

## **Practical Lecture 2: Concepts & Basics of C++ Programming**



# Quick Recap

Let's take a quick recap of previous lecture

- cin, cout
- Basic Data Types
- Loops in C++

# Today's

Derived data types ( Array, structure, union, enum, pointer)

- Array
- Structure
- Union
- Enum
- Pointer(will be covered later in detail)

**Let's Get Started-**

# Installation

**On Visual Studio code:-**

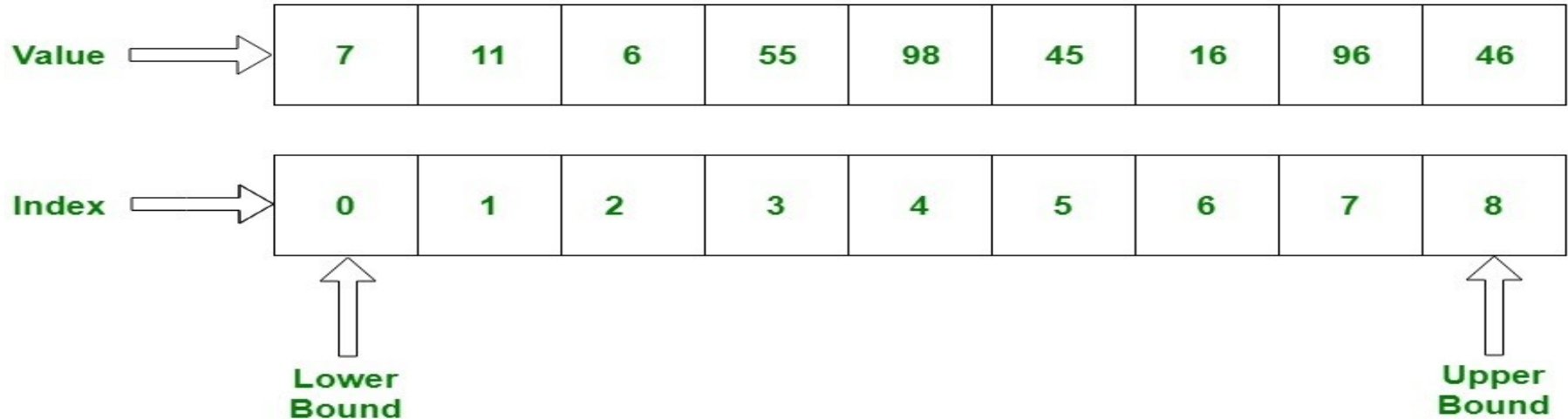
<https://code.visualstudio.com/docs/languages/cpp>

**One Code Blocks:-**

[https://www3.ntu.edu.sg/home/ehchua/programming/howto/CodeBlocks\\_HowTo.html](https://www3.ntu.edu.sg/home/ehchua/programming/howto/CodeBlocks_HowTo.html)

# Array

- Why arrays?
- Definition: An array is a collection of similar items stored in contiguous memory locations.



Array Length = 9

# Practice Question's

- Write a program to find the size of all the data types.
- Write a program to check whether a number is prime or not.
- Write a program to print the greatest among the three numbers entered by the user.
- Write a program to check whether the year is leap or not.

# Declaring array

**Method 1:-**  
`int arr[5];`  
`arr[0] = 10;`  
`arr[1] = 20;`  
`arr[2] = 30;`  
`arr[3] = 40;`  
`arr[4] = 50;`

**Method 2:-**

`int arr[] = {10, 20, 30, 40, 50};`

**Method 3:-**

`int arr[5] = {10, 20, 30, 40, 50};`



# Accessing Array

```
#include <iostream>
using namespace std;
```

```
int main(){
    int arr[] = {11, 22, 33, 44, 55};
    cout<<arr[0]<<endl;
    cout<<arr[1]<<endl;
    cout<<arr[2]<<endl;
    cout<<arr[3]<<endl;
    cout<<arr[4]<<endl;
    return 0;
}
```

# Practice Questions

- Write a program to print the sum and product of all the number in the given array.
- Write a program to find the greatest number in the array.
- Write a program to check whether user entered string is palindrome or not.
- Write a program to convert decimal number into hexadecimal number (Hint: use switch case and array)
- Write a program to find out second maximum and second minimum number from an array.

# structure

- A *structure* is a group of dissimilar data elements grouped together under one name.
- These data elements, known as *members*, can have different types and different lengths.

# Practice Questions

- Write a program to define a struct student with data members as following

```
int rollno;  
char name[50];  
char course[10];  
float marks;
```

Read the data from user and display the entered data.

Homework: Write a program to define structure of an employee to record and display employee no, name, dept,salary.

# union

- Unions allow one portion of memory to be accessed as different data types.
- Its declaration and use is similar to the one of structures, but its functionality is totally different
- The size of this type is the one of the largest member element.
- Modification of one of the members will affect the value of all of them
- It is not possible to store different values in them in a way that each is independent of the others.

