

Don Bosco Institute of Technology, Kurla(W)
Department of Electronics and Tele-Communication Engineering
ECL304 - Skill Lab: C++ and Java Programming
Sem III
2021-22

Lab Number:	01
Student Name:	SHIVAM SHARMA
Roll No :	E-19

Title: 1. Write a C++ Program to display Names, RollNo., and grades of 3 students who have appeared in the examination. Declare the class of name, Roll No. and grade. Create an array of class objects. Read and display the contents of the array.

Learning Objective:

- Ability to execute a simple C++ and Java program with and without any inputs to the program.

Learning Outcome:

- Understanding array in c++ java programming

Theory:

What is Arrays ?

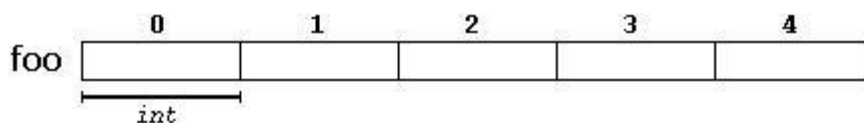
Arrays are used to store multiple values in a single variable, instead of declaring separate variables for each value.

To declare an array, define the variable type, specify the name of the array followed by **square brackets** and specify the number of elements it should store:

An array is a collection of elements of the same type placed in contiguous memory locations that can be individually referenced by using an index to a unique identifier.

Five values of type int can be declared as an array without having to declare five different variables (each with its own identifier).

For example, a five element integer array foo may be logically represented as;



where each blank panel represents an element of the array. In this case, these are values of type int. These elements are numbered from 0 to 4, with 0 being the first while 4

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ECL304 - Skill Lab: C++ and Java Programming
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2021-22

being the last; In C++, the index of the first array element is always zero. As expected, an array must be declared prior its use. A typical declaration for an array in C++ is:

`type name [elements];`

➤ **Why do we need arrays?**

We can use normal variables (v1, v2, v3, ..) when we have a small number of objects, but if we want to store a large number of instances, it becomes difficult to manage them with normal variables. The idea of an array is to represent many instances in one variable.

➤ **Advantages of an Array in C/C++:**

1. Random access of elements using array index.
2. Use of fewer line of code as it creates a single array of multiple elements.
3. Easy access to all the elements.
4. Traversal through the array becomes easy using a single loop.
5. Sorting becomes easy as it can be accomplished by writing fewer line of code.

➤ **Disadvantages of an Array in C++:**

1. Allows a fixed number of elements to be entered which is decided at the time of declaration. Unlike a linked list, an array in C is not dynamic.
2. Insertion and deletion of elements can be costly since the elements are needed to be managed in accordance with the new memory allocation.

➤ **Few Things to Remember:**

The array indices start with 0. Meaning x[0] is the first element stored at index 0.

If the size of an array is n, the last element is stored at index (n-1). In this example, x[5] is the last element.

Elements of an array have consecutive addresses. For example, suppose the starting address of x[0] is 2120d. Then, the address of the next element x[1] will be 2124d, the address of x[2] will be 2128d and so on.

Here, the size of each element is increased by 4. This is because the size of int is 4 bytes.

There are 3 types of an array in C++ :

- One-dimensional array.
- Two-dimensional array.
- Multidimensional array.

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Sem III
2021-22

ALGORITHM :

Step 1 : start

Step 2 : create a class student

Step 3 : declared data types int,char, float etc

Step 4 : Enter a name, roll no, total marks outoff 500

Step 5 : create array

Step 6 : use for loop and if else loop

Step 7 : return 0

Step 8 : end

INPUT :

```
#include<iostream>
```

```
using namespace std;
```

```
#define MAX 10
```

```
class student
```

```
{
```

```
private:
```

```
char name[30];
```

```
int rollNo;
```

```
int total;
```

```
float perc;
```

```
public:
```

```
void getDetails(void)
```

Don Bosco Institute of Technology, Kurla(W)
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2021-22

```
{
    cout << "Enter name: " ;

    cin>>name;

    cout<<"Enter roll number:";

    cin>>rollNo;

    cout << "Enter total marks outof 500: ";

    cin>>total;

    perc=(float)total/500*100;
}
//member function to get student's details

void putDetails(void); //memberfunction to print student's details

};
void student:: putDetails(void) //member function definition, outside of the class

{

    cout << "Student details:\n";

    cout<<"Name:"<<name << ", RollNumber:" <<rollNo<< ", Total:"<<total
    << ", Percentage:"<<perc;

}

int main()

{

    student std[MAX]; //array of objects creation

    int n, loop;

    cout<<"Enter total number of students:";

    cin>>n;
```

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ECL304 - Skill Lab: C++ and Java Programming
Sem III
2021-22

```
if(n>MAX){
    cout<<"Out of range, limit is 10";
}
else{

for(loop=0;loop<n; loop++)

{

cout << "Enter details of student " << loop+1 << ":\n";

std[loop].getDetails();

}

cout << endl;

for(loop=0;loop<n;loop++)

{

cout << "Details of student " << (loop+1) << ":\n";

std[loop].putDetails();

}
}
return 0;

}
```

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2021-22

9OUTPUT:

```
Enter total number of students:2
Enter details of student 1:
Enter name: shivam
Enter roll number:19
Enter total marks outof 500: 395
Enter details of student 2:
Enter name: aaron
Enter roll number:10
Enter total marks outof 500: 420

Details of student 1:
Student details:
Name:shivam, RollNumber:19, Total:395, Percentage:79
Details of student 2:
Student details:
Name:aaron, RollNumber:10, Total:420, Percentage:84

...Program finished with exit code 0
Press ENTER to exit console.
```