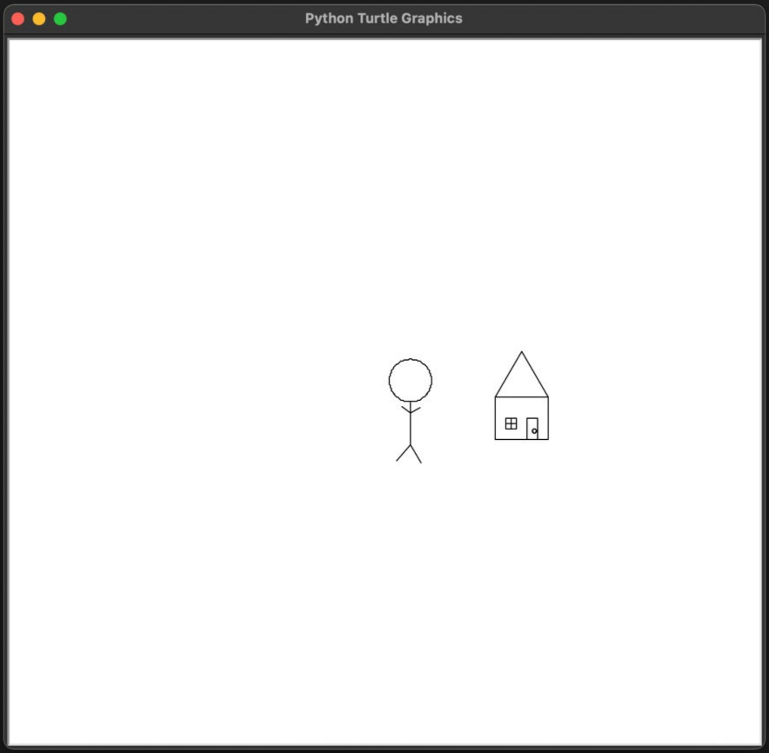
Shape Exercise

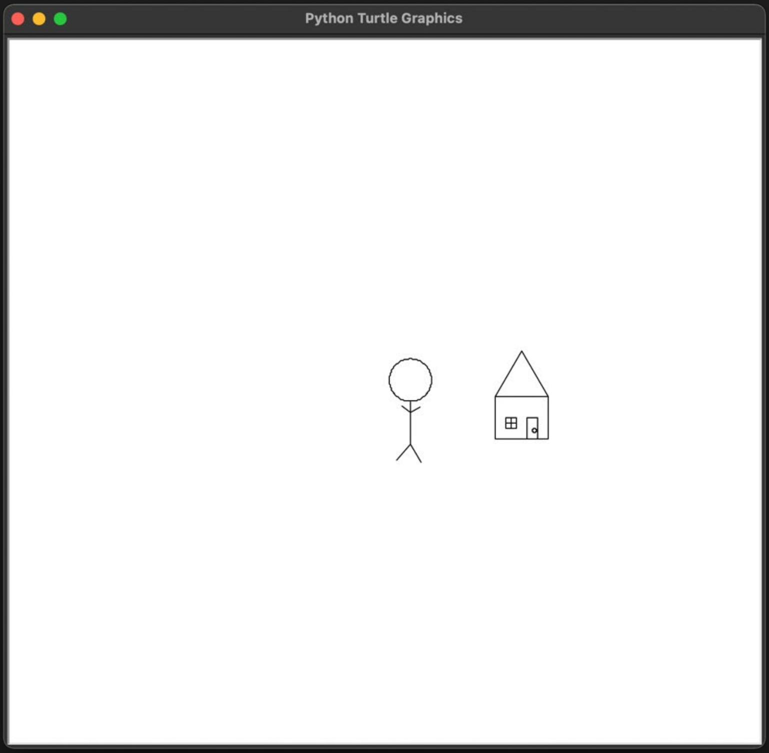
```python
'''
lab5.py
This program has several sub-classes that when used properly can have their respective draw functions called to
draw the coresponding shapes with particular elements specified by the user.
'''
import turtle
import math
# Other imports, such as math, random, etc., as needed
class Shape(object):
    '''This class is the parents class for basic elements of a shape, such as a color.'''
    def __init__(self, t, color):
        '''Initializes the color and turtle.'''
        self.t = t
        self.color = color
    def draw(self): #Draw method does nothing for this class.
        return


''' Circle class inherits Shape class'''
class Circle(Shape):
    def __init__(self, t, radius, color, centerX, centerY):
        Shape.__init__(self, t, color)
        '''Initializes the needed remaining instance variables needed.'''
        self.radius = radius
        self.centerx = centerX
        self.centery = centerY
    def draw(self): #Overrides parent's draw method and draws a circle instead. Typical child ignoring their parents...
        self.t.down()
        self.t.pencolor(self.color)
        self.t.up()
        self.t.goto(self.centerx, self.centery)
        self.t.right(180)
        self.t.forward(self.radius)
        self.t.right(90)
        self.t.down()
        distance = 2 * math.pi * self.radius / 120
        for count in range(120):
            self.t.forward(distance)
            self.t.right(3)



class Rectangle(Shape):
    '''Rectangle class inherits Shape class'''
    def __init__(self, t, color, longS, shortS):
        Shape.__init__(self, t, color)
        '''Initializes the remaining instance variables needed for a sqaure'''
        self.long = longS
        self.short = shortS

    def draw(self): #Overrides parent's draw method and draws a circle instead. Two child classes disobeying must be
hard for the parent class.
        self.t.pencolor(self.color)
        self.t.down()
        self.t.setheading(0)
        self.topleftcorner = self.t.pos()
        for i in range(2):
            self.t.forward(self.long)
            self.t.right(90)
            self.t.forward(self.short)
            self.t.right(90)

class Line(Shape):
    '''Line calss inherits Shape class'''
    def __init__(self, t, color, length, width, angle):
        Shape.__init__(self, t, color)
        self.length = length
        self.width = width
        self.angle = angle
    def draw(self): #Overrides parent's draw method and draws a circle instead. This rebellion is getting ridiculous...
        self.t.down()
