Python problem set 3
Graphics development

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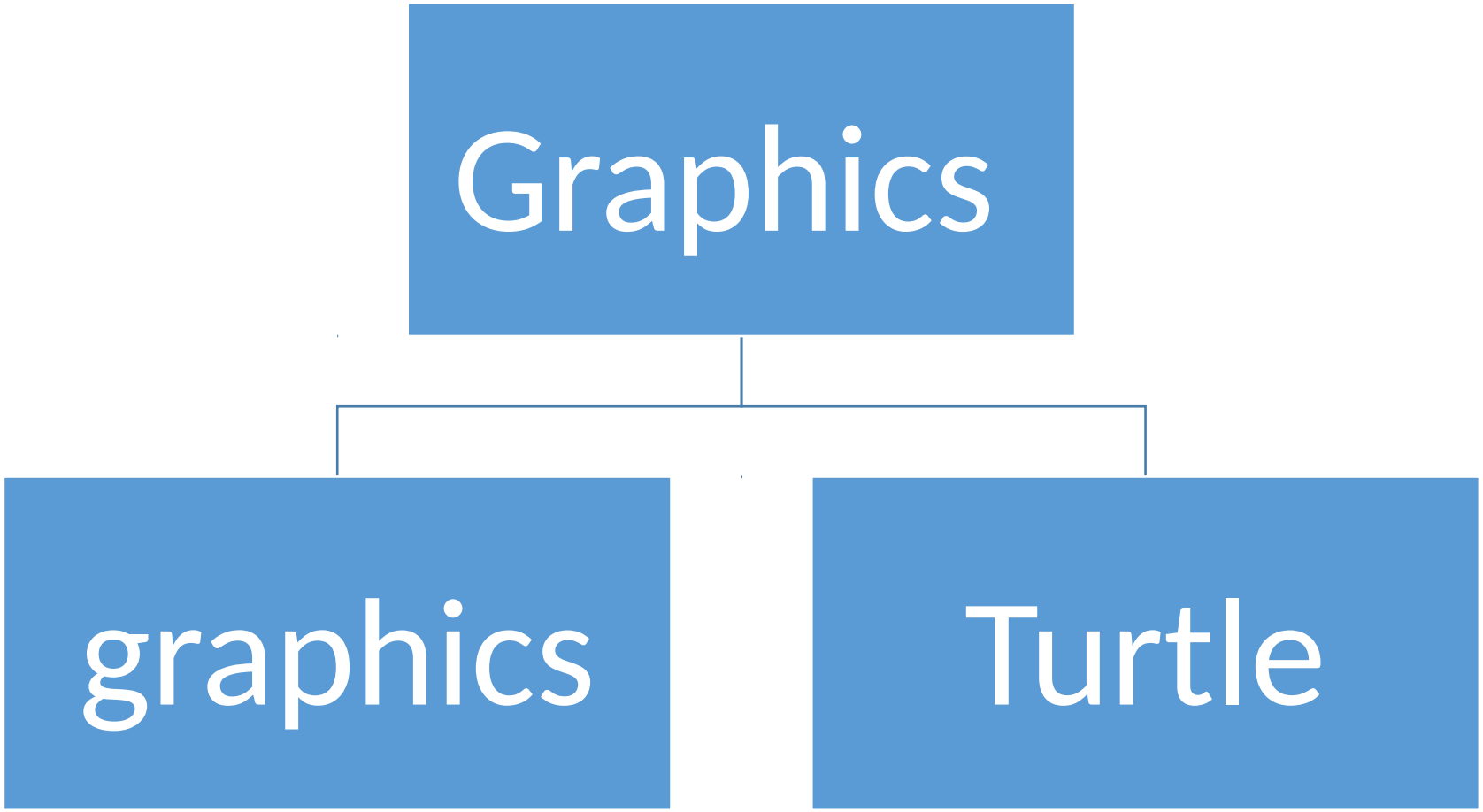
What is graphics?



