# LAB #5: Complex If and switch statements

# Purpose:

1. Use **if, else** and **else if** statements
2. Use nested **if** statement
3. Use switch statement

**Lab 5.1**: Working with **nested if** statements [**6 points**]

Before starting the lab activity, create an empty C++ project called Lab5\_1. Then create a new, blank .cpp file, named lab5\_1.cpp in your project.

For this activity you are going to compute the real roots of a quadratic equation using the formula and pseudocode shown below. Use the sqrt(base) function in <cmath> to calculate the square root. sqrt(base) function takes floating point argument. ***The output numbers should be formatted as shown in the sample runs.***



Pseudocode:

Prompt the user to enter values for a, b and c

Enter values for a, b and c

If a = 0 and b = 0 then

Display the message “The equation has no solution.”

Else if a = 0

Compute and display the single root x = -c / b

Else

Calculate the discriminant, disc = b \* b – 4 \* a \* c

If the discriminant < zero

Display the message “There are no real roots for the equation.”

Else

Compute and display the two roots of the equation

End

A sample run of your program would be:

Sample run 1:

Enter values for a, b, c: 12.2 3.4 1.2

There are no real roots for the equation.

Sample run 2:

Enter values for a, b, c: 12.2 3.4 -1.2

The roots are: x1: 0.204 and x2: -0.483

Sample run 3:

Enter values for a, b, c: 0.0 0.0 3.4

The equation has no solution.

**After you run the program, show the results to the lab TA before you do the next lab activity.**

**Lab 5.2**: Working with swit**ch** statements [**4 points**]

Save your lab5\_1.cpp file, and close Lab5\_1 project. Create an empty C++ project called Lab5\_2, and then create a new, blank .cpp file, named lab5\_2.cpp, in your project.

For this activity complete the program that determine how many Frequent Flyer miles you can earn flying Global Express Airlines. The program asks the user to enter actual miles that he or she has traveled and the ticket fare class, and then displays the number of award miles. ***Your program should have error handling for invalid inputs.*** The award miles are calculated by multiplying the actual miles and the conversion rate of the purchased fare class in the following table.

|  |  |
| --- | --- |
| **Class of service** | **Base miles rate** |
| First | 150% |
| Business | 125% |
| Economy | 100% |
| Discount Economy | 50% |
| Other | 0% |

A sample run of your program would be:

Sample run 1:

Enter the actual miles: ***1000***

1. First
2. Business
3. Economy
4. Discount Economy
5. Other

Enter the ticket fare class: ***2***

You have earned 1250 miles.

Sample run 2:

Enter the actual miles: ***6500***

1. First
2. Business
3. Economy
4. Discount Economy
5. Other

Enter the ticket fare class: ***4***

You have earned 3250 miles.

**Save your program for the second activity, compile, run and show the output of your program to the lab TA before the end of the lab period**.

**Please, return this printed lab page to the TA. Thank you.**

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