

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()	scatter()
Used for line charts	Used for scatter plots
Shows trends over time	Shows relationship between variables
Points are connected	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