Turtle

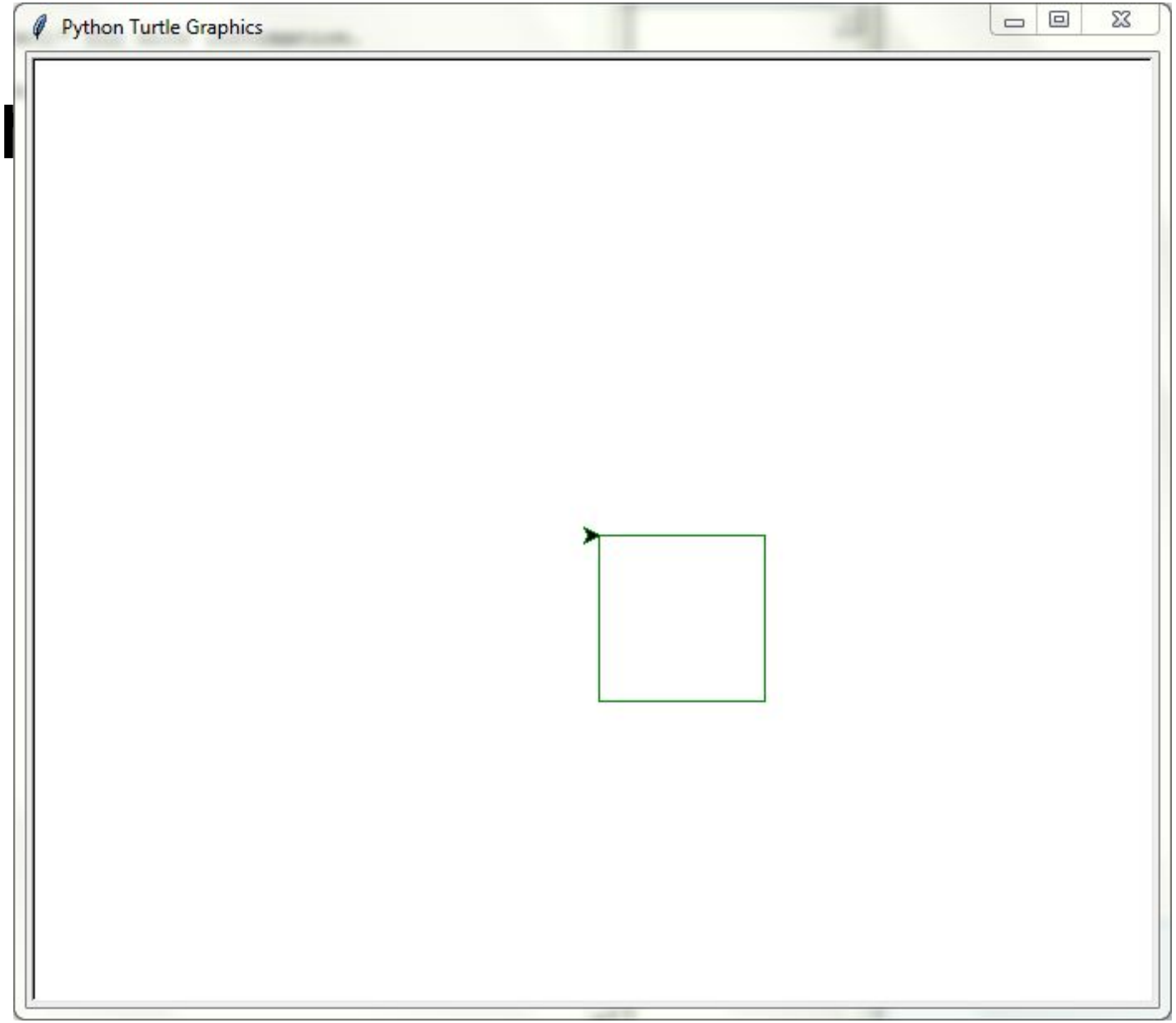
- Turtle graphics is a popular way for introducing programming to kids. It was part of the original Logo programming language developed by Wally Feurzig and Seymour Papert in 1966.
- The turtle module is an extended reimplementation of the same-named module from the Python standard distribution up to version Python 2.5.