        self.t.pencolor(self.color)
        self.t.width(self.width)
        self.t.setheading(self.angle)
        self.t.forward(self.length)

class Triangle(Shape):
    '''Triangle class inherits Shape class'''
    def __init__(self, t, color, length):
        Shape.__init__(self, t, color)
        self.length = length
    def draw(self): #Overrides parent's draw method and draws a circle instead. At this point it's on the parent...
        self.t.down()
        self.t.setheading(60)
        self.t.forward(self.length)
        self.t.right(120)
        self.t.forward(self.length)
        self.t.right(120)
        self.t.forward(self.length)

def main(): #Main function of the program
    t = turtle.Turtle()
```

```python
    drawStickman(t)
    drawHouse(t)
    t.hideturtle()
    turtle.done()

def drawStickman(t): #Calls the classes and functions of classes needed to draw a handsome stickman.
    head = Circle(t, 20, "black", 20, 15)
    body = Line(t, "black", 40, 1, 270)
    arm1 = Line(t, "black", 10, 1, 30)
    arm2 = Line(t, "black", 10, 1, 140)
    leg1 = Line(t, "black", 20, 1, 300)
    leg2 = Line(t, "black", 20, 1, 230)
    head.draw()
    t.up()
    t.goto(20, 15)
    t.setheading(270)
    t.forward(20)
    neck = t.pos()
    body.draw()
    t.up()
    legpos = t.pos()
    t.goto(neck)
    t.forward(10)
    arm1.draw()
    t.up()
    t.setheading(270)
    t.goto(neck)
    t.forward(10)
    arm2.draw()
    t.up()
    t.goto(legpos)
    leg1.draw()
    t.up()
    t.goto(legpos)
    leg2.draw()

def drawHouse(t): #Draws a house, or as some might consider it, a countryside church building minus the cross.
    t.up()
    t.goto(100,0)
    body = Rectangle(t, "black", 50, 40)
    roof = Triangle(t, "black", 50)
    body.draw()
    t.up()
    t.goto(100,0)
    roof.draw()
    t.up()
    t.goto(100,0)
    t.setheading(0)
    t.forward(50)
    t.right(90)
    t.forward(40)
    t.right(90)
    t.forward(20)
    t.right(90)
    t.forward(20)
    doorpos = t.pos()
    door = Rectangle(t, "black", 10, 20)
    t.right(90)
    door.draw()
    t.up()
    t.forward(10)
    t.right(90)
    t.forward(12)
    t.right(90)
    t.forward(3)
    circ = t.pos()
    knob = Circle(t, 2, "black", circ[0], circ[1])
    knob.draw()
    t.up()
    t.goto(doorpos)
    t.setheading(180)
    t.forward(20)
    t.setheading(0)
    winpos = t.pos()
    window = Rectangle(t, "black", 5, 5)
    window.draw()
    t.up()
    t.forward(5)
    window.draw()
    t.up()
    t.goto(winpos)
    t.setheading(270)
    t.forward(5)
    t.setheading(0)
    window.draw()
    t.up()
    t.forward(5)
    window.draw()

if __name__ == "__main__":
    main()
```

