Risk Assessment includes documentation risks	X			
38	Risk Assessment includes integration risks	X			
39	Risk Assessment includes interface risks (non-standard)	X			
40	Risk Assessment includes continuing requirements change (feature creep)	X			
41	Risk Assessment includes dependent projects/programs risks	X			
42	Documentation proof exists to demonstrate following risk management plan	X			
43	High rish have measured tracking (high profile status)	X			
44	Organizational history used to search for risks	X			
45	Other organizational checklists used for risk assessment		X		
46	Internal organizational checklists used for risk assessment	X			
47	Risk Assessment information contributed to internal or other database		X		
48	Risk Assessment includes internal organization risks	X			
49	Risk Assessment includes stakeholder risks	X			
50	No risk management needed; program is straightforward & understood		X		Total
	TOTAL SCORING	27	23		46

6. Pair Choices Responses

Pair choice section ONE: (Requirements Management) choose most applicable term of the two for each row (page 1 of 2):

formal requirement list	X	informal requirement list	
written requirements	X	oral requirements	
requirements informal, but recorded		requirements not recorded	X
requirements as part of an SRS (or other formal repository)		requirements informally recorded	X
requirements taken as is from customer		look to reformulate, interview in-depth, or otherwise re-validate	X
only one development strategy used		strategies not consistent, used at different times	X
stakeholders as part of requirements development		stakeholders approving requirements after formulated by development team	X
requirements are testable		requirements have no test plans	X
informal test plan or no test plan		formal test plan	X
test team involved with requirements	X	no test team input or plans during requirements development	
only a percentage of requirements present in baseline		baseline must contain all requirements	X
requirements documentation has hierarchical structure		all requirements must be implemented	X
requirements have listed responsible party	X	requirements origin not important	
requirements documentation have versions	X	no requirements history	
requirements have specific attribute values	X	requirements all rank evenly	
funding controls requirements definition		requirements definition controls funding	X
reqquirements are top down	X	requirements are bottom up	
users/stakeholders are identified and interviewed (market survey)		no special consideration to identify users/stakeholders	X
each requirement has a singular concept		some requirements are compound statements	X
requirements definition minimized when funding short		program scope may reduce, but requirements definition completed	X
requirements extraction has formal process	X	requirements extraction ad hoc	
change procedures formal	X	change procedures ad hoc	
users/stakeholders somehow involved in requirements definition	X	program team only involved in requirement definition	
management sets requirements for developers		developers at least partially involved in setting requirements	X
requirements changed at least once since baseline established prior to new version	X	requirements in baseline has not changed prior to new version or upgrade	
no ranking of requirements		requirements have priorities assigned	X
use-case diagrams (or other models or scenario developments)	X	no models used for requirements extraction	
requirements changes informal		requirements changes formal	X
plan to "freeze" requirements at some designated milestone	X	no provision for "freezing" requirements	
requirements must be traceable	X	origin of requirements not important	
requirements must be testable	X	system developed must be testable	
test plans to determine requirements implemented	X	no test plans needed for requirements verification	
requirements have priorities in implementation		all requirements must be implemented	X
some requirements have multiple statements or ideas	X	one idea, one statement per requirement	

Requirements Management (page 1 of 2) score **35**

Pair choice section ONE: (Requirements Management) choose most applicable term of the two for each row (page 2 of 2):

ANSWER THIS BLOCK OF QUESTIONS ONLY IF A SEQUENTIAL OR WATERFALL APPROACH IS USED FOR DEVELOPMENT (Requirements page 2 of 2)			
requirements first, then initial development work		initial development work then requirements	X
requirements documentation driving development		requirements documentation developed in parallel/after development	X
user feedback considered during development		after development starts, user feedback serves as input to new work	X
change management procedures used strictly	X	change management procedures as guidance only	
design decisions prior to or in parallel to requirrements development	X	design decisions only after approved requirements stabilized	
requirements summarized wht we have developed		requirements are the blueprint for development	X
length of time for requirements work greater than development work	X	length of time for requirements work less than development work	X
requirements have design detail		no design detail in requirements	X
requirements creep to be avoided		requirements creep o.k., but need to be controlled	X
freeze requirements at some point		requirements are fluid throughout development	
formal change procedure	X	informal change procedure	
change management plan	X	no change management plan	
requirements ambiguity always present to some extent	X	requirements ambuiguity unacceptable at any level	
testing considered up frornt during requirements determination		testing considered down the line during development	X
requirements development team members different from implementation		those working on requirements, work on implementation	X
start implementation as early as possible to help define requirements		requirements must be defined prior to any implementation work	X
ANSWER THIS BLOCK OF QUESTIONS ONLY IF A PROTOTYPING, THROWAWAY, SYNCHRONIZE & STABILIZE, OR OTHER STRATEGY USED			
develop prototype, then determine requirements		determine requirements prior to any development work	
requirements testing done after each iteration		no testing	
individual changes as necessary		only block changes made	
development team decides on changes after iteration		users involved with changes	
changes based on feedback only from user for correction of problems		changes to upgrade system and correct problems	
funding controls changes and change procedures		changes control funding	
requirements documentation finalized prior to development		requirements fluid throughout development (only freeze at end)	
requirements test plans completed prior to development		requirements test plans completed after development	
requirements first, then initial development work		initial development work then requirements	
use development effort to learn more about requirements		define all requirements prior to coding anything	
requirements ambiguity always present to some extent		requirements ambiguity unacceptable at any level	
requirements have design detail		no design detail in requirements	
user feedback considered during development		after development starts, user feedback serves as input to new work	
get something to users as soon as possible for evaluation		make sure it is complete before releasing	
management dictates requirements		development team visually represent requirements through rapid prototyping	
new requirements allowed after initial requirements defined		new requirements not allowed	

Requirements Management (pg 2 of 2) score [12] +pg 1 score [35] = TOTAL SCORE [47] Enter on QMM scoresheet blk a.

Pair choice section TWO: (Estimation/Planning Management) choose most applicable term of the two for each row (page 1 of 2):

at least one estimation method used in program	X	no estimates	
formal derivation of product metric for estimation of size	X	ad hoc size estimation	
ad hoc process evaluation		formal derivation of at lest one process metric	X
develop work breakdown structure (WBS)	X	assign work as needs arise	
estimates are developed to fulfill a data call only		use estimates to plan program	X
use estimates to sell program only		estimates are useful to the project tema for planning purposes	X
resource evaluations made for program		no resource evaluation for planning	
use both bottom up & top down for estimate, use one stakeholders like	X	use both bottom up & top down and evaluate significant differences	
estimates made and not updated	X	estimates updated throughout program	
resources estimations used to adjust product size estimate	X	estimations made irregardless of resources available	
estimations made to fit budget		budget made from estimations	X
estimations compromised to get program		rather risk loss of program than compromise confident estimations	X
cycle time estimations		no cycle time estimations	X
event count estimations		no event count estimations	X
lines of code (LOC) estimation	X	no LOC estimation	
function pont (FP) estimation	X	no FP estimation	
estimates by algorithmic methods		estimates by analogy	X
expert judgement for estimates	X	ad hoc estimates	
estimates by algorithmic methods	X	ad hoc estimates	
expert judgement for estimates	X	estimates by analogy	
ad hoc estimates		estimates by analogy	X
bottom up estimates	X	expert judgement	
top down estimates	X	expert judgement	
ad hoc estimates		any other estimate process	X
fuzzy logic estimating method	X	no formal estimation methodology	
WBS development from estimates	X	WBS development in parallel or prior to estimation completion	
critical path of program determined		tasks developed but no path is identified	X
estimators are program team members	X	estimators are outside program team	
management only on estimations		all team members involved in estimation process	X
estimates updated at reviews		no updates of estimates	X
estimates updated at reviews	X	estimates constantly updates (in between reviews, to)	
estimate procedures stay the same	X	estimate procedures change	
stakeholders are part of estimation process		stakeholders brief estimations after completion	X
estimates are used beyond initial selling of program	X	estimates are one time events, used for a specific purpose once	
WBS has objective measure of completeness		important to have WBS as guide, not rigid implementation	X

Estimation/Planning Management (page 1 of 2) score **25**

Pair choice section TWO: (Estimation/Planning Management) choose most applicable term of the two for each row (page 2 of 2):

life cycle estimates		estimates for program initiation only	X
system upgrades (SCR) software change requests estimated individually	X	systems upgrades estimated as whole	
estimates for on-gong resources needed to maintain s/w		estimates for maintenance not done	X
informal re-estimates during development	X	formal re-estimates at pre-defined milestones	
formal re-estimates when amendment changing the system is introduced	X	informal re-estimates when amendment changing the system	
person in-charge of estimation walks in a managers office to get an opinion	X	meeting(s) organized for purpose of performing cost estimations	
factor analysis prior to commencement of program		none done	X
change control procedures set in place	X	no set procedures	
elapsed time and actual work time estimates		one or the other or neither	X
no schedule created	X	scheudle created	
schedule not updated	X	schedule updated	
schedule followed	X	schedule not followed	
tasks identification arises as program progresses	X	detailed level tasks identified prior to program initiation	
scope of program understood by all		scope not explicitly defined	X
quality factors and criteria identified	X	no explicit quality factors defined	
no project tracking tools used		project tracking tools used	X
CSCIs identified and tasked	X	CSCIs not explicitly identified	
expectations are managed via estimations	X	estimations are made to fit preconceived expectations	
no cost schedule developed		cost schedule developed	
no resource schedule developed	X	resource schedule developed	
team members, management know at any time if in budget & schedule		exact budget & schedule status somewhat unclear to at least some	X
individual program phases are estimated	X	only top level program estimated	
stakeholders/users emphasis understood-quick to field or all complete		program management sets delivery tradeoffs without outside input	
testing planned with initial program planning	X	testing not in initial planning	
documentation not considered ininitial planning	X	documentation part of initial planning	
hardware considered in estimations	X	software only considered	
no formal schedule/cost tracking	X	formal procedures established for tracking cost and schedule	
earned value set up	X	earned value not used	
estimations omit documentation planning	X	documentation in estimates	
training omitted in estimates	X	training part of estimates	
earned value set up, but not tracked		earned value tracked	X
detailed planning done with incomplete set of requirements	X	detailed planning done with detailed set of requirements	
complete infrastructure support mechanism understood for estimations		no consideration of infrastructure done for estimations	X
team possibilities considered for planning of program	X	no consideration for outside teaming possibilities	
work breakdown structure (WBS) set up		no WBS completed	X

Estimation/Planning Management (pg 2 of 2) score [14] +pg 1 score [25] = TOTAL SCORE [39] Enter on QMM scoresheet blk b.

Pair choice section THREE: (People Management) choose most applicable term of the two for each row (page 1 of 2):

Human Resources

program team members have clearly deined, segmented roles	X	work responsibilities are shared	
formal team building procedures are used		no formal team building emphasized	X
program manager flexible regarding work hours	X	program manager maintains strict standards for work hours	
big picture conveyed to all team members by program management	X	program management focuses on the partitioned tasks with team	
people issues dealt with primarily through indirect methods (email, memo, etc)		people issues dealt with primarily through direct methods (face-to-face)	X
training is required and planned on a regular basis		training is ad hoc	X
each team member is educated on and understands overall program and their roles		team members only know their respective areas	X
consideration for team members' career goals are reflected in assignments	X	team members must adapt to tasks that are assigned	
team members assignments and responsibilities are mostly dictated by PM		assignments and responsibilities are discussed and agreed upon with PM	X
management leads in problem solving		management facilitates and lets team lead in problem solving	X
management welcomes problems as challenges and opportunities	X	management views problems as obstacles and grounds for punishment	
team members participate in performance evaluations of peers		Personnel evaluations are strictly PM responsibility	X
management reinforcement feedback sparse and inconsistent, if any	X	management provides timely reinforcement feedback for positive behaviors	
management provides basic needs of office facilities fairly well	X	office facilities are a drawback to working in the program	
working conditions are fairly comfortable, time off policy fairly good	X	working conditions and time off policy is inconsistent and difficult at times	

Communication:

communications primarily written (email)		communications primarily verbal (face-to-face)	X
detailed instructions: oral presentation, follow-up email	X	email only	
formal communication protocol		informal communications	X
external vertical communications restricted	X	external vertical communication allowed	
coders notebook weekly accomplishment reports required	X	not required	
user-coder relationship established, encouraged, and mediated		user-coder interaction minimized	X
meetings structured to minimize waster time	X	meetings unstructured and open ended	
meetings have agenda, objectives, and conclude with action items	X	meeting agenda fluid and open ended	
program management and coder communication face to face	X	program management and coder communication primarily email	
program team updated regularly regarding organizational & program status		meetings infrequently scheduled	X
open communications is encouraged	X	communication hrough chain of command only is encouraged	
program manager accessible for discussions	X	program manager difficult to get an appointment to see	
program management (PM) is viewed as separate from team		PM mixes with team frequently	X
management regularly holds team meetings	X	meetings are sporadic	
meetings are structured with definite goals and objectives	X	meetings are informal	
program management is generally easy to reach and talk to	X	PM is usually hard to get a hold of and difficult to talk to	
team-program manager relationship adult-adult	X	team-program management relationship parent-child	
schedules are spontaneous and poorly communicated		schedules must be fixed and rigidly followed and formally reported	X
work is seen as complex processes involving team working together	X	work broken into pieces with minimal team member interaction	
action items often is poorly disseminated and usually not followed through		action items communicated and followed through thoroughly	X
team members require frequent clarifications by PM for assigned tasks		team members rarly require clarifications by PM for assigned tasks	X

Pair choice section THREE: (People Management) choose most applicable term of the two for each row (page 2 of 2):

Leadership:

long range organizational vision		short tem program and immediate w ork focus	X
lead through personal attention to others		action-oriented leadership approach	X
run as much of the organization as possible		let team make decisions as much as possible	X
direct and domineering style	X	encourage independence in others	
traditional leaders respect hierarchy		do w hat needs to be done	X
w in cooperation rather than demand it	X	tough-minded w ith others	
act strongly and forcefully in the field of ideas	X	prefer to lead other independent types while seeking autonomy for self	
consults w ith team members to find solutions to problems	X	consults team members to get validation of PM's predetermined solutions	
keep people w ell informed	X	only as much know ledge as necessary for their w ork	
make things happen by focusing on the immediate problems	X	long range focus and de-emphasize current problems	
manage others loosely and prefer minimal supervision		follow traditional procedures and rules conscientiously	X
leadership, management decisions exclusively by program management		program management makes decisions but gets inputs from team	X
team-program manager relationship adult-adult	X	team-program management relationship parent-child	
program management makes decisions but gets inputs from team	X	all program team members responsible for program decisions	
w hen a problem arises: management takes over to solve it	X	management lets the team solve the problems	
leadership is do as I say, not do as I do	X	leadership by example	
program expectation not influenced by PM		program expectation managed by PM	X
PM gives freedom to team, but has no mentoring for members (abdication)	X	PM empow ers teams by mentoring members to be leaders	
promgram management w aits and sees w hat happens then plans		management plans far in advance	X
program management is constantly reacting to emergencies	X	management is one step ahead of problems	
facilitative approach to solving problems		take charge readily and often	X
program management is complex, takes much time to understand	X	management is simple, easy to figure out	
program management prefers to plunge right in	X	takes time to separate things to be done and order of doing them	
program management reacts spur of the moment	X	methodically follow s plans	

Technical Competency of the Program Manager:

PM has technical experience particular to the particular s/w program	X	PM relies on team members solely	
PM participates in technical review s	X	PM only in non-technical review s	
PM participates in making technical decisions w hen problems arise	X	PM delegates technical questions	
PM does not get involved discussing technical options		PM contributes to technical options being discussed	X
PM does not review technical options and decisions		PM review s technical options and decisions	X
PM actively attempts to keep up-to-date with current technology and standards		PM is removed from cutting edge technology issues	X
PM receives technical periodicals and occasionally references applicable articles	X	PM doesn't read periodicals nor reference current articles to team	
PM doesn't have technical background (or education)		PM has technical background (or education)	X
team members avoid PM w hen they need technical advice		team members generally consider talking to PM regarding technical issues	X

HR [9] + Comm. [17] + Leadership [11] + Tech. Competency [8] = People Mgmt. score [45] Enter on QMM scoresheet blk c.

Pair choice section FOUR: (Risk Management(RM)) choose most applicable term of the two for each row (page 1 of 2):

RM is formal and documented	X	RM is informal, if at all	
a risk management plan exists	X	no risk management plan is developed	
RM is more of a data call than a useful document		RM drives decisions on the program	X
RM is done prior to the program beginning		RM is done prior and during program execution	X
RM is only done during the program execution		RM is done prior and during program execution	X
risks are generalized through the whole program		risks are categorized	X
risk management is done internally, only		an outside organization also contributes to the RM process	X
risk is a management function		risk is a program team function	X
risks are precisely articulated		risks are generalized, if at all	
each risk has a consequence	X	consequences are generalized, if at all	
a mitigation strategy is completed for each risk	X	mitigation strategy is generalized, if at all	
contingency plans are developed for a RM plan	X	contingency plans are ad hoc as problems arise in the program	
risks are anticipated		if problems arise, management will deal with it	X
the program doesn't have any risk		programs that do not have risk, have problems	X
risk management is automated		risk management may use tools, but depend on human input	X
risks are assigned probabilities		probabilities are not relevant for RM	X
all risks are potential problems, relative priorities for risks are not useful		risks are weighed relative to other program risks and thus prioritized	X
risk management information is only shared internally		risk management information is shared with all stakeholders	X
risk analysis uses ordinal rankings		risk analysis uses actual measurements with a mathematical model	X
regret analysis used	X	no regret analysis done	
attach probabilities to future events	X	no probabilities associated with future events	
assessing risks with mechanical meethods		risks should be compared to other risks and sorted	X
risk status tracked	X	not tracked	
technical risks examined	X	no technical risks examined	
process risks examined	X	no process risks examined	
product risks examined	X	no product risks examined	
stakeholder/user risks examined	X	no examination of stakeholder/user risks	
checklists used to identify risks		no checklists used	X
risks are tracked		no tracking or monitoring of risks	X
each risk has an impact	X	no impact analysis of risk	
each risk has a mitigation plan	X	no individual risk mitigation	
risks monitored by priority	X	no special attention to track higher priority risks	X
risk assessment is formalized	X	no formal risk assessment	
risk control is formalized	X	no formal risk control	
integration risks not considered		integration risks examined	X

Risk Management (page 1 of 2) score **30**

Pair choice section FOUR: (Risk Management(RM)) choose most applicable term of the two for each row (page 2 of 2):

risks to cost	X	no cost risks examined	
unforeseen risks have occurred in program	X	any risk that came up had been identified previously	
personnel risks examined	X	no personnel risks examined	
estimation risks examined	X	no estimation risks examined	
planning risks examined	X	no planning risks examined	
requirements risks examined	X	no requirements risks examined	
resource risks examined	X	no resource risks examined	
risk management plan updated regularly	X	no regular risk management plan updates	
risks charted	X	risks not charted	
performance risks examined	X	performance risks not examined	
program management self risks examined	X	no program management risks examined	
risk from program constraints examined	X	no program constraint risks examined	
each category of risks are prioritized	X	no prioritization	
each category of risks are evaluated for impact	X	no impact analysis performed	
each category of risks have control strategy	X	no control strategy	
documentation risks examined	X	no documentation risks examined	
regret matrix tracked		no regret matrix or not tracked	X
communication of risk activities are facilitated	X	no facilitation or promotion of communication of risk activities	X
taxonomy-based questionnaire used to identify risks		taxonomy-based questionnaire not used	X
associated hardware risks examined	X	no consideration for hardware risks	
integration risks examined	X	integration risks not examined	
communication risks examined	X	communication risks not examined	
leadership risks examined	X	leadership risks not considered	
risk avoidance considered for certain risks	X	risk avoidance not considered for risks	
risk documentation forms used		no risk documentation forms used	X
dependency risks examined	X	no dependency risks examined	
alternatives like risk avoidance considered for high risk items	X	no consideration of risk avoidance	
documented risk statements use a condition-consequence type format		condition-consequence of risk statements not clearly defined	X
no assignment of ownership of risk mitigation action	X	each risk mitigation action is assigned to an individual for resolution	
calculation of risk exposure made (probability X loss, for each risk)		no risk exposure calculations	X
oral communication of risks only	X	risks written in a way that communicates nature and status of factors	
triggers used to quantify risk conditions present	X	risk conditions present are all subjective	X
risk "czar" in program for monitoring risks		no special positions/responsibilities for risk monitoring	X
post-program review completed (scheduled) for unanticipated problems ID		no post-program reviews completed or scheduled	X
no schedule risks examined		risks to schedule investigated	X

Risk Management (pg 2 of 2) score [25] +pg 1 score [30] = TOTAL SCORE [55] Enter on QMM scoresheet blk d.

B. PROGRAM A – ASSOCIATE

1. QMM Summary Score Sheet

QMM Scoresheet Category	Part One	Score	Part Two	Score	Total Score		Importance Coefficient		Weighted Score
Requirements Management	a	44	e	51	95	X	0.92	=	87.4
Est./Planning Management	b	52	f	47	99	X	0.67	=	66.33
People Management	c	54	g	45	99	X	1.86	=	184.14
Risk Management	d	55	h	43	98	X	0.55	=	53.9

QMM SCORE	391.77

Max. QMM score possible **528.00**
Min. QMM score possible **-130.86**

QMM percentage score: **79.32%**

Objective/Subjective view of the overall success of program A on a scale of 0 to 10
(0 being total failure, 10 being perfect program total success)
Survey Participant: Associate
Success Score: 8

2. Requirements Management Questionnaire Responses

No.	Requirements Management Questionnaire - Total: Block e	Yes	No	N/A	
1	PM chose to have a formal requirements list	X			
2	Requirements recorded in some way		X		
3	Written requirements were part of some formal document	X			
4	Written requirements were informal	X			
5	At least some requirements were oral only		X		
6	All stakeholders were identified	X			
7	All stakeholders participated in the requirements extraction	X			
8	Some stakeholders participated in the requirements extraction	X			
9	Management extracted requirements, no stakeholder involvement		X		
10	Management passed requirements to development team	X			
11	Stakeholders not involvved in Management extraction, but approved				
12	Management gets inputs from stakeholders, then develops requirements	X			
13	Developers work informally with users to arrive at requirements	X			
14	Same as 13, but management oversees and formalizes	X			
	If a waterfall or sequential development strategy:				
15	All requirements complete before design		X		
16	Some requirements left incomplete prior to design		X		
17	Requirements informal prior to design effort		X		
18	Requirements serve as input	X			
19	Length of time for requirements work greater than development work	X			
20	Requirements developed in parallel to design		X		
OR	***If a prototype, throwaway, or other development strategy:***				
15	Learn about requirements through development efforts	X			
16	No coding until all requirements are defined				
17	Requirements formal prior to design effort				
18	Requirements serve as output				
19	Requirements definition work in parallel to development efforts	X			
20	Requirements developed in parallel to design	X			
21	Are requirements frozen at some phase	X			
22	Change management exists	X			
23	Change management is formal	X			
24	Project strategy is consistent throughout development	X			
25	Requirements are updated	X			
26	Configuration Management (CM) exists	X			
27	CM is formal	X			
28	Requirements are testable	X			
29	Requirements testing considered/implemented during extraction	X			
30	Requirements testing plan exists	X			
31	Requirements testing is formal	X			
32	All requirements have priorities	X			
33	All requirements must be implemented	X			
34	Requirements are tested	X			
35	All requirements are equally important		X		
36	At least some requirements have priorities	X			
37	All requirements are traceable	X			
38	Traceability not important		X		
39	Each requirement has an author	X			
40	Who authored requirement is not important	X			
41	Initial set of requirements to be implemented, no requirements creep	X			
42	Structured and tracked changes to requirements only		X		
43	Change is inevitable, changes allowed at all times		X		
44	Change is inevitable, but changes limited	X			
45	Requirements control funding		X		
46	Requirements history kept	X			
47	Baseline established for requirements at some point prior to develop	X			Total
	TOTAL SCORING	49	2		51

3. Estimation/Planning Questionnaire Responses

No.	Estimation/Planning Questionnaire - Total: Block f	Yes	No	N/A	
1	A volume product metric used (LOC, # of files, # of screens, pages of doc)	X			
2	Measure used for various product elements (modules, components, CSCI)	X			
3	Product measures made by phase (amt at implementation, LOC changed at unit test)		X		
4	Other product attributes measured (FP, throughput, mem cap, cyclomatic complexity)	X			
5	Product matrics tracked and updated throughout program execution	X			
6	Event count process metric used (# defects in test, reqmt changes, milestones met)	X			
7	Time measure process metric used (cycle time)		X		
8	Process metrics tracked and updated throughout program execution	X			
9	Program cost estimations made from product or process metrics	X			
10	Program cost extimations tracked and updated to reflect progress/changes	X			
11	Factor analysis performed on program		X		
12	Program's primary purpose, including major functions and deliverables known	X			
13	Work breakdown structure developed	X			
14	Task estimated with realistic expectations of productivity probabilities		X		
15	Schedules developed based on realistic expectations	X			
16	Schedules tracked and updated based on new information	X			
17	Detailed activity lists used for clearly defined completed/not completed tasks		X		
18	Quality assurance plan or similar to aid in detecting defects early in program	X			
19	COCOMO estimates performed	X			
20	CSCI clearly defined and tasked	X			
21	Estimates completed ad hoc		X		
22	Gantt charts used and updated	X			
23	Resource estimations (working hrs, job categories, task activities) done	X			
24	Earned value established	X			
25	Earned value tracked throughout program	X			
26	Quality expectations established for product with users and stakeholders	X			
27	Critical path for program tasks developed and tracked	X			
28	Measure of effectiveness (MOE) or Figure of merit established and tracked	X			
29	Estimates are updated routinely	X			
30	Schedules are updated routinely	X			
31	Estimations are made by program management (top-down)	X			
32	Estimateions are made by program team members (bottom-up)	X			
33	Automated program tracking used	X			
34	PM usually thorough in tracking and reporting schedules and financials	X			
35	WBS developed only as data call		X		
36	Earned value used to track program progress	X			
37	PM insists on prioritizing work reduction as schedule/funding compromised by stakeholders	X			
38	Estimations are done using both top down and bottoms up approaches	X			
39	All program team members involved in planning process	X			
40	Hardware also considered in estimaation process	X			
41	Program history compiled	X			
42	System upgrades (SCR) software changes requests estimated individually	X			
43	Management duties apart of each team member's responsibilities		X		
44	PM dictates schedules to program team		X		
45	Code reviews planned in schedule	X			
46	Defined tangible milestones established for program tasks	X			
47	Test planning done at the start of the program		X		
48	Estimations are completed by those performing the tasks	X			
49	Sensitivity analysis performed for program choices		X		
50	Software deployment planning completed	X			Total
	TOTAL SCORING	50	-3		47