Basic movement using turtle

```
>>> import turtle
>>> tmnt=turtle.Turtle()
>>> tmnt.forward(100)
```

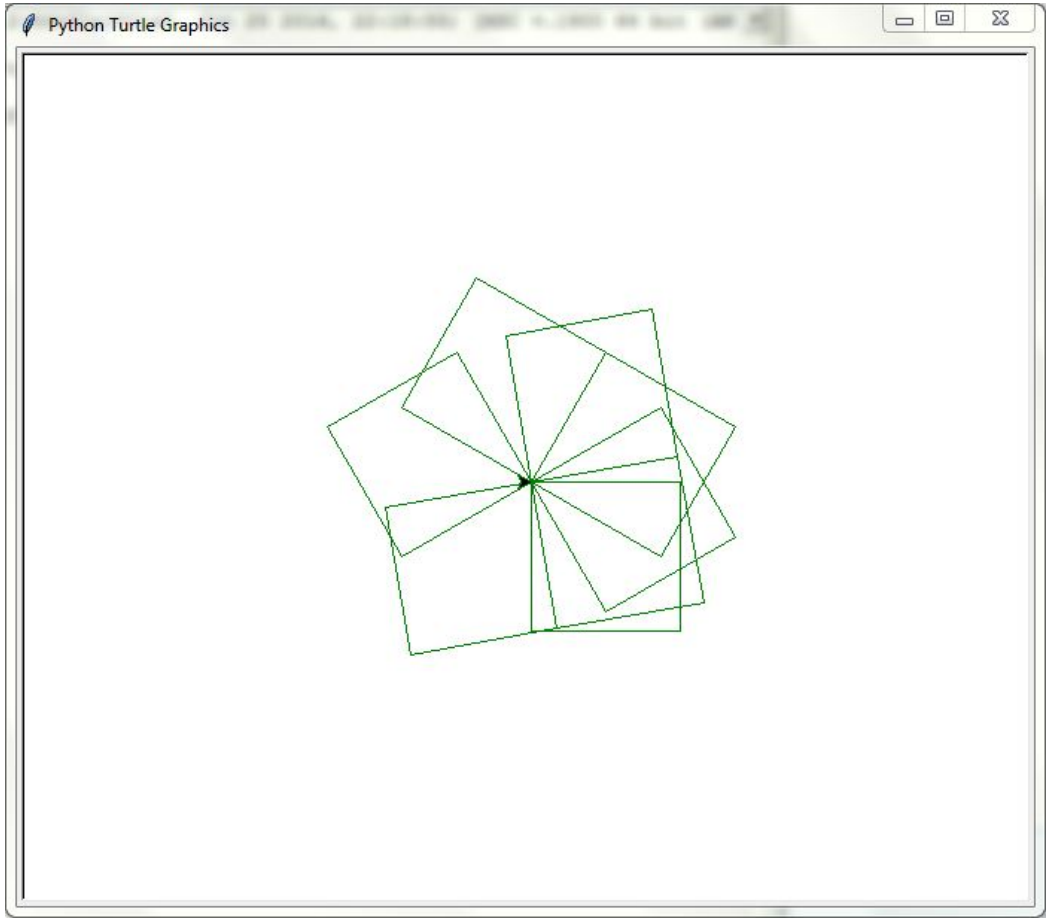
Drawing a squar

```
import turtle
loc=turtle.Turtle()
loc.pencolor("green")
for i in range(4):
    loc.forward(100)
    loc.right(90)
```



