Lab 3

Instructions: Complete the steps below. Be sure to show your code to one of the lab TAs before you leave, so that you can receive credit for this lab. You must also upload a copy of all your source code (.java) files to the link on Blackboard by **11:59 PM on February 11 (Monday), 2019 for L01 and by 11:59 PM on February 12 (Tuesday) 2019, for L02-L06**.

1. The two roots of a quadratic equation $ax^2 + bx + c = 0$ can be obtained using the following formula:
   $r_1 = \frac{-b + \sqrt{b^2-4ac}}{2a}$ and $r_2 = \frac{-b - \sqrt{b^2-4ac}}{2a}$
   $b^2 - 4ac$ is called the discriminant of the quadratic equation. If it is positive, the equation has two real roots. If it is zero, the equation has one root. If it is negative, the equation has no real roots.
   Write a program that prompts the user to enter values for a, b, and c and displays the result based on the discriminant. If the discriminant is positive, display two roots. If the discriminant is 0, display one root. Otherwise, display "The equation has no roots."

   Note: you can use $Math.pow(x, 0.5)$ to compute $\sqrt{x}$.

   Enter $a, b, c:$ 1.0 3 1
   The equation has two roots $-0.381966\ and\ -2.61803$

   Enter $a, b, c:$ 1 2.0 1
   The equation has one root -1.0

   Enter $a, b, c:$ 1 2 3
   The equation has no real roots.

2. A shipping company use the following function to calculate the cost (in dollars) of shipping based on the weight of the package (in pounds).

$$c(w) = \begin{cases} 3.5, if\ 0 < w \leq 1 \\ 5.5, if\ 1 < w \leq 3 \\ 8.5, if\ 3 < w \leq 10 \\ 10.5, if\ 10 < w \leq 20 \end{cases}$$

   Write a program that prompts the user to enter the weight of the package and displays the shipping cost. If the weight is negative or zero, display a message "Invalid input." If the weight is greater than 20 display a message "The package cannot be shipped."

Grading Guidelines: This lab is graded on a scale of 0-6 points, assigned as follows:

- **0 points:** Student is absent or does not appear to have completed any work for the lab
- **2 point (2*1):** Student has written the program, but it has errors.
- **4 points (2*2):** Student has written the program it compiles without error, but it does not produce the correct output.
- **6 points (2*3):** Student has written the program and it compiles and runs correctly, without any errors.