PRACTICE SHEET

What you will Learn:

Turtle Graphics in Python, Flowchart design using Flowgorithm

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Turtle Graphics in Python

1. Introduction

Turtle graphics is a simple yet powerful way to create graphics in Python and provides an interactive method to draw on a virtual canvas.
It uses an on-screen “turtle” that moves, turns, and draws lines based on your commands, making it ideal for learning programming concepts and creating visual designs without needing complex graphics libraries.

Imagine you have a robotic turtle sitting in the middle of a big, white sheet of paper. This turtle can walk forward, turn left or right, and draw lines with a pen attached to its belly. You can even tell it to lift the pen so it can move without drawing.

2. Getting Started

Basic Steps to Run a Turtle Program

- **Import the module**

  ```
  import turtle
  # or
  from turtle import *
  ```

- **Create a window (drawing board)**

  ```
  wn = turtle.Screen()
  wn.bgcolor("light green")
  wn.title("Turtle Example")
  ```

- **Create a turtle object**

  ```
  skk = turtle.Turtle()
  ```

- **Move and draw using turtle methods**

  ```
  skk.forward(100)
  skk.right(90)
  ```

- **Complete the program**
- turtle.done()

3. Commonly Used Turtle Methods

Method	Parameters	Description
Turtle()	None	Creates and returns a turtle object
forward() / fd()	distance	Move forward by a given distance
backward() / bk()	distance	Move backward by a given distance
right()	angle	Turn clockwise by given angle
left()	angle	Turn counterclockwise by given angle
penup() / up()	None	Lift pen (no drawing)
pendown() / down()	None	Put pen down (draw)
color()	color name	Set pen color
fillcolor()	color name	Set fill color
begin_fill()	None	Start filling a shape
end_fill()	None	Stop filling a shape
heading()	None	Get current direction in degrees
position() / pos()	None	Get current (x, y) coordinates
goto()	x, y	Move to a specific location
dot()	None	Draw a dot at current position
stamp()	None	Leave an impression of turtle shape
shape()	shape name	Change turtle shape ('arrow', 'classic', 'turtle', 'circle')
home()	None	Return to (0, 0) and reset direction

Method	Parameters	Description
clearscreen()	None	Clear entire window

4. Examples

Example 1 – Drawing a Square

```
import turtle
skk = turtle.Turtle()
for i in range(4):
    skk.forward(50)
    skk.right(90)
turtle.done()
```

Example 2 – Drawing a Triangle

```
import turtle
t = turtle.Turtle()
for i in range(3):
    t.forward(100)
    t.left(120)
turtle.done()
```

Example 3 – Colored Shape

```
import turtle
t = turtle.Turtle()
t.color("blue")
t.begin_fill()
```

```
for i in range(4):
    t.forward(100)
    t.right(90)
t.end_fill()
turtle.done()
```

5. Uses of Turtle Graphics

- **Educational tool** - Helps beginners learn programming logic visually.
- **Creative art** - Enables drawing of patterns, fractals, and animations.
- **Graphical experiments** - Quick prototyping without installing complex libraries.
- **Mathematics & geometry** - Visualizing angles, shapes, and coordinate systems.

[MEDIUM] Q1) Draw a flowchart using Flowgorithm to find the sum of the series: $1-X+X^2-X^3...X^N$.

[MEDIUM] Q2) Draw a flowchart using Flowgorithm to find the GCD and LCM of two numbers.

[MEDIUM] Q3) Draw a flowchart using Flowgorithm to swap two numbers:

- Without using a temporary variable.
- Using a temporary variable.

[HARD] Q4) Draw a flowchart using Flowgorithm to calculate:

- Simple Interest: $SI = (P \times N \times R)/100$
- Compound Interest: $CI = P(1+R/100)^N - P$

[EASY] Q5) Draw a flowchart to calculate the average from 25 exam scores.

[EASY] Q6) Draw a flowchart to find the sum of the first 100 natural numbers.

[EASY] Q7) Draw a flowchart to find the largest of 3 numbers.

[MEDIUM] Q8) Draw a flowchart to check if a given number is prime or not.

[MEDIUM] Q9) Draw a flowchart to count how many Pythagorean triplets (a,b,c) exist such that $a^2 + b^2 = c^2$ and $c \leq n$, for a given integer n.

Example:
If n=20 → Possible triplets: (3, 4, 5), (5, 12, 13), (6, 8, 10), (8, 15, 17), (9, 12, 15), (12, 16, 20) → Count = 6

[HARD] Q10) Draw a flowchart to calculate the number of ₹10, ₹5, and ₹1 coins needed for a given amount, using the least number of coins.

[EASY] Q11) Using Flowgorithm, create a flowchart to calculate the current flowing through a circuit using Ohm's Law. The program should take voltage (V) and resistance (R) as inputs and output the calculated current (I = V / R). Ensure that the flowchart includes proper input, process, and output steps.

[EASY] Q12) Create a flowchart to calculate the density of an object. The program should take mass (m) and volume (v) as inputs and output the density (Density = m / v).

[MEDIUM] Q13) Draw a flowchart to repeatedly add the digits of a given number **n** until a single digit is obtained.
Also, display:

1. The final single digit.
2. The number of steps taken to reach it.

Example:

- Input: 999
- Process: 9+9+9 = 27 → 2+7 = 9
- Output: Single digit = 9, Steps = 2