ARRAYS

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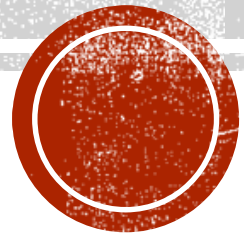


ARRAYS

- List of items of the same type
- Think of it a list of boxes.
- First box starts at index 0.
- Each box (element) afterwards is the previous index + 1.

- allow you to store more than one item in only one variable.

ARRAY DECLARATION

- SYNTAX

```
type array_name [size];
```

- EXAMPLES

```
int numArray[100];
    //an array with 100 elements
double decimalArray[10];
char grade[10];
```

ARRAY INITIALIZATION

- SYNTAX

```
type array[size] = { item1, item2, …, item 3};
type array[index] = item;
```

- EXAMPLES

```
int children[3] = {2, 12, 1};
    //declaring and initializing at the same time.
scores[0] = 2.7;
   //array size is already declared.
```

ZERO-BASED INDEX

- Array of size N elements.
- Indexes run from 0 to N-1.

Scores[0]	Scores[1]	Scores[2]	Scores[3]	Scores[4]	Scores[5]
0	95	60	75	45	57

```
scores[0] = 0;
scores[1] = 95;
Scores[2] = 60;
scores[3] = 75;
scores[4] = 45;
scores[5] = 57;
```

ARRAY AND LOOPS

- Loops allow access to all elements of the array.

- EXAMPLES

```
for (int i = 0; i < 5; ++i)
   cout << scores[i] << " ";
for (int i = 0; i < 5; ++i)
   cin >> scores[i];
```

ARRAY AND FUNCTIONS

- Indexed variables as Function Arguments

```
myFunction (a[3]);
```

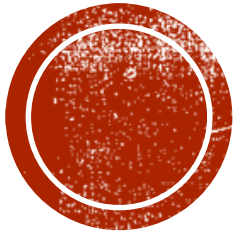
- Entire Arrays as Function arguments

```
void fillup(int scores[], int size);
```

- Function MAY NOT return an array in the same way it returns type int or double!
- Only pointers may returned.

SORTING AN ARRAY

- Pass by reference!



Multidimensional Arrays

2D ARRAYS

- To store even more large amount of information of the same type.
- Same as 1D array, but two indexes for the dimension of the array.
- Each index MUST BE enclosed in its own set of square brackets.

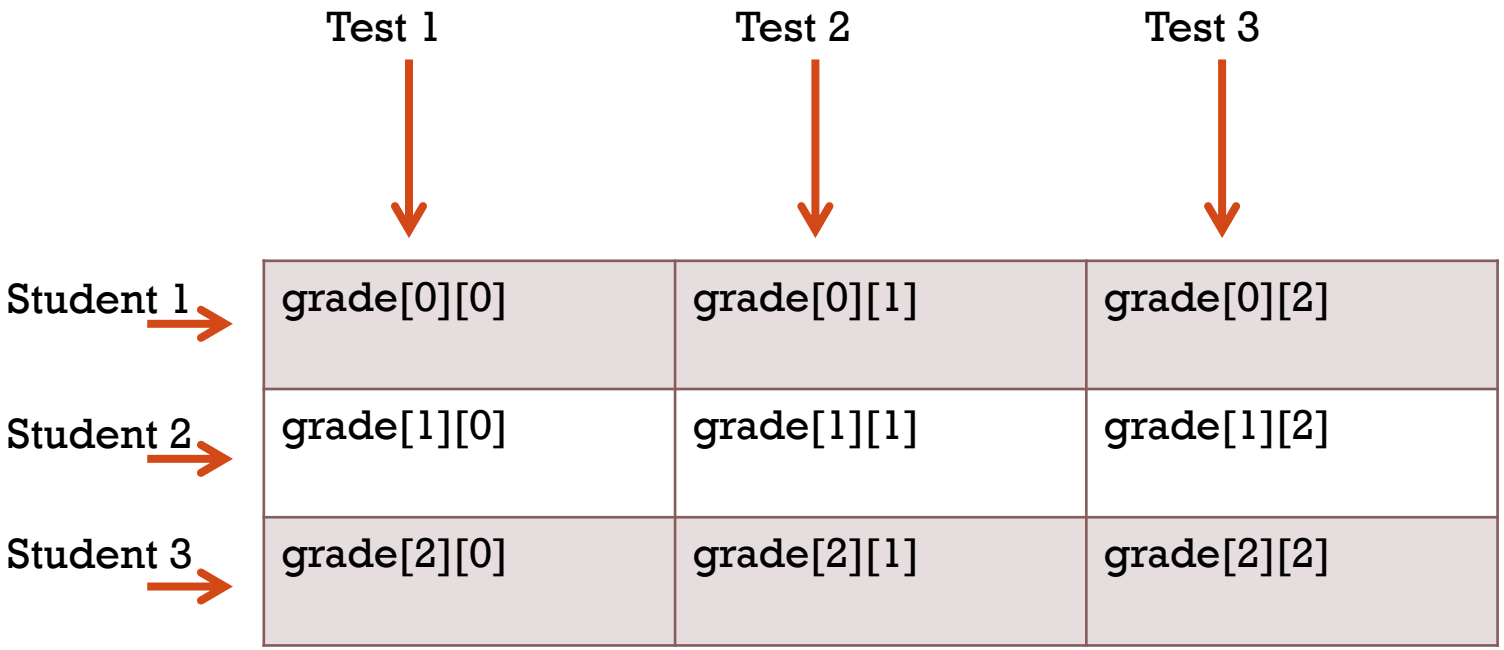
2D ARRAY DECLARATION

- SYNTAX

```
type array_name [size1][size2];
```

- EXAMPLES

```
int numArray[10][10];
   //an array with 10x10 elements (total 100)
```


Test 1
Test 2
Test 3
Student 1
Student 2
Student 3
grade[0][0]
grade[0][1]
grade[0][2]
grade[1][0]
grade[1][1]
grade[1][2]
grade[2][0]
grade[2][1]
grade[2][2]

LOOPS & 2D ARRAY

```
int rows = 3, cols = 3;
int grade = new int[rows][cols];

for (int r = 0; r < rows; ++r)
            for (int c = 0; c < cols; ++c)
                  cin << grade [r][c];
```

2D ARRAY & FUNCTION

- Size of the first dimension is not given, but the remaining dimension size MUST e given in square brackets.

- Example

```
int getMin (int p[][100], int sizedimension1);
```