**Matplotlib is invented by John Hunter in 2003. He was American neurobiologist.**

**Matplotlib is a plotting library and it is extension NumPy.Matplotlib was used for data visualization during the 2008 landing of the**[**Phoenix spacecraft**](https://en.wikipedia.org/wiki/Phoenix_(spacecraft))**on Mars and for the creation of**[**the first image**](https://en.wikipedia.org/wiki/Event_Horizon_Telescope)**of a**[**black hole**](https://en.wikipedia.org/wiki/Black_hole)**.**

**Q1. What is the difference between plt.show() and plt.savefig() in Matplotlib?**

**plt.show() is used to display a plot in the output console, while plt.savefig() is used to save a plot as an image file.**

**Q2. How can you create a histogram in Matplotlib?**

**You can create a histogram in Matplotlib using the plt.hist() method.**

**import matplotlib.pyplot as plt**

**import numpy as np**

**data = np.random.normal(size=1000)**

**plt.hist(data, bins=30)**

**plt.show()**

**bins=30**: This specifies the number of bins (intervals) into which the data will be divided for the histogram.

**normal: This is a function within the random module that generates samples from a normal (Gaussian) distribution.**

**Q3. How can you add a legend to a plot in Matplotlib?**

**You can add a legend to a plot in Matplotlib using the plt.legend() method. For example:**

**plt.plot(x, y, label='My Line')**

**plt.legend()**

**Q4. What is the purpose of the plt.subplots() function in Matplotlib?**

**Answer 4: The plt.subplots() function is used to create multiple subplots in a single figure.**

**It returns a tuple containing the figure object and an array of subplot objects.**

**Q5. How can you set the font size of a plot in Matplotlib?**

**You can set the font size of a plot in Matplotlib using the plt.rcParams dictionary. For example:**

**plt.rcParams.update({'font.size': 12})**

**Q6. What is the difference between a scatter plot and a line plot in Matplotlib?**

**A scatter plot displays individual data points as markers, while a line plot connects data points with a line.**

**Q7. How can you add text to a plot in Matplotlib?**

**You can add text to a plot in Matplotlib using the plt.text() method. For example:**

**plt.text(x, y, 'My Text')**

**Q8. What is the difference between a bar plot and a histogram in Matplotlib?**

**A bar plot displays discrete data as bars, while a histogram displays continuous data as bars that represent the frequency of data points in a given range.**

**Q9. How can you create a 3D plot in Matplotlib?**

**You can create a 3D plot in Matplotlib using the mplot3d toolkit. For example:**

**from mpl\_toolkits import mplot3d**

**fig = plt.figure()**

**ax = fig.add\_subplot(111, projection='3d')**

**ax.scatter(x, y, z)**

**Q11. What is the difference between a line plot and a step plot in Matplotlib?**

**A line plot connects data points with a line, while a step plot connects data points with horizontal and vertical lines.**

**Q12. How can you set the color of a plot in Matplotlib?**

**You can set the color of a plot in Matplotlib using the color parameter of the plotting function. For example: plt.plot(x, y, color='red')**

**Q13. What is the purpose of the plt.subplots\_adjust() function in Matplotlib?**

**The plt.subplots\_adjust() function is used to adjust the spacing between subplots in a figure. It takes several arguments that control the spacing between subplots, such as left, right, bottom, and top.**

**Q14. What is the purpose of the plt.grid() function in Matplotlib?**

**The plt.grid() function is used to add a grid to a plot. It takes an optional which parameter that specifies which gridlines to display (major or minor).**

**Q15. How can you create a pie chart in Matplotlib?**

**You can create a pie chart in Matplotlib using the plt.pie() method. For example:**

**labels = ['Apples', 'Bananas', 'Oranges']**

**sizes = [30, 40, 20]**

**plt.pie(sizes, labels=labels)**

**Q16. What is the purpose of the plt.errorbar() function in Matplotlib?**

**The plt.errorbar() function is used to display error bars on a plot. It takes several arguments that specify the x and y data, the error values, and the format of the error bars.**

**Q17. How can you create a heat map in Matplotlib?**

**You can create a heat map in Matplotlib using the plt.imshow() method. For example:**

**import matplotlib.pyplot as plt**

**import numpy as np**

**data = np.random.rand(10, 10)**

**plt.imshow(data, cmap='viridis', interpolation='nearest')**

**plt.colorbar()**

**plt.xlabel('X axis')**

**plt.ylabel('Y axis')**

**plt.title('Simple Heatmap')**

**plt.show()**

**Q19. How can you create a box plot in Matplotlib?**

**You can create a box plot in Matplotlib using the plt.boxplot() method. For example:**

**data = np.random.normal(size=100)**

**plt.boxplot(data)**

**Q20. What is the purpose of the plt.annotate() function in Matplotlib?**

**The plt.annotate() function is used to add annotations to a plot, such as arrows, lines, and text. It takes several arguments that specify the position and content of the annotation.**

