

FINAL QUESTION PAPER

1. 2. The most commonly used module from the Matplotlib library for creating 2D plots is: a) matplotlib.numpy b) matplotlib.pandas c) matplotlib.pyplot d) matplotlib.seaborn
2. 110. A computer engineering diploma student tries to create a 2x2 grid of subplots using `plt.subplot(2, 2, 5)`. What will be the outcome of this call? a) It will successfully create the fifth subplot in the 2x2 grid. b) It will create a 3x2 grid of subplots instead. c) It will raise a `ValueError` because the index is out of range. d) It will create the subplot but it will not be visible.
3. 61. What is the primary purpose of the `matplotlib.pyplot.grid()` function? (a) To define the limits of the x and y axes. (b) To display horizontal and vertical lines on the plot for better readability. (c) To add a title and labels to the plot. (d) To save the generated plot as an image file.
4. 95. When using `plt.hist(data, density=True)`, what does the y-axis typically represent? a) The raw count or frequency of observations in each bin b) The percentage of observations in each bin c) The probability density function value for each bin d) The cumulative sum of observations
5. 89. A data scientist wants to compare the performance (e.g., accuracy scores) of three different Machine Learning models on a specific dataset. Which type of Matplotlib plot is generally most effective for this comparison? a) Pie chart b) Line plot c) Histogram d) Bar chart
6. 34. Consider a script that creates two separate figures (Figure 1 and Figure 2). If `plt.show()` is called after creating Figure 1 and again after creating Figure 2, what will happen? a) Only Figure 2 will be displayed, overwriting Figure 1. b) Figure 1 will be displayed, and upon closing it, Figure 2 will be displayed. c) Both Figure 1 and Figure 2 will be displayed simultaneously in a single window. d) An error will occur because `show()` cannot be called multiple times.
7. 56. When saving a plot to a PDF file using `plt.savefig('my_plot.pdf')`, what role do `xlabel()` and `ylabel()` play? (a) They are ignored during saving, only appearing in the interactive display. (b) They are included in the saved PDF image, enhancing its clarity. (c) They are converted into metadata within the PDF, not visible in the plot. (d) They can cause the save operation to fail if not properly defined.
8. 147. To save a Matplotlib plot with a transparent background, which argument should be passed to the `plt.savefig()` function? (a) `alpha=0` (b) `background='transparent'` (c) `transparent=True` (d) `bgcolor='none'`
9. 131. To save a generated pie chart as a PDF file, which Matplotlib function would you use after calling `plt.pie()` and `plt.show()`? (a) `plt.save_chart("pie.pdf")` (b) `plt.export("pie.pdf")` (c) `plt.savefig("pie.pdf")` (d) `plt.write_fig("pie.pdf")`
10. 162. To set the label for the vertical (y) axis of a Matplotlib plot, which function should be used? (a) `plt.xlabel()` (b) `plt.label_y()` (c) `plt.ylabel()` (d) `plt.set_yaxis_label()`
11. 141. Which of the following file formats is generally NOT supported for saving plots using `plt.savefig()` by default without additional backend installations? (a) PNG (b) JPEG (c) GIF (d) PDF
12. 164. In the broader context of Python libraries suitable for Machine Learning, what is Matplotlib's primary role? (a) To perform numerical computations and array operations. (b) To implement machine learning algorithms directly. (c) To provide tools for data visualization and graphical representation. (d) To handle data manipulation and cleaning.

13. 122. In Matplotlib's `plt.pie()` function, what is the purpose of the 'labels' parameter? (a) To set the title of the pie chart. (b) To label individual wedges with descriptive text. (c) To add a legend to the chart. (d) To define the values for each wedge.

14. 124. To display the percentage value on each slice of a pie chart, which parameter of the `plt.pie()` function should be used? (a) `percentage` (b) `showpct` (c) `autopct` (d) `values_percent`

15. 31. What is the primary purpose of calling `plt.show()` in a Matplotlib script? a) To save the generated plot to a file. b) To display the generated plot on the screen. c) To clear all previously generated plots from memory. d) To convert the plot into a specific data format.

