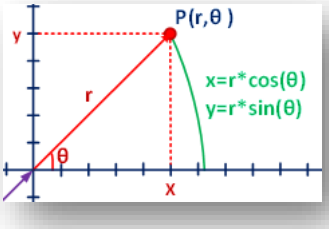
PROJECT

SUBJECT & BASIC INFORMATION

WRITE A C# PROGRAM WITH FOLLOWING REQUIREMENTS

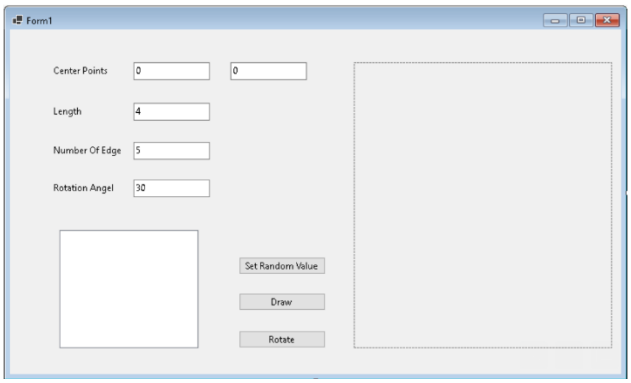
- Define a **Point2D** class:
  - Add data members of cartesian coordinates (**x** and **y**) and related properties for these fields
  - Define a default constructor with no parameters
  - Define a constructor setting inital 2D coordinates with random **x** and **y** values
  - Define a **printCoordinates()** method that prints the coordinates of the 2D point
  - Define a **calculatePolarCoordinates()** method that calculates polar coordinates (**P(r,θ)**) of this 2D point according to the figure below:



$$x^2 + y^2 = r^2$$
$$r = sqrt(x^2 + y^2)$$
$$\theta = tan^{-1}(y/x)$$

  - Define a **calculateCartesianCoordinates()** method that calculates castesian coordinates (**P(x,y)**) of the 2D point (vice verse of converting to polar coordinates)
  - Define a **printPolarCoordinates()** method that prints the pre-calculated polar coordinates of this 2D point.
- Define a **Polygon** class
  - Add **center** data member composed of **Point2D** class
  - Add **length** data member and related property for this field
  - Add **numberofEdges** data member and related property fort his field
  - Define a default constructor with no parameters
  - Define a second constructor gets inital center and radius as parameter
  - Define a **calculateEdgeCoordinates()** method that calculates the vertex points of the polygon.
    - First vertex should start with a random point calculated depending on the **center** and **length** values.
  - Define a **rotatePolygon()** method that recalculates the vertex points of the polygon (rotation is done clockwise)

- Create a form interface including these form elements below :



  - Two **textBoxes** to enter the **center** of the polygon
    - range of random values for x is [0,3] and for y is [0-3]
    - set default value as **(0,0)**
  - A **textBox** to enter the **length** of the polygon
    - range of random values is [3-9]
    - set default value as **4**
  - A **textBox** to enter **numberOfEdges** of the polygon
    - range of random values is [3-10]
    - set default value as **5**
  - A **textBox** to enter the angle of rotation (the first draw value should be zero)
    - range of random values is [0-359]
    - set default value as **30**
  - A **listBox** to write the edge coordinates in order
  - A **pictureBox** to draw the graphics depending on the textboxes
    - get the center point as the midpoint of the pictureBox
  - A **button** that will start drawing graphics
    - create a polygon object depending on the the values of text boxes except rotation angel (angel will be zero for first draw)
    - call the required functions to (re)calculate the edge coordinates
    - draw the polygon on the pictureBox and list the edge coordinates in the listBox
  - A **button** that will rotate the drawed graph depending on the entered angle
    - if no drawn graph exist do nothing or give warning
  - A **button** that will set random value on all textboxes

NOTE: These default and random values are given to make it easier for you but, If you can't cope, you can use other values .

RULES & EVALUATION

- Name of the project should be the student number (without dot)
- To optimize the size of the assignment folder, the project should be cleaned (to clean your Solution/Project, use **Build-> Clean Solution**)
- The beginning of all .cs files should include this comment lines below

```
//**********************************************************************
//**                                                                  **
//**         STUDENT NAME..............:                             **
//**         STUDENT NUMBER............:                             **
//**********************************************************************
```

- There should be comment lines for some operations (methods, specific calculations, etc.)
- **Deadline:** Control SABIS system
- You should upload **your zipped project file(s)** before deadline.
- Evaluation Criteria
  - Comment lines (student information, explaining operations like variable names, if statements, loops, etc.)
  - Obeying the variable declaration rules
  - Being readable (intendation, comments, etc.)
  - Correct compilation of the code
  - The evaluation of projects will be competitive and copied assignments will be evaluated as 0.