## Homework #2 (due on 9/17/24)

*Complete the following 4 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. (25%)** 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 $\sqrt{(x2-x1)^2 + (y2-y1)^2}$. Note that you can use **Math.pow**(*a*, 0.5) or **Math.sqrt**(*a*) to compute the square root of *a*.

**Problem 2. (25%)** 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:

$t_{WC} = 35.74 + 0.6215\ t - 35.75\ w^{0.16} + 0.4275\ t\ w^{0.16}$

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

**Problem 3. (25%)** 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* = $\sqrt{s(s-side1)(s-side2)(s-side3)}$

**Problem 4. (25%)** 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.

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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.*

***What and how to submit?***
*Homework should be submitted through **NYU Classes**. It should be submitted by the time and date is due, or it will be marked as late. To submit homework, upload a single file (just the source code, i.e. files ending with the .java extension, not the .class extension). If there is more than one file, upload a single zip file please.*