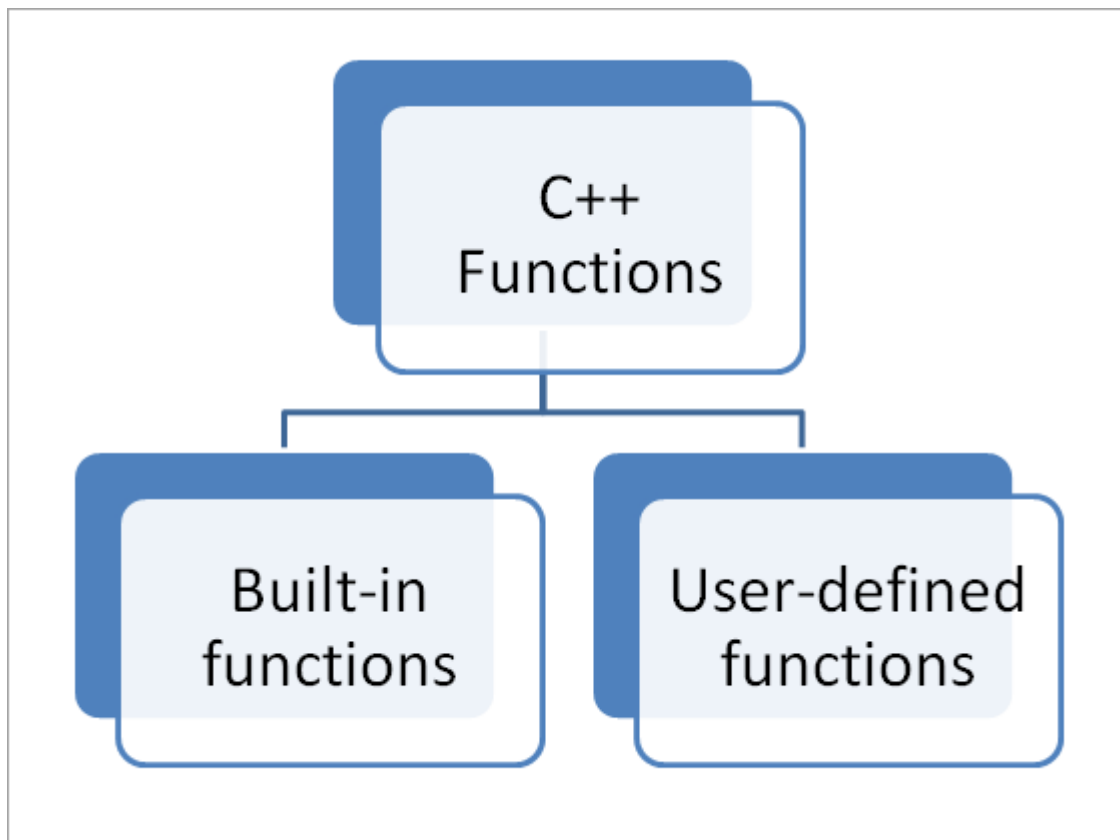
# enum

- An enumeration is a user-defined data type that consists of integral constants.
- It is mainly used to assign names to integral constants, the names make a program easy to read and maintain.
- `enum season { spring, summer, autumn, winter };`
- And, spring, summer and winter are values of type season.
- By default, spring is 0, summer is 1 and so on.
- You can change the default value of an enum element during declaration (if necessary).  
`enum season { spring = 0, summer = 4, autumn = 8, winter = 12 };`

# Functions

- Why functions:
- Definition: A function is block of code which is used to perform a particular task
- Makes code simple, readable and reusable.

# Function





# Build In Function

```
#include <iostream>
#include <cmath>
using namespace std;

int main() {

double num, squareRoot;
cout << "Enter number: ";
cin >> num;
squareRoot = sqrt(num);
cout << "The square root of " << num << " is: " << squareRoot;
return 0;
}
```

# User Defined Function

Steps to call function

- Function prototype
- Function call
- Function definition

# User Defined Function

- Ways to invoke function
  1. accept input and return output  
`int sum(int , int );`
  2. accept input and no output  
`void sum (int , int);`
  3. no input and return output  
`int sum();`
  4. no input but no output  
`void sum();`

# Practice Questions

- Define a function that returns the product of two numbers entered by user.
- Write a program to print the circumference and area of a circle of radius entered by user by defining your own function.
- A person is eligible to vote if his/her age is greater than or equal to 18. Define a function to find out if he/she is eligible to vote.

# Assignment For You

- C++ Program to Check Armstrong Number using function . Function accepts a number and returns boolean value (int value =1 for true and 0 for false) True/False if armstrong number.

In the case of an Armstrong number of 3 digits, the sum of cubes of each digit is equal to the number itself. For example, 153 is an Armstrong number because

$$153 = 1*1*1 + 5*5*5 + 3*3*3$$

A blurred photograph of a conference or seminar. In the foreground, the backs of several audience members' heads and shoulders are visible. One person on the left has their hand raised. In the background, a speaker is standing at a podium, gesturing with their right hand. A large screen is visible on the left side of the stage.

Any  
Questions ??

# Thank You!

**See you guys in next class.**