

Paint Application

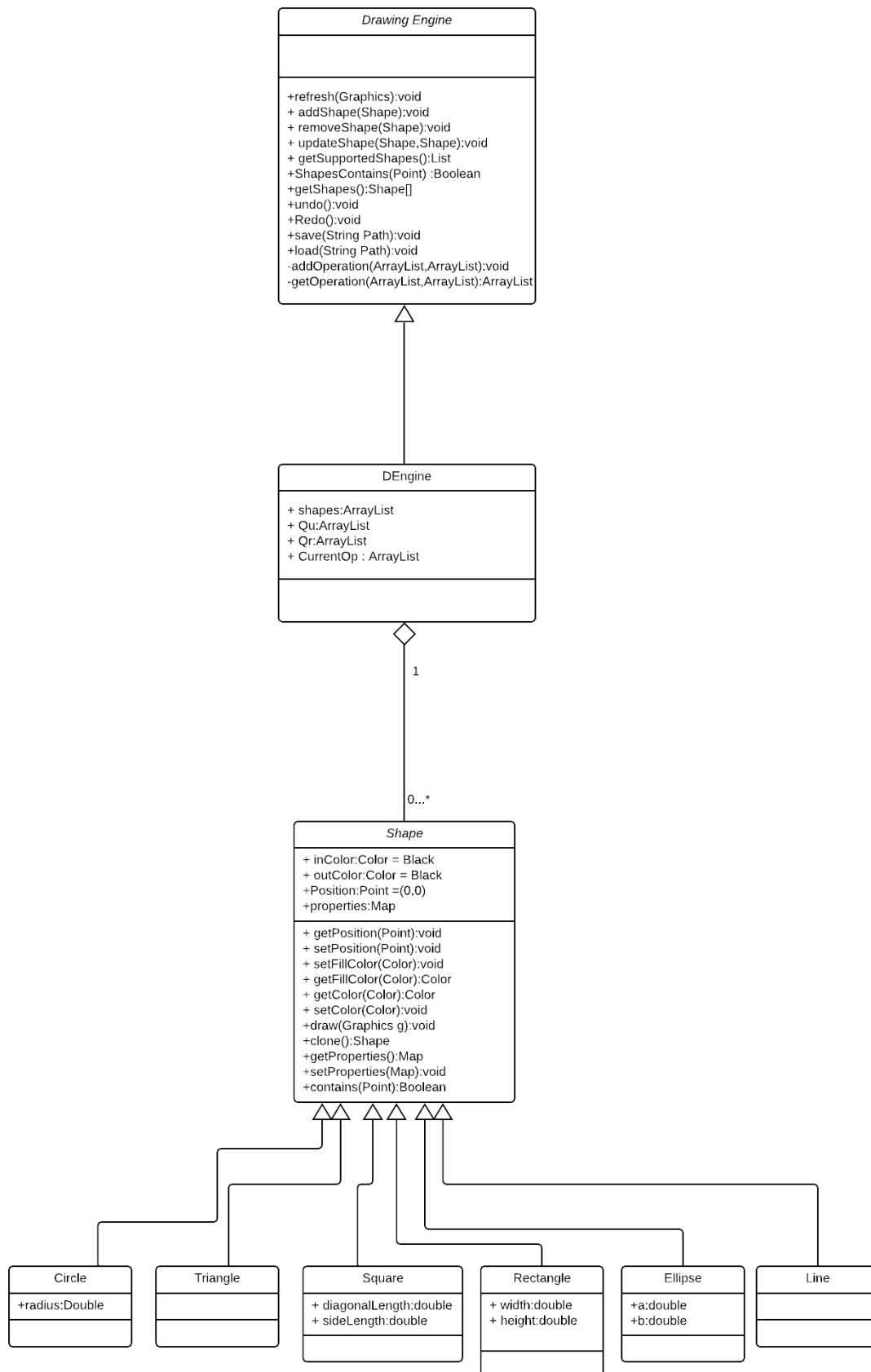
(Report)

1- Lab Statement :

Build a Java AWT/Swing based gui paint application using (Object Oriented Programming) concepts that can do the following :

- a- Paint different shapes [E.g. rectangle , square , ellipse , circle , triangle] .
- b- Make different operations on shapes such as move , resize ..
- c- Can undo and redo operations .
- d- Can save in two different file extensions (JSON – XML) .
- e- Can use new shapes by importing jar plugins .