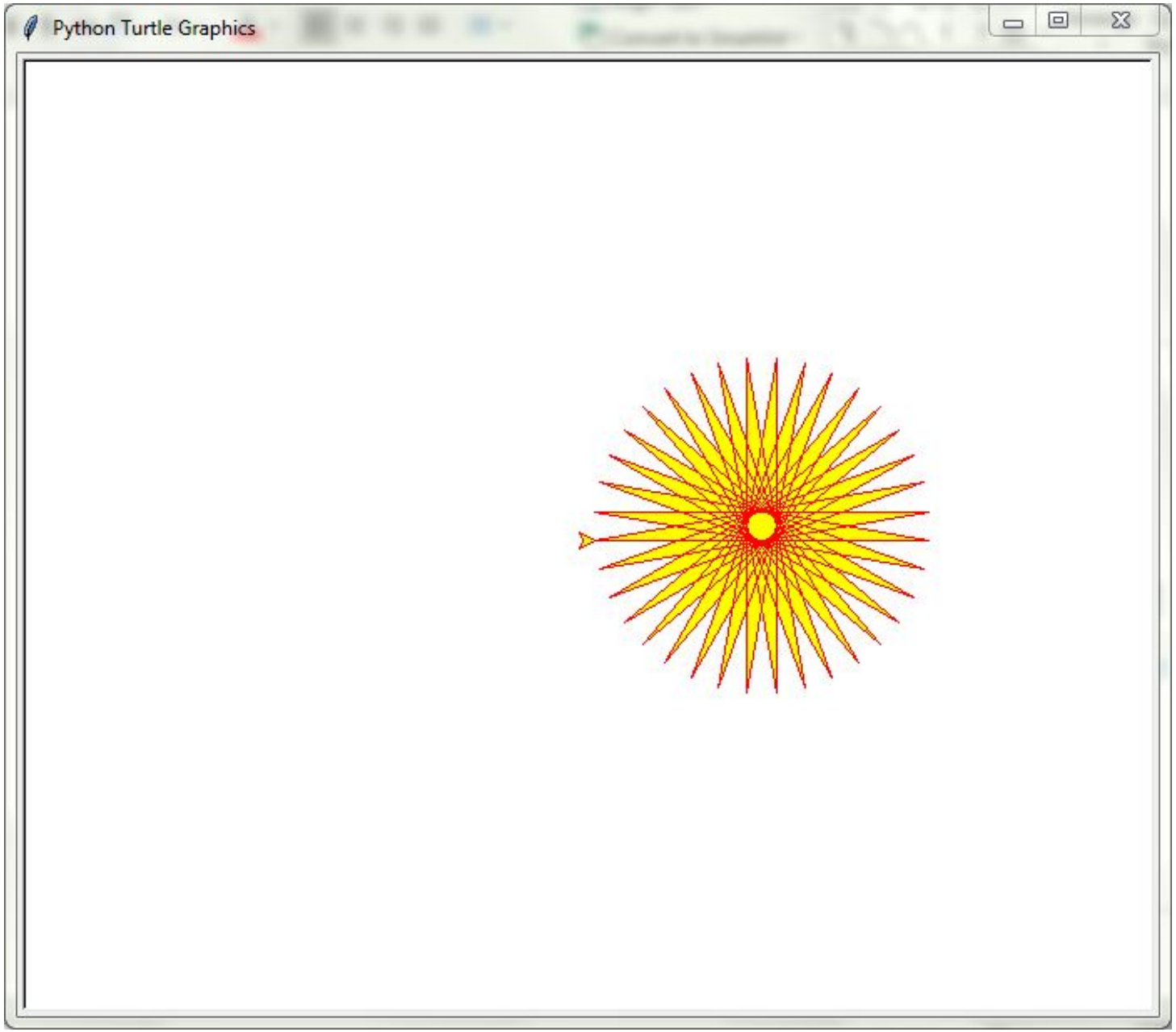
Squares with one point common

```
import turtle
loc=turtle.Turtle()
loc.pencolor("green")
for angle in range(10,90,10):
    loc.left(angle)
    for sides in range(4):
        loc.forward(100)
        loc.right(90)
```



A fancy star

```
from turtle import *
color('red', 'yellow')
begin_fill()
while True:
    forward(200)
    left(170)
    if abs(pos()) < 1:
        break
end_fill()
done()
```



Can you trace the output of this? (Yes/No)