16. 115. After generating a figure with multiple subplots using `subplot()` and populating them with data, what is the correct way to save this entire figure (including all subplots) to a PDF file named "multiview.pdf"? a) `plt.savefig("multiview.pdf")` b) `ax.savefig("multiview.pdf")` where `ax` is any of the subplot axes. c) `plt.subplot().savefig("multiview.pdf")` d) `plt.figure().savefig("multiview.pdf")`

17. 53. Which of the following attributes cannot be directly modified through a parameter within the `plt.xlabel()` or `plt.ylabel()` function call itself (without using additional `plt.setp()` or specific text properties)? (a) The text of the label. (b) The font size of the label. (c) The color of the label. (d) The font family of the label.

18. 51. When plotting a histogram using `plt.hist()`, how are `xlabel()` and `ylabel()` typically used? (a) `xlabel()` labels the bin edges, and `ylabel()` labels the frequency/count. (b) `xlabel()` labels the frequency/count, and `ylabel()` labels the bin edges. (c) Neither `xlabel()` nor `ylabel()` is applicable to histograms. (d) They are used to set the plot's title and subtitle, respectively.

19. 106. In the call `matplotlib.pyplot.subplot(nrows, ncols, index)`, what does the 'index' parameter represent? a) The total number of plots in the figure. b) The unique identifier for the subplot, starting from 0 and increasing row-wise. c) The unique identifier for the subplot, starting from 1 and increasing column-wise. d) The unique identifier for the subplot, starting from 1 and increasing row-wise.

20. 150. When is the `'pad_inches'` parameter of `'plt.savefig()'` particularly useful? (a) To specify the dimensions of the saved image in inches. (b) To control the padding around the figure's bounding box when `'bbox_inches='tight''` is used. (c) To add extra spacing between subplots within a figure. (d) To define the margin between the plot area and the figure edges.

21. 64. Which parameter in the `grid()` function allows you to specify the style of the grid lines, such as dashed or dotted? (a) `lineformat` (b) `linestyle` (c) `linemode` (d) `gridstyle`

22. 15. True or False: Matplotlib is exclusively used for static image generation and does not support interactive plots.

23. 87. Which of the following is a valid way to create a basic bar chart in Matplotlib? a) `plt.bar(height=[1,2,3], labels=['A','B','C'])` b) `plt.bar(data=['A','B','C'], values=[1,2,3])` c) `plt.bar(x=[1,2,3], y_values=['A','B','C'])` d) `plt.bar(['A','B','C'], [1,2,3])`

24. 86. Consider the code: `pyplot.bar(['Apples', 'Oranges'], [10, 15])`. What do the values [10, 15] represent in this context? a) The x-axis positions of the bars. b) The labels for the x-axis. c) The heights of the bars. d) The colors of the bars.

25. 134. In the context of machine learning, a pie chart is most effectively used for: (a) Visualizing the performance of a regression model. (b) Showing the distribution of features in a high-dimensional dataset. (c) Illustrating the class imbalance in a classification dataset. (d) Plotting the training loss over epochs.

26. 132. You want to create two pie charts side-by-side in the same figure. Which Matplotlib function is essential for arranging multiple plots in this manner? (a) `plt.grid()` (b) `plt.subplot()` (c) `plt.figure()` (d) `plt.layout()`

27. 43. In a script that uses `plt.subplot()` to create a grid of plots within a single figure, when should `plt.show()` be called to display all the subplots? a) After each individual subplot command (e.g., after each `ax.plot()`). b) Only once, after all subplots and their content have been defined within the figure. c) Before any subplot is created, to initialize the display. d) It is not needed for subplots, as they display automatically.

28. 7. Which function is used to add a label to the horizontal axis of a Matplotlib plot? a) `plt.label_x()` b) `plt.xaxis_label()` c) `plt.xlabel()` d) `plt.set_xlabel()`

29. 66. If you want to make the grid lines thicker, which argument of the `grid()` function would you adjust? (a) thickness (b) linewidth (c) width (d) line_weight

30. 130. When is a pie chart generally considered less effective for data visualization compared to a bar chart? (a) When showing proportions for only two categories. (b) When comparing many categories with very similar proportions. (c) When the exact numerical values are less important than the overall distribution. (d) When visualizing the distribution of a continuous variable.

