

Example 1

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Using 1-d Arrays

```
#include <stdio.h>
#include <stdlib.h>
#define SIZE 10
```

Using 1-d Arrays

```
//-----  
// Calculating the average of three numbers  
//-----  
double avg3(int x, int y, int z)  
{  
    return (x+y+z) / 3.;  
}
```

Using 1-d Arrays

```
//-----  
// Initialize K[], E[], M[] arrays  
// by assigning random number grade  
//-----  
void init_arrays  
(int I[], int K[], int E[], int M[], double A[])  
{  
    int i;  
  
    // srand(7) makes rand() generate  
    // the same random sequence  
    // --> easy to debug a program  
    srand(7);  
  
    for (i=0; i<SIZE; ++i) {  
        I[i] = i+1 + 201600;  
        K[i] = rand() % 101;  
        E[i] = rand() % 101;  
        M[i] = rand() % 101;  
        A[i] = avg3(K[i], E[i], M[i]);  
    }  
}
```

Using 1-d Arrays

```
//-----  
// Print the original table  
//-----  
void pr_table  
(int I[], int K[], int E[], int M[], double A[])  
{  
    int i;  
  
    printf("%10s %10s %10s %10s %10s \n", "StID",  
        "Korean", "English", "Math", "Average");  
  
    for (i=0; i<SIZE; ++i) {  
        printf("%10d %10d %10d %10d %10.2f \n",  
            I[i], K[i], E[i], M[i], A[i]);  
    }  
}
```

Using 1-d Arrays

```
//-----  
// Bubble Sort Double Array  
//-----  
void DbubbleSort(double a[], int size)  
{  
    int p, j;  
    double tmp;  
  
    for (p=1; p< size; ++p) {  
        for (j=0; j< size-1; ++j) {  
            if ( a[j] < a[j+1] ) {  
                tmp = a[j];  
                a[j] = a[j+1];  
                a[j+1] = tmp;  
            }  
        }  
    }  
}
```

Using 1-d Arrays

```
//-----  
// Print the Sorted Table  
//-----  
void pr_sorted_table  
(int I[], int K[], int E[], int M[], double A[])  
{  
    int i, j;  
    double B[SIZE]; // Backup Array for Sorting  
  
    for (i=0; i<SIZE; ++i) B[i] = A[i];  
  
    //.....  
    DbubbleSort(B, SIZE);  
    //.....  
  
    printf("\n\nSorted on a student's average\n\n");  
    printf("%10s %10s %10s %10s %10s \n", "StID",  
        "Korean", "English", "Math", "Average");  
  
    for (i=0; i<SIZE; ++i) {  
        for (j=0; j<SIZE; ++j) if (B[i] == A[j]) break;  
  
        printf("%10d %10d %10d %10d %10.2f \n",  
            I[i], K[i], E[i], M[i], A[i]);  
    }  
}
```


Using 1-d Arrays

```
//-----  
// Average over Integer Array  
//-----  
double Avg(int X[], int n) {  
    int i; double S=0.0;  
  
    for (i=0; i<n; ++i) S+= X[i];  
    return S/n;  
}
```

Using 1-d Arrays

```
//-----  
// Average over Double Array  
//-----  
double DAvg(double Y[], int n) {  
    int i; double S=0.0;  
  
    for (i=0; i<n; ++i) S+= Y[i];  
    return S/n;  
}
```

Using 1-d Arrays

```
//-----  
// Print the Averages  
//-----  
void pr_averages(int K[], int E[], int M[], double A[])  
{  
    double A1 = Avg(K, SIZE);  
    double A2 = Avg(E, SIZE);  
    double A3 = Avg(M, SIZE);  
    double A4 = DAvg(A, SIZE);  
  
    printf("%10s %10.2f %10.2f %10.2f %10.2f \n",  
        "Average", A1, A2, A3, A4);  
}
```

