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 – in this class DO ONLY VALID
* 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 2 screenshots showing the execution trace inside both the true and false sections of the ‘if’ statement for this value.
2. Repeat for input value 14.

**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>