CMP 1001

INTRODUCTION TO PROGRAMMING

PART 7: MULTIDIMENSIONAL ARRAYS

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CMP 1001

Section 9: Multidimensional Arrays

MULTIDIMENSIONAL ARRAYS

We can also define multiple dimension arrays, like 2D, 3D, … arrays.

Imagine "**2D arrays**" like tables or Excel sheets.

The first index number

An int "**2D array**" with 6 rows and 10 columns:

x[0][0]	x[0][1]	x[0][2]	x[0][3]	x[0][4]	x[0][5]	x[0][6]	x[0][7]	x[0][8]	x[0][9]
x[1][0]	x[1][1]	x[1][2]	x[1][3]	x[1][4]	x[1][5]				
x[2][0]	x[2][1]	x[2][2]							
x[3][0]									
x[4][0]									
x[5][0]									x[5][9]

The second index number

MULTIDIMENSIONAL ARRAYS

Declaring an Integer 2D Array with 3 rows and 6 columns:

```
int a[3][6];
```

```
a[1][2] = 2;
a[0][4] = a[1][2] * 5;
a[0][4]++;
```

NOTE: Similar to 1D arrays, multidimensional arrays also CANNOT be created or used dynamically.

MULTIDIMENSIONAL ARRAYS

Example:

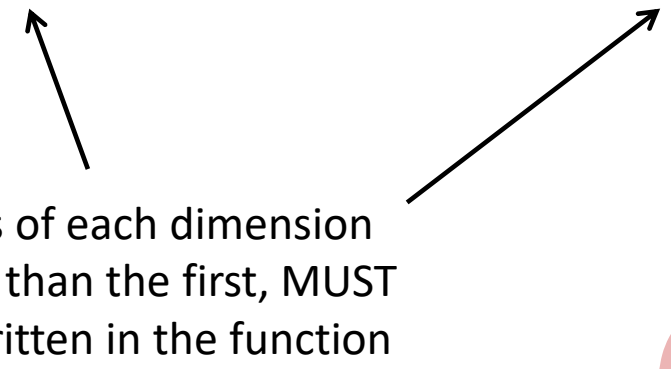
Consider a block of 10 apartment houses, each of which contains 6 apartment flats. First, we want to keep the number of people in each flat, and then we want to compute the average number of people that live in each apartment house.

MULTIDIMENSIONAL ARRAYS & FUNCTIONS

You can pass multidimensional arrays to a function.

However, the parameter definition is somewhat different.

```
int method_ex(int an_integer, int integer_2Darray[][10], double double3D_array[][5][10])
```



MULTIDIMENSIONAL ARRAYS

Example:

We have two matrices (represented by 2D arrays) whose dimensions are 2x4.

a) Write a method for computing the sum of these two matrices.
b) Write another method to compute the transpose of a give matrix.

MULTIDIMENSIONAL ARRAYS

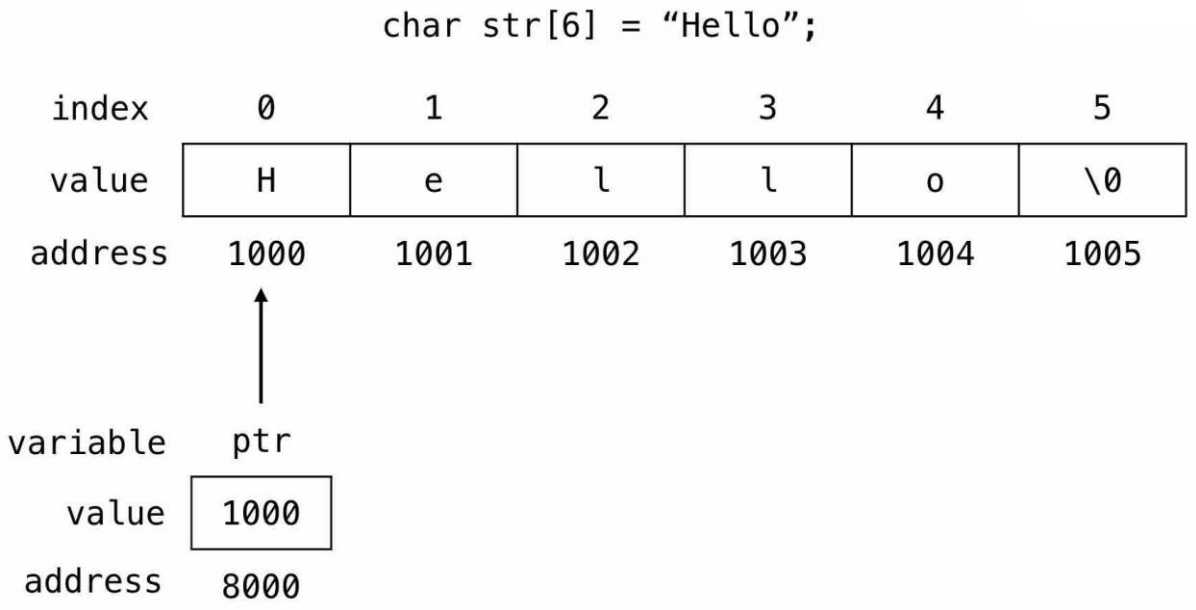
Example:

Consider we have 3 classes (ME, EE, CMP), each of which has 10 students. Each student takes the SAME 5 courses (HUM101, ENG101, MATH101, COMP101, SCI101)

a) **Write a method that takes grades of each student from the user.**
b) **Write a method that computes the averages of 5 courses.**
c) **Write a method that assigns letter grades to the given grades of the students (90 - 100: A, 80 - 89: B, 70 - 79: C, 60 - 69: D, 0 - 59: F, and assume all grades are given between 0 and 100).**

COMING SOON...

Next week on CMP 1001



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