4. People Management Questionnaire Responses

No.	People Management Questionnaire - Total: Block g	Yes	No	N/A	
1	PM is accessible in person by each team member		X		
2	PM is accessible via email (memo, letter) by each team member	X			
3	PM is accessible via phone by each team member	X			
4	PM not only considers a person's suitability, not also desire to be on a team	X			
5	PM consults with each team member regarding their career goals		X		
6	PM regularly holds meetings to inform team of program progress	X			
7	PM solicits opinions from team members before making decisions	X			
8	PM lets teams make decisions affecting their work	X			
9	PM freuently makes decisions without any consultation with members		X		
10	PM understands the technology/language of the program	X			
11	PM is able to communicate with other the technical issues in the program	X			
12	PM prioritized problems or conflicts within the program	X			
13	PM assists team members in developing/advising of career path	X			
14	PM empowers program members to recommend hiring new team members	X			
15	PM empowers program members to recommend firings of other members	X			
16	PM specifically assigns work to each program member		X		
17	PM sets communication protocol	X			
18	PM allows unrestricted communications		X		
19	PM encourages or requires training for each individual	X			
20	PM takes control in difficult/roblem areas	X			
21	PM looks ahead to new programs, new upgrades of existing program	X			
22	PM maintains regular communications with all stakeholders	X			
23	PM maintains regular communications with users	X			
24	PM encourages program team communication with users	X			
25	PM encourages program team communication with stakeholders	X			
26	PM facilitates horizontal communication within program	X			
27	PM facilitates communication during integration	X			
28	PM holds meetings without clear objectives		X		
29	PM must approve all decisions within the program		X		
30	PM must approve all interactions with stakeholders		X		
31	PM must approve all interactions with users		X		
32	PM makes all presentations to stakeholders/users	X			
33	PM is considered "flexible" in terms of program members personal issues		X		
34	PM, at least occasionally, schedules/promotes outside work team activities	X			
35	PM is readily willing to listen to program prblems and complaints	X			
36	PM takes action to resolve program problems and complaints	X			
37	PM is generally respected by stakeholders, users, and organization	X			
38	PM sometimes fails to grasp important technical issues in program	X			
39	PM recruits program team members from outside organization	X			
40	PM participates in technical reviews	X			
41	Program personnel have clearly defined specific tasks	X			
42	Although individual's tasks are specific, each exposed to the "bigger picture"	X			
43	PM has clearly defined his/her expectations for each individual	X			
44	PM delegation of duties is usually seemless in execution		X		
45	PM acts as facilitator to solving personnel conflicts		X		
46	PM attempts to motivate individuals on the program team	X			
47	PM clearly spearates technical from managerial roles for individuals	X			
48	PM directs how he/she expects the task to be accomplished		X		
49	PM directs what needs to be done, but does not direct how	X			
50	PM attempts to spotlight individuals in the program for positive exposure	X			Total
	TOTAL SCORING	39	6		45

5. Risk Management Questionnaire Responses

No.	Risk Management Questionnaire - Total: Block h	Yes	No	N/A	
1	Risk Management (RM) is specifically an activity in the program	X			
2	RM is formal and documented	X			
3	A specific RM lan exists		X		
4	RM is required in the program, but not used during the program		X		
5	RM is done prior to the program execution	X			
6	RM is done by an outside entity to the development		X		
7	RM is done internally only		X		
8	RM is both internally performed and externally assessed		X		
9	RM planning occurs during or after major milestones in the program	X			
10	Risk Assessment is only a management function		X		
11	RM is informal or non existent		X		
12	There is a RM plan, but it is not updated or tracked		X		
13	Risks are only generalized		X		
14	Each risk is delineated		X		
15	Each risk has a consequence	X			
16	Each risk has a likelihood rating of some sort	X			
17	Each risk has a mitigation strategy		X		
18	Risk Management is automated	X			
19	Risks are tracked	X			
20					
21	Regret analysis performed	X			
22	RM drives decisions in the program	X			
23	Risks have probabilities	X			
24	Risk Management is ad hoc		X		
25	RM information is shared with all stakeholders (as appropriate)	X			
26	Risks are weighed relative to other program risks	X			
27	Risk Assessment is a program team activity	X			
28	Risk Assessment done prior to program start	X			
29	Risk Assessment includes personnal risk	X			
30	RM uses tools, but depends on human decisions	X			
31	Risk assessment includes cost risks	X			
32	Risk Assessment includes schedule risks	X			
33	Risk Assessment includes technology risks	X			
34	Risk Assessment is briefed organization structure above program manager	X			
35	Risk Assessment includes requirements risks	X			
36	Risk Assessment includes user risks (too little involvement of user)		X		
37	Risk Assessment includes documentation risks	X			
38	Risk Assessment includes integration risks	X			
39	Risk Assessment includes interface risks (non-standard)	X			
40	Risk Assessment includes continuing requirements change (feature creep)	X			
41	Risk Assessment includes dependent projects/programs risks	X			
42	Documentation proof exists to demonstrate following risk management plan		X		
43	High rish have measured tracking (high profile status)	X			
44	Organizational history used to search for risks		X		
45	Other organizational checklists used for risk assessment		X		
46	Internal organizational checklists used for risk assessment	X			
47	Risk Assessment information contributed to internal or other database		X		
48	Risk Assessment includes internal organization risks	X			
49	Risk Assessment includes stakeholder risks	X			
50	No risk management needed; program is straightforward & understood		X		Total
	TOTAL SCORING	43	0		43

6. Pair Choices Responses

Pair choice section ONE: (Requirements Management) choose most applicable term of the two for each row (page 1 of 2):

formal requirement list	X	informal requirement list	
written requirements	X	oral requirements	
requirements informal, but recorded	X	requirements not recorded	
requirements as part of an SRS (or other formal repository)	X	requirements informally recorded	
requirements taken as is from customer	X	look to reformulate, interview in-depth, or otherwise re-validate	
only one development strategy used		strategies not consistent, used at different times	X
stakeholders as part of requirements development		stakeholders approving requirements after formulated by development team	X
requirements are testable	X	requirements have no test plans	
informal test plan or no test plan		formal test plan	X
test team involved with requirements	X	no test team input or plans during requirements development	
only a percentage of requirements present in baseline		baseline must contain all requirements	X
requirements documentation has hierarchical structure		all requirements must be implemented	X
requirements have listed responsible party		requirements origin not important	X
requirements documentation have versions	X	no requirements history	
requirements have specific attribute values		requirements all rank evenly	X
funding controls requirements definition	X	requirements definition controls funding	
reqquirements are top down	X	requirements are bottom up	
users/stakeholders are identified and interviewed (market survey)	X	no special consideration to identify users/stakeholders	
each requirement has a singular concept		some requirements are compound statements	X
requirements definition minimized when funding short		program scope may reduce, but requirements definition completed	X
requirements extraction has formal process	X	requirements extraction ad hoc	
change procedures formal	X	change procedures ad hoc	
users/stakeholders somehow involved in requirements definition	X	program team only involved in requirement definition	
management sets requirements for developers		developers at least partially involved in setting requirements	X
requirements changed at least once since baseline established prior to new version	X	requirements in baseline has not changed prior to new version or upgrade	
no ranking of requirements	X	requirements have priorities assigned	
use-case diagrams (or other models or scenario developments)		no models used for requirements extraction	X
requirements changes informal		requirements changes formal	X
plan to "freeze" requirements at some designated milestone	X	no provision for "freezing" requirements	
requirements must be traceable	X	origin of requirements not important	
requirements must be testable	X	system developed must be testable	
test plans to determine requirements implemented	X	no test plans needed for requirements verification	
requirements have priorities in implementation		all requirements must be implemented	X
some requirements have multiple statements or ideas	X	one idea, one statement per requirement	

Requirements Management (page 1 of 2) score **31**

Pair choice section ONE: (Requirements Management) choose most applicable term of the two for each row (page 2 of 2):

ANSWER THIS BLOCK OF QUESTIONS ONLY IF A SEQUENTIAL OR WATERFALL APPROACH IS USED FOR DEVELOPMENT (Requirements page 2 of 2)			
requirements first, then initial development work		initial development work then requirements	
requirements documentation driving development		requirements documentation developed in parallel/after development	
user feedback considered during development		after development starts, user feedback serves as input to new work	
change management procedures used strictly		change management procedures as guidance only	
design decisions prior to or in parallel to requirrements development		design decisions only after approved requirements stabilized	
requirements summarized wht we have developed		requirements are the blueprint for development	
length of time for requirements work greater than development work		length of time for requirements work less than development work	
requirements have design detail		no design detail in requirements	
requirements creep to be avoided		requirements creep o.k., but need to be controlled	
freeze requirements at some point		requirements are fluid throughout development	
formal change procedure		informal change procedure	
change management plan		no change management plan	
requirements ambiguity always present to some extent		requirements ambuiguity unacceptable at any level	
testing considered up frornt during requirements determination		testing considered down the line during development	
requirements development team members different from implementation		those working on requirements, work on implementation	
start implementation as early as possible to help define requirements		requirements must be defined prior to any implementation work	
ANSWER THIS BLOCK OF QUESTIONS ONLY IF A PROTOTYPING, THROWAWAY, SYNCHRONIZE & STABILIZE, OR OTHER STRATEGY USED			
develop prototype, then determine requirements		determine requirements prior to any development work	X
requirements testing done after each iteration		no testing	X
individual changes as necessary	X	only block changes made	
development team decides on changes after iteration	X	users involved with changes	
changes based on feedback only from user for correction of problems		changes to upgrade system and correct problems	X
funding controls changes and change procedures	X	changes control funding	
requirements documentation finalized prior to development	X	requirements fluid throughout development (only freeze at end)	
requirements test plans completed prior to development	X	requirements test plans completed after development	
requirements first, then initial development work	X	initial development work then requirements	X
use development effort to learn more about requirements	X	define all requirements prior to coding anything	
requirements ambiguity always present to some extent	X	requirements ambiguity unacceptable at any level	
requirements have design detail	X	no design detail in requirements	
user feedback considered during development	X	after development starts, user feedback serves as input to new work	
get something to users as soon as possible for evaluation	X	make sure it is complete before releasing	
management dictates requirements	X	development team visually represent requirements through rapid prototyping	
new requirements allowed after initial requirements defined	X	new requirements not allowed	

Requirements Management (pg 2 of 2) score [13] +pg 1 score [31] = TOTAL SCORE [44] Enter on QMM scoresheet blk a.

Pair choice section TWO: (Estimation/Planning Management) choose most applicable term of the two for each row (page 1 of 2):

at least one estimation method used in program	X	no estimates	
formal derivation of product metric for estimation of size		ad hoc size estimation	X
ad hoc process evaluation		formal derivation of at lest one process metric	X
develop work breakdown structure (WBS)	X	assign work as needs arise	
estimates are developed to fulfill a data call only		use estimates to plan program	X
use estimates to sell program only		estimates are useful to the project tema for planning purposes	X
resource evaluations made for program	X	no resource evaluation for planning	
use both bottom up & top down for estimate, use one stakeholders like		use both bottom up & top down and evaluate significant differences	X
estimates made and not updated		estimates updated throughout program	X
resources estimations used to adjust product size estimate	X	estimations made irregardless of resources available	
estimations made to fit budget		budget made from estimations	X
estimations compromised to get program		rather risk loss of program than compromise confident estimations	X
cycle time estimations	X	no cycle time estimations	
event count estimations	X	no event count estimations	
lines of code (LOC) estimation	X	no LOC estimation	
function pont (FP) estimation		no FP estimation	X
estimates by algorithmic methods		estimates by analogy	X
expert judgement for estimates	X	ad hoc estimates	
estimates by algorithmic methods	X	ad hoc estimates	
expert judgement for estimates		estimates by analogy	X
ad hoc estimates		estimates by analogy	X
bottom up estimates	X	expert judgement	
top down estimates	X	expert judgement	
ad hoc estimates		any other estimate process	X
fuzzy logic estimating method		no formal estimation methodology	X
WBS development from estimates		WBS development in parallel or prior to estimation completion	X
critical path of program determined	X	tasks developed but no path is identified	
estimators are program team members	X	estimators are outside program team	
management only on estimations		all team members involved in estimation process	X
estimates updated at reviews	X	no updates of estimates	
estimates updated at reviews		estimates constantly updates (in between reviews, to)	X
estimate procedures stay the same		estimate procedures change	X
stakeholders are part of estimation process		stakeholders brief estimations after completion	X
estimates are used beyond initial selling of program	X	estimates are one time events, used for a specific purpose once	
WBS has objective measure of completeness	X	important to have WBS as guide, not rigid implementation	
Estimation/Planning Management (page 1 of 2) score	**29**		

Pair choice section TWO: (Estimation/Planning Management) choose most applicable term of the two for each row (page 2 of 2):

life cycle estimates	X	estimates for program initiation only	
system upgrades (SCR) software change requests estimated individually	X	systems upgrades estimated as whole	
estimates for on-gong resources needed to maintain s/w	X	estimates for maintenance not done	
informal re-estimates during development		formal re-estimates at pre-defined milestones	X
formal re-estimates when amendment changing the system is introduced	X	informal re-estimates when amendment changing the system	
person in-charge of estimation walks in a managers office to get an opinion	X	meeting(s) organized for purpose of performing cost estimations	
factor analysis prior to commencement of program		none done	X
change control procedures set in place	X	no set procedures	
elapsed time and actual work time estimates		one or the other or neither	X
no schedule created		scheudle created	X
schedule not updated		schedule updated	X
schedule followed	X	schedule not followed	
tasks identification arises as program progresses	X	detailed level tasks identified prior to program initiation	
scope of program understood by all	X	scope not explicitly defined	
quality factors and criteria identified		no explicit quality factors defined	X
no project tracking tools used		project tracking tools used	X
CSCIs identified and tasked		CSCIs not explicitly identified	X
expectations are managed via estimations	X	estimations are made to fit preconceived expectations	
no cost schedule developed		cost schedule developed	X
no resource schedule developed		resource schedule developed	X
team members, management know at any time if in budget & schedule		exact budget & schedule status somewhat unclear to at least some	X
individual program phases are estimated	X	only top level program estimated	
stakeholders/users emphasis understood-quick to field or all complete	X	program management sets delivery tradeoffs without outside input	
testing planned with initial program planning	X	testing not in initial planning	
documentation not considered ininitial planning	X	documentation part of initial planning	
hardware considered in estimations	X	software only considered	
no formal schedule/cost tracking		formal procedures established for tracking cost and schedule	X
earned value set up	X	earned value not used	
estimations omit documentation planning	X	documentation in estimates	
training omitted in estimates	X	training part of estimates	
earned value set up, but not tracked	X	earned value tracked	
detailed planning done with incomplete set of requirements	X	detailed planning done with detailed set of requirements	
complete infrastructure support mechanism understood for estimations	X	no consideration of infrastructure done for estimations	
team possibilities considered for planning of program	X	no consideration for outside teaming possibilities	
work breakdown structure (WBS) set up	X	no WBS completed	

Estimation/Planning Management (pg 2 of 2) score [23] +pg 1 score [29] = TOTAL SCORE [52] Enter on QMM scoresheet blk b.

Pair choice section THREE: (People Management) choose most applicable term of the two for each row (page 1 of 2):

Human Resources

program team members have clearly deined, segmented roles	X	work responsibilities are shared	
formal team building procedures are used	X	no formal team building emphasized	
program manager flexible regarding work hours	X	program manager maintains strict standards for work hours	
big picture conveyed to all team members by program management	X	program management focuses on the partitioned tasks with team	
people issues dealt with primarily through indirect methods (email, memo, etc)		people issues dealt with primarily through direct methods (face-to-face)	X
training is required and planned on a regular basis	X	training is ad hoc	
each team member is educated on and understands overall program and their roles		team members only know their respective areas	X
consideration for team members' career goals are reflected in assignments	X	team members must adapt to tasks that are assigned	
team members assignments and responsibilities are mostly dictated by PM		assignments and responsibilities are discussed and agreed upon with PM	X
management leads in problem solving		management facilitates and lets team lead in problem solving	X
management welcomes problems as challenges and opportunities	X	management views problems as obstacles and grounds for punishment	
team members participate in performance evaluations of peers	X	Personnel evaluations are strictly PM responsibility	
management reinforcement feedback sparse and inconsistent, if any		management provides timely reinforcement feedback for positive behaviors	X
management provides basic needs of office facilities fairly well	X	office facilities are a drawback to working in the program	
working conditions are fairly comfortable, time off policy fairly good	X	working conditions and time off policy is inconsistent and difficult at times	

Communication:

communications primarily written (email)	X	communications primarily verbal (face-to-face)	
detailed instructions: oral presentation, follow-up email	X	email only	
formal communication protocol	X	informal communications	
external vertical communications restricted		external vertical communication allowed	X
coders notebook weekly accomplishment reports required	X	not required	
user-coder relationship established, encouraged, and mediated	X	user-coder interaction minimized	
meetings structured to minimize waster time	X	meetings unstructured and open ended	
meetings have agenda, objectives, and conclude with action items	X	meeting agenda fluid and open ended	
program management and coder communication face to face		program management and coder communication primarily email	X
program team updated regularly regarding organizational & program status	X	meetings infrequently scheduled	
open communications is encouraged	X	communication hrough chain of command only is encouraged	
program manager accessible for discussions	X	program manager difficult to get an appointment to see	
program management (PM) is viewed as separate from team	X	PM mixes with team frequently	
management regularly holds team meetings		meetings are sporadic	X
meetings are structured with definite goals and objectives	X	meetings are informal	
program management is generally easy to reach and talk to	X	PM is usually hard to get a hold of and difficult to talk to	
team-program manager relationship adult-adult	X	team-program management relationship parent-child	
schedules are spontaneous and poorly communicated		schedules must be fixed and rigidly followed and formally reported	X
work is seen as complex processes involving team working together	X	work broken into pieces with minimal team member interaction	
action items often is poorly disseminated and usually not followed through		action items communicated and followed through thoroughly	X
team members require frequent clarifications by PM for assigned tasks		team members rarly require clarifications by PM for assigned tasks	X

Pair choice section THREE: (People Management) choose most applicable term of the two for each row (page 2 of 2):

Leadership:

long range organizational vision	X	short tem program and immediate work focus	
lead through personal attention to others		action-oriented leadership approach	X
run as much of the organization as possible		let team make decisions as much as possible	X
direct and domineering style		encourage independence in others	X
traditional leaders respect hierarchy		do what needs to be done	X
win cooperation rather than demand it	X	tough-minded with others	
act strongly and forcefully in the field of ideas	X	prefer to lead other independent types while seeking autonomy for self	
consults with team members to find solutions to problems	X	consults team members to get validation of PM's predetermined solutions	
keep people well informed	X	only as much knowledge as necessary for their work	
make things happen by focusing on the immediate problems	X	long range focus and de-emphasize current problems	X
manage others loosely and prefer minimal supervision		follow traditional procedures and rules conscientiously	
leadership, management decisions exclusively by program management	X	program management makes decisions but gets inputs from team	X
team-program manager relationship adult-adult		team-program management relationship parent-child	
program management makes decisions but gets inputs from team	X	all program team members responsible for program decisions	
when a problem arises: management takes over to solve it	X	management lets the team solve the problems	
leadership is do as I say, not do as I do	X	leadership by example	
program expectation not influenced by PM	X	program expectation managed by PM	
PM gives freedom to team, but has no mentoring for members (abdication)	X	PM empowers teams by mentoring members to be leaders	
promgram management waits and sees what happens then plans	X	management plans far in advance	
program management is constantly reacting to emergencies		management is one step ahead of problems	X
facilitative approach to solving problems		take charge readily and often	X
program management is complex, takes much time to understand	X	management is simple, easy to figure out	X
program management prefers to plunge right in		takes time to separate things to be done and order of doing them	X
program management reacts spur of the moment		methodically follows plans	X

Technical Competency of the Program Manager:

PM has technical experience particular to the particular s/w program		PM relies on team members solely	X
PM participates in technical reviews	X	PM only in non-technical reviews	
PM participates in making technical decisions when problems arise		PM delegates technical questions	X
PM does not get involved discussing technical options		PM contributes to technical options being discussed	X
PM does not review technical options and decisions		PM reviews technical options and decisions	X
PM actively attempts to keep up-to-date with current technology and standards	X	PM is removed from cutting edge technology issues	
PM receives technical periodicals and occasionally references applicable articles	X	PM doesn't read periodicals nor reference current articles to team	
PM doesn't have technical background (or education)		PM has technical background (or education)	X
team members avoid PM when they need technical advice		team members generally consider talking to PM regarding technical issues	X

HR [13] + Comm. [18] + Leadership [16] + Tech. Competency [7] = People Mgmt. score [54] Enter on QMM scoresheet blk c.

Pair choice section FOUR: (Risk Management(RM)) choose most applicable term of the two for each row (page 1 of 2):

RM is formal and documented		RM is informal, if at all	X
a risk management plan exists	X	no risk management plan is developed	
RM is more of a data call than a useful document	X	RM drives decisions on the program	
RM is done prior to the program beginning		RM is done prior and during program execution	X
RM is only done during the program execution		RM is done prior and during program execution	X
risks are generalized through the whole program		risks are categorized	X
risk management is done internally, only		an outside organization also contributes to the RM process	X
risk is a management function		risk is a program team function	X
risks are precisely articulated		risks are generalized, if at all	X
each risk has a consequence		consequences are generalized, if at all	X
a mitigation strategy is completed for each risk		mitigation strategy is generalized, if at all	X
contingency plans are developed for a RM plan		contingency plans are ad hoc as problems arise in the program	X
risks are anticipated		if problems arise, management will deal with it	X
the program doesn't have any risk		programs that do not have risk, have problems	X
risk management is automated		risk management may use tools, but depend on human input	X
risks are assigned probabilities	X	probabilities are not relevant for RM	
all risks are potential problems, relative priorities for risks are not useful		risks are weighed relative to other program risks and thus prioritized	X
risk management information is only shared internally		risk management information is shared with all stakeholders	X
risk analysis uses ordinal rankings	X	risk analysis uses actual measurements with a mathematical model	
regret analysis used		no regret analysis done	X
attach probabilities to future events		no probabilities associated with future events	X
assessing risks with mechanical meethods		risks should be compared to other risks and sorted	X
risk status tracked	X	not tracked	
technical risks examined	X	no technical risks examined	
process risks examined	X	no process risks examined	
product risks examined	X	no product risks examined	
stakeholder/user risks examined	X	no examination of stakeholder/user risks	
checklists used to identify risks	X	no checklists used	
risks are tracked	X	no tracking or monitoring of risks	
each risk has an impact		no impact analysis of risk	X
each risk has a mitigation plan	X	no individual risk mitigation	
risks monitored by priority	X	no special attention to track higher priority risks	
risk assessment is formalized		no formal risk assessment	X
risk control is formalized		no formal risk control	X
integration risks not considered		integration risks examined	X

Risk Management (page 1 of 2) score **22**

Pair choice section FOUR: (Risk Management(RM)) choose most applicable term of the two for each row (page 2 of 2):

risks to cost	X	no cost risks examined	
unforeseen risks have occurred in program		any risk that came up had been identified previously	X
personnel risks examined	X	no personnel risks examined	
estimation risks examined	X	no estimation risks examined	
planning risks examined	X	no planning risks examined	
requirements risks examined	X	no requirements risks examined	
resource risks examined	X	no resource risks examined	
risk management plan updated regularly	X	no regular risk management plan updates	
risks charted		risks not charted	X
performance risks examined	X	performance risks not examined	
program management self risks examined		no program management risks examined	X
risk from program constraints examined	X	no program constraint risks examined	
each category of risks are prioritized	X	no prioritization	
each category of risks are evaluated for impact	X	no impact analysis performed	
each category of risks have control strategy		no control strategy	X
documentation risks examined	X	no documentation risks examined	
regret matrix tracked		no regret matrix or not tracked	X
communication of risk activities are facilitated	X	no facilitation or promotion of communication of risk activities	
taxonomy-based questionnaire used to identify risks		taxonomy-based questionnaire not used	X
associated hardware risks examined	X	no consideration for hardware risks	
integration risks examined	X	integration risks not examined	
communication risks examined	X	communication risks not examined	
leadership risks examined	X	leadership risks not considered	
risk avoidance considered for certain risks	X	risk avoidance not considered for risks	
risk documentation forms used		no risk documentation forms used	X
dependency risks examined	X	no dependency risks examined	
alternatives like risk avoidance considered for high risk items	X	no consideration of risk avoidance	
documented risk statements use a condition-consequence type format		condition-consequence of risk statements not clearly defined	X
no assignment of ownership of risk mitigation action		each risk mitigation action is assigned to an individual for resolution	X
calculation of risk exposure made (probability X loss, for each risk)		no risk exposure calculations	X
oral communication of risks only		risks written in a way that communicates nature and status of factors	X
triggers used to quantify risk conditions present		risk conditions present are all subjective	X
risk "czar" in program for monitoring risks		no special positions/responsibilities for risk monitoring	X
post-program review completed (scheduled) for unanticipated problems ID	X	no post-program reviews completed or scheduled	X
no schedule risks examined		risks to schedule investigated	X

Risk Management (pg 2 of 2) score [23] +pg 1 score [22] = TOTAL SCORE [55] Enter on QMM scoresheet blk d.

