Code / Project : CME1251 / 1
Year / Semester : 2021-2022 Fall Semester
Duration : 4 weeks

Project: Triangle Battleship Game

The aim of the project is to develop a one-player game in which user creates a triangle battleship, calculating geometrical properties of the ship and surviving from a random shot. If the ship survives, the player gets a point which is the area of the ship.

Game Playing Rules

1. The game starts with a menu which includes five options: (i) entering ship location (ii) listing the properties of the ship, (iii) shooting at the ship, (iv) showing high score table, and (v) exit.
2. The shape of the ship is a triangle and it can only be placed in the first quadrant (x>0, y>0) of the Cartesian coordinate plane. The player will enter the coordinates of three vertices (named A, B, and C) of the triangle. The program should control the validity of the triangle.
3. The game area is 30 * 12 units. The ship will be shown on the coordinate plane.
4. The program should list the following properties about the battleship:

   Basic Properties:

   (i) The size of the ship (length of the edges)
   (ii) The perimeter of the ship
   (iii) The area of the ship
   (iv) The angles of the ship
   (v) Median points of the ship (intersection of a median and a triangle edge)
   (vi) The centroid of the ship

   Advanced Properties:

   (vii) The length of the bisector of the point A
   (viii) The area of the inscribed and circumscribed circles
   (ix) The type of the ship
   - Equilateral, Isosceles, Scalene
   - Acute-angled, Right-angled, Obtuse-angled
5. It will be a random shot. If it hits the ship, the ship sinks.
6. If the ship survives, the player will get the point which is the area of the ship.
7. At the end of the game, the program should print the *high score table*. If the player gets a score that is high enough to be on the table, the name of the player is entered and his/her score is shown on the table.

   If the player gets a score that is equal to a score in the table, the name of the player is placed under the old one.

   The default score table is as follows:

Name	**Score**
Nazan Kaya	60
Ali Kurt	30
Sibel Arslan	10

Sample Game

```
- MENU -
PLEASE SELECT FROM THE OPTIONS BELOW:
      1 – Enter ship location
      2 – Ship info
      3 – Shoot at the ship
      4 – Show high score table
      5 – Exit
```

EXAMPLE 1

```
Please enter the location of the ship
A: (4,8)
B: (4,2)
C: (12,2)
```

```
  12|
  11|
  10|
   9|
   8|    A
   7|
   6|
   5|
   4|
   3|
   2|    B       C
   1|
    +------------------------------
     12345678901234567890123456789 0
```

SHIP INFO

```
The size of the ship: a=8, b=10, c=6
The perimeter of the ship: 24
The area of the ship: 24
The angles of the ship: A=53.13 B=90.00 C=36.87
The median points:  (8,2) (8,5) (4,5)
The centroid of the ship:  (6.67, 4)
The length of the bisector: 6.71
The area of the inscribed circle: 12.57
The area of circumscribed circle: 78.54
The type of the ship: Scalene (Right-angled)
```

Shoot: (16,5)

```
  12|
  11|
  10|
   9|
   8|    A
   7|
   6|
   5|                X
   4|
   3|
   2|    B       C
   1|
    +------------------------------
     12345678901234567890123456789 0
```

```
Your ship survived! Total score is 24
Enter your name: Elif Polat
```

HIGH SCORE TABLE

Name	Score
Nazan Kaya	60
Ali Kurt	30
Elif Polat	24

EXAMPLE 2

```
Please enter the location of the ship
A: (8,4)
B: (12,12)
C: (16,4)
```

```
  12|           B
  11|
  10|
   9|
   8|
   7|
   6|
   5|
   4|       A       C
   3|
   2|
   1|
    +------------------------------
     12345678901234567890123456789 0
```

SHIP INFO

```
The size of the ship: a=8.94, b=8, c=8.94
The perimeter of the ship: 25.89
The area of the ship: 32
The angles of the ship: A=63.44 B=53.12 C=63.44
The median points:  (14,8) (12,4) (10,8)
The centroid of the ship:  (12, 6.67)
The length of the bisector: 7.18
The area of the inscribed circle: 19.2
The area of circumscribed circle: 78.54
The type of the ship: Isosceles (Acute-angled)
```

Shoot: (14,4)

```
  12|           B
  11|
  10|
   9|
   8|
   7|
   6|
   5|
   4|       A     X C
   3|
   2|
   1|
    +------------------------------
     12345678901234567890123456789 0
```

```
Your ship sank! Total score is 0
```

HIGH SCORE TABLE

Name	Score
Nazan Kaya	60
Ali Kurt	30
Sibel Arslan	10

Suggested Weekly Program

1. Understanding the game. Discussing and designing solution alternatives. Drawing flowchart.
2. Creating the necessary variables, screen. Drawing the ship. Calculating basic properties of the ship.
3. Calculating advanced properties of the ship. Triangle validation. Shooting.
4. Menu. Playing the game with all rules. High score table operations. Remaining parts of the game.

First Evaluation: 22.10.2021	**Final Evaluation:** 05.11.2021 (powerpoint + poster)
Progress Report: 22.10.2021	**Final Report:** 05.11.2021