31. 14. What type of chart is typically created using the `matplotlib.pyplot.pie()` function?

32. 145. You are working with a Matplotlib figure object named 'fig' (e.g., `fig = plt.figure()`). To save this specific figure object to a file, which is the correct approach? (a) `plt.savefig('my_figure.png')` while 'fig' is the active figure. (b) `fig.savefig('my_figure.png')` (c) `plt.save(fig, 'my_figure.png')` (d) `fig.export('my_figure.png')`

33. 117. Consider the following code: `import matplotlib.pyplot as plt` `import numpy as np` `x = np.linspace(0, 10, 100)` `y1 = np.sin(x)` `y2 = np.cos(x)` `plt.subplot(1, 2, 1)` `plt.plot(x, y1)` `plt.title("Sine Wave")` `plt.subplot(1, 2, 2)` `plt.plot(x, y2, color='red')` `plt.title("Cosine Wave")` `plt.show()` What will be displayed when this code runs? a) Two separate figure windows, one with a sine wave and one with a cosine wave. b) A single figure window with a sine wave on the left and a cosine wave on the right. c) A single figure window with both sine and cosine waves plotted on the same axes. d) An error due to missing a `plt.figure()` call.

34. 98. After creating a histogram using `plt.hist()`, what function is commonly called to display the generated plot? a) `plt.save()` b) `plt.display()` c) `plt.show()` d) `plt.render()`

35. 97. Which of the following is the standard and recommended way to import the `pyplot` module from Matplotlib? a) `import matplotlib.pyplot` b) `import pyplot as plt` c) `from matplotlib import pyplot as plt` d) `import matplotlib.pyplot as plt`

36. 16. Which of the following is the primary purpose of the `pyplot.plot()` function in Matplotlib? (a) To create bar charts for categorical data. (b) To draw lines and/or markers connecting data points on a 2D plane. (c) To generate 3D surface plots for complex datasets. (d) To display images from numerical arrays.

37. 38. After `plt.show()` displays a plot and the user closes the plot window, what typically happens to the Matplotlib Figure object associated with that plot in a non-interactive script? a) The Figure object remains active and can be modified for future displays. b) The Figure object is usually closed and released from memory implicitly. c) The script will raise an error if any further operations are attempted on the closed figure. d) The Figure object is serialized and saved to a temporary file.

38. 37. In which of the following environments might a user often see a plot without explicitly calling `plt.show()`? a) When running a Python script from the command line without an active display server. b) When executing code in an Integrated Development Environment (IDE) that doesn't have Matplotlib integration. c) When working in an interactive Jupyter Notebook or IPython shell, especially with `"%matplotlib inline"` or `"%matplotlib notebook"` magic commands. d) When compiling the Python script into an executable file.

39. 90. After creating a Matplotlib plot, such as a bar chart, using various pyplot functions, what is the primary purpose of calling `pyplot.show()`? a) To save the plot to a file. b) To close all active plot windows. c) To render the plot and display it to the user. d) To reset all plot parameters to their default values.

40. 60. Which keyword argument is commonly used in `plt.xlabel()` or `plt.ylabel()` to specify the padding between the label and the axis? (a) margin (b) pad (c) spacing (d) offset

41. 1. Which of the following is the primary role of Matplotlib in a typical Machine Learning workflow? a) Data storage and management b) Numerical computation and array manipulation c) Data visualization and graphical representation d) Model deployment and serving

42. 58. When analyzing a model's performance where ``x_data`` represents the number of training iterations and ``y_data`` represents the accuracy, what would be the most descriptive labels for `plt.plot(x_data, y_data)`? (a) `plt.xlabel("Data Points"), plt.ylabel("Metrics")` (b) `plt.xlabel("Training Iterations"), plt.ylabel("Accuracy")` (c) `plt.xlabel("Features"), plt.ylabel("Labels")` (d) `plt.xlabel("X-Axis"), plt.ylabel("Y-Axis")`

43. 125. What is the effect of the 'explode' parameter in `plt.pie()`? (a) It rotates the starting angle of the first wedge. (b) It determines the color scheme for the wedges. (c) It specifies the fraction of the radius with which to offset each wedge. (d) It adds a shadow effect to the pie chart.