C. PROGRAM B – PROGRAM MANAGER

1. QMM Summary Score Sheet

QMM Scoresheet Category	Part One	Score	Part Two	Score	Total Score		Importance Coefficient		Weighted Score
Requirements Management	a	62	e	48	110	X	0.92	=	101.2
Est./Planning Management	b	66	f	53	119	X	0.67	=	79.73
People Management	c	61	g	43	104	X	1.86	=	193.44
Risk Management	d	62	h	54	116	X	0.55	=	63.8

QMM SCORE	438.17

Max. QMM score possible **528.00**
Min. QMM score possible **-130.86**

QMM percentage score: **86.37%**

Objective/Subjective view of the overall success of program A on a scale of 0 to 10
(0 being total failure, 10 being perfect program total success)
Survey Participant: Program Manager
Success Score: 8.5

2. Requirements Management Questionnaire Responses

No.	Requirements Management Questionnaire - Total: Block e	Yes	No	N/A	
1	PM chose to have a formal requirements list	X			
2	Requirements recorded in some way	X			
3	Written requirements were part of some formal document	X			
4	Written requirements were informal		X		
5	At least some requirements were oral only		X		
6	All stakeholders were identified	X			
7	All stakeholders participated in the requirements extraction		X		
8	Some stakeholders participated in the requirements extraction	X			
9	Management extracted requirements, no stakeholder involvement		X		
10	Management passed requirements to development team	X			
11	Stakeholders not involvved in Management extraction, but approved		X		
12	Management gets inputs from stakeholders, then develops requirements	X			
13	Developers work informally with users to arrive at requirements		X		
14	Same as 13, but management oversees and formalizes	X			
	If a waterfall or sequential development strategy:				
15	All requirements complete before design				
16	Some requirements left incomplete prior to design				
17	Requirements informal prior to design effort				
18	Requirements serve as input				
19	Length of time for requirements work greater than development work				
20	Requirements developed in parallel to design				
OR	***If a prototype, throwaway, or other development strategy:***				
15	Learn about requirements through development efforts	X			
16	No coding until all requirements are defined		X		
17	Requirements formal prior to design effort		X		
18	Requirements serve as output	X			
19	Requirements definition work in parallel to development efforts	X			
20	Requirements developed in parallel to design	X			
21	Are requirements frozen at some phase		X		
22	Change management exists	X			
23	Change management is formal	X			
24	Project strategy is consistent throughout development	X			
25	Requirements are updated	X			
26	Configuration Management (CM) exists	X			
27	CM is formal	X			
28	Requirements are testable	X			
29	Requirements testing considered/implemented during extraction	X			
30	Requirements testing plan exists	X			
31	Requirements testing is formal	X			
32	All requirements have priorities	X			
33	All requirements must be implemented		X		
34	Requirements are tested	X			
35	All requirements are equally important		X		
36	At least some requirements have priorities	X			
37	All requirements are traceable	X			
38	Traceability not important		X		
39	Each requirement has an author		X		
40	Who authored requirement is not important		X		
41	Initial set of requirements to be implemented, no requirements creep	X			
42	Structured and tracked changes to requirements only	X			
43	Change is inevitable, changes allowed at all times		X		
44	Change is inevitable, but changes limited	X			
45	Requirements control funding	X			
46	Requirements history kept	X			
47	Baseline established for requirements at some point prior to develop	X			Total
	TOTAL SCORING	42	6	0	48

3. Estimation/Planning Questionnaire Responses

No.	Estimation/Planning Questionnaire - Total: Block f	Yes	No	N/A	
1	A volume product metric used (LOC, # of files, # of screens, pages of doc)	X			
2	Measure used for various product elements (modules, components, CSCI)	X			
3	Product measures made by phase (amt at implementation, LOC changed at unit test)		X		
4	Other product attributes measured (FP, throughput, mem cap, cyclomatic complexity)	X			
5	Product matrics tracked and updated throughout program execution	X			
6	Event count process metric used (# defects in test, reqmt changes, milestones met)	X			
7	Time measure process metric used (cycle time)	X			
8	Process metrics tracked and updated throughout program execution	X			
9	Program cost estimations made from product or process metrics	X			
10	Program cost extimations tracked and updated to reflect progress/changes	X			
11	Factor analysis performed on program	X			
12	Program's primary purpose, including major functions and deliverables known	X			
13	Work breakdown structure developed	X			
14	Task estimated with realistic expectations of productivity probabilities				
15	Schedules developed based on realistic expectations	X			
16	Schedules tracked and updated based on new information	X			
17	Detailed activity lists used for clearly defined completed/not completed tasks				
18	Quality assurance plan or similar to aid in detecting defects early in program				
19	COCOMO estimates performed				
20	CSCI clearly defined and tasked	X			
21	Estimates completed ad hoc		X		
22	Gantt charts used and updated	X			
23	Resource estimations (working hrs, job categories, task activities) done	X			
24	Earned value established	X			
25	Earned value tracked throughout program	X			
26	Quality expectations established for product with users and stakeholders	X			
27	Critical path for program tasks developed and tracked	X			
28	Measure of effectiveness (MOE) or Figure of merit established and tracked	X			
29	Estimates are updated routinely	X			
30	Schedules are updated routinely	X			
31	Estimations are made by program management (top-down)	X			
32	Estimateions are made by program team members (bottom-up)	X			
33	Automated program tracking used	X			
34	PM usually thorough in tracking and reporting schedules and financials	X			
35	WBS developed only as data call		X		
36	Earned value used to track program progress	X			
37	PM insists on prioritizing work reduction as schedule/funding compromised by stakeholders	X			
38	Estimations are done using both top down and bottoms up approaches	X			
39	All program team members involved in planning process	X			
40	Hardware also considered in estimaation process	X			
41	Program history compiled	X			
42	System upgrades (SCR) software changes requests estimated individually	X			
43	Management duties apart of each team member's responsibilities		X		
44	PM dictates schedules to program team		X		
45	Code reviews planned in schedule	X			
46	Defined tangible milestones established for program tasks	X			
47	Test planning done at the start of the program	X			
48	Estimations are completed by those performing the tasks	X			
49	Sensitivity analysis performed for program choices	X			
50	Software deployment planning completed	X			Total
	TOTAL SCORING	52	1		53

4. People Management Questionnaire Responses

No.	People Management Questionnaire - Total: Block g	Yes	No	N/A	
1	PM is accessible in person by each team member	X			
2	PM is accessible via email (memo, letter) by each team member	X			
3	PM is accessible via phone by each team member	X			
4	PM not only considers a person's suitability, not also desire to be on a team	X			
5	PM consults with each team member regarding their career goals		X		
6	PM regularly holds meetings to inform team of program progress		X		
7	PM solicits opinions from team members before making decisions	X			
8	PM lets teams make decisions affecting their work	X			
9	PM freuently makes decisions without any consultation with members		X		
10	PM understands the technology/language of the program	X			
11	PM is able to communicate with other the technical issues in the program	X			
12	PM prioritized problems or conflicts within the program	X			
13	PM assists team members in developing/advising of career path	X			
14	PM empowers program members to recommend hiring new team members	X			
15	PM empowers program members to recommend firings of other members	X			
16	PM specifically assigns work to each program member		X		
17	PM sets communication protocol	X			
18	PM allows unrestricted communications	X			
19	PM encourages or requires training for each individual	X			
20	PM takes control in difficult/roblem areas	X			
21	PM looks ahead to new programs, new upgrades of existing program	X			
22	PM maintains regular communications with all stakeholders	X			
23	PM maintains regular communications with users	X			
24	PM encourages program team communication with users	X			
25	PM encourages program team communication with stakeholders	X			
26	PM facilitates horizontal communication within program	X			
27	PM facilitates communication during integration	X			
28	PM holds meetings without clear objectives	X			
29	PM must approve all decisions within the program	X			
30	PM must approve all interactions with stakeholders	X			
31	PM must approve all interactions with users	X			
32	PM makes all presentations to stakeholders/users		X		
33	PM is considered "flexible" in terms of program members personal issues	X			
34	PM, at least occasionally, schedules/promotes outside work team activities	X			
35	PM is readily willing to listen to program prblems and complaints	X			
36	PM takes action to resolve program problems and complaints	X			
37	PM is generally respected by stakeholders, users, and organization	X			
38	PM sometimes fails to grasp important technical issues in program	X			
39	PM recruits program team members from outside organization	X			
40	PM participates in technical reviews	X			
41	Program personnel have clearly defined specific tasks	X			
42	Although individual's tasks are specific, each exposed to the "bigger picture"	X			
43	PM has clearly defined his/her expectations for each individual	X			
44	PM delegation of duties is usually seemless in execution	X			
45	PM acts as facilitator to solving personnel conflicts	X			
46	PM attempts to motivate individuals on the program team	X			
47	PM clearly spearates technical from managerial roles for individuals	X			
48	PM directs how he/she expects the task to be accomplished	X			
49	PM directs what needs to be done, but does not direct how	X			
50	PM attempts to spotlight individuals in the program for positive exposure	X			Total
	TOTAL SCORING	44	-1		43

5. Risk Management Questionnaire Responses

No.	Risk Management Questionnaire - Total: Block h	Yes	No	N/A	
1	Risk Management (RM) is specifically an activity in the program	X			
2	RM is formal and documented	X			
3	A specific RM lan exists	X			
4	RM is required in the program, but not used during the program	X			
5	RM is done prior to the program execution	X			
6	RM is done by an outside entity to the development	X			
7	RM is done internally only		X		
8	RM is both internally performed and externally assessed	X			
9	RM planning occurs during or after major milestones in the program	X			
10	Risk Assessment is only a management function		X		
11	RM is informal or non existent		X		
12	There is a RM plan, but it is not updated or tracked	X			
13	Risks are only generalized	X			
14	Each risk is delineated	X			
15	Each risk has a consequence	X			
16	Each risk has a likelihood rating of some sort	X			
17	Each risk has a mitigation strategy	X			
18	Risk Management is automated	X			
19	Risks are tracked	X			
20					
21	Regret analysis performed	X			
22	RM drives decisions in the program	X			
23	Risks have probabilities	X			
24	Risk Management is ad hoc	X			
25	RM information is shared with all stakeholders (as appropriate)	X			
26	Risks are weighed relative to other program risks	X			
27	Risk Assessment is a program team activity	X			
28	Risk Assessment done prior to program start	X			
29	Risk Assessment includes personnal risk	X			
30	RM uses tools, but depends on human decisions	X			
31	Risk assessment includes cost risks	X			
32	Risk Assessment includes schedule risks	X			
33	Risk Assessment includes technology risks	X			
34	Risk Assessment is briefed organization structure above program manager	X			
35	Risk Assessment includes requirements risks	X			
36	Risk Assessment includes user risks (too little involvement of user)	X			
37	Risk Assessment includes documentation risks	X			
38	Risk Assessment includes integration risks	X			
39	Risk Assessment includes interface risks (non-standard)	X			
40	Risk Assessment includes continuing requirements change (feature creep)	X			
41	Risk Assessment includes dependent projects/programs risks	X			
42	Documentation proof exists to demonstrate following risk management plan	X			
43	High rish have measured tracking (high profile status)	X			
44	Organizational history used to search for risks	X			
45	Other organizational checklists used for risk assessment	X			
46	Internal organizational checklists used for risk assessment	X			
47	Risk Assessment information contributed to internal or other database	X			
48	Risk Assessment includes internal organization risks	X			
49	Risk Assessment includes stakeholder risks	X			
50	No risk management needed; program is straightforward & understood		X		Total
	TOTAL SCORING	48	6		54

6. Pair Choices Responses

Pair choice section ONE: (Requirements Management) choose most applicable term of the two for each row (page 1 of 2):

formal requirement list	X	informal requirement list	
written requirements	X	oral requirements	
requirements informal, but recorded	X	requirements not recorded	
requirements as part of an SRS (or other formal repository)	X	requirements informally recorded	
requirements taken as is from customer	X	look to reformulate, interview in-depth, or otherwise re-validate	
only one development strategy used		strategies not consistent, used at different times	X
stakeholders as part of requirements development	X	stakeholders approving requirements after formulated by development team	
requirements are testable	X	requirements have no test plans	
informal test plan or no test plan		formal test plan	X
test team involved with requirements	X	no test team input or plans during requirements development	
only a percentage of requirements present in baseline	X	baseline must contain all requirements	
requirements documentation has hierarchical structure	X	all requirements must be implemented	
requirements have listed responsible party	X	requirements origin not important	
requirements documentation have versions	X	no requirements history	
requirements have specific attribute values	X	requirements all rank evenly	
funding controls requirements definition	X	requirements definition controls funding	
reqquirements are top down	X	requirements are bottom up	
users/stakeholders are identified and interviewed (market survey)		no special consideration to identify users/stakeholders	X
each requirement has a singular concept	X	some requirements are compound statements	
requirements definition minimized when funding short	X	program scope may reduce, but requirements definition completed	
requirements extraction has formal process	X	requirements extraction ad hoc	
change procedures formal	X	change procedures ad hoc	
users/stakeholders somehow involved in requirements definition	X	program team only involved in requirement definition	
management sets requirements for developers	X	developers at least partially involved in setting requirements	
requirements changed at least once since baseline established prior to new version	X	requirements in baseline has not changed prior to new version or upgrade	
no ranking of requirements	X	requirements have priorities assigned	
use-case diagrams (or other models or scenario developments)	X	no models used for requirements extraction	
requirements changes informal	X	requirements changes formal	
plan to "freeze" requirements at some designated milestone		no provision for "freezing" requirements	X
requirements must be traceable	X	origin of requirements not important	
requirements must be testable		system developed must be testable	
test plans to determine requirements implemented	X	no test plans needed for requirements verification	
requirements have priorities in implementation	X	all requirements must be implemented	
some requirements have multiple statements or ideas		one idea, one statement per requirement	X

Requirements Management (page 1 of 2) score **44**

Pair choice section ONE: (Requirements Management) choose most applicable term of the two for each row (page 2 of 2):

ANSWER THIS BLOCK OF QUESTIONS ONLY IF A SEQUENTIAL OR WATERFALL APPROACH IS USED FOR DEVELOPMENT (Requirements page 2 of 2)			
requirements first, then initial development work		initial development work then requirements	
requirements documentation driving development		requirements documentation developed in parallel/after development	
user feedback considered during development		after development starts, user feedback serves as input to new work	
change management procedures used strictly		change management procedures as guidance only	
design decisions prior to or in parallel to requirrements development		design decisions only after approved requirements stabilized	
requirements summarized wht we have developed		requirements are the blueprint for development	
length of time for requirements work greater than development work		length of time for requirements work less than development work	
requirements have design detail		no design detail in requirements	
requirements creep to be avoided		requirements creep o.k., but need to be controlled	
freeze requirements at some point		requirements are fluid throughout development	
formal change procedure		informal change procedure	
change management plan		no change management plan	
requirements ambiguity always present to some extent		requirements ambuiguity unacceptable at any level	
testing considered up frornt during requirements determination		testing considered down the line during development	
requirements development team members different from implementation		those working on requirements, work on implementation	
start implementation as early as possible to help define requirements		requirements must be defined prior to any implementation work	
ANSWER THIS BLOCK OF QUESTIONS ONLY IF A PROTOTYPING, THROWAWAY, SYNCHRONIZE & STABILIZE, OR OTHER STRATEGY USED			
develop prototype, then determine requirements	X	determine requirements prior to any development work	
requirements testing done after each iteration	X	no testing	
individual changes as necessary	X	only block changes made	
development team decides on changes after iteration		users involved with changes	X
changes based on feedback only from user for correction of problems	X	changes to upgrade system and correct problems	
funding controls changes and change procedures	X	changes control funding	
requirements documentation finalized prior to development		requirements fluid throughout development (only freeze at end)	X
requirements test plans completed prior to development	X	requirements test plans completed after development	
requirements first, then initial development work		initial development work then requirements	X
use development effort to learn more about requirements	X	define all requirements prior to coding anything	
requirements ambiguity always present to some extent	X	requirements ambiguity unacceptable at any level	
requirements have design detail	X	no design detail in requirements	
user feedback considered during development	X	after development starts, user feedback serves as input to new work	
get something to users as soon as possible for evaluation	X	make sure it is complete before releasing	
management dictates requirements		development team visually represent requirements through rapid prototyping	X
new requirements allowed after initial requirements defined	X	new requirements not allowed	

Requirements Management (pg 2 of 2) score [18] +pg 1 score [44] = TOTAL SCORE [62] Enter on QMM scoresheet blk a.

Pair choice section TWO: (Estimation/Planning Management) choose most applicable term of the two for each row (page 1 of 2):

at least one estimation method used in program	X	no estimates	
formal derivation of product metric for estimation of size	X	ad hoc size estimation	
ad hoc process evaluation		formal derivation of at lest one process metric	X
develop work breakdown structure (WBS)	X	assign work as needs arise	
estimates are developed to fulfill a data call only		use estimates to plan program	X
use estimates to sell program only		estimates are useful to the project tema for planning purposes	X
resource evaluations made for program	X	no resource evaluation for planning	
use both bottom up & top down for estimate, use one stakeholders like		use both bottom up & top down and evaluate significant differences	X
estimates made and not updated		estimates updated throughout program	X
resources estimations used to adjust product size estimate	X	estimations made irregardless of resources available	
estimations made to fit budget		budget made from estimations	X
estimations compromised to get program		rather risk loss of program than compromise confident estimations	X
cycle time estimations	X	no cycle time estimations	
event count estimations	X	no event count estimations	
lines of code (LOC) estimation	X	no LOC estimation	
function pont (FP) estimation	X	no FP estimation	
estimates by algorithmic methods	X	estimates by analogy	
expert judgement for estimates	X	ad hoc estimates	
estimates by algorithmic methods	X	ad hoc estimates	
expert judgement for estimates		estimates by analogy	X
ad hoc estimates		estimates by analogy	X
bottom up estimates	X	expert judgement	
top down estimates	X	expert judgement	
ad hoc estimates		any other estimate process	
fuzzy logic estimating method	X	no formal estimation methodology	
WBS development from estimates	X	WBS development in parallel or prior to estimation completion	
critical path of program determined	X	tasks developed but no path is identified	
estimators are program team members	X	estimators are outside program team	
management only on estimations		all team members involved in estimation process	X
estimates updated at reviews	X	no updates of estimates	
estimates updated at reviews		estimates constantly updates (in between reviews, to)	
estimate procedures stay the same	X	estimate procedures change	
stakeholders are part of estimation process	X	stakeholders brief estimations after completion	
estimates are used beyond initial selling of program	X	estimates are one time events, used for a specific purpose once	
WBS has objective measure of completeness	X	important to have WBS as guide, not rigid implementation	

Estimation/Planning Management (page 1 of 2) score **33**

Pair choice section TWO: (Estimation/Planning Management) choose most applicable term of the two for each row (page 2 of 2):

life cycle estimates	X	estimates for program initiation only	
system upgrades (SCR) software change requests estimated individually	X	systems upgrades estimated as whole	
estimates for on-gong resources needed to maintain s/w	X	estimates for maintenance not done	
informal re-estimates during development		formal re-estimates at pre-defined milestones	X
formal re-estimates when amendment changing the system is introduced	X	informal re-estimates when amendment changing the system	
person in-charge of estimation walks in a managers office to get an opinion		meeting(s) organized for purpose of performing cost estimations	X
factor analysis prior to commencement of program	X	none done	
change control procedures set in place	X	no set procedures	
elapsed time and actual work time estimates	X	one or the other or neither	
no schedule created		scheudle created	X
schedule not updated		schedule updated	X
schedule followed	X	schedule not followed	
tasks identification arises as program progresses		detailed level tasks identified prior to program initiation	X
scope of program understood by all	X	scope not explicitly defined	
quality factors and criteria identified	X	no explicit quality factors defined	
no project tracking tools used		project tracking tools used	X
CSCIs identified and tasked	X	CSCIs not explicitly identified	
expectations are managed via estimations	X	estimations are made to fit preconceived expectations	
no cost schedule developed		cost schedule developed	X
no resource schedule developed		resource schedule developed	X
team members, management know at any time if in budget & schedule	X	exact budget & schedule status somewhat unclear to at least some	
individual program phases are estimated	X	only top level program estimated	
stakeholders/users emphasis understood-quick to field or all complete	X	program management sets delivery tradeoffs without outside input	
testing planned with initial program planning	X	testing not in initial planning	
documentation not considered ininitial planning		documentation part of initial planning	
hardware considered in estimations	X	software only considered	
no formal schedule/cost tracking		formal procedures established for tracking cost and schedule	
earned value set up	X	earned value not used	
estimations omit documentation planning		documentation in estimates	X
training omitted in estimates	X	training part of estimates	
earned value set up, but not tracked		earned value tracked	X
detailed planning done with incomplete set of requirements	X	detailed planning done with detailed set of requirements	
complete infrastructure support mechanism understood for estimations	X	no consideration of infrastructure done for estimations	
team possibilities considered for planning of program	X	no consideration for outside teaming possibilities	
work breakdown structure (WBS) set up	X	no WBS completed	

Estimation/Planning Management (pg 2 of 2) score [33] +pg 1 score [33] = TOTAL SCORE [66] Enter on QMM scoresheet blk b.

Pair choice section THREE: (People Management) choose most applicable term of the two for each row (page 1 of 2):

Human Resources

program team members have clearly deined, segmented roles		work responsibilities are shared	X
formal team building procedures are used	X	no formal team building emphasized	
program manager flexible regarding work hours	X	program manager maintains strict standards for work hours	
big picture conveyed to all team members by program management	X	program management focuses on the partitioned tasks with team	
people issues dealt with primarily through indirect methods (email, memo, etc)		people issues dealt with primarily through direct methods (face-to-face)	X
training is required and planned on a regular basis	X	training is ad hoc	
each team member is educated on and understands overall program and their roles	X	team members only know their respective areas	
consideration for team members' career goals are reflected in assignments	X	team members must adapt to tasks that are assigned	
team members assignments and responsibilities are mostly dictated by PM		assignments and responsibilities are discussed and agreed upon with PM	X
management leads in problem solving		management facilitates and lets team lead in problem solving	X
management welcomes problems as challenges and opportunities	X	management views problems as obstacles and grounds for punishment	
team members participate in performance evaluations of peers		Personnel evaluations are strictly PM responsibility	X
management reinforcement feedback sparse and inconsistent, if any		management provides timely reinforcement feedback for positive behaviors	X
management provides basic needs of office facilities fairly well	X	office facilities are a drawback to working in the program	
working conditions are fairly comfortable, time off policy fairly good	X	working conditions and time off policy is inconsistent and difficult at times	

Communication:

communications primarily written (email)	X	communications primarily verbal (face-to-face)	
detailed instructions: oral presentation, follow-up email	X	email only	
formal communication protocol	X	informal communications	
external vertical communications restricted		external vertical communication allowed	X
coders notebook weekly accomplishment reports required		not required	X
user-coder relationship established, encouraged, and mediated	X	user-coder interaction minimized	
meetings structured to minimize waster time	X	meetings unstructured and open ended	
meetings have agenda, objectives, and conclude with action items	X	meeting agenda fluid and open ended	
program management and coder communication face to face	X	program management and coder communication primarily email	
program team updated regularly regarding organizational & program status	X	meetings infrequently scheduled	
open communications is encouraged	X	communication hrough chain of command only is encouraged	
program manager accessible for discussions	X	program manager difficult to get an appointment to see	
program management (PM) is viewed as separate from team		PM mixes with team frequently	X
management regularly holds team meetings		meetings are sporadic	X
meetings are structured with definite goals and objectives	X	meetings are informal	
program management is generally easy to reach and talk to	X	PM is usually hard to get a hold of and difficult to talk to	
team-program manager relationship adult-adult	X	team-program management relationship parent-child	
schedules are spontaneous and poorly communicated	X	schedules must be fixed and rigidly followed and formally reported	
work is seen as complex processes involving team working together	X	work broken into pieces with minimal team member interaction	
action items often is poorly disseminated and usually not followed through		action items communicated and followed through thoroughly	X
team members require frequent clarifications by PM for assigned tasks		team members rarly require clarifications by PM for assigned tasks	X

Pair choice section THREE: (People Management) choose most applicable term of the two for each row (page 2 of 2):

Leadership:

long range organizational vision	X	short tem program and immediate w ork focus	
lead through personal attention to others		action-oriented leadership approach	X
run as much of the organization as possible		let team make decisions as much as possible	X
direct and domineering style		encourage independence in others	X
traditional leaders respect hierarchy		do w hat needs to be done	X
w in cooperation rather than demand it	X	tough-minded w ith others	
act strongly and forcefully in the field of ideas		prefer to lead other independent types while seeking autonomy for self	X
consults w ith team members to find solutions to problems	X	consults team members to get validation of PM's predetermined solutions	
keep people w ell informed	X	only as much know ledge as necessary for their w ork	
make things happen by focusing on the immediate problems	X	long range focus and de-emphasize current problems	
manage others loosely and prefer minimal supervision	X	follow traditional procedures and rules conscientiously	
leadership, management decisions exclusively by program management		program management makes decisions but gets inputs from team	X
team-program manager relationship adult-adult	X	team-program management relationship parent-child	
program management makes decisions but gets inputs from team	X	all program team members responsible for program decisions	
w hen a problem arises: management takes over to solve it		management lets the team solve the problems	X
leadership is do as I say, not do as I do		leadership by example	X
program expectation not influenced by PM		program expectation managed by PM	X
PM gives freedom to team, but has no mentoring for members (abdication)	X	PM empow ers teams by mentoring members to be leaders	
promgram management w aits and sees w hat happens then plans		management plans far in advance	X
program management is constantly reacting to emergencies		management is one step ahead of problems	X
facilitative approach to solving problems		take charge readily and often	X
program management is complex, takes much time to understand	X	management is simple, easy to figure out	
program management prefers to plunge right in		takes time to separate things to be done and order of doing them	X
program management reacts spur of the moment		methodically follow s plans	X

Technical Competency of the Program Manager:

PM has technical experience particular to the particular s/w program	X	PM relies on team members solely	
PM participates in technical review s	X	PM only in non-technical review s	
PM participates in making technical decisions w hen problems arise	X	PM delegates technical questions	
PM does not get involved discussing technical options		PM contributes to technical options being discussed	X
PM does not review technical options and decisions		PM review s technical options and decisions	X
PM actively attempts to keep up-to-date with current technology and standards	X	PM is removed from cutting edge technology issues	
PM receives technical periodicals and occasionally references applicable articles	X	PM doesn't read periodicals nor reference current articles to team	
PM doesn't have technical background (or education)		PM has technical background (or education)	X
team members avoid PM w hen they need technical advice		team members generally consider talking to PM regarding technical issues	X

HR [13] + Comm. [18] + Leadership [21] + Tech. Competency [9] = People Mgmt. score [61] Enter on QMM scoresheet blk c.

Pair choice section FOUR: (Risk Management(RM)) choose most applicable term of the two for each row (page 1 of 2):

RM is formal and documented	X	RM is informal, if at all	
a risk management plan exists	X	no risk management plan is developed	
RM is more of a data call than a useful document		RM drives decisions on the program	X
RM is done prior to the program beginning		RM is done prior and during program execution	X
RM is only done during the program execution		RM is done prior and during program execution	X
risks are generalized through the whole program		risks are categorized	X
risk management is done internally, only		an outside organization also contributes to the RM process	X
risk is a management function		risk is a program team function	X
risks are precisely articulated	X	risks are generalized, if at all	
each risk has a consequence	X	consequences are generalized, if at all	
a mitigation strategy is completed for each risk	X	mitigation strategy is generalized, if at all	
contingency plans are developed for a RM plan	X	contingency plans are ad hoc as problems arise in the program	
risks are anticipated		if problems arise, management will deal with it	X
the program doesn't have any risk		programs that do not have risk, have problems	X
risk management is automated	X	risk management may use tools, but depend on human input	
risks are assigned probabilities	X	probabilities are not relevant for RM	
all risks are potential problems, relative priorities for risks are not useful		risks are weighed relative to other program risks and thus prioritized	X
risk management information is only shared internally		risk management information is shared with all stakeholders	X
risk analysis uses ordinal rankings		risk analysis uses actual measurements with a mathematical model	X
regret analysis used	X	no regret analysis done	
attach probabilities to future events	X	no probabilities associated with future events	
assessing risks with mechanical meethods		risks should be compared to other risks and sorted	X
risk status tracked	X	not tracked	
technical risks examined	X	no technical risks examined	
process risks examined	X	no process risks examined	
product risks examined	X	no product risks examined	
stakeholder/user risks examined	X	no examination of stakeholder/user risks	
checklists used to identify risks	X	no checklists used	
risks are tracked	X	no tracking or monitoring of risks	
each risk has an impact	X	no impact analysis of risk	
each risk has a mitigation plan	X	no individual risk mitigation	
risks monitored by priority	X	no special attention to track higher priority risks	
risk assessment is formalized		no formal risk assessment	X
risk control is formalized		no formal risk control	X
integration risks not considered		integration risks examined	X

Risk Management (page 1 of 2) score **33**

Pair choice section FOUR: (Risk Management(RM)) choose most applicable term of the two for each row (page 2 of 2):

risks to cost	X	no cost risks examined	
unforeseen risks have occurred in program	X	any risk that came up had been identified previously	
personnel risks examined	X	no personnel risks examined	
estimation risks examined	X	no estimation risks examined	
planning risks examined	X	no planning risks examined	
requirements risks examined	X	no requirements risks examined	
resource risks examined	X	no resource risks examined	
risk management plan updated regularly	X	no regular risk management plan updates	
risks charted	X	risks not charted	
performance risks examined	X	performance risks not examined	
program management self risks examined	X	no program management risks examined	
risk from program constraints examined	X	no program constraint risks examined	
each category of risks are prioritized	X	no prioritization	
each category of risks are evaluated for impact	X	no impact analysis performed	
each category of risks have control strategy	X	no control strategy	
documentation risks examined	X	no documentation risks examined	
regret matrix tracked	X	no regret matrix or not tracked	
communication of risk activities are facilitated	X	no facilitation or promotion of communication of risk activities	
taxonomy-based questionnaire used to identify risks	X	taxonomy-based questionnaire not used	
associated hardware risks examined	X	no consideration for hardware risks	
integration risks examined	X	integration risks not examined	
communication risks examined	X	communication risks not examined	
leadership risks examined		leadership risks not considered	X
risk avoidance considered for certain risks	X	risk avoidance not considered for risks	
risk documentation forms used	X	no risk documentation forms used	
dependency risks examined	X	no dependency risks examined	
alternatives like risk avoidance considered for high risk items	X	no consideration of risk avoidance	
documented risk statements use a condition-consequence type format	X	condition-consequence of risk statements not clearly defined	
no assignment of ownership of risk mitigation action	X	each risk mitigation action is assigned to an individual for resolution	
calculation of risk exposure made (probability X loss, for each risk)	X	no risk exposure calculations	
oral communication of risks only		risks written in a way that communicates nature and status of factors	X
triggers used to quantify risk conditions present		risk conditions present are all subjective	X
risk "czar" in program for monitoring risks		no special positions/responsibilities for risk monitoring	X
post-program review completed (scheduled) for unanticipated problems ID	X	no post-program reviews completed or scheduled	
no schedule risks examined		risks to schedule investigated	X

Risk Management (pg 2 of 2) score [29] +pg 1 score [33] = TOTAL SCORE [62] Enter on QMM scoresheet blk d.

