**Assignment #1 (due on 9/7/18)**

*Complete the following programming exercises. Please submit a zipped project folder that has a separate class for each problem. You may discuss the assignments with your classmates and tutors (or anyone else) but all work for all assignments must be entirely your own. Any sharing or copying of assignments will be considered cheating.*

**Problem 1.** Write a program that prompts the user to enter two points (x1, y1) and (x2, y2) and displays the distance between them. The formula for computing the distance is . Note that you can use **Math.pow**(*a*, 0.5) or **Math.sqrt**(*a*) to compute the square root of *a*. *(Problem 2.15 in the textbook)*

**Problem 2.** How cold is outside? The temperature alone is not enough to provide the answer. Other factors including the wind speed, relative humidity, and sunshine play an important role in determining coldness outside. In 2001, the National Weather Service (NWS) implemented the new wind-chill temperature to measure coldness using temperature and wind speed, the formula is:

*tWC* = 35.74 + 0.6215 *t* – 35.75 *w*0.16 + 0.4275 *t* *w*0.16

where *t* is the outside temperature in degrees Fahrenheit and *w* is the wind speed measured in miles per hour. *tWC* is the wind-chilled temperature. The formula cannot be used for wind speeds below 2 mph or temperatures below -58oF or above 41oF. Write a program that prompts the user to enter a temperature between -58oF and 41oF and a wind speed greater than or equal to 2 mph and displays the wind-chill temperature. Use **Math.pow**(*a, b*) to compute *ab* *(Problem 2.17 in the textbook)*

**Problem 3.** Write a program that prompts the user to enter the vertices of a triangle (x1, y1), (x2, y2), (x3, y3) and displays its area. The formula for computing the area of a triangle is:

*s = (side1 + side2 + side3) / 2*

*area* =

*(Problem 2.19 in the textbook)*

**Problem 4.** Write a program that reads an investment amount, annual interest rate, and the number of years, and displays the future investment value using the following formula:

*futureInvestmentValue = investmentAmount (1 + (annualInterestRate/12))numberOfYears\*12*

For example, if you enter amount 1000, annual interest rate 3.25%, and number of years 1, the future investment value is 1032.98. *(Problem 2.21 in the textbook)*

**Problem 5.** The two roots of a quadratic equation *ax2 + bx + c = 0* can be obtained using the following formula:

*b2 – 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 zero, display one root. Otherwise, display “The equation has no real roots.”

*(Problem 3.1 in the textbook)*

**Problem 6.** Write a program that reads three edges for a triangle and computes the perimeter if the input is valid. Otherwise, display that the input is invalid. The input is valid if the sum of every pair of two edges is greater than the remaining edge.

*(Problem 3.19 in the textbook)*

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***Grading***

*Does the program compile? If not, you will lose all the points for that problem.*

*Is the program properly documented? (worth ~50% of the problem)*

*Proper documentation includes:*

* *a preamble with the name of the author, date of creation and brief description of the program.*
* *comments inside the code describing steps needed to be taken to accomplish the goal of the program.*
* *appropriate formatting, indentation and use of white space to make the code readable.*

*Remember that the code is read by humans and it should be easy to read for people who were not involved in its development.*

*Is the program correct? (worth ~50% of the problem), Make sure that your program produces results as specified above.*