Arrays and Pointers

IN 1101 PROGRAMMING FUNDAMENTALS

Arrays

- An array is a collective name given to a group of ‘similar quantities’ (Similar elements). These elements could be all ints, all floats, or all chars etc.

  E.g. Percentage marks of 100 students.

  Salaries of 300 employees.

  Ages if 50 employees.

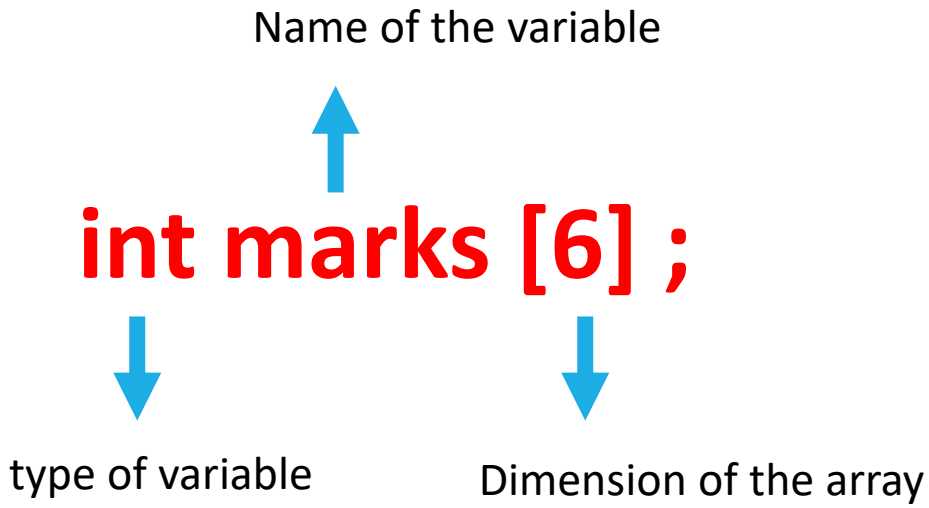
- Each member of the group is referred to by its position in the group.
- In C, the counting of elements begins with 0.

  E.g marks = { 50, 76, 80, 46, 23, 96}

  here, marks[0] refers to 50 and marks[5] refers to 96.

Array Declarations

- Array declaration :



Accessing Element of an Array

- Accessing an element is done with subscript, the number in the brackets following the array name.
- This specifies the element's position in the array.
- All the array elements are numbered, starting with 0.

  E.g. marks[2] is not the second element of the array, but the third

Entering Data Into an Array

- Assign values to array elements one by one.

E.g.:

```
marks[0] = 56;
marks[1] = 76;
marks[2] = 46;
marks[3] = 80;
```

- Assign values to array to entire at the time declaration.

E.g.: `int marks[5] = { 56, 45, 78, 80, 60};`

`float height[3] = { 12.50, 24.0, 78.25};`

`int n[ ] = { 2, 4, 12, 5, 45, 5 } ;`

Entering Data Into an Array Cont..

- Entering data using loop,

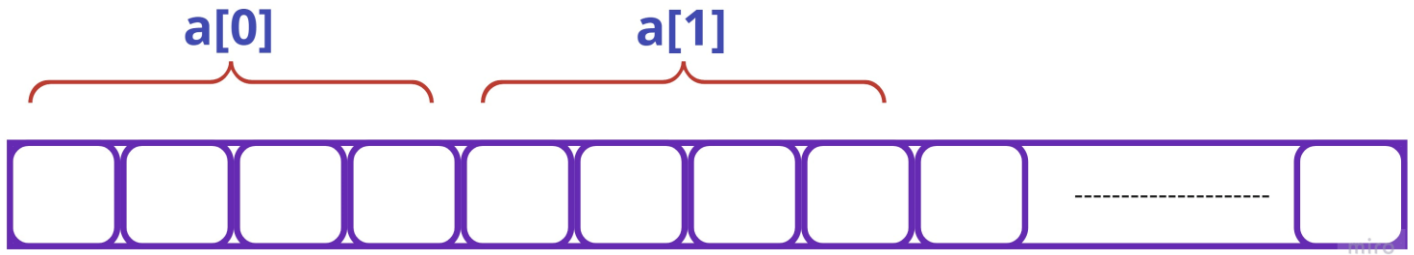
```
for ( i = 0 ; i <= 5 ; i++ )
{
    printf ( "Enter marks " ) ;
    scanf ( "%d", &marks[ i ] ) ;
}
```

- We use & operator to find the address of the array.

Memory Allocation

- What happens in memory when you declare,

int a[8];



- If array is not initialized, it will fill with garbage values(storage class of this array is assumed to be **auto**).
- Data entered with a subscript exceeding the array size will simply be placed in memory outside the array; probably on top of other data, or on the program itself

Exercise

Write a program to enter marks of 25 students for a particular subject using arrays.

Exercise

Extend the above program,

1. to read and print the marks of each student.

2. to get the average mark for the subject.

Passing Array Elements to a Function

- Array elements can be passed to a function,
  1. By calling the function by value
  2. By calling the function by reference

Calling The Function By Value

```
# include <stdio.h>
void display ( int ) ;
int main( )
{
        int i ;
        int marks[ ] = { 55, 65, 75, 56, 78, 78, 90 } ;
        for ( i = 0 ; i <= 6 ; i++ )
                display ( marks[ i ] ) ;
        return 0 ;
}
void display ( int m )
{
        printf ( "%d ", m ) ;
}
```

Call The Function By Reference

```
# include <stdio.h>
void disp ( int * ) ;
int main( )
{
	int i ;
	int marks[ ] = { 55, 65, 75, 56, 78, 78, 90 } ;
	for ( i = 0 ; i <= 6 ; i++ )
		disp ( &marks[ i ] ) ;
	return 0 ;
}
void disp ( int *n )
{
	printf ( "%d ", *n ) ;
}
```

Exercise

Write a program in C to store 10 elements in an array and print it.

Exercise

Extend the above program and write a program in C to find the sum of all elements of the array.

Exercise

Write a program in C to read n number of values in an array and display it in reverse order.

Questions?