

Marmara University – Faculty of Engineering – Department of Computer Engineering

Fall 2021 – CSE1241 Computer Programming I

Homework #3

Due: 18.12.2021.Sat 23.59

- 1) Write a program that draws the coordinate system and some geometric shapes on the console screen as described below.

Ask the user to select one of the following shapes:

1. Line
2. Rectangle
3. Triangle
4. Parabola
5. Circle

Line -> If the user selects to draw a line, ask for the coefficients **a** and **b** that describe the line on the coordinate system such that $y = ax + b$.

Triangle -> If the user selects to draw a triangle, ask for the coordinates of the three vertices vertex 1 (**a**, **b**), vertex 2 (**c**, **d**), and vertex 3 (**e**, **f**) that describe the triangle.

Rectangle -> If the user selects to draw a rectangle, ask for the coordinates of the three vertices vertex 1 (**a**, **b**), vertex 2 (**c**, **d**), and vertex 3 (**e**, **f**) that describe the rectangle. Vertex 2 and vertex 3 are in the neighborhood of vertex 1, and vertex 4 is in the opposite of vertex 1, i.e. the first diagonal is between vertex 1 and vertex 4, and the second one is between vertex 2 and vertex 3. You will the coordinates of vertex 4 using the information for other vertices. Also, you will check whether the points given construct a rectangle; if not, you will notice the user and will not the the rectangle.

Parabola -> Similarly, for the parabola, ask for the coefficients **a**, **b**, **c** to draw the parabola for the equation $y = ax^2 + bx + c$.

Circle -> Finally, for the circle, ask for the radius (**r**) and the center (**a**, **b**) to define the circle equation $(x - a)^2 + (y - b)^2 = r^2$.

After getting required parameters, draw the coordinate system on the console screen using the characters – and |. Draw the geometric shape using the character *.

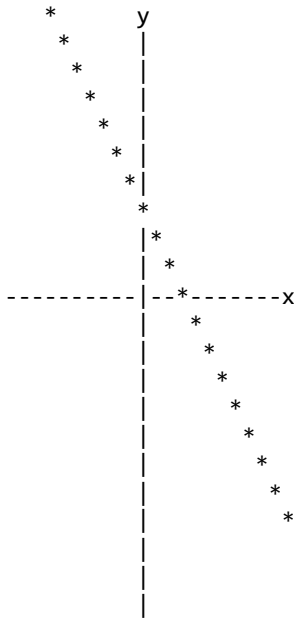
Both x and y values in the coordinate system should range at least in [-10, 10]. You may draw a larger coordinate system as it will look clearer. However, make sure that your coordinate system fits in the console screen.

Sample run of the program is as follows:

```
Which shape would you like to draw?
1. Line
2. Triangle
3. Rectangle
4. Parabola
5. Circle
6.Exit
1
```

Line formula is $y = ax + b$

Please enter the coefficients a and b:-1 3

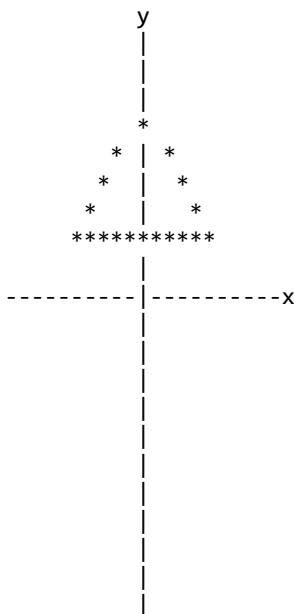


Which shape would you like to draw?

1. Line
 2. Triangle
 3. Rectangle
 4. Parabola
 5. Circle
 - 6.Exit
- 2

For triangle, we need the coordinates of the points for three vertices.

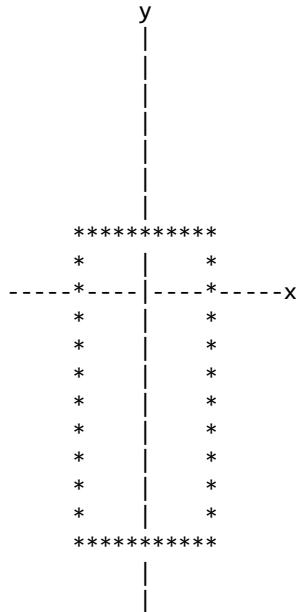
Please enter the coordinates of 3 vertices a, b, c, d, e, f:-5 3 0 6 5 3



Which shape would you like to draw?

