Access

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Outline

Based on

"Self-service Linux: Mastering the Art of Problem Determination", Mark Wilding
"Computer Architecture: A Programmer's Perspective", Bryant & O'Hallaron

Operand Types

1. Immediate Operand Type
2. Register Operand Type
3. Memory Reference Type

1) Immediate Operand Type

- constant values
- $ followed by integer number
- only one or two bytes of 4 bytes integer

2) Register Operand Type

- denote the content of a register
  - 8 32-bit registers for double word operations
  - 8 8-bit registers for a byte operation
  - Ea : an arbitrary register a
  - R[Ea] the value of an Ea register
  - view the set of registers as an array R
    - indexed by register identifiers

3) Memory Reference Type

- access some memory location
  - according to the computed address
  - effective address
- view the memory as a large array of bytes
- Mb[Addr] : the by b-byte value stored in memory starting at Addr
- addressing modes : allowing different forms of memory references
  - Imm : immediate offset
  - Eb : a base register
  - Ei : an index register
  - s : a scale factor (1, 2, 4, 8)

Addressing Modes

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Imm                M[Imm]                    Absolute
(Ea)               M[R[Ea]]                  Indirect
Imm (Eb)           M[Imm + R[Eb]]            Base + displace
(Eb, Ei)           M[R[Eb]+R[Ei]]            Indexed
Imm (Eb, Ei)       M[Imm + R[Eb] + R[Ei]]    Indexed
(, Ei, s)          M[R[Ei]*s]                Scaled Indexed
Imm (, Ei, s)      M[Imm + R[Ei]*s]          Scaled Indexed
(Eb, Ei, s)        M[R[Eb] + R[Ei]*s]        Scaled Indexed
Imm (Eb, Ei, s)    M[Imm + R[Eb] + R[Ei]*s]  Scaled Indexed
```

- Imm : M[Imm] : Absolute
- (Ea) : M[R[Ea]] : Indirect
- Imm (Eb) : M[Imm + R[Eb]] : Base + displacement
- (Eb, Ei) : M[R[Eb]+R[Ei]] : Indexed
- Imm (Eb, Ei) : M[Imm + R[Eb] + R[Ei]] : Indexed
- (, Ei, s) : M[R[Ei]*s] : Scaled Indexed
- Imm (, Ei, s) : M[Imm + R[Ei]*s] : Scaled Indexed
- (Eb, Ei, s) : M[R[Eb] + R[Ei]*s] : Scaled Indexed
- Imm (Eb, Ei, s) : M[Imm + R[Eb] + R[Ei]*s] : Scaled Indexed