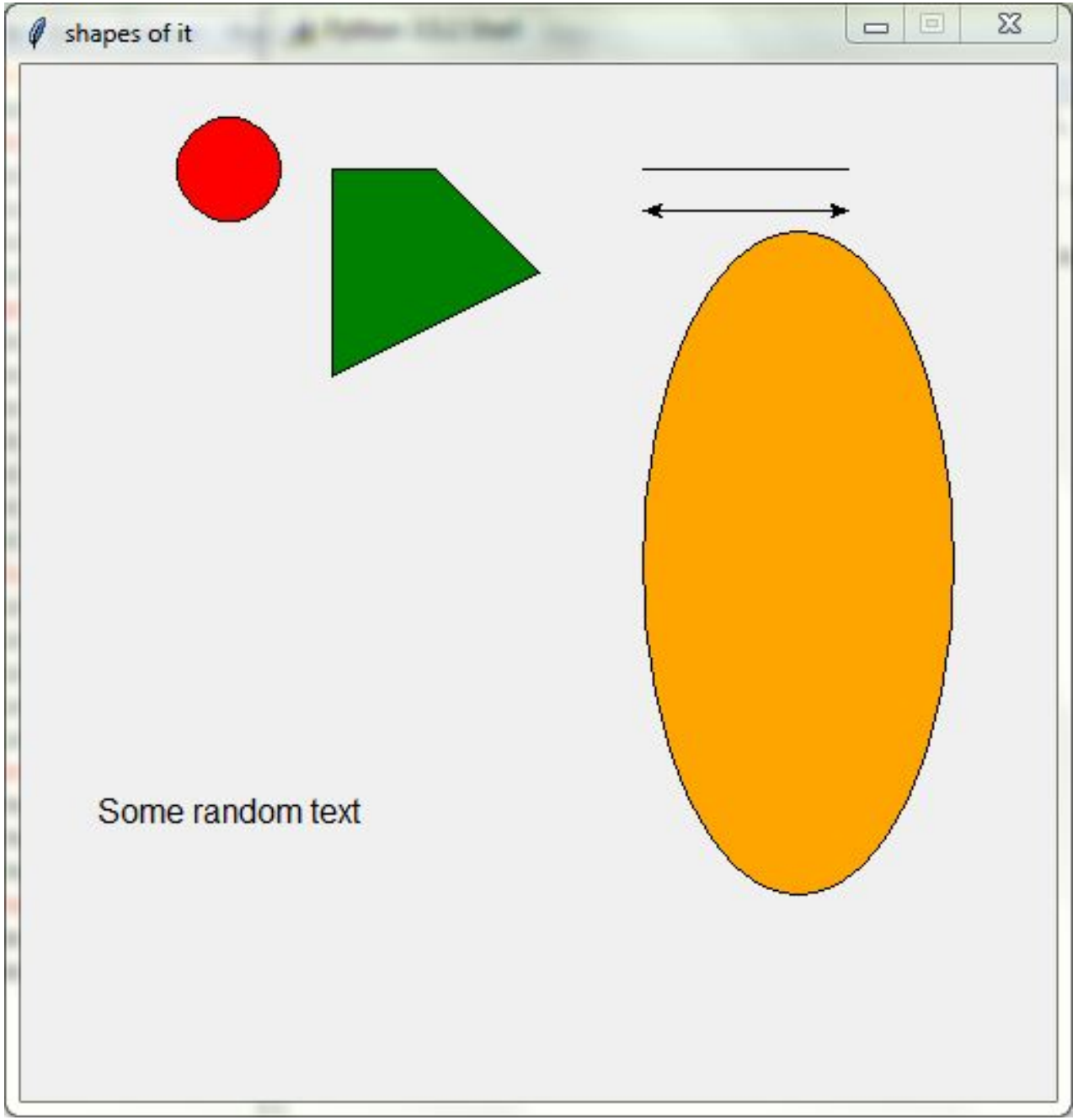
```
import turtle
import random
loc=turtle.Turtle()
for angle in range(10,90,10):
    loc.left(angle)
    for sides in range(10):
        loc.pencolor("blue")
        loc.setposition(random.randint(0,100),random.randint(0,100))
        loc.dot(random.randint(0,10))
        print(loc.position())
        loc.pencolor("green")
        loc.forward(random.randint(0,50))
        loc.degrees(90)
        loc.pencolor("red")
        loc.circle(random.randint(0,50))
```

Graphics

Drawing shapes

```
from graphics import *
window=GraphWin("shapes of it",500,500)
#circle
point=Point(100,50)
circle=Circle(point,25)
circle.setFill('red')
circle.draw(window)
#polygon
point1=Point(150,50)
point2=Point(200,50)
point3=Point(250,100)
point4=Point(150,150)
poly=Polygon([point1,point2,point3,point4])
poly.setFill('green')
poly.draw(window)
#line method
line=Line(Point(300,50),Point(400,50))
line.draw(window)
line2=Line(Point(300,70),Point(400,70))
line2.setArrow("both")
line2.draw(window)
#oval
oval=Oval(Point(300,80),Point(450,400))
oval.setFill('orange')
oval.draw(window)
#text
message=Text(Point(100,360),'Some random text')
message.draw(window)
```

