

Chapter 12

A.

1. B
2. C
3. A
4. D
5. B
6. D
7. B
8. A

B.

1. False
2. True
3. True
4. False
5. True
6. False
7. False
8. False
9. True
10. False

C.

1.

Turtle is a graphics package for drawing lines, circles, and various other shapes including text. In short **turtle** is a **cursor** on the screen to draw various things related to graphics. At the python's interactive mode type the following command to import turtle module.

```
>>> import turtle    #import turtle module
```

Thus, importing turtle module helps programmer to access all the graphics functions

2. The various built in methods to change the direction of turtles are as follows

- a. `forward(x)` - Move turtle P pixels in the direction of its current heading.
- b. `left(angle)` - Rotates the turtle left by the specified angle

- c. `right(angle)` - Rotates the turtle in place a degree clockwise.
- d. `Backward(x)` - Moves the turtle P pixels in the opposite direction of its current heading.

3. Different shapes can be drawn by making use of iterations

The following examples demonstrate to draw square without using the concept of iteration.

Draw square without Iteration

```
import turtle                #import turtle module
turtle.forward(100)          #Move turtle in forward direction
turtle.left(90) #Change the direction of turtle to left by 90 degree
turtle.forward(100)
turtle.left(90)
turtle.forward(100)
turtle.left(90)
turtle.forward(100)
```

Output



Explanation: In the above example we have make use of **`turtle.forward(100)`** and **`turtle.left(90)`** for three times. Thus if we make use of iterations then we can easily iterate loop for three times and execute the said statements for three times in order to square.

Draw square using the concept of Iteration

```
import turtle                #import turtle module
for x in range(3):
    turtle.forward(100)      #Move turtle in forward direction
    turtle.left(90)         #Change the direction of turtle to left by 90 degree
turtle.forward(100)
```

Similarly we can draw different shapes by making use of iterations.

- ### 4. Turtles can be used to create bar charts. Basic methods such as **`turtle.forward()`** , **`turtle.left()`** and **`turtle.right()`** are used to draw bar charts. Also Various in build methods such as **`write()`**, **`begin_fill()`** , and **`end_fill()`** are used to write text and fill color with specific color onto the canvas.

***For more detail Refer 12.9 from the chapter (example).

5. Turtles penup() method Pulls pen up. In this state it just moves without drawing from one place to other. Thus penup() method can be used by the programmer if just want to move from one point to other without drawing. Whereas pendown() method pulls pen down and moves from one place to other in order to draw figures.

1.

```
import turtle                #import turtle module
turtle.left(60)              #Change the direction of turtle left
turtle.forward(50)
turtle.left(60)              #Change the direction of turtle left
turtle.forward(50)
turtle.left(60)              #Change the direction of turtle left
turtle.forward(50)
turtle.left(60)              #Change the direction of turtle left
turtle.forward(50)
turtle.left(60)              #Change the direction of turtle left
turtle.forward(50)
turtle.left(60)              #Change the direction of turtle left
turtle.forward(50)
```

2.

```
Import turtle as t
t.pencolor("#C0C0C0")
t.pensize(4)
t.dot(300,"Black")
t.fillcolor("white")
t.begin_fill()
t.fd(100)
t.setheading(90)
t.circle(100,90)
t.goto(0,0)
t.end_fill()
t.setheading(90)
t.fillcolor("blue")
t.begin_fill()
t.fd(100)
t.setheading(180)
t.circle(100,90)
t.goto(0,0)
t.end_fill()
t.setheading(180)
```

```
t.fillcolor("white")
t.begin_fill()
t.fd(100)
t.setheading(270)
t.circle(100,90)
t.goto(0,0)
t.end_fill()
t.setheading(270)
t.fillcolor("blue")
t.begin_fill()
t.fd(100)
t.setheading(360)
t.circle(100,90)
t.goto(0,0)
t.end_fill()
```

3.

```
import turtle as t
t.setheading(0)
t.fillcolor("Pink")
t.begin_fill()
t.circle(50,180)
t.goto(0,0)
t.end_fill()
t.setheading(90)
t.fillcolor("Gray")
t.begin_fill()
t.circle(50,180)
t.goto(0,0)
t.end_fill()
t.setheading(180)
t.fillcolor("Red")
t.begin_fill()
t.circle(50,180)
t.goto(0,0)
t.end_fill()
t.setheading(270)
t.fillcolor("Orange")
t.begin_fill()
t.circle(50,180)
t.goto(0,0)
t.end_fill()
```

4.

```
import turtle as t
t.penup()
x = 0
y = 0
t.goto(x,y) #Move pen at location x and y
t.penup()
for i in range(1,6): # value of i varies from 1 to 10
    y = y - 20
    for j in range(1,6): # Value of j varies from 1 to 10
        if j<=i:
            t.penup()
            t.speed(1)
            t.forward(20)
            t.write('*')
    t.goto(x, y)
```