Object Oriented Programming with C++

1. Introduction

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Second Semester, 2021-22
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Book

- Object Oriented Programming with C++
  - E Balagurusamy

What is C++

- Object Oriented Programming Language, developed by Bjarne Stroustrup in early 1980s
- Standardized in 1997, ANSI/ISO standard committee
- Most C programs are valid C++ programs
- Addition of OOP is the major change from C language

Applications of C++

- Versatile language
- System programming – Parts of Linux and Windows
- Application programming – Paint, Notepad etc.

- Now a days, very popular for competitive coding due to its good computing performance compared to java and python and avaibility of very good library compared to C language.

Sample C++ program

```
#include<iostream>
using namespace std;
/* Comments same as C Language */
int main()          // Like C language, execution starts from main
{
    // cout is output stream object declared in iostream
    // It represents standard output
    // << is called insertion or put to operator. Declared in iostream
    // Sends contents of variable/constant on right to object on left
    cout << "Hello World!\n";
    return 0;
}
```

Explanation

- iostream file inclusion
  - No .h extension – old style don’t use it
  - For C library files prepend library name with ‘c’ and drop .h extension
  - e.g. #include<cstdio> instead of #include<stdio.h>

- using and namespace keywords
  - Will be covered in later lectures in more details

Another C++ program

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

int main()
{
    int num1, num2;

    cout << "Enter two numbers: ";
    cin >> num1 >> num2;

    int sum = num1 + num2; // Variable can be declared anywhere

    cout << "Sum is: " << sum << endl; // No need of format specifier
    return 0;
}
```

C Vs C++ sample program

```
#include<stdio.h>

int main()
{
        int num1, num2, result;

        printf("Enter two numbers: ");
        scanf("%d %d", &num1, &num2);

        result = num1 + num2;

        printf("Result is %d\n", result);

        return 0;
}
```

```
#include<cstdio>

int main()
{
        int num1, num2, result;

        printf("Enter two numbers: ");
        scanf("%d %d", &num1, &num2);

        result = num1 + num2;

        printf("Result is %d\n", result);

        return 0;
}
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        return 0;
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#include<cstdio>
#include<iostream>

using namespace std;

int main()
{
        int num1, num2;

        cout << "Enter two numbers: ";
        cin >> num1;
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        int result = num1 + num2;

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        cout << "Enter two numbers: ";
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        scanf("%d", &num2);

        int result = num1 + num2;

        printf("Result is %d\n", result);

        return 0;
}
```

```
#include<iostream>

using namespace std;

int main()
{
        int num1, num2;

        cout << "Enter two numbers: ";
        cin >> num1 >> num2;

        int result = num1 + num2;

        cout << "Result is " << result << "\n";

        return 0;
}
```

Observations

- *cin* is input stream object declared in iostream and represents standard input
- >> is *Extraction* or *Get From* operator declared in iostream
- Cascading of I/O operators

- Operator overloading – bitwise shift Vs insertion/Extraction
  - Another example of operator overloading in C++
    - Use of + operator on string and numbers
  - Will be more clear later when we overload operators ourselves

- In C language bitwise AND (&) and address of (&) operators are same. But that is syntax of the language and not operator overloading.

- endl is manipulator defined in iostream

Compiling and running c++ program

- g++ prog.cpp
- ./a.out

Structure of C++ program

- So far its almost same as C program
- Will change once we introduce class concepts

Interesting reads...

- Which is faster *cin* and *cout* Vs *scanf* and *printf*
  - https://stackoverflow.com/questions/1042110/using-scanf-in-c-programs-is-faster-than-using-cin

- “\n” vs endl
  - https://stackoverflow.com/questions/213907/c-stdendl-vs-n