

BSc (Hons) in Information Technology

Year 1

Tutorial 03

IT1050 – Object Oriented Concepts

Semester 2, 2021

Objectives : Learn to use Structures and Reference type parameters

Use your GitHub Repo and Repl.IT account and use the Instructions provided by your Instructors to complete the Tutorial. All instructions are in the Repl.IT classroom for the Tutorial Questions for Week 03. Please submit your solutions using Repl.IT itself by committing your code. There is an autograder which tell you if your program is correct. Please see Tutorial 2 on how to run and test your programs in Repl.IT

Exercise 0 – Setting up your Repo

Please see previous tutorials for instructions on setting up your GitHub repo and how to access your code using Repl.IT

Login to your GitHub account and use the following code to clone Tutorial 03 to your repo
<https://classroom.github.com/a/BpDgj3rV>

Students having an issue in connecting to Repl.IT from their GitHub Repo kindly read the instructions provided at the end of the Tutorial 03 sheet.

Exercise 1 - Formatting

Modify the program to produce the output given below (don't print the first two lines and the blank line).

You have to use the following commands in the <iomanip> header file

```
#include <iostream>
using namespace std;
int main() {
    float marks[] = {78.4, 90.6, 45.9, 72.2, 54.4};
    char names[][20] = {"Ajith", "Wimal", "Kanthi", "Suranji", "Kushmitha"};
    cout << "No" << "Name" << "Marks" << endl;
    for (int r = 0; r < 5; r++) {
        cout << r+1
              << names[r]
              << marks[r] << endl;
    }
}
setw(), setprecision(), setiosflags(ios::fixed)
```

Note : No has a width of 5, Name a width of 15, and Marks a width of 10, the marks are displayed with a precision of 2 decimal places.

```
0      1      2      3
123456789012345678901234567890

No      Name      Marks
1      Ajith      78.40
2      Wimal      90.60
3      Kanthi      45.90
4      Suranji      72.20
5      Kushmitha      54.40
```

Exercise 2 – Functions with variables

Implement the method Volume () to compute the volume of a Box.

```
int volume(int height, int width, int length)

#include <iostream>
using namespace std;
int volume(int height, int width, int length);

int main() {
    int box1Height, box1Width, box1Length;
    int box2Height, box2Width, box2Length;
    int totalVolume, totalSurface;

    cout << "Enter Box 1 Height : ";
    cin >> box1Height;
    cout << "Enter Box 1 Width : ";
    cin >> box1Width;
    cout << "Enter Box 1 Length : ";
    cin >> box1Length;

    cout << "Enter Box 2 Height : ";
    cin >> box2Height;
    cout << "Enter Box 2 Width : ";
    cin >> box2Width;
    cout << "Enter Box 2 Length : ";
    cin >> box2Length;

    totalVolume = volume(box1Height, box1Width, box1Length)
                  + volume(box2Height, box2Width, box2Length);

    cout << "Volume of Box is " << totalVolume << endl;

    return 0;
}

// Implement the Volume() function here
```

Exercise 3 – Functions with structures

1) Create a structure to store the details of the Height, Width and Length called Box

use the struct command for this.

```
struct structname {  
    datatype var1;  
    datatype var2;  
};
```

2) Create a variable of the structure type Box called box1

3) Create a variable of the structure type Box called box2

4) Input the height, width, length of box1 and box2

5) Replace the coding to pass box1 and box2 to the volume function

```
#include <iostream>  
  
using namespace std;  
int volume(int height, int width, int length);  
  
// 1. Define a structure called Box  
// have the integer data types Height, Width, Length  
  
// Do not change the main function  
int main() {  
    // 2. Create a variable called box1 of the Box structure type  
    // int box1Height, box1Width, box1Length;  
    // 3. Create a variable called box2 of the Box structure type  
  
    // int box2Height, box2Width, box2Length;  
    int totalVolume;  
  
    // 4. Input the height, width, length of box1 and box2  
    cout << "Enter Box 1 Height : ";  
    cin >> Height of Box 1;  
    cout << "Enter Box 1 Width : ";  
    cin >> Width of Box 1;  
    cout << "Enter Box 1 Length : ";
```

```
cin >> Length of Box 1;

cout << "Enter Box 2 Height : ";
cin >> Height of Box 2;
cout << "Enter Box 2 Width : ";
cin >> Width of Box 2;
cout << "Enter Box 2 Length : ";
cin >> Length of Box 2;

// 5. Replace the coding below to pass the Box type structure
totalVolume = volume( , , )
               + volume( , , );

cout << "Volume of Box is " << totalVolume << endl;

return 0;
}

// Implement the functions here
```

Exercise 4 – Using Reference Type Parameters

Implement the Input function to input values for the parameters length and width from the keyboard.

a) Do you get the correct values printed ?

length and width passed as given below are really value type parameters. They do not return values from the function.

```
void input(int length, int width);
```

Reference type variables in C++ have a & sign in front of the parameter. Reference variables return values from the function.

b) Modify the parameters of your input function as given below, to use length and width as reference type parameters.

```
void input(int &length, int &width);
```

c) Do you get the correct values printed ?

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

void print(int len, int wth);
void input(int len, int wth);

// Do not change the main() function
int main() {
    int length = 10, width = 5;
    input(length, width);
    print(length, width);
    return 0;
}

// Do not change the print() function
void print(int len, int wth) {
    cout << "Length : " << len
         << ", Width : " << wth << endl;
}

// Implement the Input Function here
```

Finishing Up Tutorial

Use the Repl.IT version icon to commit your code. Goto GitHub and check if your code has been committed.

Exercise 0 (contd)

Students who have issues in connecting to Repl.IT when following instructions given in Exercise 0 in Page 1 can use the following link https://classroom.github.com/a/_1RjBf6r (please use this only if you have a problem with the first link)