D. PROGRAM B – ASSOCIATE

1. QMM Summary Score Sheet

QMM Scoresheet Category	Part One Score		Part Two Score		Total Score		Importance Coefficient		Weighted Score
Requirements Management	a	60	e	47	107	X	0.92	=	98.44
Est./Planning Management	b	64	f	52	116	X	0.67	=	77.72
People Management	c	60	g	42	102	X	1.86	=	189.72
Risk Management	d	61	h	53	114	X	0.55	=	62.7

QMM SCORE	428.58

Max. QMM score possible **528.00**
Min. QMM score possible **-130.86**

QMM percentage score: **84.91%**

Objective/Subjective view of the overall success of program B on a scale of 0 to 10 (0 being total failure, 10 being perfect program total success)
Survey Participant: Associate
Success Score: 8.5

2. Requirements Management Questionnaire Responses

No.	Requirements Management Questionnaire - Total: Block e	Yes	No	N/A	
1	PM chose to have a formal requirements list	X			
2	Requirements recorded in some way	X			
3	Written requirements were part of some formal document	X			
4	Written requirements were informal	X			
5	At least some requirements were oral only		X		
6	All stakeholders were identified	X			
7	All stakeholders participated in the requirements extraction	X			
8	Some stakeholders participated in the requirements extraction	X			
9	Management extracted requirements, no stakeholder involvement		X		
10	Management passed requirements to development team	X			
11	Stakeholders not involvved in Management extraction, but approved		X		
12	Management gets inputs from stakeholders, then develops requirements	X			
13	Developers work informally with users to arrive at requirements	X			
14	Same as 13, but management oversees and formalizes	X			
	If a waterfall or sequential development strategy:				
15	All requirements complete before design				
16	Some requirements left incomplete prior to design				
17	Requirements informal prior to design effort				
18	Requirements serve as input				
19	Length of time for requirements work greater than development work				
20	Requirements developed in parallel to design				
OR	***If a prototype, throwaway, or other development strategy:***				
15	Learn about requirements through development efforts	X			
16	No coding until all requirements are defined		X		
17	Requirements formal prior to design effort			X	
18	Requirements serve as output	X			
19	Requirements definition work in parallel to development efforts	X			
20	Requirements developed in parallel to design	X			
21	Are requirements frozen at some phase			X	
22	Change management exists	X			
23	Change management is formal	X			
24	Project strategy is consistent throughout development	X			
25	Requirements are updated	X			
26	Configuration Management (CM) exists	X			
27	CM is formal	X			
28	Requirements are testable	X			
29	Requirements testing considered/implemented during extraction	X			
30	Requirements testing plan exists	X			
31	Requirements testing is formal	X			
32	All requirements have priorities	X			
33	All requirements must be implemented		X		
34	Requirements are tested			X	
35	All requirements are equally important			X	
36	At least some requirements have priorities			X	
37	All requirements are traceable			X	
38	Traceability not important			X	
39	Each requirement has an author			X	
40	Who authored requirement is not important			X	
41	Initial set of requirements to be implemented, no requirements creep			X	
42	Structured and tracked changes to requirements only			X	
43	Change is inevitable, changes allowed at all times			X	
44	Change is inevitable, but changes limited	X			
45	Requirements control funding	X			
46	Requirements history kept	X			
47	Baseline established for requirements at some point prior to develop			0	Total
	TOTAL SCORING	43	4		47

3. Estimation/Planning Questionnaire Responses

No.	Estimation/Planning Questionnaire - Total: Block f	Yes	No	N/A	
1	A volume product metric used (LOC, # of files, # of screens, pages of doc)	X			
2	Measure used for various product elements (modules, components, CSCI)	X			
3	Product measures made by phase (amt at implementation, LOC changed at unit test)	X			
4	Other product attributes measured (FP, throughput, mem cap, cyclomatic complexity)	X			
5	Product matrics tracked and updated hroughout program execution	X			
6	Event count process metric used (# defects in test, reqmt changes, milestones met)	X			
7	Time measure process metric used (cycle time)	X			
8	Process metrics tracked and updated throughout program execution	X			
9	Program cost estimations made from product or process metrics	X			
10	Program cost extimations tracked and updated to reflect progress/changes	X			
11	Factor analysis performed on program	X			
12	Program's primary purpose, including major functions and deliverables known	X			
13	Work breakdown structure developed	X			
14	Task estimated with realistic expectations of productivity probabilities	X			
15	Schedules developed based on realistic expectations	X			
16	Schedules tracked and updated based on new information	X			
17	Detailed activity lists used for clearly defined completed/not completed tasks	X			
18	Quality assurance plan or similar to aid in detecting defects early in program	X			
19	COCOMO estimates performed			X	
20	CSCI clearly defined and tasked			X	
21	Estimates completed ad hoc		X		
22	Gantt charts used and updated	X			
23	Resource estimations (working hrs, job categories, task activities) done	X			
24	Earned value established	X			
25	Earned value tracked throughout program	X			
26	Quality expectations established for product with users and stakeholders	X			
27	Critical path for program tasks developed and tracked	X			
28	Measure of effectiveness (MOE) or Figure of merit established and tracked	X			
29	Estimates are updated routinely	X			
30	Schedules are updated routinely	X			
31	Estimations are made by program management (top-down)	X			
32	Estimateions are made by program team members (bottom-up)		X		
33	Automated program tracking used		X		
34	PM usually thorough in tracking and reporting schedules and financials	X			
35	WBS developed only as data call		X		
36	Earned value used to track program progress	X			
37	PM insists on prioritizing work reduction as schedule/funding compromised by stakeholders	X			
38	Estimations are done using both top down and bottoms up approaches	X			
39	All program team members involved in planning process	X			
40	Hardware also considered in estimaation process			X	
41	Program history compiled	X			
42	System upgrades (SCR) software changes requests estimated individually		X		
43	Management duties apart of each team member's responsibilities	X			
44	PM dictates schedules to program team		X		
45	Code reviews planned in schedule	X			
46	Defined tangible milestones established for program tasks	X			
47	Test planning done at the start of the program	X			
48	Estimations are completed by those performing the tasks	X			
49	Sensitivity analysis performed for program choices	X			
50	Software deployment planning completed	X			Total
	TOTAL SCORING	51	1		52

4. People Management Questionnaire Responses

No.	People Management Questionnaire - Total: Block g	Yes	No	N/A	
1	PM is accessible in person by each team member	X			
2	PM is accessible via email (memo, letter) by each team member	X			
3	PM is accessible via phone by each team member	X			
4	PM not only considers a person's suitability, not also desire to be on a team	X			
5	PM consults with each team member regarding their career goals	X			
6	PM regularly holds meetings to inform team of program progress	X			
7	PM solicits opinions from team members before making decisions	X			
8	PM lets teams make decisions affecting their work	X			
9	PM freuently makes decisions without any consultation with members	X			
10	PM understands the technology/language of the program	X			
11	PM is able to communicate with other the technical issues in the program	X			
12	PM prioritized problems or conflicts within the program	X			
13	PM assists team members in developing/advising of career path	X			
14	PM empowers program members to recommend hiring new team members	X			
15	PM empowers program members to recommend firings of other members	X			
16	PM specifically assigns work to each program member	X			
17	PM sets communication protocol	X			
18	PM allows unrestricted communications	X			
19	PM encourages or requires training for each individual	X			
20	PM takes control in difficult/roblem areas	X			
21	PM looks ahead to new programs, new upgrades of existing program	X			
22	PM maintains regular communications with all stakeholders	X			
23	PM maintains regular communications with users	X			
24	PM encourages program team communication with users	X			
25	PM encourages program team communication with stakeholders	X			
26	PM facilitates horizontal communication within program	X			
27	PM facilitates communication during integration	X			
28	PM holds meetings without clear objectives		X		
29	PM must approve all decisions within the program		X		
30	PM must approve all interactions with stakeholders		X		
31	PM must approve all interactions with users		X		
32	PM makes all presentations to stakeholders/users		X		
33	PM is considered "flexible" in terms of program members personal issues	X			
34	PM, at least occasionally, schedules/promotes outside work team activities	X			
35	PM is readily willing to listen to program prblems and complaints	X			
36	PM takes action to resolve program problems and complaints	X			
37	PM is generally respected by stakeholders, users, and organization	X			
38	PM sometimes fails to grasp important technical issues in program	X			
39	PM recruits program team members from outside organization	X			
40	PM participates in technical reviews	X			
41	Program personnel have clearly defined specific tasks	X			
42	Although individual's tasks are specific, each exposed to the "bigger picture"	X			
43	PM has clearly defined his/her expectations for each individual		X		
44	PM delegation of duties is usually seemless in execution		X		
45	PM acts as facilitator to solving personnel conflicts		X		
46	PM attempts to motivate individuals on the program team		X		
47	PM clearly spearates technical from managerial roles for individuals		X		
48	PM directs how he/she expects the task to be accomplished		X		
49	PM directs what needs to be done, but does not direct how	X			
50	PM attempts to spotlight individuals in the program for positive exposure	X	X		Total
	TOTAL SCORING	37	5		42

5. Risk Management Questionnaire Responses

No.	Risk Management Questionnaire - Total: Block h	Yes	No	N/A	
1	Risk Management (RM) is specifically an activity in the program	X			
2	RM is formal and documented	X			
3	A specific RM lan exists	X			
4	RM is required in the program, but not used during the program		X		
5	RM is done prior to the program execution	X			
6	RM is done by an outside entity to the development	X			
7	RM is done internally only		X		
8	RM is both internally performed and externally assessed	X			
9	RM planning occurs during or after major milestones in the program	X			
10	Risk Assessment is only a management function		X		
11	RM is informal or non existent		X		
12	There is a RM plan, but it is not updated or tracked	X			
13	Risks are only generalized		X		
14	Each risk is delineated	X			
15	Each risk has a consequence	X			
16	Each risk has a likelihood rating of some sort	X			
17	Each risk has a mitigation strategy	X			
18	Risk Management is automated	X			
19	Risks are tracked	X			
20					
21	Regret analysis performed	X			
22	RM drives decisions in the program	X			
23	Risks have probabilities	X			
24	Risk Management is ad hoc		X		
25	RM information is shared with all stakeholders (as appropriate)	X			
26	Risks are weighed relative to other program risks	X			
27	Risk Assessment is a program team activity	X			
28	Risk Assessment done prior to program start	X			
29	Risk Assessment includes personnal risk		X		
30	RM uses tools, but depends on human decisions	X			
31	Risk assessment includes cost risks	X			
32	Risk Assessment includes schedule risks	X			
33	Risk Assessment includes technology risks		X		
34	Risk Assessment is briefed organization structure above program manager	X			
35	Risk Assessment includes requirements risks	X			
36	Risk Assessment includes user risks (too little involvement of user)	X			
37	Risk Assessment includes documentation risks		X		
38	Risk Assessment includes integration risks	X			
39	Risk Assessment includes interface risks (non-standard)	X			
40	Risk Assessment includes continuing requirements change (feature creep)	X			
41	Risk Assessment includes dependent projects/programs risks	X			
42	Documentation proof exists to demonstrate following risk management plan	X			
43	High rish have measured tracking (high profile status)	X			
44	Organizational history used to search for risks		X		
45	Other organizational checklists used for risk assessment		X		
46	Internal organizational checklists used for risk assessment		X		
47	Risk Assessment information contributed to internal or other database		X		
48	Risk Assessment includes internal organization risks		X		
49	Risk Assessment includes stakeholder risks	X			
50	No risk management needed; program is straightforward & understood		X		Total
	TOTAL SCORING	46	7		53

6. Pair Choices Responses

Pair choice section ONE: (Requirements Management) choose most applicable term of the two for each row (page 1 of 2):

formal requirement list	X	informal requirement list	
written requirements	X	oral requirements	
requirements informal, but recorded	X	requirements not recorded	
requirements as part of an SRS (or other formal repository)	X	requirements informally recorded	
requirements taken as is from customer		look to reformulate, interview in-depth, or otherwise re-validate	X
only one development strategy used	X	strategies not consistent, used at different times	
stakeholders as part of requirements development	X	stakeholders approving requirements after formulated by development team	
requirements are testable	X	requirements have no test plans	
informal test plan or no test plan		formal test plan	X
test team involved with requirements	X	no test team input or plans during requirements development	
only a percentage of requirements present in baseline		baseline must contain all requirements	X
requirements documentation has hierarchical structure	X	all requirements must be implemented	
requirements have listed responsible party	X	requirements origin not important	
requirements documentation have versions	X	no requirements history	
requirements have specific attribute values	X	requirements all rank evenly	
funding controls requirements definition		requirements definition controls funding	X
reqquirements are top down	X	requirements are bottom up	
users/stakeholders are identified and interviewed (market survey)	X	no special consideration to identify users/stakeholders	
each requirement has a singular concept	X	some requirements are compound statements	
requirements definition minimized when funding short	X	program scope may reduce, but requirements definition completed	
requirements extraction has formal process	X	requirements extraction ad hoc	
change procedures formal	X	change procedures ad hoc	
users/stakeholders somehow involved in requirements definition	X	program team only involved in requirement definition	
management sets requirements for developers		developers at least partially involved in setting requirements	X
requirements changed at least once since baseline established prior to new version		requirements in baseline has not changed prior to new version or upgrade	X
no ranking of requirements		requirements have priorities assigned	X
use-case diagrams (or other models or scenario developments)	X	no models used for requirements extraction	
requirements changes informal		requirements changes formal	
plan to "freeze" requirements at some designated milestone		no provision for "freezing" requirements	
requirements must be traceable		origin of requirements not important	
requirements must be testable		system developed must be testable	
test plans to determine requirements implemented		no test plans needed for requirements verification	
requirements have priorities in implementation		all requirements must be implemented	
some requirements have multiple statements or ideas		one idea, one statement per requirement	

Requirements Management (page 1 of 2) score **45**

Pair choice section ONE: (Requirements Management) choose most applicable term of the two for each row (page 2 of 2):

ANSWER THIS BLOCK OF QUESTIONS ONLY IF A SEQUENTIAL OR WATERFALL APPROACH IS USED FOR DEVELOPMENT (Requirements page 2 of 2)			
requirements first, then initial development work		initial development work then requirements	
requirements documentation driving development		requirements documentation developed in parallel/after development	
user feedback considered during development		after development starts, user feedback serves as input to new work	
change management procedures used strictly		change management procedures as guidance only	
design decisions prior to or in parallel to requirrements development		design decisions only after approved requirements stabilized	
requirements summarized wht we have developed		requirements are the blueprint for development	
length of time for requirements work greater than development work		length of time for requirements work less than development work	
requirements have design detail		no design detail in requirements	
requirements creep to be avoided		requirements creep o.k., but need to be controlled	
freeze requirements at some point		requirements are fluid throughout development	
formal change procedure		informal change procedure	
change management plan		no change management plan	
requirements ambiguity always present to some extent		requirements ambuiguity unacceptable at any level	
testing considered up frornt during requirements determination		testing considered down the line during development	
requirements development team members different from implementation		those working on requirements, work on implementation	
start implementation as early as possible to help define requirements		requirements must be defined prior to any implementation work	
ANSWER THIS BLOCK OF QUESTIONS ONLY IF A PROTOTYPING, THROWAWAY, SYNCHRONIZE & STABILIZE, OR OTHER STRATEGY USED			
develop prototype, then determine requirements	X	determine requirements prior to any development work	
requirements testing done after each iteration		no testing	X
individual changes as necessary	X	only block changes made	X
development team decides on changes after iteration	X	users involved with changes	
changes based on feedback only from user for correction of problems		changes to upgrade system and correct problems	X
funding controls changes and change procedures	X	changes control funding	
requirements documentation finalized prior to development		requirements fluid throughout development (only freeze at end)	X
requirements test plans completed prior to development	X	requirements test plans completed after development	
requirements first, then initial development work	X	initial development work then requirements	
use development effort to learn more about requirements	X	define all requirements prior to coding anything	
requirements ambiguity always present to some extent	X	requirements ambiguity unacceptable at any level	
requirements have design detail		no design detail in requirements	X
user feedback considered during development		after development starts, user feedback serves as input to new work	X
get something to users as soon as possible for evaluation	X	make sure it is complete before releasing	
management dictates requirements	X	development team visually represent requirements through rapid prototyping	
new requirements allowed after initial requirements defined	X	new requirements not allowed	

Requirements Management (pg 2 of 2) score [15] +pg 1 score [45] = TOTAL SCORE [60] Enter on QMM scoresheet blk a.

Pair choice section TWO: (Estimation/Planning Management) choose most applicable term of the two for each row (page 1 of 2):

at least one estimation method used in program	X	no estimates	
formal derivation of product metric for estimation of size	X	ad hoc size estimation	
ad hoc process evaluation		formal derivation of at lest one process metric	X
develop work breakdown structure (WBS)	X	assign work as needs arise	
estimates are developed to fulfill a data call only		use estimates to plan program	X
use estimates to sell program only		estimates are useful to the project tema for planning purposes	X
resource evaluations made for program	X	no resource evaluation for planning	
use both bottom up & top down for estimate, use one stakeholders like		use both bottom up & top down and evaluate significant differences	
estimates made and not updated		estimates updated throughout program	
resources estimations used to adjust product size estimate	X	estimations made irregardless of resources available	
estimations made to fit budget		budget made from estimations	X
estimations compromised to get program		rather risk loss of program than compromise confident estimations	X
cycle time estimations	X	no cycle time estimations	
event count estimations	X	no event count estimations	
lines of code (LOC) estimation	X	no LOC estimation	
function pont (FP) estimation	X	no FP estimation	
estimates by algorithmic methods	X	estimates by analogy	
expert judgement for estimates	X	ad hoc estimates	
estimates by algorithmic methods	X	ad hoc estimates	
expert judgement for estimates		estimates by analogy	X
ad hoc estimates		estimates by analogy	X
bottom up estimates	X	expert judgement	
top down estimates	X	expert judgement	
ad hoc estimates		any other estimate process	
fuzzy logic estimating method	X	no formal estimation methodology	
WBS development from estimates	X	WBS development in parallel or prior to estimation completion	
critical path of program determined	X	tasks developed but no path is identified	
estimators are program team members	X	estimators are outside program team	
management only on estimations		all team members involved in estimation process	X
estimates updated at reviews	X	no updates of estimates	
estimates updated at reviews		estimates constantly updates (in between reviews, to)	X
estimate procedures stay the same	X	estimate procedures change	
stakeholders are part of estimation process	X	stakeholders brief estimations after completion	
estimates are used beyond initial selling of program	X	estimates are one time events, used for a specific purpose once	
WBS has objective measure of completeness	X	important to have WBS as guide, not rigid implementation	

Estimation/Planning Management (page 1 of 2) score **32**

Pair choice section TWO: (Estimation/Planning Management) choose most applicable term of the two for each row (page 2 of 2):

life cycle estimates	X	estimates for program initiation only	
system upgrades (SCR) software change requests estimated individually	X	systems upgrades estimated as whole	
estimates for on-gong resources needed to maintain s/w	X	estimates for maintenance not done	
informal re-estimates during development	X	formal re-estimates at pre-defined milestones	
formal re-estimates when amendment changing the system is introduced	X	informal re-estimates when amendment changing the system	
person in-charge of estimation walks in a managers office to get an opinion		meeting(s) organized for purpose of performing cost estimations	X
factor analysis prior to commencement of program	X	none done	
change control procedures set in place	X	no set procedures	
elapsed time and actual work time estimates	X	one or the other or neither	
no schedule created		scheudle created	X
schedule not updated		schedule updated	X
schedule followed	X	schedule not followed	
tasks identification arises as program progresses		detailed level tasks identified prior to program initiation	X
scope of program understood by all	X	scope not explicitly defined	
quality factors and criteria identified	X	no explicit quality factors defined	
no project tracking tools used		project tracking tools used	X
CSCIs identified and tasked	X	CSCIs not explicitly identified	
expectations are managed via estimations	X	estimations are made to fit preconceived expectations	
no cost schedule developed		cost schedule developed	X
no resource schedule developed		resource schedule developed	X
team members, management know at any time if in budget & schedule	X	exact budget & schedule status somewhat unclear to at least some	
individual program phases are estimated	X	only top level program estimated	
stakeholders/users emphasis understood-quick to field or all complete	X	program management sets delivery tradeoffs without outside input	
testing planned with initial program planning	X	testing not in initial planning	
documentation not considered ininitial planning	X	documentation part of initial planning	
hardware considered in estimations	X	software only considered	
no formal schedule/cost tracking		formal procedures established for tracking cost and schedule	X
earned value set up	X	earned value not used	
estimations omit documentation planning		documentation in estimates	X
training omitted in estimates		training part of estimates	X
earned value set up, but not tracked		earned value tracked	X
detailed planning done with incomplete set of requirements	X	detailed planning done with detailed set of requirements	
complete infrastructure support mechanism understood for estimations	X	no consideration of infrastructure done for estimations	
team possibilities considered for planning of program	X	no consideration for outside teaming possibilities	
work breakdown structure (WBS) set up	X	no WBS completed	

Estimation/Planning Management (pg 2 of 2) score [32] +pg 1 score [32] = TOTAL SCORE [64] Enter on QMM scoresheet blk b.

Pair choice section THREE: (People Management) choose most applicable term of the two for each row (page 1 of 2):

Human Resources

program team members have clearly deined, segmented roles		work responsibilities are shared	X
formal team building procedures are used	X	no formal team building emphasized	
program manager flexible regarding work hours	X	program manager maintains strict standards for work hours	
big picture conveyed to all team members by program management	X	program management focuses on the partitioned tasks with team	
people issues dealt with primarily through indirect methods (email, memo, etc)	X	people issues dealt with primarily through direct methods (face-to-face)	
training is required and planned on a regular basis	X	training is ad hoc	
each team member is educated on and understands overall program and their roles	X	team members only know their respective areas	
consideration for team members' career goals are reflected in assignments	X	team members must adapt to tasks that are assigned	
team members assignments and responsibilities are mostly dictated by PM		assignments and responsibilities are discussed and agreed upon with PM	X
management leads in problem solving		management facilitates and lets team lead in problem solving	X
management welcomes problems as challenges and opportunities	X	management views problems as obstacles and grounds for punishment	
team members participate in performance evaluations of peers	X	Personnel evaluations are strictly PM responsibility	
management reinforcement feedback sparse and inconsistent, if any	X	management provides timely reinforcement feedback for positive behaviors	
management provides basic needs of office facilities fairly well	X	office facilities are a drawback to working in the program	
working conditions are fairly comfortable, time off policy fairly good	X	working conditions and time off policy is inconsistent and difficult at times	

Communication:

communications primarily written (email)	X	communications primarily verbal (face-to-face)	
detailed instructions: oral presentation, follow-up email	X	email only	
formal communication protocol	X	informal communications	
external vertical communications restricted	X	external vertical communication allowed	
coders notebook weekly accomplishment reports required	X	not required	
user-coder relationship established, encouraged, and mediated	X	user-coder interaction minimized	
meetings structured to minimize waster time	X	meetings unstructured and open ended	
meetings have agenda, objectives, and conclude with action items	X	meeting agenda fluid and open ended	
program management and coder communication face to face	X	program management and coder communication primarily email	
program team updated regularly regarding organizational & program status	X	meetings infrequently scheduled	
open communications is encouraged	X	communication hrough chain of command only is encouraged	
program manager accessible for discussions	X	program manager difficult to get an appointment to see	
program management (PM) is viewed as separate from team		PM mixes with team frequently	X
management regularly holds team meetings	X	meetings are sporadic	
meetings are structured with definite goals and objectives	X	meetings are informal	
program management is generally easy to reach and talk to	X	PM is usually hard to get a hold of and difficult to talk to	
team-program manager relationship adult-adult	X	team-program management relationship parent-child	
schedules are spontaneous and poorly communicated		schedules must be fixed and rigidly followed and formally reported	X
work is seen as complex processes involving team working together	X	work broken into pieces with minimal team member interaction	
action items often is poorly disseminated and usually not followed through		action items communicated and followed through thoroughly	X
team members require frequent clarifications by PM for assigned tasks		team members rarly require clarifications by PM for assigned tasks	X

Pair choice section THREE: (People Management) choose most applicable term of the two for each row (page 2 of 2):

Leadership:

long range organizational vision	X	short tem program and immediate w ork focus	
lead through personal attention to others	X	action-oriented leadership approach	
run as much of the organization as possible		let team make decisions as much as possible	X
direct and domineering style		encourage independence in others	X
traditional leaders respect hierarchy		do w hat needs to be done	X
w in cooperation rather than demand it	X	tough-minded w ith others	
act strongly and forcefully in the field of ideas		prefer to lead other independent types while seeking autonomy for self	X
consults w ith team members to find solutions to problems	X	consults team members to get validation of PM's predetermined solutions	
keep people w ell informed	X	only as much know ledge as necessary for their w ork	
make things happen by focusing on the immediate problems	X	long range focus and de-emphasize current problems	
manage others loosely and prefer minimal supervision	X	follow traditional procedures and rules conscientiously	
leadership, management decisions exclusively by program management		program management makes decisions but gets inputs from team	X
team-program manager relationship adult-adult	X	team-program management relationship parent-child	
program management makes decisions but gets inputs from team		all program team members responsible for program decisions	X
w hen a problem arises: management takes over to solve it		management lets the team solve the problems	X
leadership is do as I say, not do as I do	X	leadership by example	
program expectation not influenced by PM	X	program expectation managed by PM	
PM gives freedom to team, but has no mentoring for members (abdication)		PM empow ers teams by mentoring members to be leaders	X
promgram management w aits and sees w hat happens then plans	X	management plans far in advance	
program management is constantly reacting to emergencies		management is one step ahead of problems	X
facilitative approach to solving problems	X	take charge readily and often	
program management is complex, takes much time to understand	X	management is simple, easy to figure out	
program management prefers to plunge right in		takes time to separate things to be done and order of doing them	X
program management reacts spur of the moment		methodically follow s plans	X

Technical Competency of the Program Manager:

PM has technical experience particular to the particular s/w program	X	PM relies on team members solely	
PM participates in technical review s	X	PM only in non-technical review s	
PM participates in making technical decisions w hen problems arise	X	PM delegates technical questions	
PM does not get involved discussing technical options		PM contributes to technical options being discussed	X
PM does not review technical options and decisions		PM review s technical options and decisions	X
PM actively attempts to keep up-to-date with current technology and standards		PM is removed from cutting edge technology issues	X
PM receives technical periodicals and occasionally references applicable articles	X	PM doesn't read periodicals nor reference current articles to team	
PM doesn't have technical background (or education)	X	PM has technical background (or education)	
team members avoid PM w hen they need technical advice		team members generally consider talking to PM regarding technical issues	X

HR [13] + Comm. [21] + Leadership [20] + Tech. Competency [8] = People Mgmt. score [60] Enter on QMM scoresheet blk c.

