

### **1. What is Matplotlib? Explain about it.**

**Matplotlib** is a popular Python library used for **data visualization**.

It was introduced by **John D. Hunter**.

**It is used to:**

- Create charts and graphs
- Identify patterns and trends
- Detect outliers
- Compare variables
- Build business insights

**It is widely used in:**

- Data Analytics
- Data Science
- Machine Learning

### **2. Difference between plot() and scatter()**

#### **plot()**

Used for line charts

Shows trends over time

Points are connected

#### **scatter()**

Used for scatter plots

Shows relationship between variables

Points are separate

### **3. What is Pyplot? Explain about it.**

**Pyplot** is a submodule of Matplotlib.

It provides simple functions to:

- Create charts
- Customize graphs
- Display visualizations

**Import:**

```
import matplotlib.pyplot as plt
```

#### **4. How to add labels and title?**

Use these functions:

```
plt.xlabel("X Label")
```

```
plt.ylabel("Y Label")
```

```
plt.title("Graph Title")
```

#### **5. Difference between Figure and Axes**

| Figure               | Axes                    |
|----------------------|-------------------------|
| Entire canvas/window | Plot area inside figure |
| Container for plots  | Actual graph location   |

#### **6. How to create multiple subplots?**

Using subplot():

```
plt.subplot(rows, columns, position)
```

Example:

```
plt.subplot(2,2,1)
```

#### **7. What is the use of marker? Types of markers?**

Markers highlight **data points** in a plot.

**Common markers:**

##### **Symbol Shape**

o      Circle

\*

Star

.

Point

p      Pentagon

d      Diamond

h      Hexagon

Example:

```
plt.plot(x, marker='o')
```

## **8. How to customize colors?**

Using color parameter:

```
plt.plot(x, color='r')
```

**Color codes:**

r → Red  
g → Green  
b → Blue  
c → Cyan  
m → Magenta  
k → Black

## **9. How to handle large amount of data in visualization?**

Methods include:

- Sampling data
- Using transparency (alpha)
- Aggregation of values
- Using histograms with bins
- Using scatter instead of line plots

## **10. Which plot is used for trends in data?**

**Line Plot**

Because it shows changes over time.

## **11. Which plot is used for data distribution?**

**Histogram**

It shows frequency distribution of data.

## **12. How to change line color?**

```
plt.plot(x, color='blue')
```

### **13. Different line styles available**

#### **Style Meaning**

'-' Solid

'--' Dashed

':' Dotted

'-.-' Dash-dot

### **14. How to display grid?**

plt.grid()

Customize:

plt.grid(color='g', linestyle='--')

### **15. Who introduced Matplotlib library?**

**John D. Hunter**