Using 1-d Arrays

```
int main(void) {
    int I[SIZE]; // ID of a student
    int K[SIZE]; // Grade of Korean Class
    int E[SIZE]; // Grade of English Class
    int M[SIZE]; // Grade of Math Class
    double A[SIZE]; // Average of a student

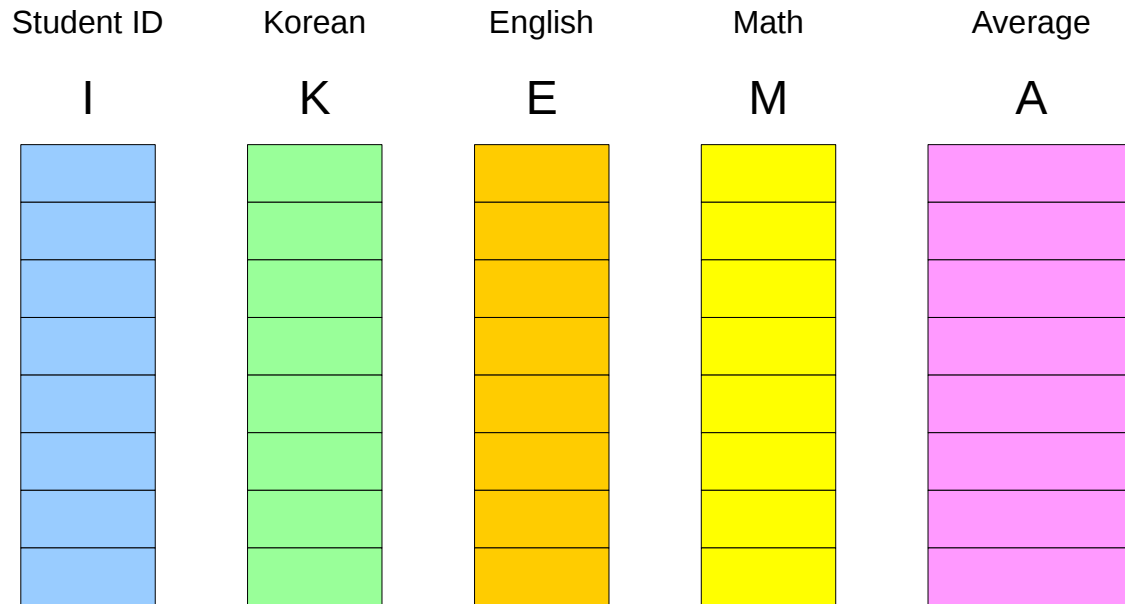
    init_arrays(I, K, E, M, A);

    pr_table(I, K, E, M, A);

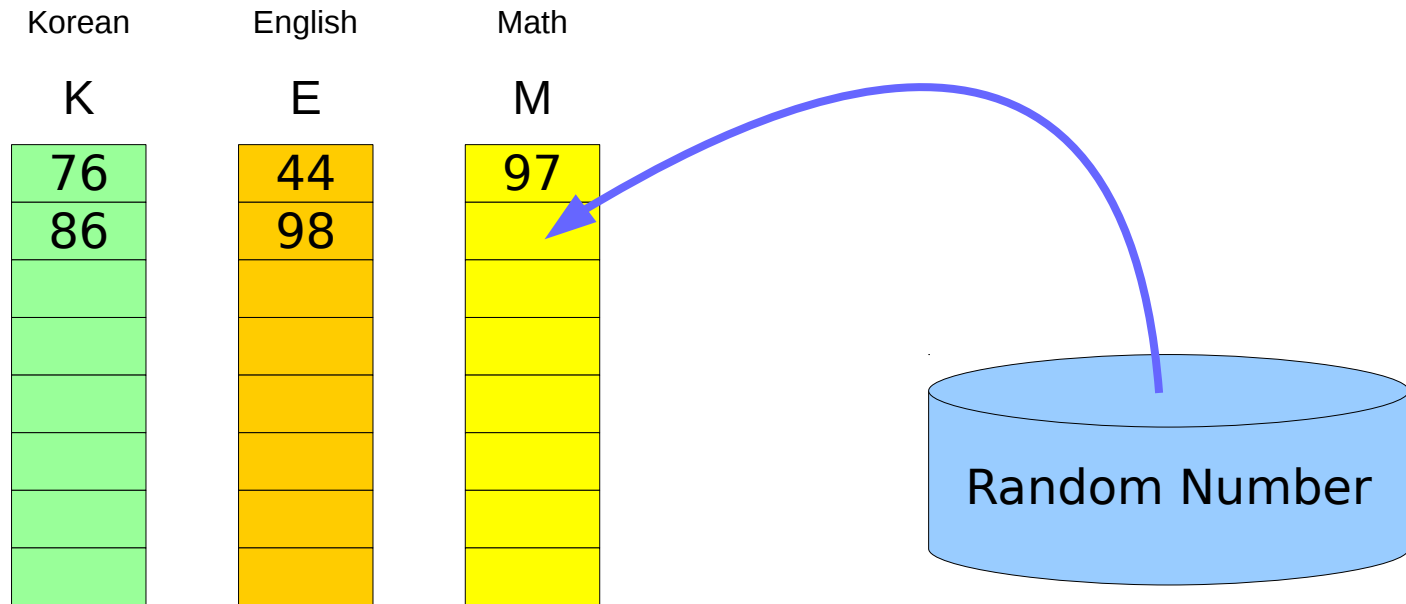
    pr_sorted_table(I, K, E, M, A);

    pr_averages(K, E, M, A);
}
```