output



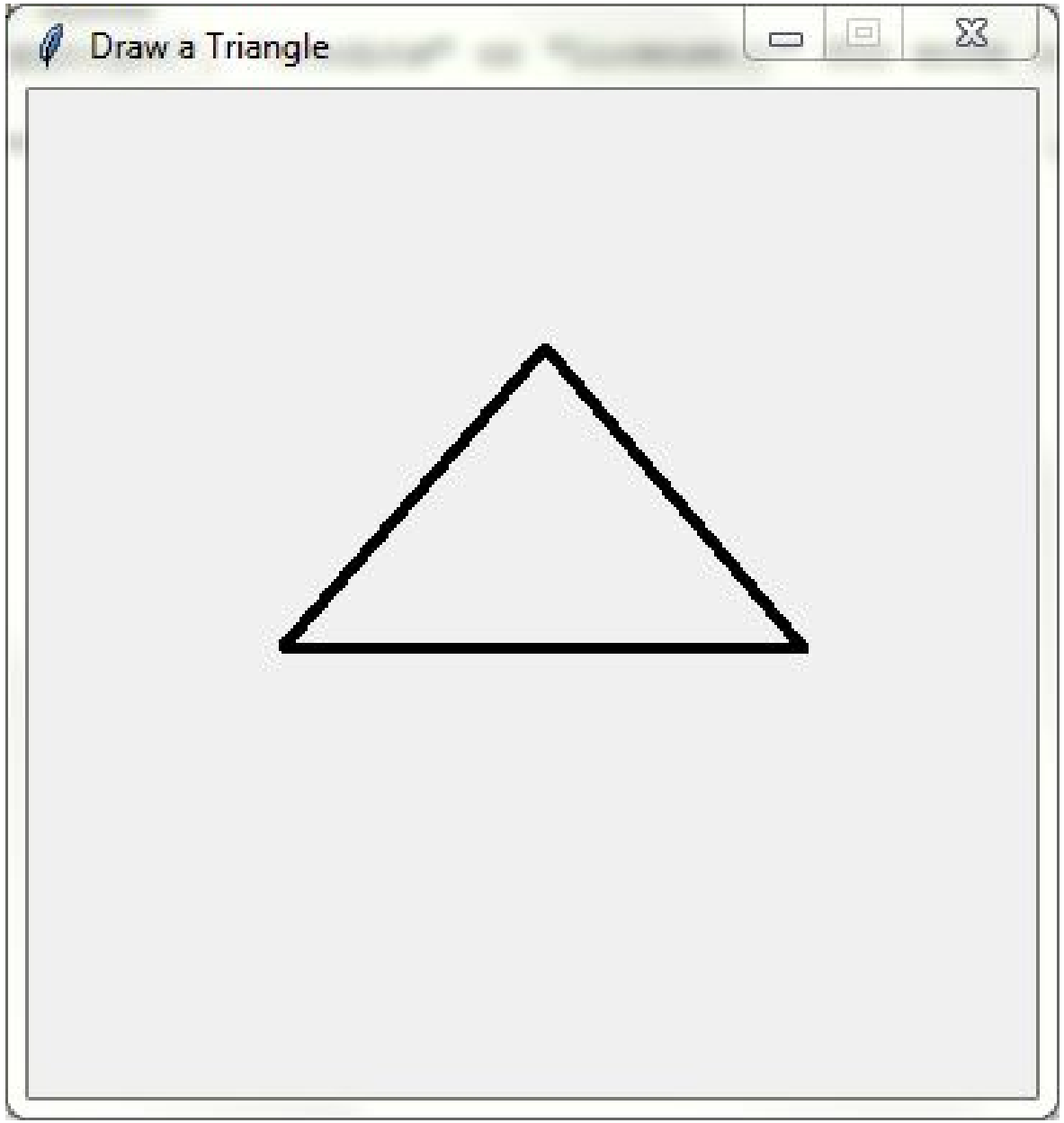
Moving effect

```
from graphics import *
import time
win = GraphWin('Back and Forth', 350, 350)
cir1 = Circle(Point(40,100), 25)
cir1.setFill("yellow")
cir1.draw(win)
for i in range(46):
    cir1.move(5, 5)
    time.sleep(.05)
for i in range(46):
    cir1.move(-5,-5)
    time.sleep(.05)
```

Triangle generator

```
from graphics import *
win = GraphWin('Draw a Triangle', 350, 350)
# Get and draw three vertices of triangle
p1 = win.getMouse()
p1.draw(win)
p2 = win.getMouse()
p2.draw(win)
p3 = win.getMouse()
p3.draw(win)
vertices = [p1, p2, p3]
# Use Polygon object to draw the triangle
triangle = Polygon(vertices)
```

Output



Thank you

- Designing is thinking made visible.