Pair choice section FOUR: (Risk Management(RM)) choose most applicable term of the two for each row (page 1 of 2):

RM is formal and documented	X	RM is informal, if at all	
a risk management plan exists	X	no risk management plan is developed	
RM is more of a data call than a useful document		RM drives decisions on the program	X
RM is done prior to the program beginning		RM is done prior and during program execution	X
RM is only done during the program execution		RM is done prior and during program execution	X
risks are generalized through the whole program		risks are categorized	X
risk management is done internally, only	X	an outside organization also contributes to the RM process	
risk is a management function	X	risk is a program team function	
risks are precisely articulated	X	risks are generalized, if at all	
each risk has a consequence	X	consequences are generalized, if at all	
a mitigation strategy is completed for each risk	X	mitigation strategy is generalized, if at all	
contingency plans are developed for a RM plan	X	contingency plans are ad hoc as problems arise in the program	
risks are anticipated	X	if problems arise, management will deal with it	
the program doesn't have any risk		programs that do not have risk, have problems	X
risk management is automated	X	risk management may use tools, but depend on human input	
risks are assigned probabilities	X	probabilities are not relevant for RM	
all risks are potential problems, relative priorities for risks are not useful	X	risks are weighed relative to other program risks and thus prioritized	
risk management information is only shared internally	X	risk management information is shared with all stakeholders	
risk analysis uses ordinal rankings	X	risk analysis uses actual measurements with a mathematical model	
regret analysis used	X	no regret analysis done	
attach probabilities to future events	X	no probabilities associated with future events	
assessing risks with mechanical meethods	X	risks should be compared to other risks and sorted	X
risk status tracked	X	not tracked	
technical risks examined	X	no technical risks examined	
process risks examined	X	no process risks examined	
product risks examined	X	no product risks examined	
stakeholder/user risks examined	X	no examination of stakeholder/user risks	
checklists used to identify risks	X	no checklists used	
risks are tracked	X	no tracking or monitoring of risks	
each risk has an impact	X	no impact analysis of risk	
each risk has a mitigation plan	X	no individual risk mitigation	
risks monitored by priority	X	no special attention to track higher priority risks	
risk assessment is formalized	X	no formal risk assessment	
risk control is formalized	X	no formal risk control	
integration risks not considered		integration risks examined	X
Risk Management (page 1 of 2) score	**30**		

Pair choice section FOUR: (Risk Management(RM)) choose most applicable term of the two for each row (page 2 of 2):

risks to cost	X	no cost risks examined	
unforeseen risks have occurred in program		any risk that came up had been identified previously	X
personnel risks examined	X	no personnel risks examined	
estimation risks examined	X	no estimation risks examined	
planning risks examined	X	no planning risks examined	
requirements risks examined	X	no requirements risks examined	
resource risks examined	X	no resource risks examined	
risk management plan updated regularly	X	no regular risk management plan updates	
risks charted	X	risks not charted	
performance risks examined	X	performance risks not examined	
program management self risks examined	X	no program management risks examined	
risk from program constraints examined		no program constraint risks examined	X
each category of risks are prioritized	X	no prioritization	
each category of risks are evaluated for impact	X	no impact analysis performed	
each category of risks have control strategy	X	no control strategy	
documentation risks examined	X	no documentation risks examined	
regret matrix tracked	X	no regret matrix or not tracked	
communication of risk activities are facilitated	X	no facilitation or promotion of communication of risk activities	
taxonomy-based questionnaire used to identify risks		taxonomy-based questionnaire not used	X
associated hardware risks examined	X	no consideration for hardware risks	
integration risks examined	X	integration risks not examined	
communication risks examined	X	communication risks not examined	
leadership risks examined		leadership risks not considered	X
risk avoidance considered for certain risks	X	risk avoidance not considered for risks	
risk documentation forms used	X	no risk documentation forms used	
dependency risks examined	X	no dependency risks examined	
alternatives like risk avoidance considered for high risk items	X	no consideration of risk avoidance	
documented risk statements use a condition-consequence type format	X	condition-consequence of risk statements not clearly defined	
no assignment of ownership of risk mitigation action		each risk mitigation action is assigned to an individual for resolution	X
calculation of risk exposure made (probability X loss, for each risk)		no risk exposure calculations	X
oral communication of risks only		risks written in a way that communicates nature and status of factors	X
triggers used to quantify risk conditions present	X	risk conditions present are all subjective	
risk "czar" in program for monitoring risks		no special positions/responsibilities for risk monitoring	X
post-program review completed (scheduled) for unanticipated problems ID		no post-program reviews completed or scheduled	X
no schedule risks examined		risks to schedule investigated	X

Risk Management (pg 2 of 2) score [30] +pg 1 score [31] = TOTAL SCORE [61] Enter on QMM scoresheet blk d.

E. PROGRAM C – PROGRAM MANAGER

1. QMM Summary Score Sheet

QMM Scoresheet Category	Part One Score		Part Two Score		Total Score		Importance Coefficient		Weighted Score
Requirements Management	a	46	e	7	53	X	0.92	=	48.76
Est./Planning Management	b	60	f	44	104	X	0.67	=	69.68
People Management	c	18	g	-15	3	X	1.86	=	5.58
Risk Management	d	62	h	47	109	X	0.55	=	59.95

QMM SCORE	183.97

Max. QMM score possible **528.00**
Min. QMM score possible **-130.86**

QMM percentage score: **47.78%**

Objective/Subjective view of the overall success of program A on a scale of 0 to 10
(0 being total failure, 10 being perfect program total success)
Survey Participant: Program Manager
Success Score: 6

2. Requirements Management Questionnaire Responses

No.	Requirements Management Questionnaire - Total: Block e	Yes	No	N/A	
1	PM chose to have a formal requirements list			X	
2	Requirements recorded in some way			X	
3	Written requirements were part of some formal document			X	
4	Written requirements were informal			X	
5	At least some requirements were oral only			X	
6	All stakeholders were identified			X	
7	All stakeholders participated in the requirements extraction	X			
8	Some stakeholders participated in the requirements extraction			X	
9	Management extracted requirements, no stakeholder involvement		X		
10	Management passed requirements to development team			X	
11	Stakeholders not involvved in Management extraction, but approved			X	
12	Management gets inputs from stakeholders, then develops requirements		X		
13	Developers work informally with users to arrive at requirements			X	
14	Same as 13, but management oversees and formalizes			X	
	If a waterfall or sequential development strategy:				
15	All requirements complete before design				
16	Some requirements left incomplete prior to design				
17	Requirements informal prior to design effort				
18	Requirements serve as input				
19	Length of time for requirements work greater than development work				
20	Requirements developed in parallel to design				
OR	***If a prototype, throwaway, or other development strategy:***				
15	Learn about requirements through development efforts	X			
16	No coding until all requirements are defined			X	
17	Requirements formal prior to design effort			X	
18	Requirements serve as output			X	
19	Requirements definition work in parallel to development efforts			X	
20	Requirements developed in parallel to design	X			
21	Are requirements frozen at some phase			X	
22	Change management exists			X	
23	Change management is formal		X		
24	Project strategy is consistent throughout development			X	
25	Requirements are updated			X	
26	Configuration Management (CM) exists	X			
27	CM is formal			X	
28	Requirements are testable			X	
29	Requirements testing considered/implemented during extraction			X	
30	Requirements testing plan exists			X	
31	Requirements testing is formal			X	
32	All requirements have priorities			X	
33	All requirements must be implemented			X	
34	Requirements are tested			X	
35	All requirements are equally important			X	
36	At least some requirements have priorities			X	
37	All requirements are traceable			X	
38	Traceability not important			X	
39	Each requirement has an author			X	
40	Who authored requirement is not important			X	
41	Initial set of requirements to be implemented, no requirements creep			X	
42	Structured and tracked changes to requirements only			X	
43	Change is inevitable, changes allowed at all times			X	
44	Change is inevitable, but changes limited			X	
45	Requirements control funding			X	
46	Requirements history kept			X	
47	Baseline established for requirements at some point prior to develop				Total
	TOTAL SCORING	7	0		7

3. Estimation/Planning Questionnaire Responses

No.	Estimation/Planning Questionnaire - Total: Block f	Yes	No	N/A	
1	A volume product metric used (LOC, # of files, # of screens, pages of doc)	X			
2	Measure used for various product elements (modules, components, CSCI)	X			
3	Product measures made by phase (amt at implementation, LOC changed at unit test)	X			
4	Other product attributes measured (FP, throughput, mem cap, cyclomatic complexity)		X		
5	Product matrics tracked and updated hroughout program execution	X			
6	Event count process metric used (# defects in test, reqmt changes, milestones met)			X	
7	Time measure process metric used (cycle time)	X			
8	Process metrics tracked and updated throughout program execution	X			
9	Program cost estimations made from product or process metrics	X			
10	Program cost extimations tracked and updated to reflect progress/changes	X			
11	Factor analysis performed on program	X			
12	Program's primary purpose, including major functions and deliverables known			X	
13	Work breakdown structure developed	X			
14	Task estimated with realistic expectations of productivity probabilities	X			
15	Schedules developed based on realistic expectations	X			
16	Schedules tracked and updated based on new information	X			
17	Detailed activity lists used for clearly defined completed/not completed tasks	X			
18	Quality assurance plan or similar to aid in detecting defects early in program	X			
19	COCOMO estimates performed	X			
20	CSCI clearly defined and tasked	X			
21	Estimates completed ad hoc		X		
22	Gantt charts used and updated	X			
23	Resource estimations (working hrs, job categories, task activities) done	X			
24	Earned value established	X			
25	Earned value tracked throughout program	X			
26	Quality expectations established for product with users and stakeholders	X			
27	Critical path for program tasks developed and tracked	X			
28	Measure of effectiveness (MOE) or Figure of merit established and tracked		X		
29	Estimates are updated routinely	X			
30	Schedules are updated routinely	X			
31	Estimations are made by program management (top-down)	X			
32	Estimateions are made by program team members (bottom-up)		X		
33	Automated program tracking used		X		
34	PM usually thorough in tracking and reporting schedules and financials	X			
35	WBS developed only as data call		X		
36	Earned value used to track program progress	X			
37	PM insists on prioritizing work reduction as schedule/funding compromised by stakeholders			X	
38	Estimations are done using both top down and bottoms up approaches			X	
39	All program team members involved in planning process			X	
40	Hardware also considered in estimaation process	X			
41	Program history compiled	X			
42	System upgrades (SCR) software changes requests estimated individually	X			
43	Management duties apart of each team member's responsibilities			X	
44	PM dictates schedules to program team	X			
45	Code reviews planned in schedule	X			
46	Defined tangible milestones established for program tasks			X	
47	Test planning done at the start of the program			X	
48	Estimations are completed by those performing the tasks	X			
49	Sensitivity analysis performed for program choices	X		X	
50	Software deployment planning completed	X		X	Total
	TOTAL SCORING	44			44

4. People Management Questionnaire Responses

No.	People Management Questionnaire - Total: Block g	Yes	No	N/A	
1	PM is accessible in person by each team member		X		
2	PM is accessible via email (memo, letter) by each team member		X		
3	PM is accessible via phone by each team member		X		
4	PM not only considers a person's suitability, not also desire to be on a team		X		
5	PM consults with each team member regarding their career goals		X		
6	PM regularly holds meetings to inform team of program progress		X		
7	PM solicits opinions from team members before making decisions		X		
8	PM lets teams make decisions affecting their work		X		
9	PM freuently makes decisions without any consultation with members			X	
10	PM understands the technology/language of the program		X		
11	PM is able to communicate with other the technical issues in the program		X		
12	PM prioritized problems or conflicts within the program		X		
13	PM assists team members in developing/advising of career path		X		
14	PM empowers program members to recommend hiring new team members		X		
15	PM empowers program members to recommend firings of other members			X	
16	PM specifically assigns work to each program member			X	
17	PM sets communication protocol			X	
18	PM allows unrestricted communications			X	
19	PM encourages or requires training for each individual		X		
20	PM takes control in difficult/roblem areas		X		
21	PM looks ahead to new programs, new upgrades of existing program		X		
22	PM maintains regular communications with all stakeholders			X	
23	PM maintains regular communications with users		X		
24	PM encourages program team communication with users		X		
25	PM encourages program team communication with stakeholders			X	
26	PM facilitates horizontal communication within program			X	
27	PM facilitates communication during integration			X	
28	PM holds meetings without clear objectives	X			
29	PM must approve all decisions within the program	X			
30	PM must approve all interactions with stakeholders	X			
31	PM must approve all interactions with users	X			
32	PM makes all presentations to stakeholders/users	X			
33	PM is considered "flexible" in terms of program members personal issues		X		
34	PM, at least occasionally, schedules/promotes outside work team activities		X		
35	PM is readily willing to listen to program prblems and complaints			X	
36	PM takes action to resolve program problems and complaints			X	
37	PM is generally respected by stakeholders, users, and organization			X	
38	PM sometimes fails to grasp important technical issues in program			X	
39	PM recruits program team members from outside organization		X		
40	PM participates in technical reviews			X	
41	Program personnel have clearly defined specific tasks	X			
42	Although individual's tasks are specific, each exposed to the "bigger picture"			X	
43	PM has clearly defined his/her expectations for each individual			X	
44	PM delegation of duties is usually seemless in execution		X		
45	PM acts as facilitator to solving personnel conflicts		X		
46	PM attempts to motivate individuals on the program team		X		
47	PM clearly spearates technical from managerial roles for individuals	X			
48	PM directs how he/she expects the task to be accomplished	X			
49	PM directs what needs to be done, but does not direct how	X			
50	PM attempts to spotlight individuals in the program for positive exposure			X	Total
	TOTAL SCORING	-4	-11		-15

5. Risk Management Questionnaire Responses

No.	Risk Management Questionnaire - Total: Block h	Yes	No	N/A	
1	Risk Management (RM) is specifically an activity in the program	X			
2	RM is formal and documented	X			
3	A specific RM lan exists	X			
4	RM is required in the program, but not used during the program	X			
5	RM is done prior to the program execution		X		
6	RM is done by an outside entity to the development	X			
7	RM is done internally only	X			
8	RM is both internally performed and externally assessed		X		
9	RM planning occurs during or after major milestones in the program	X			
10	Risk Assessment is only a management function	X			
11	RM is informal or non existent		X		
12	There is a RM plan, but it is not updated or tracked		X		
13	Risks are only generalized	X			
14	Each risk is delineated	X			
15	Each risk has a consequence	X			
16	Each risk has a likelihood rating of some sort	X			
17	Each risk has a mitigation strategy	X			
18	Risk Management is automated	X			
19	Risks are tracked	X			
20					
21	Regret analysis performed		X		
22	RM drives decisions in the program			X	
23	Risks have probabilities	X			
24	Risk Management is ad hoc		X		
25	RM information is shared with all stakeholders (as appropriate)	X			
26	Risks are weighed relative to other program risks	X			
27	Risk Assessment is a program team activity	X			
28	Risk Assessment done prior to program start	X			
29	Risk Assessment includes personnal risk	X			
30	RM uses tools, but depends on human decisions	X			
31	Risk assessment includes cost risks	X			
32	Risk Assessment includes schedule risks	X			
33	Risk Assessment includes technology risks	X			
34	Risk Assessment is briefed organization structure above program manager	X			
35	Risk Assessment includes requirements risks	X			
36	Risk Assessment includes user risks (too little involvement of user)	X			
37	Risk Assessment includes documentation risks	X			
38	Risk Assessment includes integration risks	X			
39	Risk Assessment includes interface risks (non-standard)	X			
40	Risk Assessment includes continuing requirements change (feature creep)	X			
41	Risk Assessment includes dependent projects/programs risks	X			
42	Documentation proof exists to demonstrate following risk management plan	X			
43	High rish have measured tracking (high profile status)	X			
44	Organizational history used to search for risks	X			
45	Other organizational checklists used for risk assessment	X			
46	Internal organizational checklists used for risk assessment	X			
47	Risk Assessment information contributed to internal or other database	X			
48	Risk Assessment includes internal organization risks	X			
49	Risk Assessment includes stakeholder risks	X			
50	No risk management needed; program is straightforward & understood		X		Total
	TOTAL SCORING	47			47

6. Pair Choices Responses

Pair choice section ONE: (Requirements Management) choose most applicable term of the two for each row (page 1 of 2):

formal requirement list	X	informal requirement list	
written requirements	X	oral requirements	
requirements informal, but recorded	X	requirements not recorded	
requirements as part of an SRS (or other formal repository)	X	requirements informally recorded	
requirements taken as is from customer		look to reformulate, interview in-depth, or otherwise re-validate	X
only one development strategy used	X	strategies not consistent, used at different times	
stakeholders as part of requirements development	X	stakeholders approving requirements after formulated by development team	
requirements are testable	X	requirements have no test plans	
informal test plan or no test plan		formal test plan	X
test team involved with requirements	X	no test team input or plans during requirements development	
only a percentage of requirements present in baseline		baseline must contain all requirements	X
requirements documentation has hierarchical structure	X	all requirements must be implemented	
requirements have listed responsible party	X	requirements origin not important	
requirements documentation have versions	X	no requirements history	
requirements have specific attribute values	X	requirements all rank evenly	
funding controls requirements definition		requirements definition controls funding	X
reqquirements are top down	X	requirements are bottom up	
users/stakeholders are identified and interviewed (market survey)		no special consideration to identify users/stakeholders	X
each requirement has a singular concept		some requirements are compound statements	X
requirements definition minimized when funding short	X	program scope may reduce, but requirements definition completed	
requirements extraction has formal process	X	requirements extraction ad hoc	
change procedures formal	X	change procedures ad hoc	
users/stakeholders somehow involved in requirements definition	X	program team only involved in requirement definition	
management sets requirements for developers		developers at least partially involved in setting requirements	X
requirements changed at least once since baseline established prior to new version	X	requirements in baseline has not changed prior to new version or upgrade	
no ranking of requirements		requirements have priorities assigned	X
use-case diagrams (or other models or scenario developments)	X	no models used for requirements extraction	
requirements changes informal		requirements changes formal	X
plan to "freeze" requirements at some designated milestone		no provision for "freezing" requirements	X
requirements must be traceable	X	origin of requirements not important	
requirements must be testable		system developed must be testable	X
test plans to determine requirements implemented		no test plans needed for requirements verification	X
requirements have priorities in implementation	X	all requirements must be implemented	
some requirements have multiple statements or ideas	X	one idea, one statement per requirement	

Requirements Management (page 1 of 2) score **29**

Pair choice section ONE: (Requirements Management) choose most applicable term of the two for each row (page 2 of 2):

ANSWER THIS BLOCK OF QUESTIONS ONLY IF A SEQUENTIAL OR WATERFALL APPROACH IS USED FOR DEVELOPMENT (Requirements page 2 of 2)			
requirements first, then initial development w ork		initial development w ork then requirements	
requirements documentation driving development		requirements documentation developed in parallel/after development	
user feedback considered during development		after development starts, user feedback serves as input to new w ork	
change management procedures used strictly		change management procedures as guidance only	
design decisions prior to or in parallel to requirrements development		design decisions only after approved requirements stabilized	
requirements summarized w ht w e have developed		requirements are the blueprint for development	
length of time for requirements w ork greater than development w ork		length of time for requirements w ork less than development w ork	
requirements have design detail		no design detail in requirements	
requirements creep to be avoided		requirements creep o.k., but need to be controlled	
freeze requirements at some point		requirements are fluid throughout development	
formal change procedure		informal change procedure	
change management plan		no change management plan	
requirements ambiguity alw ays present to some extent		requirements ambuiguity unacceptable at any level	
testing considered up frornt during requirements determination		testing considered dow n the line during development	
requirements development team members different from implementation		those w orking on requirements, w ork on implementation	
start implementation as early as possible to help define requirements		requirements must be defined prior to any implementation w ork	
ANSWER THIS BLOCK OF QUESTIONS ONLY IF A PROTOTYPING, THROWAWAY, SYNCHRONIZE & STABILIZE, OR OTHER STRATEGY USED			
develop prototype, then determine requirements	X	determine requirements prior to any development w ork	
requirements testing done after each iteration	X	no testing	
individual changes as necessary	X	only block changes made	
development team decides on changes after iteration		users involved w ith changes	X
changes based on feedback only from user for correction of problems		changes to upgrade system and correct problems	X
funding controls changes and change procedures	X	changes control funding	
requirements documentation finalized prior to development		requirements fluid throughout development (only freeze at end)	X
requirements test plans completed prior to development	X	requirements test plans completed after development	
requirements first, then initial development w ork	X	initial development w ork then requirements	
use development effort to learn more about requirements	X	define all requirements prior to coding anything	
requirements ambiguity alw ays present to some extent	X	requirements ambiguity unacceptable at any level	
requirements have design detail	X	no design detail in requirements	
user feedback considered during development	X	after development starts, user feedback serves as input to new w ork	
get something to users as soon as possible for evaluation	X	make sure it is complete before releasing	
management dictates requirements	X	development team visually represent requirements through rapid prototyping	
new requirements allow ed after initial requirements defined	X	new requirements not allow ed	

Requirements Management (pg 2 of 2) score [17] +pg 1 score [29] = TOTAL SCORE [46] Enter on QMM scoresheet blk a.

Pair choice section TWO: (Estimation/Planning Management) choose most applicable term of the two for each row (page 1 of 2):

at least one estimation method used in program	X	no estimates	
formal derivation of product metric for estimation of size	X	ad hoc size estimation	
ad hoc process evaluation		formal derivation of at lest one process metric	X
develop work breakdown structure (WBS)	X	assign work as needs arise	
estimates are developed to fulfill a data call only		use estimates to plan program	X
use estimates to sell program only		estimates are useful to the project tema for planning purposes	X
resource evaluations made for program	X	no resource evaluation for planning	
use both bottom up & top down for estimate, use one stakeholders like		use both bottom up & top down and evaluate significant differences	X
estimates made and not updated		estimates updated throughout program	X
resources estimations used to adjust product size estimate	X	estimations made irregardless of resources available	
estimations made to fit budget		budget made from estimations	X
estimations compromised to get program		rather risk loss of program than compromise confident estimations	X
cycle time estimations	X	no cycle time estimations	
event count estimations	X	no event count estimations	
lines of code (LOC) estimation	X	no LOC estimation	
function pont (FP) estimation	X	no FP estimation	
estimates by algorithmic methods	X	estimates by analogy	
expert judgement for estimates	X	ad hoc estimates	
estimates by algorithmic methods	X	ad hoc estimates	
expert judgement for estimates	X	estimates by analogy	
ad hoc estimates		estimates by analogy	X
bottom up estimates	X	expert judgement	
top down estimates	X	expert judgement	
ad hoc estimates		any other estimate process	X
fuzzy logic estimating method	X	no formal estimation methodology	X
WBS development from estimates	X	WBS development in parallel or prior to estimation completion	
critical path of program determined	X	tasks developed but no path is identified	
estimators are program team members	X	estimators are outside program team	
management only on estimations	X	all team members involved in estimation process	
estimates updated at reviews	X	no updates of estimates	
estimates updated at reviews	X	estimates constantly updates (in between reviews, to)	
estimate procedures stay the same	X	estimate procedures change	
stakeholders are part of estimation process	X	stakeholders brief estimations after completion	
estimates are used beyond initial selling of program	X	estimates are one time events, used for a specific purpose once	
WBS has objective measure of completeness	X	important to have WBS as guide, not rigid implementation	

Estimation/Planning Management (page 1 of 2) score **33**

Pair choice section TWO: (Estimation/Planning Management) choose most applicable term of the two for each row (page 2 of 2):

life cycle estimates	X	estimates for program initiation only	
system upgrades (SCR) software change requests estimated individually	X	systems upgrades estimated as whole	
estimates for on-gong resources needed to maintain s/w	X	estimates for maintenance not done	
informal re-estimates during development		formal re-estimates at pre-defined milestones	X
formal re-estimates when amendment changing the system is introduced	X	informal re-estimates when amendment changing the system	
person in-charge of estimation walks in a managers office to get an opinion	X	meeting(s) organized for purpose of performing cost estimations	
factor analysis prior to commencement of program		none done	X
change control procedures set in place	X	no set procedures	
elapsed time and actual work time estimates	X	one or the other or neither	
no schedule created		scheudle created	X
schedule not updated		schedule updated	X
schedule followed	X	schedule not followed	
tasks identification arises as program progresses	X	detailed level tasks identified prior to program initiation	
scope of program understood by all	X	scope not explicitly defined	
quality factors and criteria identified		no explicit quality factors defined	X
no project tracking tools used		project tracking tools used	X
CSCIs identified and tasked		CSCIs not explicitly identified	X
expectations are managed via estimations	X	estimations are made to fit preconceived expectations	
no cost schedule developed		cost schedule developed	
no resource schedule developed		resource schedule developed	
team members, management know at any time if in budget & schedule	X	exact budget & schedule status somewhat unclear to at least some	
individual program phases are estimated	X	only top level program estimated	
stakeholders/users emphasis understood-quick to field or all complete	X	program management sets delivery tradeoffs without outside input	
testing planned with initial program planning	X	testing not in initial planning	
documentation not considered ininitial planning		documentation part of initial planning	X
hardware considered in estimations		software only considered	X
no formal schedule/cost tracking		formal procedures established for tracking cost and schedule	X
earned value set up	X	earned value not used	
estimations omit documentation planning		documentation in estimates	X
training omitted in estimates		training part of estimates	X
earned value set up, but not tracked		earned value tracked	X
detailed planning done with incomplete set of requirements		detailed planning done with detailed set of requirements	X
complete infrastructure support mechanism understood for estimations	X	no consideration of infrastructure done for estimations	
team possibilities considered for planning of program	X	no consideration for outside teaming possibilities	
work breakdown structure (WBS) set up	X	no WBS completed	

Estimation/Planning Management (pg 2 of 2) score [27] +pg 1 score [33] = TOTAL SCORE [60] Enter on QMM scoresheet blk b.