2-Uml Diagram:



3-Completion List :

a- can draw different shapes .



b- can move and color shapes .



c- can't resize shapes .  (lost 3 days trying)

d- getSupportedShapes function not working properly



e- can save and load in xml extension only



f- can undo and redo 20 operation



4-Design Description :

a- Drawing Engine : interface

b- DEngine : Class implements Drawing Engine

- 1- Uses an ArrayList (CurrentOp + shapes) to save shapes drawn into the current graphics .
- 2- New changes are made to the shapes that exists “shapes” ArrayList while “CurrentOp” ArrayList stays unchanged .
- 3- On performing any change , it adds “CurrentOp” ArrayList to “Qu” ArrayList as it holds shapes before the change was made , then sets “CurrentOp” similar to “shapes” but it’s only a cloned version of “shapes”.
- 4- On performing undo action , “CurrentOp” is added to “Qr” and the last operation that was added to “Qu” is polled and set to “CurrentOp” and “shapes” .
- 5- On performing redo action, same happens as mentioned above but with switching “Qr” and “Qu” roles.
- 6- If “Qr” or “Qu” were empty during undo/redo action an new empty ArrayList is assigned to “CurrentOp” + A NullPointerException is thrown .

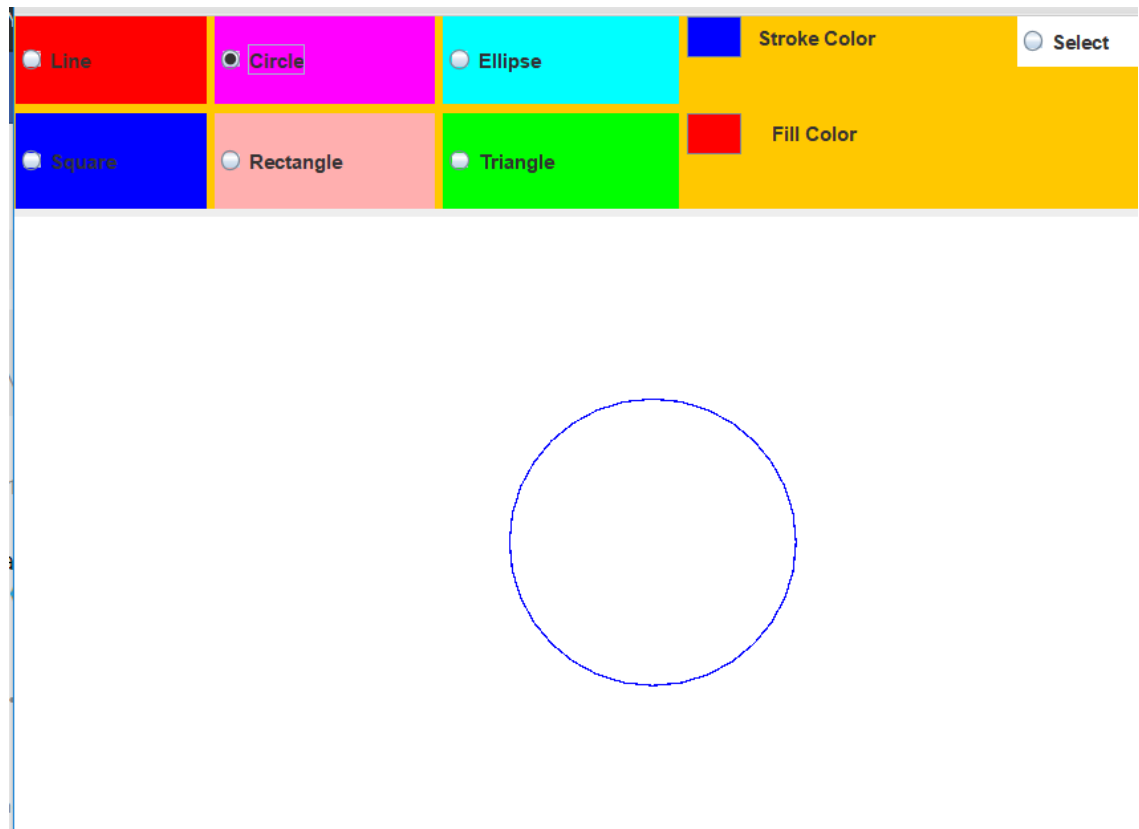
c- Shape : Interface

d- Circle/Rectangle/Line/Square/Triangle/Ellipse : class implements Shape

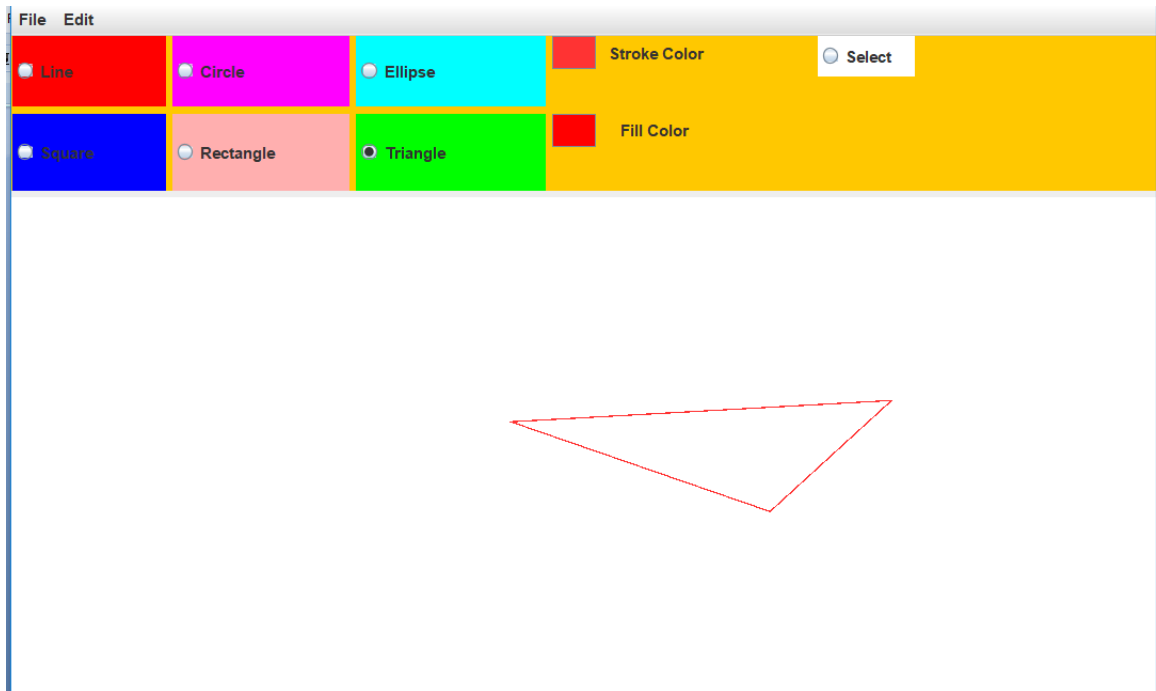
- 1- When initialized , all variables are assigned to NULL or 0
- 2- Must call set properties after initialization in order to have a well looking shape
- 3- When set properties is called , it uses values stored in passed Map to set shape’s characteristics ,values represents points that was chosen by the user to draw the shape saved in [“X”/”Y” + point No] format.
- 4- It then calculates and set different shape properties according to shape type

