CIS 150 – Lab 04

**Submission of Your Work**

You need to prepare and submit ONE SINGLE MS Word document to Canvas (in your lab section) as LastName\_FirstName\_Lab04.doc. It must contain:

* Your NAME
* For each question:
  + Specify the question number.
  + After reading the question requirements, but before beginning any coding, create the test case table, below, through column Expected Output. Write your program then complete the **test table** with actual output results and include in your report.
  + Copy/Paste your completed source code. You must include standard “header” even if code is provided.
  + Paste in a snippet of output showing results for **every listed test case**, labeled with test case #

Test Table:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test # | Valid / Invalid Data | Description of test | Input Value | Actual Output | Test Pass / Fail |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |
| 4 |  |  |  |  |  |

* Add / delete rows from Test Table as necessary
* Modify column widths as necessary
* Test both valid and invalid input
* Test for every output expected
* If failure is an expected output and it happens then that test Passes
* Any test that fails means the program must be fixed so that it passes the test

### **Question 1**

The following program asks the user for the current temperature (in Fahrenheit). Add a series of if statements (if with multiple alternatives i.e. if/else if/else) so that **one** of the following messages is printed based on the temperature value:

Temperature (F) Message

>90 “Go swimming.”

<=90, >80 “Turn on air conditioning.”

<=80, >70 “Do nothing.”

<=70, >55 “Turn on heat.”

<=55, >30 “Wear a heavy coat.”

<=30, >0 “Wear gloves.”

<=0 “Stay inside, make a fire.”

// Include ALL the compiler directives you need in the program

/\* to be filled in\*/

using namespace std;

int main()

{

int temperature;

cout << “Please enter the current temperature (F): “;

cin >> temperature;

// add cascading if-else statements to complete the program

/\* to be filled in by student \*/

system(“pause”);

return 0;

}

Draw a UML activity diagram describe your program and all alternatives that you will implement in this question. The diagram needs to reflect the control flow of your program from start to finish illustrating the proper sequence of events.

Provide a total of 7 valid test cases (one for each message). Do not provide invalid test cases.

**Question 2**

Use a **switch statement** to write the following program:

The program prompts the user for a letter grade (of type char). The list of valid letter grades is:

A B C D E F

The program should consider both lower and upper case

The program will then display the following messages:

For grade ‘A’: display “Excellent”

For grade ‘B’: display “Good”

For Grade ‘C’: display “Average”

For grade ‘D’ or ‘E’: display “Below Average”

For Grade ‘F’: display “Fail”

For any other letter grade entered by users: display “Invalid Grade”

Your test plan should include tests for each possible output, invalid input, and lowercase letters.

Provide a total of 4 test cases:

* You can choose a mix of test cases with uppercase inputs A, B, C, D, E, F or lowercase inputs a, b, c, d, e, f.
* 1 invalid test case (provide a letter that is not within [A,F] or [a,f])

**Question 3**

Use a while loop to write a program that calculates the sum of N integers entered by the user. N is a computer generated random number between 5 and 15 (both inclusive).

Provide 4 valid test cases. No invalid test cases.

**Note:** Use the following libraries for rand(),srand(), and time() support.

#include <cstdlib>

#include <ctime>

Use this for setting a seed: srand(time(NULL))

Use this for generating a random number: rand()

**Question 4**

Prompt the user for a character and the height of a right triangle. Then, print a triangle of that height using the symbol entered. The ith line of the triangle should contain i copies of the symbol. Validate that the height entered is > 0.

Hint: Use nested loops

|  |  |
| --- | --- |
| **Example Input** | **Corresponding output** |
| **Enter a character : #**  **Enter a height : 4** | **#**  **##**  **###**  **####** |

Provide 4 valid test cases. No invalid test cases.