CIS 150 – Lab 03

**Submission of Your Work**

You need to prepare and submit ONE SINGLE MS Word document to Canvas (in your lab section) as LastName\_FirstName\_Lab03.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. 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 |  |  |  |  |  |

* Provide a minimum of 4 test cases
* 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:**

Let’s consider the following program:

#include <iostream>

using namespace std;

int main() {

int x, y;

cout << “Please enter an integer value: “;

cin >> x;

if (x >= 15)

{

x++;

y = x + x - 7;

}

else

{

x = x \* 2;

y = x \* x + 7;

}

cout << “x = “ << x << “ y = “ << y << endl;

system(“pause”);

return 0;

}

1. Use the “step over” option to trace the execution of the program for an input value of 15. Copy and paste the screenshot showing the execution trace inside the true section of the ‘if’ statement for this value.
2. Repeat for input value 14 to represent the false case.

**Question 2:**

Write a program that asks users for their name and age; then display one of the following messages depending on the user’s age:

“Congratulations **<NAME>**! Your vote registration was successfully processed.”

when age is greater than or equal to 18

“You are not eligible to vote <**NAME**>.”

when age is smaller than 18

**Question 3:**

You are to write a program to compute the weekly pay for a worker, including any applicable overtime. Overtime refers to hours worked per week in excess of 40 hours. Companies pay regular pay up to and including 40 hours per week and time-and-a-half only for overtime hours.

**Input:** The number of hours worked in 1 week (a double)

The amount of pay per hour (a double)

**Output:** The total pay for the week.

|  |  |
| --- | --- |
| **Sample input/user entries shown in red** | **Corresponding output** |
| **Enter the hours worked and the pay rate: 30.0 10.0** | **Gross pay for the week is $300** |
| **Enter the hours worked and the pay rate: 50.0 10.0** | **Gross pay for the week is $550** |

**Question 4:**

Prompt the user to input 3 doubles, *a, b* and *c*. Which will represent the coefficients in the quadratic equation *ax*2 + *bx* + *c* = 0. Print out the solutions (if any) of the quadratic equation. If no root exists (this happens if *a* == 0, or *b*2 <4*ac*) print the message **No real root**.

|  |  |
| --- | --- |
| **Sample input/ user entries shown in red** | **Corresponding output** |
| **Enter a, b and c which represent the coefficients in the quadratic equation ax^2 + bx + c = 0 : 1 0 -8** | **Root1 is 2.828427**  **Root2 is -2.828422** |
| **Enter a, b and c which represent the coefficients in the quadratic equation ax^2 + bx + c = 0 : 0 3 5** | **No real root** |
| **Enter a, b and c which represent the coefficients in the quadratic equation ax^2 + bx + c = 0 : 1 5 -5** | **Root1 is 0.854101**  **Root2 is -5.854101** |

Your test plan may not contain any of the values used in the example, above.

For a quick review on how to solve quadratic equations using the quadratic formula refer to:

<http://www.personal.kent.edu/~bosikiew/Algebra-handouts/solving-quad.pdf>