SCIT-EIS-UOW

CSCI251 Advanced Programming

Spring 2024

Lab 1 for Week 2 & 3

General Note

In these series of laboratory exercises you will be learning and practicing various programming concepts enabled by C++ programming language. Mostly, these concepts will be introduced through simple and sometimes complex examples. You are encouraged to think about how and why things work the way they do. The exercises are not set up to trip you, but you need to think carefully.

In order to focus on the task at hand, you can use an integrated development environment (IDE) to write, compile and test your code. In one of the notes provided on Moodle, you can find the steps required to install Code::Blocks on several OS (e.g. Windows, Linux, MacOS). You are encouraged to follow the instructions and install it for your operating system. The operating system on which you develop your code should not matter. All that needs to happen is that your code is C++17-compliant. The system on which your code will be tested has g++ 7.5 installed and your code must work on that system (i.e. **capa.its.uow.edu.au**).

In order to test that your code is compliant and will work on **capa.its.uow.edu.au**, you will need to do a secure login to capa and test your code. The appropriate option required to ensure that you are compiling against C++17 is the -std=c++17 added to your command line instruction. For example:

g++ file1.cpp file2.cpp file3.cpp -std=c++17 -o output_exec

Get familiar with your IDE and ensure that the build option is set to use c++17.

Use sensible names for your variables and insert comments to let the reader know what your code is doing. If your code contains no comments you will lose marks.

Code Submission

For each exercise, name your code as instructed. Each Lab will be due for submission at midnight of Weeks 3, 5, 7, 9 and 11. You will also be reminded accordingly as the session progresses. Submission points will be set up on Moodle. For each task you might save the code file(s) like:

t1.cpp: only one file.

t1-1.cpp: if multiple subtasks

t1.zip: if there are multiple files

At the end, please submit a (big) zip _le that includes all task for the lab, and name it like: “familyname_studentId_lab#.zip”. The symbol # represents the lab number. For example, in Lab 1 (week 2&3), the submission can be named as “Jordan_12345_lab1.zip”.

Task 1 (20 points)

1. Debug: Debug-A.cpp. This fille is used to take two inputs and calculate their sum and multiplication. (10 points)

2. Debug the code in the compressed file Debug-B.zip. The detail has been explained in the main function. (10 points)

Task 2 (20 points)

Write a program to read two integers m and n from the user.

- Output m multiplied by the values 1 to n.
- This means, for example, that if m = 2 and n = 3, you should be outputting 2, 4, 6.
- You also need to make sure inputs are valid (such as n > 1), so a check for the input is required.

Task 3 (20 points)

Write a program to determine the cost of building a house with a retaining wall. You should implement it with multiple source files. One example can include one main, header, and implementation file (you can refer to Debug-B.zip from Task 1 as an example). So the main file only contains the main function. The header file has the declaration only. The implementation file has the detailed process, including:

1. A function which accepts the type of material used to build the wall: 'w' for wooden, 'c' for concrete or 'b' for brick. Any other entry should be rejected.

2. A function which accepts the width, height and depth of the wall.

3. A function that takes the wall width (w), the height (h), the depth (d) and materials to calculate the price. The building cost is m*(w * d * h) + 200 where m is $75, $150 and $175 respectively for wooden, concrete and brick.

4. A function to display the final cost.

Task 4 (20 points)

Complete the missing part of the following function, while this function is used to calculate the circle's circumference and area.

```
int main()
{
*** missing part ***

cout<<''input the radius''<<endl;
cin>>r;

*** missing part ***

cout<<"the area of this circle is:"<<endl;
cout<<s<<endl;
cout<<"the circumference of this circle is:"<<endl;
cout<<v<<endl;
return 0;
}
```

Task 5 (20 points)

Write a C++ program to do the following:
1. Declare one array with five integers.
2. Accept inputs from user to assign value to this array.
3. Swap the last and the second last element from this array using the following function (the declaration must be as follows):

void swap(int *ptr1, int *ptr2);

4. Display the final array.