

**Homework #4**

**01286121 Computer Programming**

**Software Engineering Program,**

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By

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1.

Code:

import turtle

p0x, p0y = input("Enter the first point (x,y): ").split(",")

p1x, p1y = input("Enter the second point (x,y): ").split(",")

p2x, p2y = input("Enter the third point (x,y): ").split(",")

p0x, p0y, p1x, p1y, p2x, p2y = int(p0x), int(p0y), int(p1x), int(p1y), int(p2x), int(p2y)

turtle.penup()

turtle.pensize(2)

turtle.speed(8)

turtle.goto(p0x, p0y)

turtle.dot(5)

turtle.write("P0")

turtle.pendown()

turtle.goto(p1x, p1y)

turtle.dot(5)

turtle.write("P1")

turtle.penup()

turtle.goto(p2x, p2y)

turtle.dot(5)

turtle.write("P2")

turtle.pendown()

turtle.penup()

turtle.goto(p2x, p2y - 20)

#cross product

#left hand side will have positive number, right hand is negative

side\_value = (p1x - p0x) \* (p2y - p0y) - (p1y - p0y) \* (p2x - p0x)

if side\_value > 0:

turtle.write("Point 2 is on the left side of the line")

elif side\_value < 0:

turtle.write("Point 2 is on the right side of the line")

else:

turtle.write("Point 2 is on the line")

turtle.hideturtle()

turtle.done()

Result: 1.1: On the line.

A line with points and text

AI-generated content may be incorrect.

|P1 = 20,20|

|P2 = 100,80|

|P3 = 60,50|

1.2: Left side of line.

A line with points and text

AI-generated content may be incorrect.

|P1 = 20,20|

|P2 = 100,80|

|P3 = 40,60|

1.3: Right side of line.

A line with points and text

AI-generated content may be incorrect.

|P1 = 20,20|

|P2 = 100,80|

|P3 = 80,20|

2.

Code:

import turtle

x1, y1 = input("Enter the first rectangle's point (x,y): ").split(",")

width1, height1 = input("Enter the first rectangle's height and width (h,w): ").split(",")

x2, y2 = input("Enter the second rectangle's point (x,y): ").split(",")

width2, height2 = input("Enter the second rectangle's point (h,w): ").split(",")

x1, y1 = int(x1), int(y1)

width1, height1 = int(width1), int(height1)

x2, y2 = int(x2), int(y2)

width2, height2 = int(width2), int(height2)

def draw\_rectangle(x, y, width, height):

turtle.penup()

turtle.goto(x - width / 2, y - height / 2)

turtle.pendown()

for \_ in range(2):

turtle.forward(width)

turtle.left(90)

turtle.forward(height)

turtle.left(90)

turtle.penup()

def is\_inside(x1, y1, width1, height1, x2, y2, width2, height2):

left1, right1 = x1 - width1 / 2, x1 + width1 / 2

bottom1, top1 = y1 - height1 / 2, y1 + height1 / 2

left2, right2 = x2 - width2 / 2, x2 + width2 / 2

bottom2, top2 = y2 - height2 / 2, y2 + height2 / 2

is\_left\_inside = left1 >= left2

is\_right\_inside = right1 <= right2

is\_bottom\_inside = bottom1 >= bottom2

is\_top\_inside = top1 <= top2

return is\_left\_inside and is\_right\_inside and is\_bottom\_inside and is\_top\_inside

draw\_rectangle(x1, y1, width1, height1)

turtle.goto(x1,y1)

turtle.write("(x1, y1)")

draw\_rectangle(x2, y2, width2, height2)

turtle.goto(x2,y2)

turtle.write("(x2, y2)")

dx = abs(x1 - x2)

dy = abs(y1 - y2)

wsum = (width1 / 2) + (width2 / 2)

h\_sum = (height1 / 2) + (height2 / 2)

overlaps = dx < wsum and dy < h\_sum

r1\_in\_r2 = is\_inside(x1, y1, width1, height1, x2, y2, width2, height2)

r2\_in\_r1 = is\_inside(x2, y2, width2, height2, x1, y1, width1, height1)

turtle.penup()

turtle.goto(x1, y1 - 20)

if r1\_in\_r2:

turtle.write("Rectangle 1 is inside Rectangle 2.")

elif r2\_in\_r1:

turtle.write("Rectangle 2 is inside Rectangle 1.")

elif overlaps:

turtle.write("The rectangles overlaps.")

else:

turtle.write("The rectangles doesn't overlap.")

turtle.hideturtle()

turtle.done()

Result: 2.1: Rectangle 2 inside Rectangle 1.

A rectangle with black text

AI-generated content may be incorrect.

First rectangle's point (x,y): 1,1

First rectangle's height, width: 200,200

Second rectangle's point (x,y): 20,50

Second rectangle's height, width: 20,20

2.2: No overlapping.

A screenshot of a computer

AI-generated content may be incorrect.

First rectangle's point (x,y): 1,1

First rectangle's height, width: 200,200

Second rectangle's point (x,y): 150,200

Second rectangle's height, width: 50,50

2.3: Overlapping between rectangles.

A close-up of a rectangle

AI-generated content may be incorrect.

First rectangle's point (x,y): 1,1

First rectangle's height, width: 200,200

Second rectangle's point (x,y): 50,50

Second rectangle's height, width: 150,150