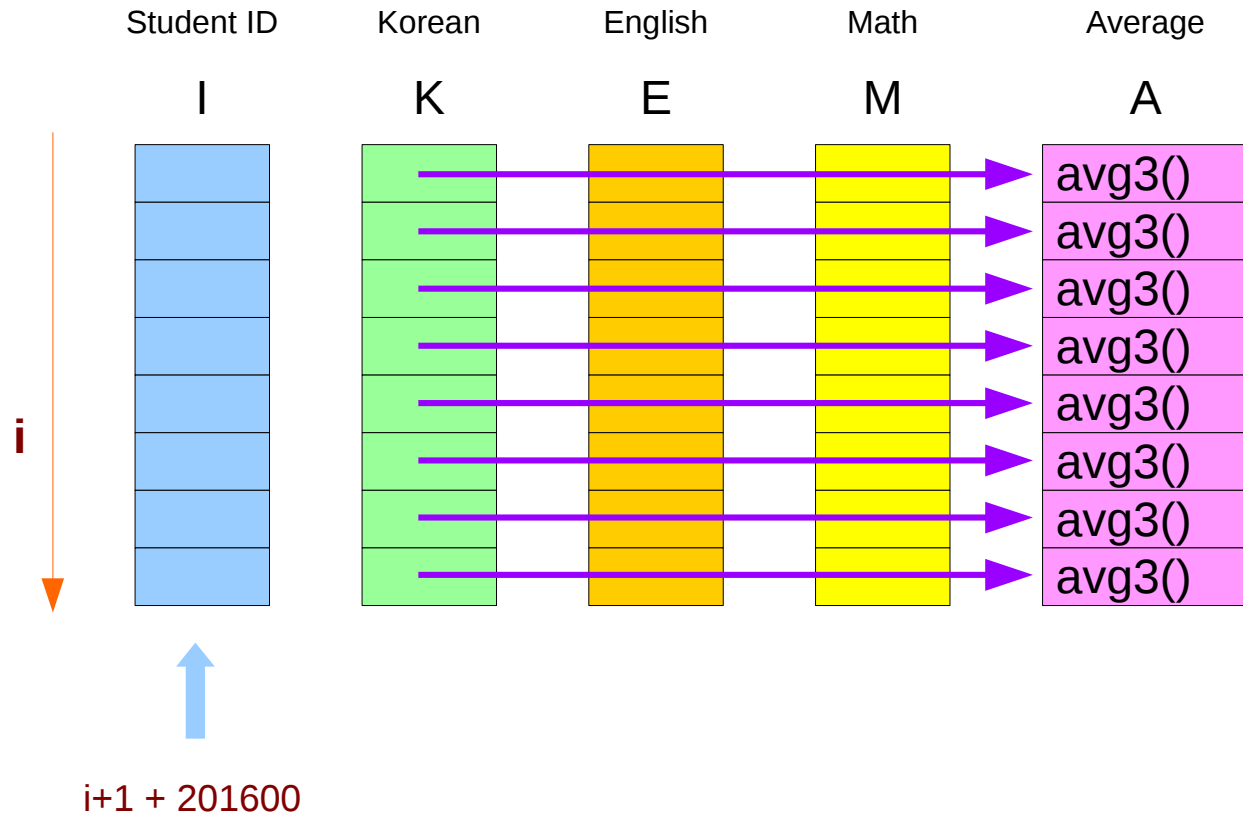
Using 1-d Arrays



init_arrays()