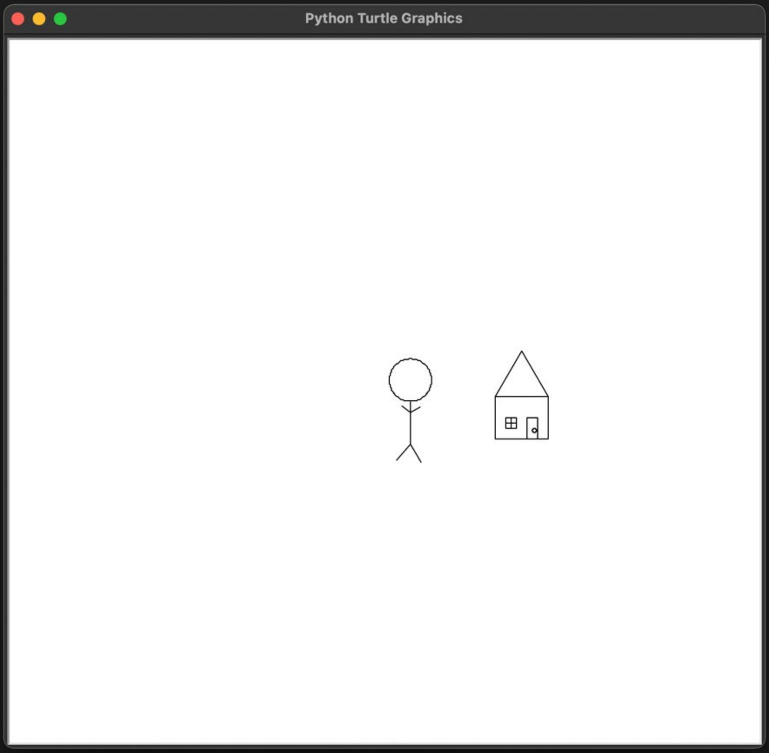
1.


Python Turtle Graphics

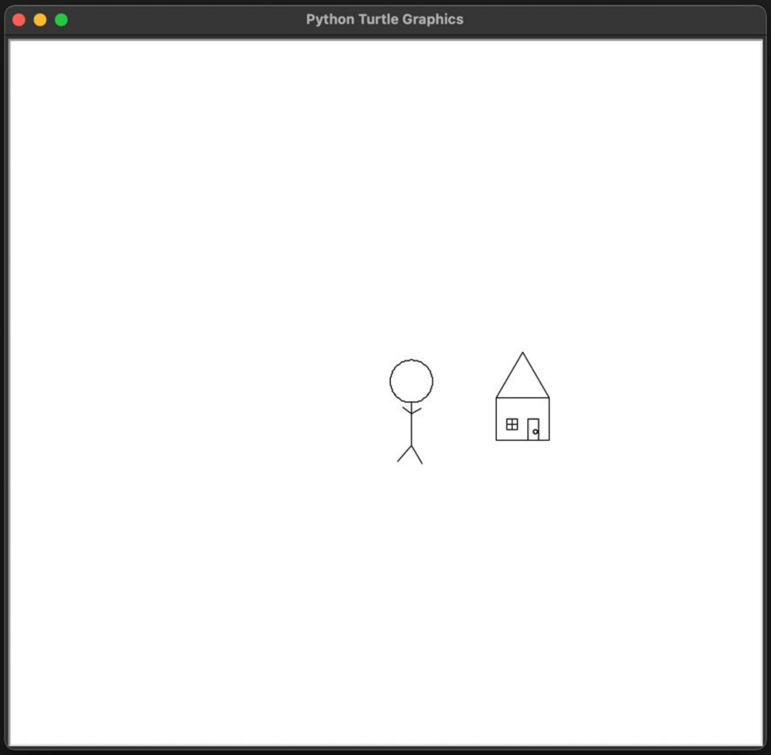
2.



3.



4.


Python Turtle Graphics