**Q22. How can you set the size of a plot in Matplotlib?**

**You can set the size of a plot in Matplotlib using the plt.figure() function. For example:**

**fig = plt.figure(figsize=(6, 4))**

**Q25. How can you change the linestyle of a plot in Matplotlib?**

**You can change the linestyle of a plot in Matplotlib by passing a linestyle argument to the plt.plot() function. For example:**

**x = np.linspace(0, 10, 100)**

**y = np.sin(x)**

**plt.plot(x, y, linestyle='dashed')**

**Note:**

**np.linspace(start, stop, num)**

**start: The starting value of the sequence.**

**stop: The end value of the sequence.**

**num: The number of evenly spaced samples to generate.**

**Q34. Write a Python code snippet to plot a horizontal bar chart.**

**import matplotlib.pyplot as plt**

**labels = ['A', 'B', 'C', 'D']**

**values = [10, 20, 30, 40]**

**plt.barh(labels, values)**

**plt.show()**

**Q33. Write a Python code snippet to plot a stacked bar chart.**

**import matplotlib.pyplot as plt**

**labels = ['A', 'B', 'C', 'D']**

**men = [20, 35, 30, 35]**

**women = [25, 32, 34, 20]**

**plt.bar(labels, men, color='b', label='Men')**

**plt.bar(labels, women, color='r', bottom=men, label='Women')**

**plt.legend()**

**plt.show()**

**Q32. Write a Python code snippet to plot a line chart with multiple lines.**

**import matplotlib.pyplot as plt**

**import numpy as np**

**x = np.linspace(0, 10, 100)**

**y1 = np.sin(x)**

**y2 = np.cos(x)**

**plt.plot(x, y1, '-b', label='sin(x)')**

**plt.plot(x, y2, '--r', label='cos(x)')**

**plt.legend(loc='upper left')**

**plt.xlabel('x')**

**plt.ylabel('y')**

**plt.show()**

**Q31. Write a Python code snippet to plot a pie chart with different colors for different slices.**

**import matplotlib.pyplot as plt**

**labels = ['A', 'B', 'C', 'D']**

**sizes = [15, 30, 45, 10]**

**colors = ['red', 'green', 'blue', 'orange']**

**plt.pie(sizes, labels=labels, colors=colors, autopct='%1.1f%%')**

**plt.axis('equal')**

**plt.show()**

**Q30. Write a Python code snippet to plot a scatter plot with different colors and sizes for different points.**

**import matplotlib.pyplot as plt**

**import numpy as np**

**x = np.random.randn(100)**

**y = np.random.randn(100)**

**colors = np.random.rand(100)**

**sizes = 1000 \* np.random.rand(100)**

**plt.scatter(x, y, c=colors, s=sizes, alpha=0.5)**

**plt.show()**

**Q26. How can you change the marker style of a plot in Matplotlib?**

**You can change the marker style of a plot in Matplotlib by passing a marker argument to the plt.plot() function. For example:**

**import matplotlib.pyplot as plt**

**import numpy as np**

**x = np.linspace(0, 10, 100)**

**y = np.sin(x)**

**plt.plot(x, y, marker='o') # data points showing as circle**

**plt.show()**

**linspace means linear space**

**0 start of sequence**

**10 end of sequence**

**100 means number of samples.**

**Chat Gpt interview questions:**

**How do you create a simple line plot using Matplotlib?**

**import matplotlib.pyplot as plt**

**x = [1, 2, 3, 4, 5]**

**y = [2, 3, 5, 7, 11]**

**plt.plot(x, y)**

**plt.xlabel('X axis label')**

**plt.ylabel('Y axis label')**

**plt.title('Simple Line Plot')**

**plt.show()**

**How can you change the style of a plot in Matplotlib?**

**You can change the style using plt.style.use().**

**plt.style.use('ggplot')**

**plt.plot(x, y)**

**plt.show()**

**How do you save a plot to a file in Matplotlib?**

**using the savefig() method**

**plt.plot(x, y)**

**plt.savefig('plot.png')**

**plt.savefig('plot.pdf')**

**What are some ways to improve the performance of Matplotlib when dealing with large datasets?**

**Downsample your data if high precision is not necessary.**

**Use more efficient data structures, such as NumPy arrays.**

**Limit the number of points plotted .**