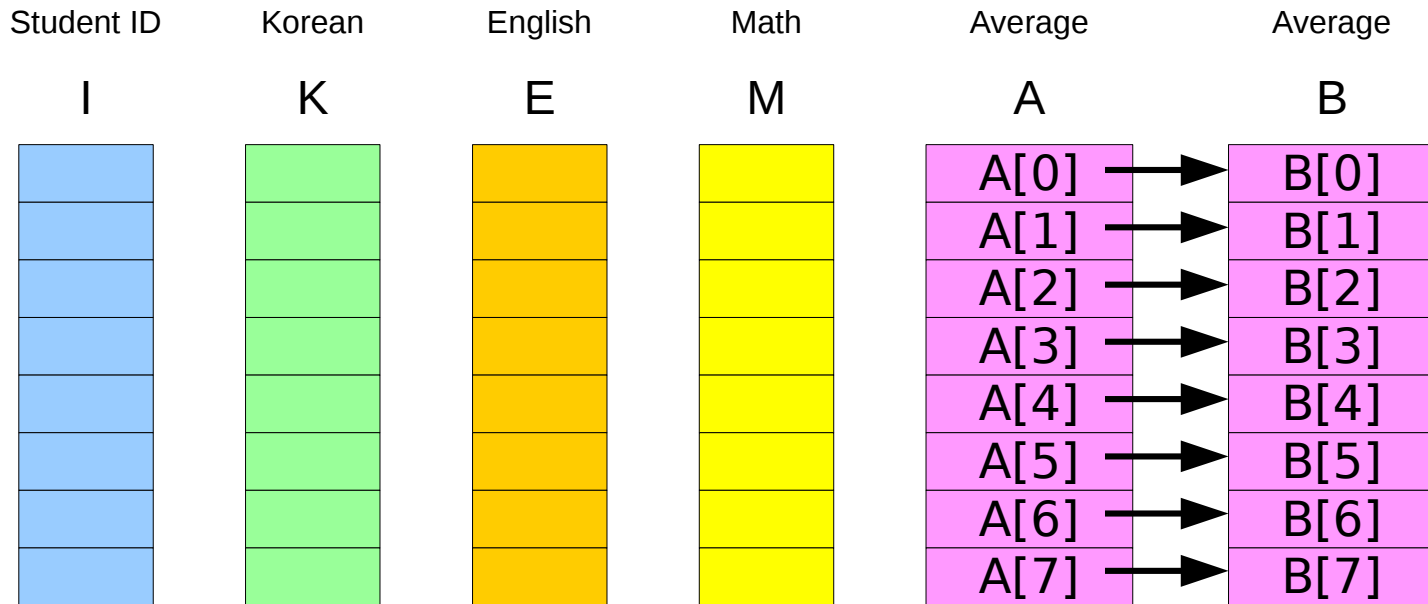
init_arrays()



pr_table()

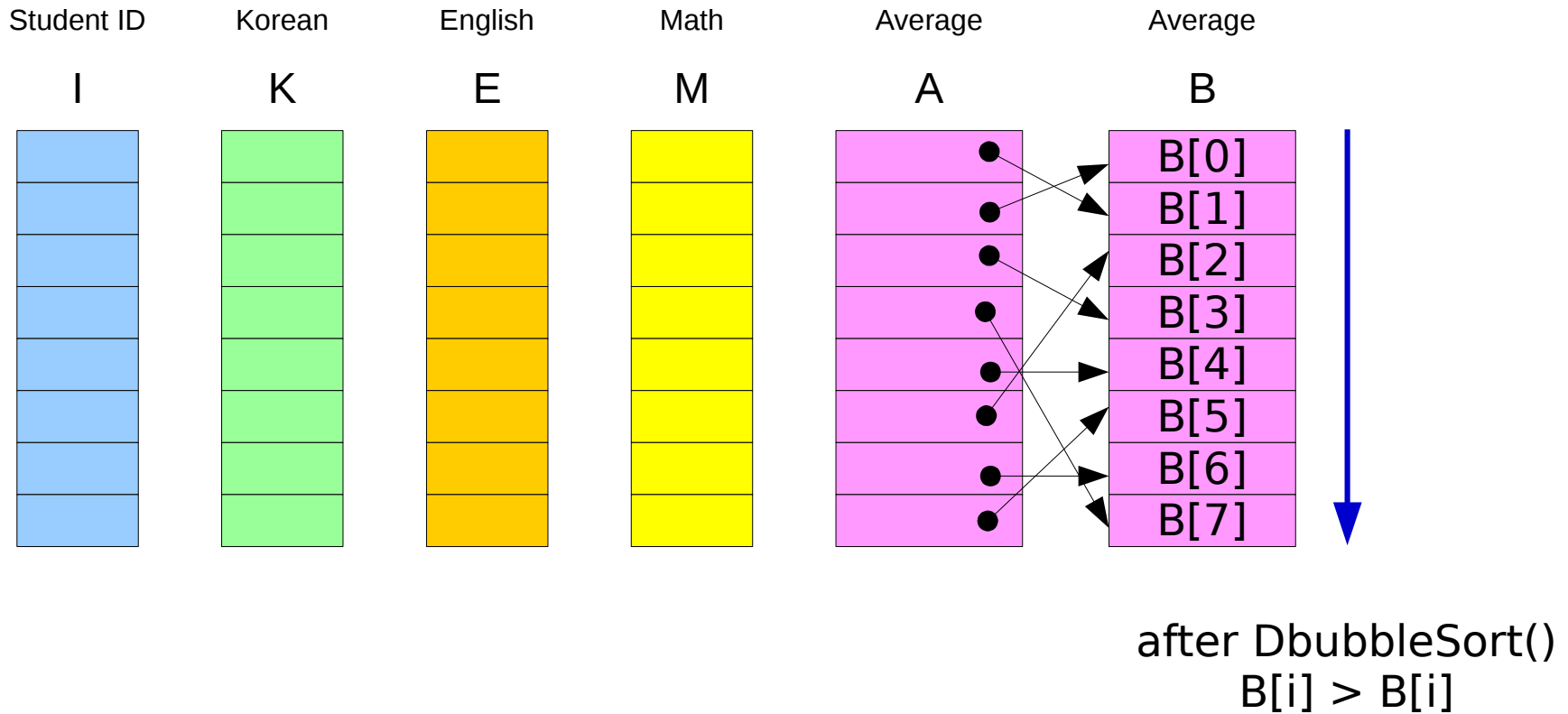
	Student ID	Korean	English	Math	Average
	I	K	E	M	A
i					