Pair choice section THREE: (People Management) choose most applicable term of the two for each row (page 1 of 2):

Human Resources

program team members have clearly deined, segmented roles	X	work responsibilities are shared	
formal team building procedures are used		no formal team building emphasized	X
program manager flexible regarding work hours		program manager maintains strict standards for work hours	X
big picture conveyed to all team members by program management		program management focuses on the partitioned tasks with team	X
people issues dealt with primarily through indirect methods (email, memo, etc)		people issues dealt with primarily through direct methods (face-to-face)	X
training is required and planned on a regular basis	X	training is ad hoc	
each team member is educated on and understands overall program and their roles		team members only know their respective areas	X
consideration for team members' career goals are reflected in assignments		team members must adapt to tasks that are assigned	X
team members assignments and responsibilities are mostly dictated by PM		assignments and responsibilities are discussed and agreed upon with PM	X
management leads in problem solving	X	management facilitates and lets team lead in problem solving	
management welcomes problems as challenges and opportunities		management views problems as obstacles and grounds for punishment	X
team members participate in performance evaluations of peers		Personnel evaluations are strictly PM responsibility	X
management reinforcement feedback sparse and inconsistent, if any	X	management provides timely reinforcement feedback for positive behaviors	
management provides basic needs of office facilities fairly well		office facilities are a drawback to working in the program	X
working conditions are fairly comfortable, time off policy fairly good		working conditions and time off policy is inconsistent and difficult at times	X

Communication:

communications primarily written (email)	X	communications primarily verbal (face-to-face)	
detailed instructions: oral presentation, follow-up email		email only	X
formal communication protocol		informal communications	X
external vertical communications restricted	X	external vertical communication allowed	
coders notebook weekly accomplishment reports required		not required	X
user-coder relationship established, encouraged, and mediated		user-coder interaction minimized	X
meetings structured to minimize waster time		meetings unstructured and open ended	X
meetings have agenda, objectives, and conclude with action items		meeting agenda fluid and open ended	X
program management and coder communication face to face		program management and coder communication primarily email	X
program team updated regularly regarding organizational & program status		meetings infrequently scheduled	X
open communications is encouraged		communication hrough chain of command only is encouraged	X
program manager accessible for discussions		program manager difficult to get an appointment to see	X
program management (PM) is viewed as separate from team	X	PM mixes with team frequently	
management regularly holds team meetings	X	meetings are sporadic	
meetings are structured with definite goals and objectives	X	meetings are informal	
program management is generally easy to reach and talk to		PM is usually hard to get a hold of and difficult to talk to	X
team-program manager relationship adult-adult		team-program management relationship parent-child	X
schedules are spontaneous and poorly communicated		schedules must be fixed and rigidly followed and formally reported	X
work is seen as complex processes involving team working together		work broken into pieces with minimal team member interaction	X
action items often is poorly disseminated and usually not followed through	X	action items communicated and followed through thoroughly	
team members require frequent clarifications by PM for assigned tasks	X	team members rarly require clarifications by PM for assigned tasks	

Pair choice section THREE: (People Management) choose most applicable term of the two for each row (page 2 of 2):

Leadership:

long range organizational vision	X	short tem program and immediate work focus	
lead through personal attention to others	X	action-oriented leadership approach	
run as much of the organization as possible	X	let team make decisions as much as possible	
direct and domineering style	X	encourage independence in others	
traditional leaders respect hierarchy	X	do what needs to be done	
win cooperation rather than demand it		tough-minded with others	X
act strongly and forcefully in the field of ideas	X	prefer to lead other independent types while seeking autonomy for self	
consults with team members to find solutions to problems	X	consults team members to get validation of PM's predetermined solutions	
keep people well informed		only as much knowledge as necessary for their work	X
make things happen by focusing on the immediate problems	X	long range focus and de-emphasize current problems	
manage others loosely and prefer minimal supervision		follow traditional procedures and rules conscientiously	X
leadership, management decisions exclusively by program management	X	program management makes decisions but gets inputs from team	
team-program manager relationship adult-adult		team-program management relationship parent-child	X
program management makes decisions but gets inputs from team	X	all program team members responsible for program decisions	
when a problem arises: management takes over to solve it	X	management lets the team solve the problems	
leadership is do as I say, not do as I do	X	leadership by example	
program expectation not influenced by PM	X	program expectation managed by PM	
PM gives freedom to team, but has no mentoring for members (abdication)	X	PM empowers teams by mentoring members to be leaders	
promgram management waits and sees what happens then plans	X	management plans far in advance	X
program management is constantly reacting to emergencies	X	management is one step ahead of problems	
facilitative approach to solving problems	X	take charge readily and often	
program management is complex, takes much time to understand		management is simple, easy to figure out	X
program management prefers to plunge right in	X	takes time to separate things to be done and order of doing them	
program management reacts spur of the moment	X	methodically follows plans	

Technical Competency of the Program Manager:

PM has technical experience particular to the particular s/w program	X	PM relies on team members solely	
PM participates in technical reviews	X	PM only in non-technical reviews	
PM participates in making technical decisions when problems arise	X	PM delegates technical questions	
PM does not get involved discussing technical options	X	PM contributes to technical options being discussed	
PM does not review technical options and decisions	X	PM reviews technical options and decisions	X
PM actively attempts to keep up-to-date with current technology and standards		PM is removed from cutting edge technology issues	X
PM receives technical periodicals and occasionally references applicable articles		PM doesn't read periodicals nor reference current articles to team	X
PM doesn't have technical background (or education)		PM has technical background (or education)	X
team members avoid PM when they need technical advice		team members generally consider talking to PM regarding technical issues	X

HR [2] + Comm. [4] + Leadership [6] + Tech. Competency [6] = People Mgmt. score [18] Enter on QMM scoresheet blk c.

Pair choice section FOUR: (Risk Management(RM)) choose most applicable term of the two for each row (page 1 of 2):

RM is formal and documented	X	RM is informal, if at all	
a risk management plan exists	X	no risk management plan is developed	
RM is more of a data call than a useful document		RM drives decisions on the program	X
RM is done prior to the program beginning		RM is done prior and during program execution	X
RM is only done during the program execution		RM is done prior and during program execution	X
risks are generalized through the whole program	X	risks are categorized	
risk management is done internally, only		an outside organization also contributes to the RM process	X
risk is a management function		risk is a program team function	X
risks are precisely articulated	X	risks are generalized, if at all	
each risk has a consequence	X	consequences are generalized, if at all	
a mitigation strategy is completed for each risk	X	mitigation strategy is generalized, if at all	
contingency plans are developed for a RM plan	X	contingency plans are ad hoc as problems arise in the program	
risks are anticipated		if problems arise, management will deal with it	X
the program doesn't have any risk		programs that do not have risk, have problems	X
risk management is automated		risk management may use tools, but depend on human input	X
risks are assigned probabilities	X	probabilities are not relevant for RM	
all risks are potential problems, relative priorities for risks are not useful		risks are weighed relative to other program risks and thus prioritized	X
risk management information is only shared internally		risk management information is shared with all stakeholders	X
risk analysis uses ordinal rankings		risk analysis uses actual measurements with a mathematical model	
regret analysis used	X	no regret analysis done	
attach probabilities to future events	X	no probabilities associated with future events	
assessing risks with mechanical meethods		risks should be compared to other risks and sorted	X
risk status tracked	X	not tracked	
technical risks examined	X	no technical risks examined	
process risks examined	X	no process risks examined	
product risks examined	X	no product risks examined	
stakeholder/user risks examined	X	no examination of stakeholder/user risks	
checklists used to identify risks	X	no checklists used	
risks are tracked	X	no tracking or monitoring of risks	
each risk has an impact	X	no impact analysis of risk	
each risk has a mitigation plan	X	no individual risk mitigation	
risks monitored by priority	X	no special attention to track higher priority risks	
risk assessment is formalized	X	no formal risk assessment	
risk control is formalized	X	no formal risk control	
integration risks not considered		integration risks examined	X

Risk Management (page 1 of 2) score **33**

Pair choice section FOUR: (Risk Management(RM)) choose most applicable term of the two for each row (page 2 of 2):

risks to cost	X	no cost risks examined	
unforeseen risks have occurred in program		any risk that came up had been identified previously	X
personnel risks examined	X	no personnel risks examined	
estimation risks examined	X	no estimation risks examined	
planning risks examined	X	no planning risks examined	
requirements risks examined	X	no requirements risks examined	
resource risks examined	X	no resource risks examined	
risk management plan updated regularly	X	no regular risk management plan updates	
risks charted	X	risks not charted	
performance risks examined	X	performance risks not examined	
program management self risks examined	X	no program management risks examined	
risk from program constraints examined	X	no program constraint risks examined	
each category of risks are prioritized	X	no prioritization	
each category of risks are evaluated for impact	X	no impact analysis performed	
each category of risks have control strategy	X	no control strategy	
documentation risks examined	X	no documentation risks examined	
regret matrix tracked	X	no regret matrix or not tracked	
communication of risk activities are facilitated	X	no facilitation or promotion of communication of risk activities	
taxonomy-based questionnaire used to identify risks	X	taxonomy-based questionnaire not used	
associated hardware risks examined	X	no consideration for hardware risks	
integration risks examined	X	integration risks not examined	
communication risks examined	X	communication risks not examined	
leadership risks examined	X	leadership risks not considered	
risk avoidance considered for certain risks	X	risk avoidance not considered for risks	
risk documentation forms used	X	no risk documentation forms used	
dependency risks examined	X	no dependency risks examined	
alternatives like risk avoidance considered for high risk items	X	no consideration of risk avoidance	
documented risk statements use a condition-consequence type format	X	condition-consequence of risk statements not clearly defined	
no assignment of ownership of risk mitigation action	X	each risk mitigation action is assigned to an individual for resolution	
calculation of risk exposure made (probability X loss, for each risk)		no risk exposure calculations	X
oral communication of risks only	X	risks written in a way that communicates nature and status of factors	
triggers used to quantify risk conditions present		risk conditions present are all subjective	X
risk "czar" in program for monitoring risks		no special positions/responsibilities for risk monitoring	X
post-program review completed (scheduled) for unanticipated problems ID		no post-program reviews completed or scheduled	X
no schedule risks examined		risks to schedule investigated	X

Risk Management (pg 2 of 2) score [29] +pg 1 score [33] = TOTAL SCORE [62] Enter on QMM scoresheet blk d.

F. PROGRAM C – ASSOCIATE

1. QMM Summary Score Sheet

QMM Scoresheet Category	Part One Score		Part Two Score		Total Score		Importance Coefficient		Weighted Score
Requirements Management	a	45	e	5	50	X	0.92	=	46
Est./Planning Management	b	54	f	38	92	X	0.67	=	61.64
People Management	c	16	g	-15	1	X	1.86	=	1.86
Risk Management	d	61	h	46	107	X	0.55	=	58.85

QMM SCORE	168.35

Max. QMM score possible **528.00**
Min. QMM score possible **-130.86**

QMM percentage score: **45.41%**

Objective/Subjective view of the overall success of program A on a scale of 0 to 10
(0 being total failure, 10 being perfect program total success)
Survey Participant: Associate
Success Score: 6

2. Requirements Management Questionnaire Responses

No.	Requirements Management Questionnaire - Total: Block e	Yes	No	N/A	
1	PM chose to have a formal requirements list		X		
2	Requirements recorded in some way			X	
3	Written requirements were part of some formal document			X	
4	Written requirements were informal			X	
5	At least some requirements were oral only			X	
6	All stakeholders were identified			X	
7	All stakeholders participated in the requirements extraction			X	
8	Some stakeholders participated in the requirements extraction			X	
9	Management extracted requirements, no stakeholder involvement	X			
10	Management passed requirements to development team		X		
11	Stakeholders not involvved in Management extraction, but approved		X		
12	Management gets inputs from stakeholders, then develops requirements		X		
13	Developers work informally with users to arrive at requirements		X		
14	Same as 13, but management oversees and formalizes		X		
	If a waterfall or sequential development strategy:				
15	All requirements complete before design				
16	Some requirements left incomplete prior to design				
17	Requirements informal prior to design effort				
18	Requirements serve as input				
19	Length of time for requirements work greater than development work				
20	Requirements developed in parallel to design				
OR	***If a prototype, throwaway, or other development strategy:***				
15	Learn about requirements through development efforts			X	
16	No coding until all requirements are defined			X	
17	Requirements formal prior to design effort			X	
18	Requirements serve as output			X	
19	Requirements definition work in parallel to development efforts	X			
20	Requirements developed in parallel to design			X	
21	Are requirements frozen at some phase			X	
22	Change management exists			X	
23	Change management is formal			X	
24	Project strategy is consistent throughout development		X		
25	Requirements are updated		X		
26	Configuration Management (CM) exists		X		
27	CM is formal	X			
28	Requirements are testable			X	
29	Requirements testing considered/implemented during extraction		X		
30	Requirements testing plan exists		X		
31	Requirements testing is formal		X		
32	All requirements have priorities			X	
33	All requirements must be implemented			X	
34	Requirements are tested			X	
35	All requirements are equally important			X	
36	At least some requirements have priorities		X		
37	All requirements are traceable		X		
38	Traceability not important			X	
39	Each requirement has an author		X		
40	Who authored requirement is not important			X	
41	Initial set of requirements to be implemented, no requirements creep			X	
42	Structured and tracked changes to requirements only			X	
43	Change is inevitable, changes allowed at all times			X	
44	Change is inevitable, but changes limited			X	
45	Requirements control funding			X	
46	Requirements history kept	X			
47	Baseline established for requirements at some point prior to develop			X	Total
	TOTAL SCORING	3			5

3. Estimation/Planning Questionnaire Responses

No.	Estimation/Planning Questionnaire - Total: Block f	Yes	No	N/A	
1	A volume product metric used (LOC, # of files, # of screens, pages of doc)	X			
2	Measure used for various product elements (modules, components, CSCI)	X			
3	Product measures made by phase (amt at implementation, LOC changed at unit test)	X			
4	Other product attributes measured (FP, throughput, mem cap, cyclomatic complexity)	X			
5	Product matrics tracked and updated hroughout program execution	X			
6	Event count process metric used (# defects in test, reqmt changes, milestones met)		X		
7	Time measure process metric used (cycle time)	X			
8	Process metrics tracked and updated throughout program execution			X	
9	Program cost estimations made from product or process metrics		X		
10	Program cost extimations tracked and updated to reflect progress/changes	X			
11	Factor analysis performed on program		X		
12	Program's primary purpose, including major functions and deliverables known			X	
13	Work breakdown structure developed	X			
14	Task estimated with realistic expectations of productivity probabilities	X			
15	Schedules developed based on realistic expectations	X			
16	Schedules tracked and updated based on new information	X			
17	Detailed activity lists used for clearly defined completed/not completed tasks			X	
18	Quality assurance plan or similar to aid in detecting defects early in program	X			
19	COCOMO estimates performed	X			
20	CSCI clearly defined and tasked			X	
21	Estimates completed ad hoc		X		
22	Gantt charts used and updated	X			
23	Resource estimations (working hrs, job categories, task activities) done	X			
24	Earned value established	X			
25	Earned value tracked throughout program	X			
26	Quality expectations established for product with users and stakeholders	X			
27	Critical path for program tasks developed and tracked	X			
28	Measure of effectiveness (MOE) or Figure of merit established and tracked		X		
29	Estimates are updated routinely	X			
30	Schedules are updated routinely	X			
31	Estimations are made by program management (top-down)	X			
32	Estimateions are made by program team members (bottom-up)	X			
33	Automated program tracking used	X			
34	PM usually thorough in tracking and reporting schedules and financials			X	
35	WBS developed only as data call			X	
36	Earned value used to track program progress	X			
37	PM insists on prioritizing work reduction as schedule/funding compromised by stakeholders			X	
38	Estimations are done using both top down and bottoms up approaches			X	
39	All program team members involved in planning process			X	
40	Hardware also considered in estimaation process			X	
41	Program history compiled	X			
42	System upgrades (SCR) software changes requests estimated individually			X	
43	Management duties apart of each team member's responsibilities			X	
44	PM dictates schedules to program team			X	
45	Code reviews planned in schedule	X			
46	Defined tangible milestones established for program tasks	X			
47	Test planning done at the start of the program	X			
48	Estimations are completed by those performing the tasks			X	
49	Sensitivity analysis performed for program choices			X	
50	Software deployment planning completed			X	Total
	TOTAL SCORING	38			38

4. People Management Questionnaire Responses

No.	People Management Questionnaire - Total: Block g	Yes	No	N/A	
1	PM is accessible in person by each team member			X	
2	PM is accessible via email (memo, letter) by each team member			X	
3	PM is accessible via phone by each team member			X	
4	PM not only considers a person's suitability, not also desire to be on a team			X	
5	PM consults with each team member regarding their career goals			X	
6	PM regularly holds meetings to inform team of program progress			X	
7	PM solicits opinions from team members before making decisions			X	
8	PM lets teams make decisions affecting their work			X	
9	PM freuently makes decisions without any consultation with members	X			
10	PM understands the technology/language of the program			X	
11	PM is able to communicate with other the technical issues in the program			X	
12	PM prioritized problems or conflicts within the program			X	
13	PM assists team members in developing/advising of career path			X	
14	PM empowers program members to recommend hiring new team members			X	
15	PM empowers program members to recommend firings of other members			X	
16	PM specifically assigns work to each program member			X	
17	PM sets communication protocol			X	
18	PM allows unrestricted communications			X	
19	PM encourages or requires training for each individual			X	
20	PM takes control in difficult/roblem areas			X	
21	PM looks ahead to new programs, new upgrades of existing program			X	
22	PM maintains regular communications with all stakeholders			X	
23	PM maintains regular communications with users			X	
24	PM encourages program team communication with users			X	
25	PM encourages program team communication with stakeholders			X	
26	PM facilitates horizontal communication within program			X	
27	PM facilitates communication during integration			X	
28	PM holds meetings without clear objectives	X			
29	PM must approve all decisions within the program	X			
30	PM must approve all interactions with stakeholders	X			
31	PM must approve all interactions with users	X			
32	PM makes all presentations to stakeholders/users	X			
33	PM is considered "flexible" in terms of program members personal issues			X	
34	PM, at least occasionally, schedules/promotes outside work team activities			X	
35	PM is readily willing to listen to program prblems and complaints		X		
36	PM takes action to resolve program problems and complaints		X		
37	PM is generally respected by stakeholders, users, and organization				
38	PM sometimes fails to grasp important technical issues in program	X			
39	PM recruits program team members from outside organization		X		
40	PM participates in technical reviews	X			
41	Program personnel have clearly defined specific tasks	X			
42	Although individual's tasks are specific, each exposed to the "bigger picture"		X		
43	PM has clearly defined his/her expectations for each individual		X		
44	PM delegation of duties is usually seemless in execution		X		
45	PM acts as facilitator to solving personnel conflicts		X		
46	PM attempts to motivate individuals on the program team		X		
47	PM clearly spearates technical from managerial roles for individuals			X	
48	PM directs how he/she expects the task to be accomplished			X	
49	PM directs what needs to be done, but does not direct how			X	
50	PM attempts to spotlight individuals in the program for positive exposure			X	Total
	TOTAL SCORING	-8	-7		-15

5. Risk Management Questionnaire Responses

No.	Risk Management Questionnaire - Total: Block h	Yes	No	N/A	
1	Risk Management (RM) is specifically an activity in the program	X			
2	RM is formal and documented	X			
3	A specific RM lan exists	X			
4	RM is required in the program, but not used during the program		X		
5	RM is done prior to the program execution	X			
6	RM is done by an outside entity to the development		X		
7	RM is done internally only		X		
8	RM is both internally performed and externally assessed	X			
9	RM planning occurs during or after major milestones in the program	X			
10	Risk Assessment is only a management function		X		
11	RM is informal or non existent		X		
12	There is a RM plan, but it is not updated or tracked	X			
13	Risks are only generalized		X		
14	Each risk is delineated	X	X		
15	Each risk has a consequence	X	X		
16	Each risk has a likelihood rating of some sort	X			
17	Each risk has a mitigation strategy	X			
18	Risk Management is automated		X		
19	Risks are tracked	X			
20					
21	Regret analysis performed	X			
22	RM drives decisions in the program		X		
23	Risks have probabilities	X			
24	Risk Management is ad hoc		X		
25	RM information is shared with all stakeholders (as appropriate)	X			
26	Risks are weighed relative to other program risks	X			
27	Risk Assessment is a program team activity	X			
28	Risk Assessment done prior to program start	X			
29	Risk Assessment includes personnal risk		X		
30	RM uses tools, but depends on human decisions	X			
31	Risk assessment includes cost risks	X			
32	Risk Assessment includes schedule risks	X			
33	Risk Assessment includes technology risks		X		
34	Risk Assessment is briefed organization structure above program manager			X	
35	Risk Assessment includes requirements risks			X	
36	Risk Assessment includes user risks (too little involvement of user)	X			
37	Risk Assessment includes documentation risks		X		
38	Risk Assessment includes integration risks	X			
39	Risk Assessment includes interface risks (non-standard)	X			
40	Risk Assessment includes continuing requirements change (feature creep)	X			
41	Risk Assessment includes dependent projects/programs risks		X		
42	Documentation proof exists to demonstrate following risk management plan		X		
43	High rish have measured tracking (high profile status)	X			
44	Organizational history used to search for risks	X			
45	Other organizational checklists used for risk assessment	X			
46	Internal organizational checklists used for risk assessment	X			
47	Risk Assessment information contributed to internal or other database	X			
48	Risk Assessment includes internal organization risks	X			
49	Risk Assessment includes stakeholder risks	X			
50	No risk management needed; program is straightforward & understood		X		Total
	TOTAL SCORING	50	-4		46

6. Pair Choices Responses

Pair choice section ONE: (Requirements Management) choose most applicable term of the two for each row (page 1 of 2):

formal requirement list	X	informal requirement list	
written requirements	X	oral requirements	
requirements informal, but recorded	X	requirements not recorded	
requirements as part of an SRS (or other formal repository)	X	requirements informally recorded	
requirements taken as is from customer		look to reformulate, interview in-depth, or otherwise re-validate	X
only one development strategy used	X	strategies not consistent, used at different times	
stakeholders as part of requirements development	X	stakeholders approving requirements after formulated by development team	
requirements are testable	X	requirements have no test plans	
informal test plan or no test plan		formal test plan	X
test team involved with requirements	X	no test team input or plans during requirements development	
only a percentage of requirements present in baseline		baseline must contain all requirements	X
requirements documentation has hierarchical structure		all requirements must be implemented	X
requirements have listed responsible party		requirements origin not important	X
requirements documentation have versions		no requirements history	X
requirements have specific attribute values		requirements all rank evenly	X
funding controls requirements definition		requirements definition controls funding	
reqquirements are top down	X	requirements are bottom up	
users/stakeholders are identified and interviewed (market survey)	X	no special consideration to identify users/stakeholders	
each requirement has a singular concept		some requirements are compound statements	X
requirements definition minimized when funding short	X	program scope may reduce, but requirements definition completed	
requirements extraction has formal process	X	requirements extraction ad hoc	
change procedures formal	X	change procedures ad hoc	X
users/stakeholders somehow involved in requirements definition		program team only involved in requirement definition	X
management sets requirements for developers	X	developers at least partially involved in setting requirements	
requirements changed at least once since baseline established prior to new version	X	requirements in baseline has not changed prior to new version or upgrade	
no ranking of requirements	X	requirements have priorities assigned	
use-case diagrams (or other models or scenario developments)		no models used for requirements extraction	X
requirements changes informal		requirements changes formal	X
plan to "freeze" requirements at some designated milestone		no provision for "freezing" requirements	X
requirements must be traceable	X	origin of requirements not important	
requirements must be testable	X	system developed must be testable	
test plans to determine requirements implemented		no test plans needed for requirements verification	X
requirements have priorities in implementation		all requirements must be implemented	X
some requirements have multiple statements or ideas		one idea, one statement per requirement	X

Requirements Management (page 1 of 2) score **29**

Pair choice section ONE: (Requirements Management) choose most applicable term of the two for each row (page 2 of 2):

ANSWER THIS BLOCK OF QUESTIONS ONLY IF A SEQUENTIAL OR WATERFALL APPROACH IS USED FOR DEVELOPMENT (Requirements page 2 of 2)			
requirements first, then initial development work		initial development work then requirements	
requirements documentation driving development		requirements documentation developed in parallel/after development	
user feedback considered during development		after development starts, user feedback serves as input to new work	
change management procedures used strictly		change management procedures as guidance only	
design decisions prior to or in parallel to requirrements development		design decisions only after approved requirements stabilized	
requirements summarized wht we have developed		requirements are the blueprint for development	
length of time for requirements work greater than development work		length of time for requirements work less than development work	
requirements have design detail		no design detail in requirements	
requirements creep to be avoided		requirements creep o.k., but need to be controlled	
freeze requirements at some point		requirements are fluid throughout development	
formal change procedure		informal change procedure	
change management plan		no change management plan	
requirements ambiguity always present to some extent		requirements ambuiguity unacceptable at any level	
testing considered up frornt during requirements determination		testing considered down the line during development	
requirements development team members different from implementation		those working on requirements, work on implementation	
start implementation as early as possible to help define requirements		requirements must be defined prior to any implementation work	
ANSWER THIS BLOCK OF QUESTIONS ONLY IF A PROTOTYPING, THROWAWAY, SYNCHRONIZE & STABILIZE, OR OTHER STRATEGY USED			
develop prototype, then determine requirements	X	determine requirements prior to any development work	
requirements testing done after each iteration	X	no testing	
individual changes as necessary	X	only block changes made	
development team decides on changes after iteration		users involved with changes	X
changes based on feedback only from user for correction of problems	X	changes to upgrade system and correct problems	
funding controls changes and change procedures	X	changes control funding	
requirements documentation finalized prior to development	X	requirements fluid throughout development (only freeze at end)	
requirements test plans completed prior to development	X	requirements test plans completed after development	
requirements first, then initial development work	X	initial development work then requirements	
use development effort to learn more about requirements	X	define all requirements prior to coding anything	
requirements ambiguity always present to some extent	X	requirements ambiguity unacceptable at any level	
requirements have design detail	X	no design detail in requirements	
user feedback considered during development	X	after development starts, user feedback serves as input to new work	
get something to users as soon as possible for evaluation	X	make sure it is complete before releasing	
management dictates requirements		development team visually represent requirements through rapid prototyping	X
new requirements allowed after initial requirements defined	X	new requirements not allowed	

Requirements Management (pg 2 of 2) score [16] +pg 1 score [29] = TOTAL SCORE [45] Enter on QMM scoresheet blk a.