1. Line
 2. Triangle
 3. Rectangle
 4. Parabola
 5. Circle
 - 6.Exit
- 3

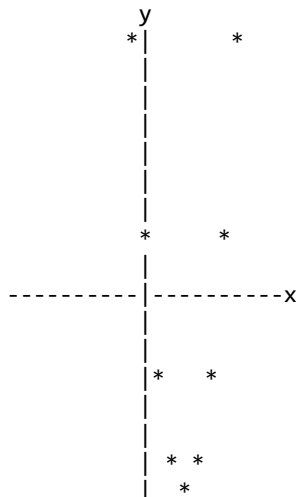
For rectangle, we need the coordinates of the points for three vertices.
Please enter the coordinates of 3 vertices a, b, c, d, e, f:-5 3 5 3 -5 9



Which shape would you like to draw?

1. Line
 2. Triangle
 3. Rectangle
 4. Parabola
 5. Circle
 - 6.Exit
- 4

Parabola formula is $y = ax^2 + bx + c$
Please enter the coefficients a, b and c:1 -6 2



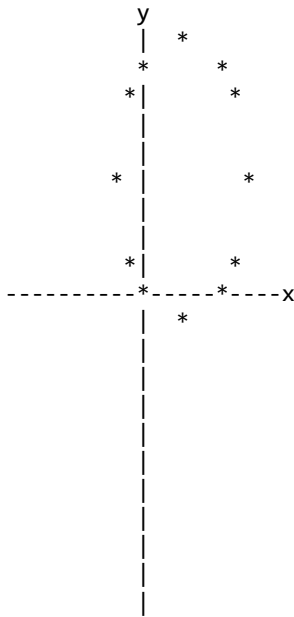
|

Which shape would you like to draw?

1. Line
 2. Triangle
 3. Rectangle
 4. Parabola
 5. Circle
 - 6.Exit
- 5

Circle formula is $(x-a)^2 + (y-b)^2 = r^2$

Please enter the coordinates of the center (a,b) and the radius:3 4 5



Which shape would you like to draw?

1. Line
 2. Triangle
 3. Rectangle
 4. Parabola
 5. Circle
 - 6.Exit
- 6

IMPORTANT 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 and labs. Do not use the ones that you have not learned in the course.
- 4) The outputs of your programs must be the same as the sample runs above.
- 5) Please be sure that your programs run properly on any computer.
- 6) Since only selected parts will be graded, send a complete solution for the homework; otherwise, you may get a zero-grade based on our evaluation.
- 7) Your program will be tested with an auto-grader. So, it should take the inputs exactly the same in the sample runs and it should print the outputs exactly the same in the sample runs. Otherwise, your program may fail.
- 8) Your program should execute correctly for different test cases.
- 9) Please zip all your files into a single zip file using file naming convention StudentID_HW3.zip, e.g., 150120123_HW3.zip. Your zip file should contain the followings:
 - a) Java source code (HW3_StudentID.java)
 - b) Java class file (HW3_StudentID.class)
- 10) Submit your zip file to <http://ues.marmara.edu.tr> before deadline.
- 11) You are responsible for making sure you are turning in the right file, and that it is not corrupted in anyway. We will not allow resubmissions if you turn in the wrong file, even if you can prove that you have not modified the file after the deadline.
- 12) Each student should submit his/her own homework. You can discuss with your peers about the homework, but you are not allowed to exchange codes or pseudocodes. This also applies to material found on the web. If some submitted homework assignments are found to be identical or suspected to be identical, all involved parties will get a grade of ZERO from all homework. You should submit your own work. In case of any forms of cheating or copying, both giver and receiver are equally culpable and suffer equal penalties. All types of plagiarism will result in FF grade from the course.
- 13) No late submission will be accepted.