

CSE 1241/1141 - COMPUTER PROGRAMMING I

Programming Assignment # 1

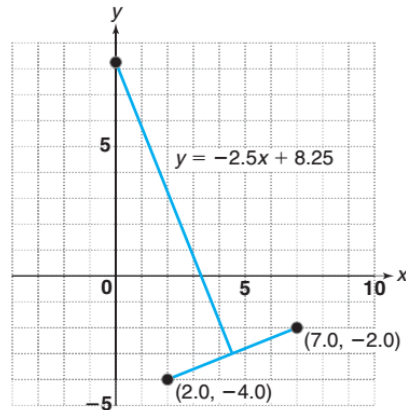
DUE DATE: 03/11/2023 - 23:59 (No extension)

1. Write a program that will print your initials (the first letters of your name and surname) to standard output in letters that are nine lines tall. Each big letter should be made up of a bunch of the initial character itself. For example, if your initials were “D J”, then the output would look something like:

```
DDDDD          JJJJJJJJJJJJJJ
D      D              J
D      D              J
D      D              J
D      D              J
D      D      J      J
D      D      J      J
D      D      J      J
DDDDD          JJ
```

Those with 2 names can choose only one of them to print. The appearance might be different than the example shown above.

2. Write a program that outputs the equation of the perpendicular bisector of the line segment between two points. Your program should
 - prompt the appropriate messages and input the coordinates of the two points as (X_1, Y_1) and (X_2, Y_2) [for example, $(2.0, -4.0)$ and $(7.0, -2.0)$];
 - compute the slope of the line between those two points [$slope = \frac{Y_2 - Y_1}{X_2 - X_1}$];
 - compute the coordinates of the midpoint of the line segment between the two points by averaging the two x coordinates and the two y coordinates; [$midpoint = (\frac{X_1 + X_2}{2}, \frac{Y_1 + Y_2}{2})$]
 - compute the slope of the perpendicular bisector by taking the negative reciprocal of the slope of the line segment; [$m = -slope^{-1}$];
 - compute the y intercept of the perpendicular bisector (you now have the slope m of the bisector and the midpoint (x_{mid}, y_{mid}) on the bisector, so the y intercept is $y_{mid} - m * x_{mid}$);
 - output with labels the original two points, and output in $y = mx + b$ format the equation of the perpendicular bisector. [b is the y intercept of the perpendicular bisector found in previous step.]
 - For example: $y = -2.5x + 8.25$
 - The figure below illustrates the sample line segment mentioned above and its perpendicular bisector.



Test your program to be sure it works on different pairs of points.

Example run:

```
Enter the value of x1:  2
Enter the value of y1: -4
Enter the value of x2:  7
Enter the value of y2: -2
The equation of the perpendicular bisector of the line segment between
(2.0,-4.0) and (7.0,-2.0) is y = -2.5x + 8.25
```

It should be noted that the figure above just shows the pictorial representation of the example given. Your program does not need to print the graph.

3. Write a program that acts as a simple calculator. The program should take two numbers and an operator as input and use a switch-case statement to perform the corresponding mathematical operation.
 - Ask the user to input the first number (a double).
 - Ask the user to input an operator (a character). The allowed operators are:
 - '+' for addition
 - '-' for subtraction
 - '*' for multiplication
 - '/' for division
 - Ask the user to input the second number (a double).
 - Use a switch-case statement to perform the operation based on the operator entered by the user.
 - Display the result of the operation with 2 significant digits (at most).
 - If the user enters an invalid operator, display an error message.

Sample Runs:

```
Enter the first number: 12.5
Enter the operator (+, -, *, /): *
Enter the second number: 3
Result: 37.5
```

```
Enter the first number: 10
Enter the operator (+, -, *, /): /
Enter the second number: 0
Error: Division by zero is not allowed.
```

```
Enter the first number: 8
Enter the operator (+, -, *, /): %
Enter the second number: 2
Invalid operator. Please enter +, -, *, or /.
```

Important Notes:

- *You should print the values with two significant digits (at most).*
- *You should declare the input variables as floating-point numbers.*
- *Your programs should execute correctly for different test cases.*
- *Selected parts of your submissions will be graded! If you only submit the implementation of a single question, you might get a grade of 0!*

Submission Instructions:

Please zip and submit all your files using filename YourNumberHW1.zip (ex: 150713852HW1.zip) to Canvas system (under Assignments tab).

Your zip file should contain the followings:

1. Java source code for Problem 1 (Pro1_150713852.java)
2. Java class file for Problem 1 (Pro1_150713852.class)
3. Java source code for Problem 2 (Pro2_150713852.java)
4. Java class file for Problem 2 (Pro2_150713852.class)
5. Java source code for Problem 3 (Pro3_150713852.java)
6. Java class file for Problem 3 (Pro3_150713852.class)

Please use the *default package in Eclipse IDE* for the assignments. Otherwise, the submitted code may not be compiled on another computer.

Notes:

1. Write a comment at the beginning of each program to explain the purpose of the program. Write your name and student ID as a comment. Include necessary comments to explain your actions.
2. Select meaningful names for your variables.
3. You are allowed to use the materials that you have learned in lectures & labs.
4. Do not use the things that you did not learn in the course.

5. Each student should submit his/her own homework. You can discuss with your peers about the homework but you are not allowed to exchange code or pseudocode. This also applies to material found on the web. Should some submitted homework assignments be identical or suspected to be identical, all involved parties will get a grade of **ZERO** from all homework assignments. In case of any forms of cheating or copying, both giver and receiver are equally culpable and suffer equal penalties.
6. No late submission will be accepted.