pr_sorted_table - copy to B

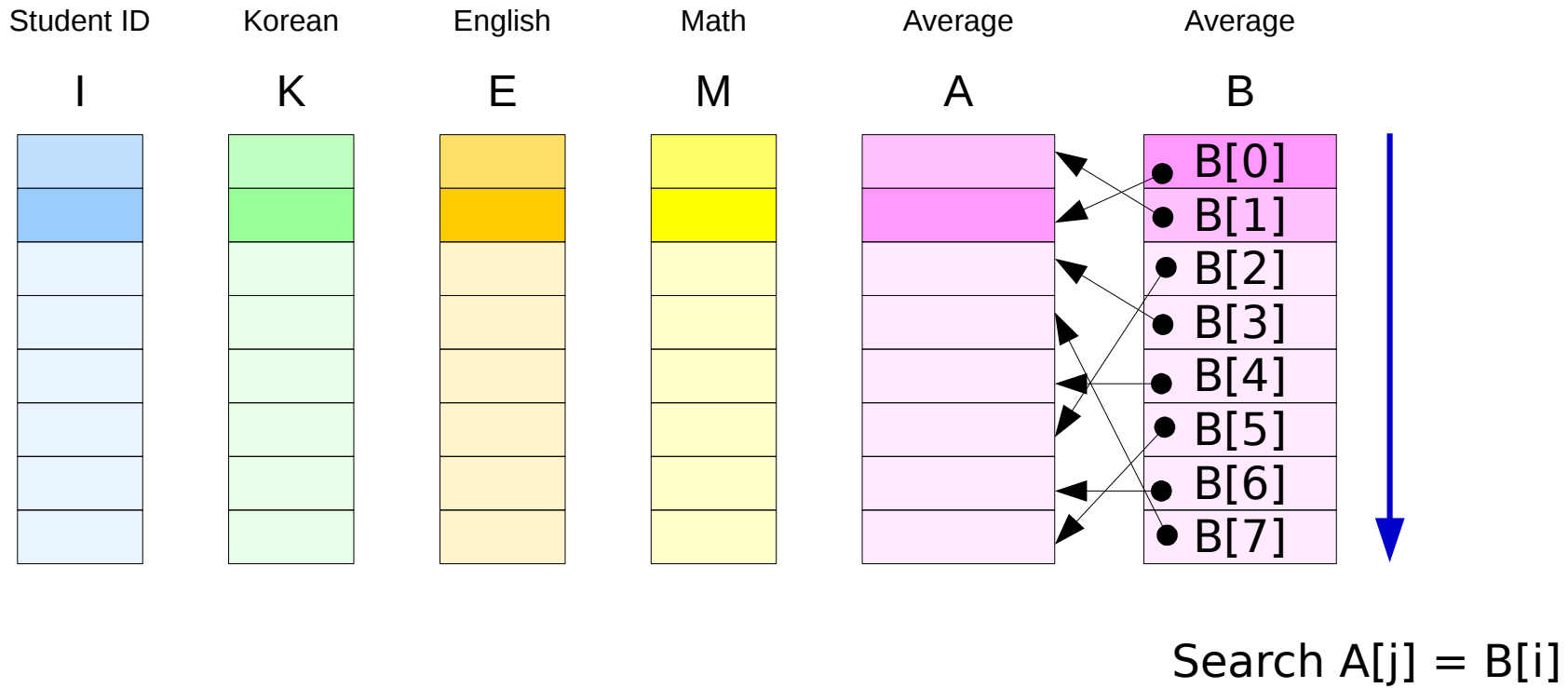


First, copy
A[i] into B[i]