Pair choice section TWO: (Estimation/Planning Management) choose most applicable term of the two for each row (page 1 of 2):

at least one estimation method used in program	X	no estimates	
formal derivation of product metric for estimation of size	X	ad hoc size estimation	
ad hoc process evaluation	X	formal derivation of at lest one process metric	
develop work breakdown structure (WBS)	X	assign work as needs arise	
estimates are developed to fulfill a data call only		use estimates to plan program	X
use estimates to sell program only		estimates are useful to the project tema for planning purposes	X
resource evaluations made for program	X	no resource evaluation for planning	
use both bottom up & top down for estimate, use one stakeholders like	X	use both bottom up & top down and evaluate significant differences	
estimates made and not updated		estimates updated throughout program	X
resources estimations used to adjust product size estimate	X	estimations made irregardless of resources available	
estimations made to fit budget		budget made from estimations	X
estimations compromised to get program	X	rather risk loss of program than compromise confident estimations	
cycle time estimations	X	no cycle time estimations	
event count estimations	X	no event count estimations	
lines of code (LOC) estimation	X	no LOC estimation	
function pont (FP) estimation	X	no FP estimation	
estimates by algorithmic methods	X	estimates by analogy	
expert judgement for estimates	X	ad hoc estimates	
estimates by algorithmic methods	X	ad hoc estimates	
expert judgement for estimates	X	estimates by analogy	
ad hoc estimates	X	estimates by analogy	
bottom up estimates	X	expert judgement	
top down estimates	X	expert judgement	
ad hoc estimates	X	any other estimate process	
fuzzy logic estimating method	X	no formal estimation methodology	
WBS development from estimates	X	WBS development in parallel or prior to estimation completion	
critical path of program determined	X	tasks developed but no path is identified	
estimators are program team members	X	estimators are outside program team	
management only on estimations	X	all team members involved in estimation process	
estimates updated at reviews	X	no updates of estimates	
estimates updated at reviews	X	estimates constantly updates (in between reviews, to)	
estimate procedures stay the same	X	estimate procedures change	
stakeholders are part of estimation process	X	stakeholders brief estimations after completion	
estimates are used beyond initial selling of program	X	estimates are one time events, used for a specific purpose once	
WBS has objective measure of completeness	X	important to have WBS as guide, not rigid implementation	

Estimation/Planning Management (page 1 of 2) score **27**

Pair choice section TWO: (Estimation/Planning Management) choose most applicable term of the two for each row (page 2 of 2):

life cycle estimates	X	estimates for program initiation only	
system upgrades (SCR) software change requests estimated individually	X	systems upgrades estimated as whole	
estimates for on-gong resources needed to maintain s/w	X	estimates for maintenance not done	
informal re-estimates during development		formal re-estimates at pre-defined milestones	X
formal re-estimates when amendment changing the system is introduced	X	informal re-estimates when amendment changing the system	
person in-charge of estimation walks in a managers office to get an opinion	X	meeting(s) organized for purpose of performing cost estimations	
factor analysis prior to commencement of program	X	none done	
change control procedures set in place	X	no set procedures	
elapsed time and actual work time estimates	X	one or the other or neither	
no schedule created		scheudle created	X
schedule not updated		schedule updated	X
schedule followed	X	schedule not followed	
tasks identification arises as program progresses	X	detailed level tasks identified prior to program initiation	
scope of program understood by all	X	scope not explicitly defined	
quality factors and criteria identified	X	no explicit quality factors defined	
no project tracking tools used	X	project tracking tools used	
CSCIs identified and tasked	X	CSCIs not explicitly identified	
expectations are managed via estimations	X	estimations are made to fit preconceived expectations	
no cost schedule developed		cost schedule developed	X
no resource schedule developed		resource schedule developed	X
team members, management know at any time if in budget & schedule	X	exact budget & schedule status somewhat unclear to at least some	
individual program phases are estimated	X	only top level program estimated	
stakeholders/users emphasis understood-quick to field or all complete	X	program management sets delivery tradeoffs without outside input	
testing planned with initial program planning	X	testing not in initial planning	
documentation not considered ininitial planning	X	documentation part of initial planning	
hardware considered in estimations	X	software only considered	
no formal schedule/cost tracking		formal procedures established for tracking cost and schedule	X
earned value set up	X	earned value not used	
estimations omit documentation planning	X	documentation in estimates	
training omitted in estimates	X	training part of estimates	
earned value set up, but not tracked	X	earned value tracked	
detailed planning done with incomplete set of requirements	X	detailed planning done with detailed set of requirements	
complete infrastructure support mechanism understood for estimations	X	no consideration of infrastructure done for estimations	
team possibilities considered for planning of program	X	no consideration for outside teaming possibilities	
work breakdown structure (WBS) set up	X	no WBS completed	

Estimation/Planning Management (pg 2 of 2) score [27] +pg 1 score [27] = TOTAL SCORE [54] Enter on QMM scoresheet blk b.

Pair choice section THREE: (People Management) choose most applicable term of the two for each row (page 1 of 2):

Human Resources

program team members have clearly deined, segmented roles	X	work responsibilities are shared	X
formal team building procedures are used		no formal team building emphasized	X
program manager flexible regarding work hours		program manager maintains strict standards for work hours	X
big picture conveyed to all team members by program management		program management focuses on the partitioned tasks with team	X
people issues dealt with primarily through indirect methods (email, memo, etc)		people issues dealt with primarily through direct methods (face-to-face)	X
training is required and planned on a regular basis	X	training is ad hoc	X
each team member is educated on and understands overall program and their roles		team members only know their respective areas	X
consideration for team members' career goals are reflected in assignments		team members must adapt to tasks that are assigned	X
team members assignments and responsibilities are mostly dictated by PM	X	assignments and responsibilities are discussed and agreed upon with PM	
management leads in problem solving	X	management facilitates and lets team lead in problem solving	
management welcomes problems as challenges and opportunities		management views problems as obstacles and grounds for punishment	X
team members participate in performance evaluations of peers		Personnel evaluations are strictly PM responsibility	X
management reinforcement feedback sparse and inconsistent, if any	X	management provides timely reinforcement feedback for positive behaviors	
management provides basic needs of office facilities fairly well		office facilities are a drawback to working in the program	X
working conditions are fairly comfortable, time off policy fairly good	X	working conditions and time off policy is inconsistent and difficult at times	

Communication:

communications primarily written (email)	X	communications primarily verbal (face-to-face)	
detailed instructions: oral presentation, follow-up email		email only	X
formal communication protocol		informal communications	X
external vertical communications restricted		external vertical communication allowed	X
coders notebook weekly accomplishment reports required		not required	X
user-coder relationship established, encouraged, and mediated		user-coder interaction minimized	X
meetings structured to minimize waster time		meetings unstructured and open ended	X
meetings have agenda, objectives, and conclude with action items		meeting agenda fluid and open ended	X
program management and coder communication face to face		program management and coder communication primarily email	X
program team updated regularly regarding organizational & program status	X	meetings infrequently scheduled	
open communications is encouraged		communication hrough chain of command only is encouraged	X
program manager accessible for discussions		program manager difficult to get an appointment to see	X
program management (PM) is viewed as separate from team	X	PM mixes with team frequently	
management regularly holds team meetings		meetings are sporadic	X
meetings are structured with definite goals and objectives		meetings are informal	X
program management is generally easy to reach and talk to		PM is usually hard to get a hold of and difficult to talk to	X
team-program manager relationship adult-adult		team-program management relationship parent-child	X
schedules are spontaneous and poorly communicated		schedules must be fixed and rigidly followed and formally reported	X
work is seen as complex processes involving team working together		work broken into pieces with minimal team member interaction	X
action items often is poorly disseminated and usually not followed through	X	action items communicated and followed through thoroughly	
team members require frequent clarifications by PM for assigned tasks	X	team members rarly require clarifications by PM for assigned tasks	

Pair choice section THREE: (People Management) choose most applicable term of the two for each row (page 2 of 2):

Leadership:

long range organizational vision	X	short tem program and immediate w ork focus	
lead through personal attention to others		action-oriented leadership approach	X
run as much of the organization as possible	X	let team make decisions as much as possible	
direct and domineering style	X	encourage independence in others	
traditional leaders respect hierarchy	X	do w hat needs to be done	
w in cooperation rather than demand it	X	tough-minded w ith others	
act strongly and forcefully in the field of ideas	X	prefer to lead other independent types while seeking autonomy for self	
consults w ith team members to find solutions to problems	X	consults team members to get validation of PM's predetermined solutions	
keep people w ell informed	X	only as much know ledge as necessary for their w ork	
make things happen by focusing on the immediate problems		long range focus and de-emphasize current problems	X
manage others loosely and prefer minimal supervision	X	follow traditional procedures and rules conscientiously	
leadership, management decisions exclusively by program management	X	program management makes decisions but gets inputs from team	
team-program manager relationship adult-adult	X	team-program management relationship parent-child	
program management makes decisions but gets inputs from team	X	all program team members responsible for program decisions	
w hen a problem arises: management takes over to solve it	X	management lets the team solve the problems	
leadership is do as I say, not do as I do	X	leadership by example	
program expectation not influenced by PM	X	program expectation managed by PM	
PM gives freedom to team, but has no mentoring for members (abdication)	X	PM empow ers teams by mentoring members to be leaders	
promgram management w aits and sees w hat happens then plans		management plans far in advance	X
program management is constantly reacting to emergencies	X	management is one step ahead of problems	
facilitative approach to solving problems	X	take charge readily and often	
program management is complex, takes much time to understand		management is simple, easy to figure out	X
program management prefers to plunge right in	X	takes time to separate things to be done and order of doing them	
program management reacts spur of the moment	X	methodically follow s plans	

Technical Competency of the Program Manager:

PM has technical experience particular to the particular s/w program		PM relies on team members solely	X
PM participates in technical review s	X	PM only in non-technical review s	
PM participates in making technical decisions w hen problems arise	X	PM delegates technical questions	
PM does not get involved discussing technical options	X	PM contributes to technical options being discussed	
PM does not review technical options and decisions		PM review s technical options and decisions	X
PM actively attempts to keep up-to-date with current technology and standards		PM is removed from cutting edge technology issues	X
PM receives technical periodicals and occasionally references applicable articles		PM doesn't read periodicals nor reference current articles to team	X
PM doesn't have technical background (or education)		PM has technical background (or education)	X
team members avoid PM w hen they need technical advice	X	team members generally consider talking to PM regarding technical issues	

HR [4] + Comm. [4] + Leadership [4] + Tech. Competency [4] = People Mgmt. score [16] Enter on QMM scoresheet blk c.

Pair choice section FOUR: (Risk Management(RM)) choose most applicable term of the two for each row (page 1 of 2):

RM is formal and documented	X	RM is informal, if at all	
a risk management plan exists	X	no risk management plan is developed	
RM is more of a data call than a useful document	X	RM drives decisions on the program	
RM is done prior to the program beginning	X	RM is done prior and during program execution	
RM is only done during the program execution	X	RM is done prior and during program execution	
risks are generalized through the whole program		risks are categorized	X
risk management is done internally, only		an outside organization also contributes to the RM process	X
risk is a management function		risk is a program team function	X
risks are precisely articulated		risks are generalized, if at all	X
each risk has a consequence	X	consequences are generalized, if at all	X
a mitigation strategy is completed for each risk	X	mitigation strategy is generalized, if at all	X
contingency plans are developed for a RM plan	X	contingency plans are ad hoc as problems arise in the program	X
risks are anticipated	X	if problems arise, management will deal with it	
the program doesn't have any risk		programs that do not have risk, have problems	X
risk management is automated		risk management may use tools, but depend on human input	X
risks are assigned probabilities	X	probabilities are not relevant for RM	
all risks are potential problems, relative priorities for risks are not useful		risks are weighed relative to other program risks and thus prioritized	X
risk management information is only shared internally	X	risk management information is shared with all stakeholders	
risk analysis uses ordinal rankings		risk analysis uses actual measurements with a mathematical model	X
regret analysis used	X	no regret analysis done	
attach probabilities to future events	X	no probabilities associated with future events	
assessing risks with mechanical meethods		risks should be compared to other risks and sorted	X
risk status tracked	X	not tracked	
technical risks examined	X	no technical risks examined	
process risks examined	X	no process risks examined	
product risks examined	X	no product risks examined	
stakeholder/user risks examined	X	no examination of stakeholder/user risks	
checklists used to identify risks	X	no checklists used	
risks are tracked	X	no tracking or monitoring of risks	
each risk has an impact	X	no impact analysis of risk	
each risk has a mitigation plan		no individual risk mitigation	X
risks monitored by priority	X	no special attention to track higher priority risks	
risk assessment is formalized	X	no formal risk assessment	
risk control is formalized	X	no formal risk control	
integration risks not considered	X	integration risks examined	

Risk Management (page 1 of 2) score **28**

Pair choice section FOUR: (Risk Management(RM)) choose most applicable term of the two for each row (page 2 of 2):

risks to cost	X	no cost risks examined	
unforeseen risks have occurred in program	X	any risk that came up had been identified previously	
personnel risks examined		no personnel risks examined	X
estimation risks examined	X	no estimation risks examined	
planning risks examined	X	no planning risks examined	
requirements risks examined	X	no requirements risks examined	
resource risks examined	X	no resource risks examined	
risk management plan updated regularly	X	no regular risk management plan updates	
risks charted	X	risks not charted	
performance risks examined	X	performance risks not examined	
program management self risks examined	X	no program management risks examined	
risk from program constraints examined	X	no program constraint risks examined	
each category of risks are prioritized	X	no prioritization	
each category of risks are evaluated for impact	X	no impact analysis performed	
each category of risks have control strategy	X	no control strategy	
documentation risks examined	X	no documentation risks examined	
regret matrix tracked	X	no regret matrix or not tracked	
communication of risk activities are facilitated	X	no facilitation or promotion of communication of risk activities	
taxonomy-based questionnaire used to identify risks	X	taxonomy-based questionnaire not used	
associated hardware risks examined		no consideration for hardware risks	X
integration risks examined	X	integration risks not examined	
communication risks examined	X	communication risks not examined	
leadership risks examined	X	leadership risks not considered	
risk avoidance considered for certain risks	X	risk avoidance not considered for risks	
risk documentation forms used	X	no risk documentation forms used	
dependency risks examined	X	no dependency risks examined	
alternatives like risk avoidance considered for high risk items		no consideration of risk avoidance	X
documented risk statements use a condition-consequence type format	X	condition-consequence of risk statements not clearly defined	
no assignment of ownership of risk mitigation action		each risk mitigation action is assigned to an individual for resolution	X
calculation of risk exposure made (probability X loss, for each risk)	X	no risk exposure calculations	
oral communication of risks only	X	risks written in a way that communicates nature and status of factors	X
triggers used to quantify risk conditions present		risk conditions present are all subjective	X
risk "czar" in program for monitoring risks	X	no special positions/responsibilities for risk monitoring	
post-program review completed (scheduled) for unanticipated problems ID	X	no post-program reviews completed or scheduled	
no schedule risks examined		risks to schedule investigated	X

Risk Management (pg 2 of 2) score [28] +pg 1 score [33] = TOTAL SCORE [61] Enter on QMM scoresheet blk d.

G. SCORING

1. Requirements Management Questionnaire

No.	Requirements Management Questionnaire	Yes	No	N/A	
1	PM chose to have a formal requirements list	1	0	0	
2	Requirements recorded in some way	2	-1	0	
3	Written requirements were part of some formal document	1	0	0	
4	Written requirements were informal	1	2	0	
5	At least some requirements were oral only	-2	1	0	
6	All stakeholders were identified	2	-1	0	
7	All stakeholders participated in the requirements extraction	2	0	0	
8	Some stakeholders participated in the requirements extraction	1	0	0	
9	Management extracted requirements, no stakeholder involvement	1	2	1	
10	Management passed requirements to development team	1	0	0	
11	Stakeholders not involvved in Management extraction, but approved	-1	0	0	
12	Management gets inputs from stakeholders, then develops requirements	1	0	1	
13	Developers work informally with users to arrive at requirements	1	0	0	
14	Same as 13, but management oversees and formalizes	2	0	0	
	If a waterfall or sequential development strategy:				
15	All requirements complete before design	1	-3	0	
16	Some requirements left incomplete prior to design	-1	0	0	
17	Requirements informal prior to design effort	-1	0	0	
18	Requirements serve as input	1	-1	0	
19	Length of time for requirements work greater than development work	2	-1	0	
20	Requirements developed in parallel to design	-1	1	0	
OR	***If a prototype, throwaway, or other development strategy:***				
15	Learn about requirements through development efforts	1	-1	0	
16	No coding until all requirements are defined	-3	1	0	
17	Requirements formal prior to design effort	-1	0	0	
18	Requirements serve as output	1	-1	0	
19	Requirements definition work in parallel to development efforts	2	-1	0	
20	Requirements developed in parallel to design	1	-1	0	
21	Are requirements frozen at some phase	1	-1	0	
22	Change management exists	3	-3	0	
23	Change management is formal	1	0	0	
24	Project strategy is consistent throughout development	1	0	0	
25	Requirements are updated	1	0	0	
26	Configuration Management (CM) exists	3	-3	0	
27	CM is formal	1	0	0	
28	Requirements are testable	2	-2	0	
29	Requirements testing considered/implemented during extraction	2	0	0	
30	Requirements testing plan exists	2	0	0	
31	Requirements testing is formal	1	0	0	
32	All requirements have priorities	2	-2	0	
33	All requirements must be implemented	0	1	0	
34	Requirements are tested	1	-1	0	
35	All requirements are equally important	0	1	0	
36	At least some requirements have priorities	1	0	0	
37	All requirements are traceable	1	0	0	
38	Traceability not important	0	1	0	
39	Each requirement has an author	1	0	0	
40	Who authored requirement is not important	0	1	0	
41	Initial set of requirements to be implemented, no requirements creep	0	1	0	
42	Structured and tracked changes to requirements only	1	-1	0	
43	Change is inevitable, changes allowed at all times	-1	1	0	
44	Change is inevitable, but changes limited	1	0	0	
45	Requirements control funding	1	0	0	
46	Requirements history kept	1	-1	0	
47	Baseline established for requirements at some point prior to develop	2	-2	0	Total
	TOTAL SCORING				

2. Estimation/Planning Questionnaire

No.	Estimation/Planning Questionnaire	Yes	No	N/A	
1	A volume product metric used (LOC, # of files, # of screens, pages of doc)	1	0	0	
2	Measure used for various product elements (modules, components, CSCI)	1	0	0	
3	Product measures made by phase (amt at implementation, LOC changed at unit test)	1	0	0	
4	Other product attributes measured (FP, throughput, mem cap, cyclomatic complexity)	1	0	0	
5	Product matrics tracked and updated hroughout program execution	2	-1	0	
6	Event count process metric used (# defects in test, reqmt changes, milestones met)	1	0	0	
7	Time measure process metric used (cycle time)	1	0	0	
8	Process metrics tracked and updated throughout program execution	2	-1	0	
9	Program cost estimations made from product or process metrics	1	0	0	
10	Program cost extimations tracked and updated to reflect progress/changes	1	0	0	
11	Factor analysis performed on program	1	0	0	
12	Program's primary purpose, including major functions and deliverables known	2	-1	0	
13	Work breakdown structure developed	2	-1	0	
14	Task estimated with realistic expectations of productivity probabilities	1	-1	0	
15	Schedules developed based on realistic expectations	1	-1	0	
16	Schedules tracked and updated based on new information	1	-1	0	
17	Detailed activity lists used for clearly defined completed/not completed tasks	1	-1	0	
18	Quality assurance plan or similar to aid in detecting defects early in program	1	-1	0	
19	COCOMO estimates performed	1	-1	0	
20	CSCI clearly defined and tasked	2	-1	0	
21	Estimates completed ad hoc	-2	0	0	
22	Gantt charts used and updated	1	-1	0	
23	Resource estimations (working hrs, job categories, task activities) done	1	-1	0	
24	Earned value established	2	-1	0	
25	Earned value tracked throughout program	2	0	0	
26	Quality expectations established for product with users and stakeholders	1	-1	0	
27	Critical path for program tasks developed and tracked	2	-1	0	
28	Measure of effectiveness (MOE) or Figure of merit established and tracked	1	0	0	
29	Estimates are updated routinely	2	-1	0	
30	Schedules are updated routinely	2	-1	0	
31	Estimations are made by program management (top-down)	1	0	0	
32	Estimateions are made by program team members (bottom-up)	2	0	0	
33	Automated program tracking used	1	0	0	
34	PM usually thorough in tracking and reporting schedules and financials	1	-1	0	
35	WBS developed only as data call	-1	0	0	
36	Earned value used to track program progress	2	-1	0	
37	PM insists on prioritizing work reduction as schedule/funding compromised by stakeholders	1	-1	0	
38	Estimations are done using both top down and bottoms up approaches	2	-1	0	
39	All program team members involved in planning process	2	-1	0	
40	Hardware also considered in estimaation process	1	-1	0	
41	Program history compiled	1	0	0	
42	System upgrades (SCR) software changes requests estimated individually	1	-1	0	
43	Management duties apart of each team member's responsibilities	-1	1	0	
44	PM dictates schedules to program team	-1	0	0	
45	Code reviews planned in schedule	1	-1	0	
46	Defined tangible milestones established for program tasks	2	-1	0	
47	Test planning done at the start of the program	1	-1	0	
48	Estimations are completed by those performing the tasks	1	-1	0	
49	Sensitivity analysis performed for program choices	1	-1	0	
50	Software deployment planning completed	1	-1	0	Total
	TOTAL SCORING				

3. People Management Questionnaire

No.	People Management Questionnaire	Yes	No	N/A	
1	PM is accessible in person by each team member	1	0	0	
2	PM is accessible via email (memo, letter) by each team member	1	0	0	
3	PM is accessible via phone by each team member	1	0	0	
4	PM not only considers a person's suitability, not also desire to be on a team	1	0	0	
5	PM consults with each team member regarding their career goals	1	0	0	
6	PM regularly holds meetings to inform team of program progress	2	-1	0	
7	PM solicits opinions from team members before making decisions	2	-1	0	
8	PM lets teams make decisions affecting their work	1	0	0	
9	PM freuently makes decisions without any consultation with members	-2	2	0	
10	PM understands the technology/language of the program	1	0	0	
11	PM is able to communicate with other the technical issues in the program	1	-1	0	
12	PM prioritized problems or conflicts within the program	1	0	0	
13	PM assists team members in developing/advising of career path	1	-1	0	
14	PM empowers program members to recommend hiring new team members	1	-1	0	
15	PM empowers program members to recommend firings of other members	1	-1	0	
16	PM specifically assigns work to each program member	1	-1	0	
17	PM sets communication protocol	1	0	0	
18	PM allows unrestricted communications	1	0	0	
19	PM encourages or requires training for each individual	1	-1	0	
20	PM takes control in difficult/roblem areas	1	0	0	
21	PM looks ahead to new programs, new upgrades of existing program	1	0	0	
22	PM maintains regular communications with all stakeholders	2	-1	0	
23	PM maintains regular communications with users	2	-1	0	
24	PM encourages program team communication with users	1	-1	0	
25	PM encourages program team communication with stakeholders	1	-1	0	
26	PM facilitates horizontal communication within program	1	-1	0	
27	PM facilitates communication during integration	1	-1	0	
28	PM holds meetings without clear objectives	-1	2	0	
29	PM must approve all decisions within the program	-1	1	0	
30	PM must approve all interactions with stakeholders	-1	1	0	
31	PM must approve all interactions with users	-1	1	0	
32	PM makes all presentations to stakeholders/users	0	1	0	
33	PM is considered "flexible" in terms of program members personal issues	1	0	0	
34	PM, at least occasionally, schedules/promotes outside work team activities	1	0	0	
35	PM is readily willing to listen to program prblems and complaints	1	-1	0	
36	PM takes action to resolve program problems and complaints	1	-1	0	
37	PM is generally respected by stakeholders, users, and organization	1	-1	0	
38	PM sometimes fails to grasp important technical issues in program	-1	1	0	
39	PM recruits program team members from outside organization	1	-1	0	
40	PM participates in technical reviews	-1	1	0	
41	Program personnel have clearly defined specific tasks	0	1	0	
42	Although individual's tasks are specific, each exposed to the "bigger picture"	2	-1	0	
43	PM has clearly defined his/her expectations for each individual	2	-1	0	
44	PM delegation of duties is usually seemless in execution	1	0	0	
45	PM acts as facilitator to solving personnel conflicts	2	-1	0	
46	PM attempts to motivate individuals on the program team	2	-1	0	
47	PM clearly spearates technical from managerial roles for individuals	0	1	0	
48	PM directs how he/she expects the task to be accomplished	0	1	0	
49	PM directs what needs to be done, but does not direct how	2	-1	0	
50	PM attempts to spotlight individuals in the program for positive exposure	2	-1	0	Total
	TOTAL SCORING				

4. Risk Management Questionnaire

No.	Risk Management Questionnaire	Yes	No	N/A	
1	Risk Management (RM) is specifically an activity in the program	4	-4	0	
2	RM is formal and documented	3	-3	0	
3	A specific RM lan exists	2	-2	0	
4	RM is required in the program, but not used during the program	-1	1	0	
5	RM is done prior to the program execution	1	0	0	
6	RM is done by an outside entity to the development	1	0	0	
7	RM is done internally only	0	1	0	
8	RM is both internally performed and externally assessed	1	-1	0	
9	RM planning occurs during or after major milestones in the program	1	-1	0	
10	Risk Assessment is only a management function	0	1	0	
11	RM is informal or non existent	-1	1	0	
12	There is a RM plan, but it is not updated or tracked	1	0	0	
13	Risks are only generalized	-1	0	0	
14	Each risk is delineated	1	0	0	
15	Each risk has a consequence	1	0	0	
16	Each risk has a likelihood rating of some sort	1	0	0	
17	Each risk has a mitigation strategy	1	0	0	
18	Risk Management is automated	1	0	0	
19	Risks are tracked	2	-2	0	
20					
21	Regret analysis performed	2	0	0	
22	RM drives decisions in the program	3	-2	0	
23	Risks have probabilities	1	0	0	
24	Risk Management is ad hoc	-3	0	0	
25	RM information is shared with all stakeholders (as appropriate)	1	0	0	
26	Risks are weighed relative to other program risks	1	0	0	
27	Risk Assessment is a program team activity	1	0	0	
28	Risk Assessment done prior to program start	2	-1	0	
29	Risk Assessment includes personnal risk	1	-1	0	
30	RM uses tools, but depends on human decisions	2	-1	0	
31	Risk assessment includes cost risks	1	0	0	
32	Risk Assessment includes schedule risks	1	0	0	
33	Risk Assessment includes technology risks	1	-1	0	
34	Risk Assessment is briefed organization structure above program manager	1	-1	0	
35	Risk Assessment includes requirements risks	1	-1	0	
36	Risk Assessment includes user risks (too little involvement of user)	1	0	0	
37	Risk Assessment includes documentation risks	1	0	0	
38	Risk Assessment includes integration risks	1	-1	0	
39	Risk Assessment includes interface risks (non-standard)	1	-1	0	
40	Risk Assessment includes continuing requirements change (feature creep)	1	-1	0	
41	Risk Assessment includes dependent projects/programs risks	1	0	0	
42	Documentation proof exists to demonstrate following risk management plan	1	0	0	
43	High rish have measured tracking (high profile status)	1	0	0	
44	Organizational history used to search for risks	1	0	0	
45	Other organizational checklists used for risk assessment	1	0	0	
46	Internal organizational checklists used for risk assessment	1	0	0	
47	Risk Assessment information contributed to internal or other database	1	0	0	
48	Risk Assessment includes internal organization risks	1	0	0	
49	Risk Assessment includes stakeholder risks	2	-1	0	
50	No risk management needed; program is straightforward & understood	-3	3	0	Total
	TOTAL SCORING				

