UEE1302(1066) F12: Introduction to Computers and Programming

Lab 2 : Basic Structure of C++ Program & Basic I/O

What you will learn from Lab 2

In this laboratory, you will understand the basic structure of a C++ program and how to use console input & output (I/O) functions with manipulators.

TASK 2-0 : REVIEW OF PROGRAM COMPILATION AND EXECUTION

- ✓ Click PieTTY to start
  - ➢ Specify the machine name/ip as one of the following:
    - ✧ **140.113.170.180**
  - ➢ Select **SSH**, not `Telnet(BBS)`,
- ✓ Authentication
  - ➢ Username: Student ID #
  - ➢ Password: UEE1302-Student ID#
- ✓ Compile the program from your file
  - ➢ `g++ <filename>.cpp -o <program>`
    - ✧ (Example) `>g++ hello.cpp -o hello` ↵
  - ➢ Check if any error occurs. If there is one, the message will be printed on screen. Try to correct the error(s) according to the system responses.
- ✓ Execute the program
  - ➢ If the compilation succeeds, run the program you designated under the current directory.
  - ➢ `>./<program>`
    - ✧ (Example) `>./hello` ↵

TASK 2-1 : BASIC STRUCTURE OF A C++ PROGRAM

- ✓ Watch/read carefully the following program `lab2-1`.

```
//File: lab2-1.cpp
#include <iostream>
using namespace std;
↵
int main()
{
    cout << "I am Lin.\nMy number in ROCKETS is 7." << endl;
↵
    cout << "I am Lin. << endl << My number in ROCKETS is 7.";
↵
```

```
    return 0;
}
```

TASK 2-2 : CONSOLE INPUT FUNCTION – cin

✓ Execute the program lab2-2 and record your result.

```
//File: lab2-2.cpp
#include <iostream>
using namespace std;

int main()
{
    int a;
    int b;
    int sum;
    cout << "Enter the first integer:" << endl;
    cin >> a;
    cout << "Enter the second integer:" << endl;
    cin >> b;
    sum = a + b;
    cout << "Their sum is " << sum << endl;

    return 0;
}
```

TASK 2-3 : CONSOLE OUTPUT cout WITH MANIPULATORS

✓ Execute the program lab2-3 and record your result.

```
//File: lab2-3.cpp
#include <iostream>
using namespace std;

int main()
{
    cout << "The original number is " << 716.54564 << endl;

    cout << "The number with set precision 3 is "
         << setprecision(3) << 716.54564 << endl;

    cout << "The number with set precision 6 is "
         << setprecision(6) << 716.54564 << endl;

    cout << "The number in showpoint decimal notation is "
         << setw(10) << showpoint << setprecision(6)
         << 716.54564 << endl;

   cout << "The number in fix-point decimal notation is "
```

```
        << setw(10) << fixed << setprecision(6)
        << 716.54564 << endl;
↵
    cout << "The number in exponential notation is "
        << setw(10) << scientific << setprecision(3)
        << 716.54564 << endl;
↵
    return 0;
}
```

- Note: If any error occurs, please correct them. Hint: `#include <iomanip>`
- Watch carefully the effect of using the manipulators in the above program.
- Please verify and explain your result with manual calculation.

TASK 2-4 : DATA TYPES AND DECLARATION

✓ Execute the program `lab2-4`, record your result, and then explain your findings.

```
//File: lab2-4.cpp
#include <iostream>
using namespace std;

int main()
{
    char a;
    int b;
    float c;
    double d;

    cout << "Bytes of one character:\t" << sizeof(a) << endl
        << "Bytes of one integer:\t" << sizeof(b) << endl
        << "Bytes of one float:\t" << sizeof(c) << endl
        << "Bytes of one double:\t" << sizeof(d) << endl;

    return 0;
}
```

✓ Execute the program `lab2-5` and record your result

```
//File: lab2-5.cpp
#include <iostream>
using namespace std;

int main()
{
    int intResult;
    float fltResult;
```

```
    intResult = 7/3;
    fltResult = 7/3;
    cout << intResult << endl;
    cout << fltResult << endl;

    intResult = int(12.6/3);
    fltResult = 12.6/3;
    cout << intResult << endl;
    cout << fltResult << endl;

    return 0;
}
```

TASK 2-5 : VARIABLE ASSIGNMENT

- ✓ Execute the program `lab2-6`, record your result, and then explain your findings.
- ✓ Try to conclude the difference between "`++x`" and "`x++`".

```
//File: lab2-6.cpp
#include <iostream>
using namespace std;

int main()
{
    int x, y;
    cout << "x = " << x << endl;
    cout << "y = " << y << endl;

    y = 25;
    cout << "x = " << x << endl;
    cout << "y = " << y << endl;

    x = 10;
    cout << "current value of x is = " << x++ << endl;
    cout << "current value of x is = " << ++x << endl;
    cout << "current value of x is = " << x << endl;

    return 0;
}
```

TASK 2-6 : EXERCISES

- ✓ Please write a C++ program and meet the requirements as follows.
  - ➢ Ask the user to input two integers. Then, show the results for the sum, subtraction, multiplication and division of the two integers.
  - ➢ Note that the second number could not be 0.

```
>./ex2-1 ↵
Enter the first number:
7 ↵
Enter the second number:
13 ↵
7 + 13 = 20
7 - 13 = -6
7 * 13 = 91
7 / 13 = 0
>
```

  - ➢ Explain the results (especially division) according to your observation.

- ✓ Please write a program to show the following result

```
>./ex2-2 ↵
Please enter the base floating-point number:
3.5 ↵
10 to the power of 1, 2, 3 and 4 are:
______3.500
_____12.250
_____42.875
____150.062
>
```

  - ➢ Hint: using `cout` with the manipulators