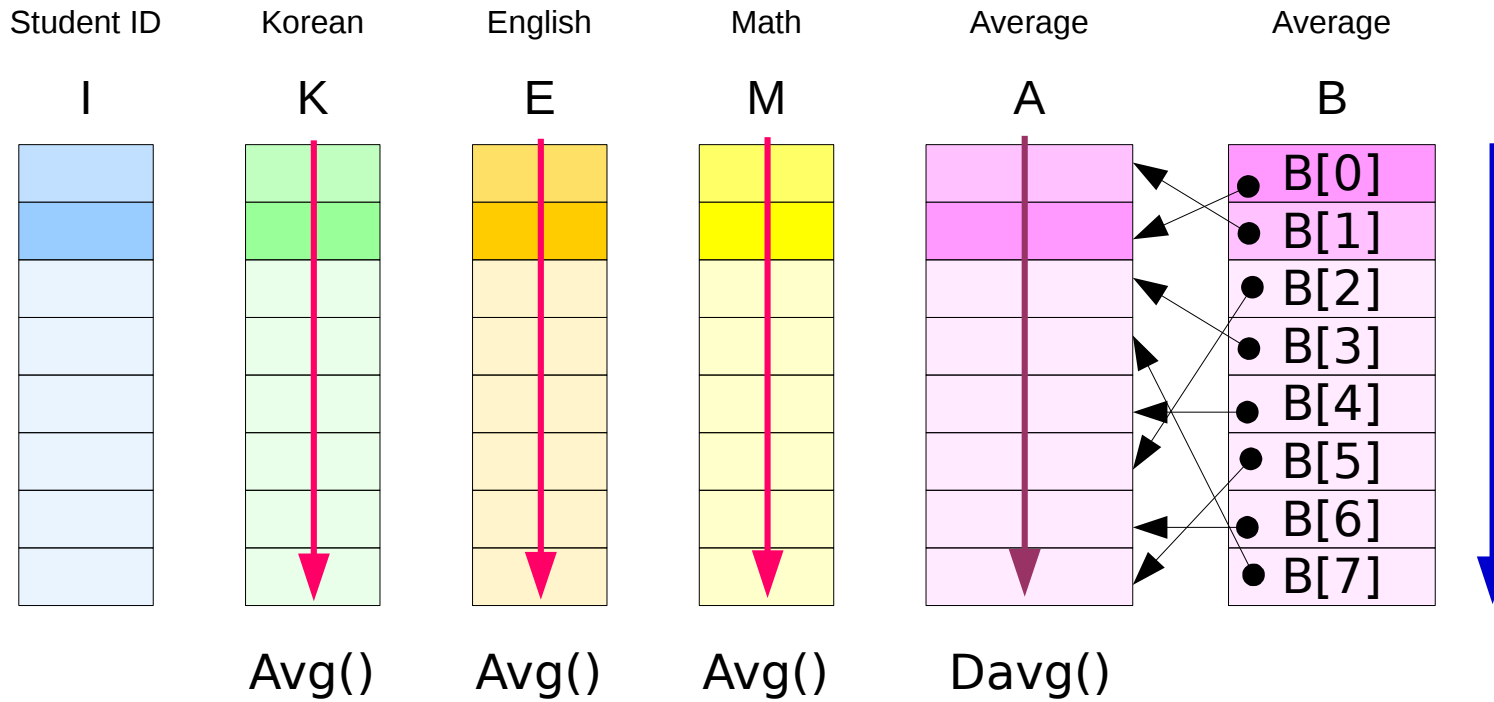
pr_sorted_table - sorting B



pr_sorted_table - print by B



pr_averages



References

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- [2] Efficient C Programming, Mark A. Weiss
- [3] C A Reference Manual, Samuel P. Harbison & Guy L. Steele Jr.
- [4] C Language Express, I. K. Chun
- [5] cprogramex.wordpress.com