5. Pair Choice

Pair choice section ONE: (Requirements Management) choose most applicable term of the two for each row (page 1 of 2):

formal requirement list	2	informal requirement list	1
written requirements	2	oral requirements	0
requirements informal, but recorded	1	requirements not recorded	0
requirements as part of an SRS (or other formal repository)	2	requirements informally recorded	1
requirements taken as is from customer	0	look to reformulate, interview in-depth, or otherwise re-validate	2
only one development strategy used	1	strategies not consistent, used at different times	0
stakeholders as part of requirements development	2	stakeholders approving requirements after formulated by development team	1
requirements are testable	2	requirements have no test plans	0
informal test plan or no test plan	0	formal test plan	2
test team involved with requirements	1	no test team input or plans during requirements development	0
only a percentage of requirements present in baseline	0	baseline must contain all requirements	2
requirements documentation has hierarchical structure	1	all requirements must be implemented	0
requirements have listed responsible party	1	requirements origin not important	0
requirements documentation have versions	2	no requirements history	0
requirements have specific attribute values	1	requirements all rank evenly	0
funding controls requirements definition	0	requirements definition controls funding	1
reqquirements are top down	1	requirements are bottom up	2
users/stakeholders are identified and interviewed (market survey)	1	no special consideration to identify users/stakeholders	0
each requirement has a singular concept	3	some requirements are compound statements	0
requirements definition minimized when funding short	0	program scope may reduce, but requirements definition completed	1
requirements extraction has formal process	1	requirements extraction ad hoc	0
change procedures formal	1	change procedures ad hoc	0
users/stakeholders somehow involved in requirements definition	1	program team only involved in requirement definition	0
management sets requirements for developers	0	developers at least partially involved in setting requirements	1
requirements changed at least once since baseline established prior to new version	0	requirements in baseline has not changed prior to new version or upgrade	1
no ranking of requirements	0	requirements have priorities assigned	1
use-case diagrams (or other models or scenario developments)	2	no models used for requirements extraction	0
requirements changes informal	0	requirements changes formal	1
plan to "freeze" requirements at some designated milestone	1	no provision for "freezing" requirements	0
requirements must be traceable	1	origin of requirements not important	0
requirements must be testable	3	system developed must be testable	1
test plans to determine requirements implemented	2	no test plans needed for requirements verification	0
requirements have priorities in implementation	1	all requirements must be implemented	0
some requirements have multiple statements or ideas	0	one idea, one statement per requirement	2

Requirements Management (page 1 of 2) score [ ]

Pair choice section ONE: (Requirements Management) choose most applicable term of the two for each row (page 2 of 2):

ANSWER THIS BLOCK OF QUESTIONS ONLY IF A SEQUENTIAL OR WATERFALL APPROACH IS USED FOR DEVELOPMENT (Requirements page 2 of 2)			
requirements first, then initial development work	1	initial development work then requirements	0
requirements documentation driving development	1	requirements documentation developed in parallel/after development	0
user feedback considered during development	1	after development starts, user feedback serves as input to new work	0
change management procedures used strictly	1	change management procedures as guidance only	0
design decisions prior to or in parallel to requirrements development	0	design decisions only after approved requirements stabilized	1
requirements summarized wht we have developed	0	requirements are the blueprint for development	1
length of time for requirements work greater than development work	2	length of time for requirements work less than development work	0
requirements have design detail	0	no design detail in requirements	1
requirements creep to be avoided	1	requirements creep o.k., but need to be controlled	0
freeze requirements at some point	1	requirements are fluid throughout development	0
formal change procedure	1	informal change procedure	0
change management plan	2	no change management plan	0
requirements ambiguity always present to some extent	0	requirements ambuiguity unacceptable at any level	2
testing considered up frornt during requirements determination	2	testing considered down the line during development	1
requirements development team members different from implementation	0	those working on requirements, work on implementation	1
start implementation as early as possible to help define requirements	0	requirements must be defined prior to any implementation work	2
ANSWER THIS BLOCK OF QUESTIONS ONLY IF A PROTOTYPING, THROWAWAY, SYNCHRONIZE & STABILIZE, OR OTHER STRATEGY USED			
develop prototype, then determine requirements	1	determine requirements prior to any development work	0
requirements testing done after each iteration	1	no testing	0
individual changes as necessary	1	only block changes made	0
development team decides on changes after iteration	0	users involved with changes	1
changes based on feedback only from user for correction of problems	1	changes to upgrade system and correct problems	1
funding controls changes and change procedures	1	changes control funding	1
requirements documentation finalized prior to development	0	requirements fluid throughout development (only freeze at end)	2
requirements test plans completed prior to development	1	requirements test plans completed after development	0
requirements first, then initial development work	0	initial development work then requirements	1
use development effort to learn more about requirements	2	define all requirements prior to coding anything	0
requirements ambiguity always present to some extent	1	requirements ambiguity unacceptable at any level	0
requirements have design detail	1	no design detail in requirements	1
user feedback considered during development	1	after development starts, user feedback serves as input to new work	0
get something to users as soon as possible for evaluation	2	make sure it is complete before releasing	0
management dictates requirements	0	development team visually represent requirements through rapid prototyping	1
new requirements allowed after initial requirements defined	1	new requirements not allowed	0

Requirements Management (pg 2 of 2) score ☐ +pg 1 score ☐ = TOTAL SCORE ☐ Enter on QMM scoresheet blk a.

Pair choice section TWO: (Estimation/Planning Management) choose most applicable term of the two for each row (page 1 of 2):

at least one estimation method used in program	1	no estimates	0
formal derivation of product metric for estimation of size	1	ad hoc size estimation	0
ad hoc process evaluation	0	formal derivation of at lest one process metric	1
develop work breakdown structure (WBS)	1	assign work as needs arise	0
estimates are developed to fulfill a data call only	0	use estimates to plan program	1
use estimates to sell program only	0	estimates are useful to the project tema for planning purposes	1
resource evaluations made for program	1	no resource evaluation for planning	0
use both bottom up & top down for estimate, use one stakeholders like	0	use both bottom up & top down and evaluate significant differences	1
estimates made and not updated	0	estimates updated throughout program	1
resources estimations used to adjust product size estimate	1	estimations made irregardless of resources available	0
estimations made to fit budget	0	budget made from estimations	1
estimations compromised to get program	0	rather risk loss of program than compromise confident estimations	1
cycle time estimations	1	no cycle time estimations	0
event count estimations	1	no event count estimations	0
lines of code (LOC) estimation	1	no LOC estimation	0
function pont (FP) estimation	1	no FP estimation	0
estimates by algorithmic methods	1	estimates by analogy	1
expert judgement for estimates	1	ad hoc estimates	0
estimates by algorithmic methods	1	ad hoc estimates	0
expert judgement for estimates	0	estimates by analogy	1
ad hoc estimates	0	estimates by analogy	1
bottom up estimates	1	expert judgement	0
top down estimates	1	expert judgement	0
ad hoc estimates	0	any other estimate process	1
fuzzy logic estimating method	1	no formal estimation methodology	0
WBS development from estimates	1	WBS development in parallel or prior to estimation completion	0
critical path of program determined	1	tasks developed but no path is identified	0
estimators are program team members	1	estimators are outside program team	0
management only on estimations	0	all team members involved in estimation process	1
estimates updated at reviews	1	no updates of estimates	0
estimates updated at reviews	0	estimates constantly updates (in between reviews, to)	1
estimate procedures stay the same	1	estimate procedures change	0
stakeholders are part of estimation process	1	stakeholders brief estimations after completion	0
estimates are used beyond initial selling of program	1	estimates are one time events, used for a specific purpose once	0
WBS has objective measure of completeness	1	important to have WBS as guide, not rigid implementation	0

Estimation/Planning Management (page 1 of 2) score

Pair choice section TWO: (Estimation/Planning Management) choose most applicable term of the two for each row (page 2 of 2):

life cycle estimates	1	estimates for program initiation only	0
system upgrades (SCR) software change requests estimated individually	1	systems upgrades estimated as whole	0
estimates for on-gong resources needed to maintain s/w	1	estimates for maintenance not done	0
informal re-estimates during development	0	formal re-estimates at pre-defined milestones	1
formal re-estimates when amendment changing the system is introduced	1	informal re-estimates when amendment changing the system	0
person in-charge of estimation walks in a managers office to get an opinion	0	meeting(s) organized for purpose of performing cost estimations	1
factor analysis prior to commencement of program	1	none done	0
change control procedures set in place	1	no set procedures	0
elapsed time and actual work time estimates	1	one or the other or neither	0
no schedule created	0	scheudle created	1
schedule not updated	0	schedule updated	1
schedule followed	1	schedule not followed	0
tasks identification arises as program progresses	0	detailed level tasks identified prior to program initiation	1
scope of program understood by all	1	scope not explicitly defined	0
quality factors and criteria identified	1	no explicit quality factors defined	0
no project tracking tools used	0	project tracking tools used	1
CSCIs identified and tasked	1	CSCIs not explicitly identified	0
expectations are managed via estimations	1	estimations are made to fit preconceived expectations	0
no cost schedule developed	0	cost schedule developed	1
no resource schedule developed	0	resource schedule developed	1
team members, management know at any time if in budget & schedule	1	exact budget & schedule status somewhat unclear to at least some	0
individual program phases are estimated	1	only top level program estimated	0
stakeholders/users emphasis understood-quick to field or all complete	1	program management sets delivery tradeoffs without outside input	0
testing planned with initial program planning	1	testing not in initial planning	0
documentation not considered ininitial planning	0	documentation part of initial planning	1
hardware considered in estimations	1	software only considered	0
no formal schedule/cost tracking	0	formal procedures established for tracking cost and schedule	1
earned value set up	1	earned value not used	0
estimations omit documentation planning	0	documentation in estimates	1
training omitted in estimates	0	training part of estimates	1
earned value set up, but not tracked	0	earned value tracked	1
detailed planning done with incomplete set of requirements	0	detailed planning done with detailed set of requirements	1
complete infrastructure support mechanism understood for estimations	1	no consideration of infrastructure done for estimations	0
team possibilities considered for planning of program	1	no consideration for outside teaming possibilities	0
work breakdown structure (WBS) set up	1	no WBS completed	0

Estimation/Planning Management (pg 2 of 2) score ☐ **+pg 1 score** ☐ **= TOTAL SCORE** ☐ **Enter on QMM scoresheet blk b.**

Pair choice section THREE: (People Management) choose most applicable term of the two for each row (page 1 of 2):

Human Resources

program team members have clearly deined, segmented roles	0	work responsibilities are shared	1
formal team building procedures are used	1	no formal team building emphasized	0
program manager flexible regarding work hours	1	program manager maintains strict standards for work hours	0
big picture conveyed to all team members by program management	1	program management focuses on the partitioned tasks with team	0
people issues dealt with primarily through indirect methods (email, memo, etc)	0	people issues dealt with primarily through direct methods (face-to-face)	1
training is required and planned on a regular basis	1	training is ad hoc	0
each team member is educated on and understands overall program and their role	1	team members only know their respective areas	0
consideration for team members' career goals are reflected in assignments	1	team members must adapt to tasks that are assigned	0
team members assignments and responsibilities are mostly dictated by PM	0	assignments and responsibilities are discussed and agreed upon with PM	1
management leads in problem solving	0	management facilitates and lets team lead in problem solving	1
management welcomes problems as challenges and opportunities	1	management views problems as obstacles and grounds for punishment	0
team members participate in performance evaluations of peers	1	Personnel evaluations are strictly PM responsibility	0
management reinforcement feedback sparse and inconsistent, if any	0	management provides timely reinforcement feedback for positive behaviors	1
management provides basic needs of office facilities fairly well	1	office facilities are a drawback to working in the program	0
working conditions are fairly comfortable, time off policy fairly good	1	working conditions and time off policy is inconsistent and difficult at times	0

Communication:

communications primarily written (email)	1	communications primarily verbal (face-to-face)	1
detailed instructions: oral presentation, follow-up email	1	email only	0
formal communication protocol	1	informal communications	0
external vertical communications restricted	0	external vertical communication allowed	1
coders notebook weekly accomplishment reports required	1	not required	0
user-coder relationship established, encouraged, and mediated	1	user-coder interaction minimized	0
meetings structured to minimize waster time	1	meetings unstructured and open ended	0
meetings have agenda, objectives, and conclude with action items	1	meeting agenda fluid and open ended	0
program management and coder communication face to face	1	program management and coder communication primarily email	0
program team updated regularly regarding organizational & program status	1	meetings infrequently scheduled	0
open communications is encouraged	1	communication hrough chain of command only is encouraged	0
program manager accessible for discussions	1	program manager difficult to get an appointment to see	0
program management (PM) is viewed as separate from team	0	PM mixes with team frequently	1
management regularly holds team meetings	1	meetings are sporadic	0
meetings are structured with definite goals and objectives	1	meetings are informal	0
program management is generally easy to reach and talk to	1	PM is usually hard to get a hold of and difficult to talk to	0
team-program manager relationship adult-adult	1	team-program management relationship parent-child	0
schedules are spontaneous and poorly communicated	0	schedules must be fixed and rigidly followed and formally reported	1
work is seen as complex processes involving team working together	1	work broken into pieces with minimal team member interaction	0
action items often is poorly disseminated and usually not followed through	0	action items communicated and followed through thoroughly	1
team members require frequent clarifications by PM for assigned tasks	0	team members rarly require clarifications by PM for assigned tasks	1

Pair choice section THREE: (People Management) choose most applicable term of the two for each row (page 2 of 2):

Leadership:

long range organizational vision	1	short tem program and immediate work focus	0
lead through personal attention to others	1	action-oriented leadership approach	1
run as much of the organization as possible	0	let team make decisions as much as possible	1
direct and domineering style	0	encourage independence in others	1
traditional leaders respect hierarchy	0	do what needs to be done	1
win cooperation rather than demand it	1	tough-minded with others	0
act strongly and forcefully in the field of ideas	0	prefer to lead other independent types while seeking autonomy for self	1
consults with team members to find solutions to problems	1	consults team members to get validation of PM's predetermined solutions	0
keep people well informed	1	only as much knowledge as necessary for their work	0
make things happen by focusing on the immediate problems	1	long range focus and de-emphasize current problems	1
manage others loosely and prefer minimal supervision	1	follow traditional procedures and rules conscientiously	0
leadership, management decisions exclusively by program management	0	program management makes decisions but gets inputs from team	1
team-program manager relationship adult-adult	1	team-program management relationship parent-child	0
program management makes decisions but gets inputs from team	0	all program team members responsible for program decisions	1
when a problem arises: management takes over to solve it	0	management lets the team solve the problems	1
leadership is do as I say, not do as I do	0	leadership by example	1
program expectation not influenced by PM	0	program expectation managed by PM	1
PM gives freedom to team, but has no mentoring for members (abdication)	0	PM empowers teams by mentoring members to be leaders	1
promgram management waits and sees what happens then plans	0	management plans far in advance	1
program management is constantly reacting to emergencies	0	management is one step ahead of problems	1
facilitative approach to solving problems	1	take charge readily and often	0
program management is complex, takes much time to understand	0	management is simple, easy to figure out	1
program management prefers to plunge right in	0	takes time to separate things to be done and order of doing them	1
program management reacts spur of the moment	0	methodically follows plans	1

Technical Competency of the Program Manager:

PM has technical experience particular to the particular s/w program	1	PM relies on team members solely	0
PM participates in technical reviews	1	PM only in non-technical reviews	0
PM participates in making technical decisions when problems arise	1	PM delegates technical questions	0
PM does not get involved discussing technical options	0	PM contributes to technical options being discussed	1
PM does not review technical options and decisions	0	PM reviews technical options and decisions	1
PM actively attempts to keep up-to-date with current technology and standards	1	PM is removed from cutting edge technology issues	0
PM receives technical periodicals and occasionally references applicable articles	1	PM doesn't read periodicals nor reference current articles to team	0
PM doesn't have technical background (or education)	0	PM has technical background (or education)	1
team members avoid PM when they need technical advice	0	team members generally consider talking to PM regarding technical issues	1

HR ☐ + Comm. ☐ + Leadership ☐ + Tech. Competency ☐ = People Mgmt. score ☐ Enter on QMM scoresheet blk c.

Pair choice section FOUR: (Risk Management(RM)) choose most applicable term of the two for each row (page 1 of 2):

RM is formal and documented	1	RM is informal, if at all	0
a risk management plan exists	1	no risk management plan is developed	0
RM is more of a data call than a useful document	0	RM drives decisions on the program	1
RM is done prior to the program beginning	0	RM is done prior and during program execution	1
RM is only done during the program execution	0	RM is done prior and during program execution	1
risks are generalized through the whole program	0	risks are categorized	1
risk management is done internally, only	0	an outside organization also contributes to the RM process	1
risk is a management function	0	risk is a program team function	1
risks are precisely articulated	1	risks are generalized, if at all	0
each risk has a consequence	1	consequences are generalized, if at all	0
a mitigation strategy is completed for each risk	1	mitigation strategy is generalized, if at all	0
contingency plans are developed for a RM plan	1	contingency plans are ad hoc as problems arise in the program	0
risks are anticipated	1	if problems arise, management will deal with it	0
the program doesn't have any risk	0	programs that do not have risk, have problems	1
risk management is automated	0	risk management may use tools, but depend on human input	1
risks are assigned probabilities	1	probabilities are not relevant for RM	0
all risks are potential problems, relative priorities for risks are not useful	0	risks are weighed relative to other program risks and thus prioritized	1
risk management information is only shared internally	0	risk management information is shared with all stakeholders	1
risk analysis uses ordinal rankings	0	risk analysis uses actual measurements with a mathematical model	1
regret analysis used	1	no regret analysis done	0
attach probabilities to future events	1	no probabilities associated with future events	0
assessing risks with mechanical meethods	0	risks should be compared to other risks and sorted	1
risk status tracked	1	not tracked	0
technical risks examined	1	no technical risks examined	0
process risks examined	1	no process risks examined	0
product risks examined	1	no product risks examined	0
stakeholder/user risks examined	1	no examination of stakeholder/user risks	0
checklists used to identify risks	1	no checklists used	0
risks are tracked	1	no tracking or monitoring of risks	0
each risk has an impact	1	no impact analysis of risk	0
each risk has a mitigation plan	1	no individual risk mitigation	0
risks monitored by priority	1	no special attention to track higher priority risks	0
risk assessment is formalized	1	no formal risk assessment	0
risk control is formalized	1	no formal risk control	0
integration risks not considered	0	integration risks examined	1

Risk Management (page 1 of 2) score

Pair choice section FOUR: (Risk Management(RM)) choose most applicable term of the two for each row (page 2 of 2):

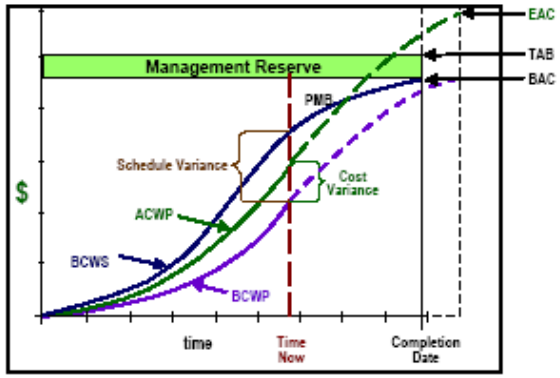
risks to cost	1	no cost risks examined	0
unforeseen risks have occurred in program	0	any risk that came up had been identified previously	1
personnel risks examined	1	no personnel risks examined	0
estimation risks examined	1	no estimation risks examined	0
planning risks examined	1	no planning risks examined	0
requirements risks examined	1	no requirements risks examined	0
resource risks examined	1	no resource risks examined	0
risk management plan updated regularly	1	no regular risk management plan updates	0
risks charted	1	risks not charted	0
performance risks examined	1	performance risks not examined	0
program management self risks examined	1	no program management risks examined	0
risk from program constraints examined	1	no program constraint risks examined	0
each category of risks are prioritized	1	no prioritization	0
each category of risks are evaluated for impact	1	no impact analysis performed	0
each category of risks have control strategy	1	no control strategy	0
documentation risks examined	1	no documentation risks examined	0
regret matrix tracked	1	no regret matrix or not tracked	0
communication of risk activities are facilitated	1	no facilitation or promotion of communication of risk activities	0
taxonomy-based questionnaire used to identify risks	1	taxonomy-based questionnaire not used	0
associated hardware risks examined	1	no consideration for hardware risks	0
integration risks examined	1	integration risks not examined	0
communication risks examined	1	communication risks not examined	0
leadership risks examined	1	leadership risks not considered	0
risk avoidance considered for certain risks	1	risk avoidance not considered for risks	0
risk documentation forms used	1	no risk documentation forms used	0
dependency risks examined	1	no dependency risks examined	0
alternatives like risk avoidance considered for high risk items	1	no consideration of risk avoidance	0
documented risk statements use a condition-consequence type format	1	condition-consequence of risk statements not clearly defined	0
no assignment of ownership of risk mitigation action	0	each risk mitigation action is assigned to an individual for resolution	1
calculation of risk exposure made (probability X loss, for each risk)	1	no risk exposure calculations	0
oral communication of risks only	0	risks written in a way that communicates nature and status of factors	1
triggers used to quantify risk conditions present	1	risk conditions present are all subjective	0
risk "czar" in program for monitoring risks	1	no special positions/responsibilities for risk monitoring	0
post-program review completed (scheduled) for unanticipated problems ID	1	no post-program reviews completed or scheduled	0
no schedule risks examined	0	risks to schedule investigated	1

Risk Management (pg 2 of 2) score ☐ **+pg 1 score** ☐ **= TOTAL SCORE** ☐ **Enter on QMM scoresheet blk d.**

APPENDIX B

Earned Value Management 'Gold Card'

Defense Acquisition University



VARIANCES

Favorable is Positive, Unfavorable is Negative

Cost Variance	CV	= BCWP – ACWP	CV % = (CV / BCWP) • 100
Schedule Variance	SV	= BCWP – BCWS	SV % = (SV / BCWS) • 100
Variance at Completion	VAC	= BAC – EAC	

PERFORMANCE INDICES

Favorable is > 1.0, Unfavorable is < 1.0

Cost Efficiency	CPI	= BCWP / ACWP
Schedule Efficiency	SPI	= BCWP / BCWS

OVERALL STATUS

- % Schedule = ($BCWS_{CUM}$ / BAC) • 100
- % Complete = ($BCWP_{CUM}$ / BAC) • 100
- % Spent = ($ACWP_{CUM}$ / BAC) • 100

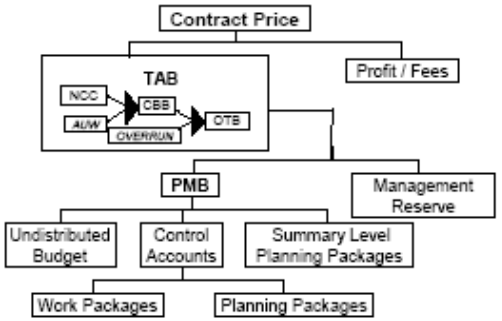
ESTIMATE AT COMPLETION

- EAC = Actuals to Date + [(Remaining Work) / (Efficiency Factor)]
- EAC_{CPI} = $ACWP_{CUM}$ + [(BAC – $BCWP_{CUM}$) / CPI_{CUM}] = BAC / CPI_{CUM}
- $EAC_{Composite}$ = $ACWP_{CUM}$ + [(BAC – $BCWP_{CUM}$) / (CPI_{CUM} • SPI_{CUM})]

TO COMPLETE PERFORMANCE INDEX (TCPI)

$TCPI_{EAC}$ = Work Remaining / Cost Remaining = (BAC – $BCWP_{CUM}$) / (EAC – $ACWP_{CUM}$)

To Determine Either TCPI or EAC; You May Replace BAC with TAB



TERMINOLOGY

NCC	Negotiated Contract Cost	Contract price less profit / fee(s)	
AUW	Authorized Unpriced Work	Work contractually approved, but not yet negotiated / definitized	
CBB	Contract Budget Base	Sum of NCC and AUW	
OTB	Over Target Baseline	Sum of CBB and recognized overrun	
TAB	Total Allocated Budget	Sum of all budgets for work on contract = NCC, CBB, or OTB	
BAC	Budget At Completion	Total budget for total contract thru any given level	
PMB	Performance Measurement Baseline	Contract time-phased budget plan	
MR	Management Reserve	Budget withheld by Ktr PM for unknowns / risk management	
UB	Undistributed Budget	Broadly defined activities not yet distributed to CAs	
CA	Control Account	Lowest CWBS element assigned to a single focal point to plan & control scope / schedule / budget	
WP	Work Package	Near-term, detail-planned activities within a CA	
PP	Planning Package	Far-term CA activities not yet defined into WPs	
BCWS	Budgeted Cost for Work Scheduled	Value of work planned to be accomplished	= PLANNED VALUE
BCWP	Budgeted Cost for Work Performed	Value of work accomplished	= EARNED VALUE
ACWP	Actual Cost of Work Performed	Cost of work accomplished	= ACTUAL COST
EAC	Estimate At Completion	Estimate of total cost for total contract thru any given level; may be generated by Ktr, PMO, DCMA, etc. = $EAC_{Ktr / PMO / DCMA}$	
LRE	Latest Revised Estimate	Ktr's EAC or EAC_{Ktr}	
SLPP	Summary Level Planning Package	Far-term activities not yet defined into CAs	
TCPI	To Complete Performance Index	Efficiency needed from 'time now' to achieve an EAC	

EVM POLICY: DoDI 5000.2, Table E3.T2 . EVMS in accordance with ANSI/EIA-748 is required for cost or incentive contracts, subcontracts, intra-government work agreements, & other agreements valued ≥ $20M (Then-Yr $). EVMS contracts > $50M (TY $) require that the EVM system be formally validated by the cognizant contracting officer. Additional Guidance in Defense Acquisition Guidebook and the Earned Value Management Implementation Guide (EVMIG 2005). EVMS is discouraged on Firm-Fixed Price, Level of Effort, & Time & Material efforts regardless of dollar value.

EVM CONTRACTING REQUIREMENTS:

- DFAR Clauses - 252.242-7001 for solicitations and 252.242-7002 for contracts
- Contract Performance Report – DI-MGMT-81466A * 5 Formats (WBS, Organization, Baseline, Staffing & Explanation)
- Integrated Master Schedule – DI-MGMT-81650 *
- Integrated Baseline Review (IBR) - Mandatory for all EVMS contracts > $20M

* See the EVMIG 2005 for CPR and IMS tailoring guidance.

EVM Home Page = https://acc.dau.mil/evm
DAU POC: (703) 805-5259 (DSN 655)
eMail Address: EVM@dau.mil
Revised May 2005

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APPENDIX C

Prog	Mth.	OCT	Varianc e	NOV	Varianc e	DEC	Varianc e	JAN	Varianc e	FEB	Varianc e	MAR	Varianc e	APR	Varianc e	MAY	Varianc e	JUN	Varianc e	JUL	Varianc e	AVG	COE
A	SPI	0.98	0.02	1.00	0.00	1.00	0.00	1.21	0.21	**1.18**	0.18	1.15	0.15	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	105	1.05
	CPI	1.09	0.09	1.07	0.07	1.02	0.01	1.24	0.24	1.14	0.14	1.14	0.14	1.14	0.14	1.14	0.14	1.14	0.14	1.14	0.14	113	1.13
B	SPI	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	100	1
	CPI	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	100	1
C	SPI	0.99	0.02	0.98	0.02	0.98	0.02	0.98	0.02	0.97	0.03	0.97	0.03	0.96	0.04	0.98	0.03	0.98	0.03	0.98	0.03	97.4	0.97
	CPI	0.95	0.05	0.96	0.04	0.96	0.04	0.97	0.03	1.01	0.01	1.01	0.00	1.04	0.04	1.05	0.04	1.05	0.05	1.05	0.04	100	1

Program	Program		Program		Program	
Participant	A_{PM}	A_1	B_{PM}	B_1	C_{PM}	C_1
QMM score	77	79	86	85	48	45
QMM percent	77	79	86	85	48	45
Success score	8	8	9	8	6	6
Mean success score (0-10)	8		8.5		6	

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