e- Frame : Gui class

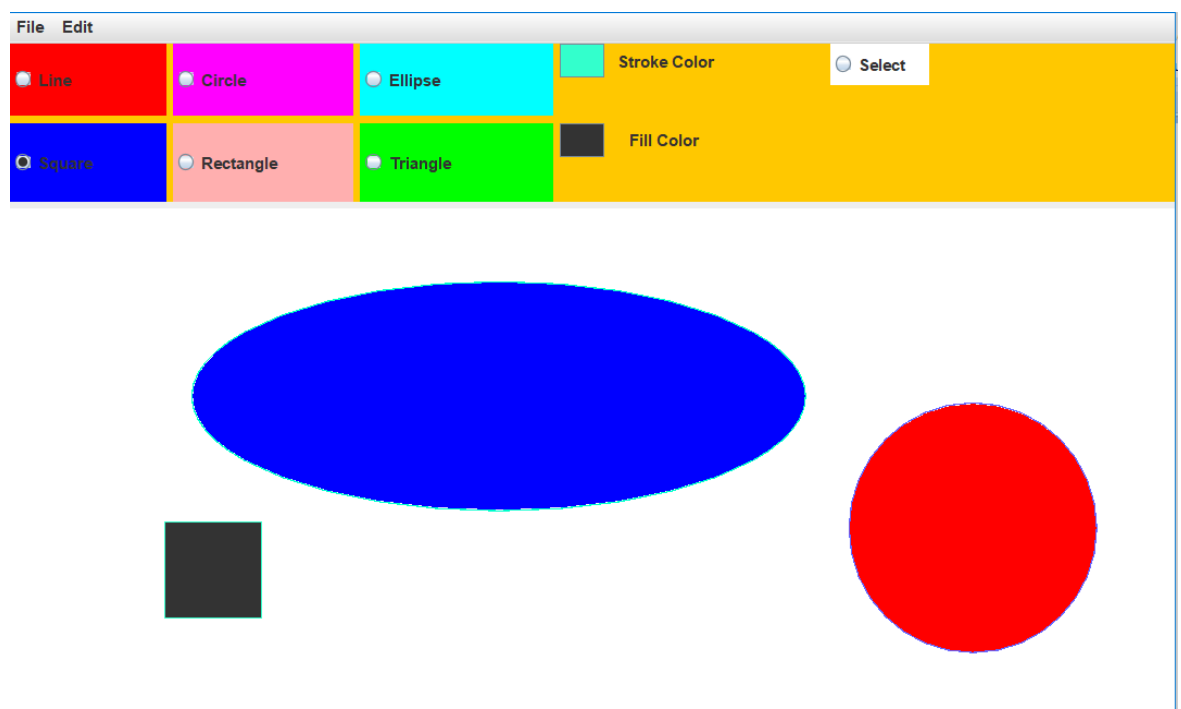
- 1- Line shape is selected at the beginning as a default shape .
- 2- When user clicks on the panel if the shapes can be drawn with two points only , paintComponent starts to set Properties for the shapes selected and draws it while the user moves the mouse , displaying a white-color-filled shape that changes its characteristics with each mouse movement .



- 3- If the shape is drawn with 3 point such as Triangle & Ellipse , application will wait for the user to click 2 times on different places inorder to make the shapes starts appearing .



- 4- Once the user clicks a final click the shapes is drawn setting its fill color to the chosen color , red color is chosen by default if the user didn't choose color at least once .



- 5- To move a shape the user should first chose Select option from the upper panel , then by clicking and dragging any object it will move .
- 6- Undo/Redo/Delete options exist in edit menu and can be triggered by Pressing [Ctrl + (Z , Y) , Delete] keys Respectively .
- 7- Save/Load options exist in File menu and can be triggered by Pressing Ctrl + (S , L) Respectively .

5- Design Decision :

- a-** Drawn shapes can only be deleted by choosing Select , clicking once on it ,then press Del key , or choose Delete option from edit menu .
- b-** Load function loads properly but shapes doesn't appear until the user make any action ,simplest action would be resize window or moving it .
- c-** Can save/load in xml extension only