44. 126. If you want to customize the colors of the wedges in a pie chart, which parameter of `plt.pie()` would you use? (a) `edgecolor` (b) `facecolor` (c) `colors` (d) `cmap`

45. 69. If you create a plot using `plt.plot()` and then call `plt.grid(True)`, what will be the effect on the plot? (a) The grid lines will only appear if `plt.grid()` was called before `plt.plot()`. (b) The grid lines will be displayed on top of the plot data, potentially obscuring it. (c) The grid lines will be displayed underneath the plot data, without affecting data visibility. (d) An error will occur because `grid()` must be called before any plotting functions.

46. 138. To save a Matplotlib plot with a higher resolution, which parameter of the `plt.savefig()` function should be adjusted? (a) quality (b) resolution (c) dpi (d) scale

47. 49. For a plot visualizing machine learning model training loss over epochs, which of the following would be an appropriate use of `xlabel()` and `ylabel()`? (a) `plt.xlabel("Loss"); plt.ylabel("Epochs")` (b) `plt.xlabel("Epochs"); plt.ylabel("Training Loss")` (c) `plt.xlabel("Model Performance"); plt.ylabel("Iteration Count")` (d) `plt.xlabel("Features"); plt.ylabel("Target Values")`

48. 151. Which Matplotlib function is used to display the currently active plot window? (a) `plt.render()` (b) `plt.show()` (c) `plt.display()` (d) `plt.view()`

49. 153. Which function is used to add a label to the horizontal (x) axis of a plot in Matplotlib? (a) `plt.ylabel()` (b) `plt.title()` (c) `plt.xlabel()` (d) `plt.legend()`

50. 102. To display two histograms side-by-side within the same figure, which Matplotlib function would be most appropriate to use in conjunction with `plt.hist()`? a) `plt.grid()` b) `plt.legend()` c) `plt.subplot()` d) `plt.title()`

51. 161. What is the fundamental difference between `plt.bar()` and `plt.hist()` in Matplotlib? (a) `plt.bar()` plots continuous data, while `plt.hist()` plots discrete data. (b) `plt.bar()` requires two lists (x, y), while `plt.hist()` takes one list and automatically bins data. (c) `plt.bar()` is used for 3D plots, while `plt.hist()` is for 2D plots. (d) `plt.bar()` always shows vertical bars, while `plt.hist()` always shows horizontal bars.

52. 68. When working with multiple subplots using `plt.subplot()`, how would you apply grid lines to only a specific subplot (e.g., the current active subplot)? (a) `plt.grid()` automatically applies to all subplots. (b) You must call `plt.grid()` before creating any subplots. (c) Call `plt.grid()` after making the desired subplot active. (d) Use `plt.subplot().grid()` directly.

53. 129. Which argument to the `plt.pie()` function controls the starting angle of the first wedge, measured counterclockwise from the x-axis? (a) `start_angle` (b) `initial_angle` (c) `angle_start` (d) `startangle`

54. 75. To set the color of the grid lines to a specific RGB hex code, for example `'#FF0000'` for red, which argument of the `grid()` function should be used? (a) `hex_color` (b) `color` (c) `grid_color` (d) `rgb_value`

55. 105. What happens when the `'cumulative'` parameter in `plt.hist()` is set to `True`? a) Each bin shows the total count of observations less than or equal to its upper bound. b) The histogram bars are stacked on top of each other. c) The plot displays a normal distribution curve over the bars. d) The x-axis labels are automatically rotated.

56. 93. What does the `'bins'` parameter in the `plt.hist()` function primarily control? a) The color of the histogram bars b) The number of intervals or ranges into which the data will be divided c) The width of the entire plot area d) The label for the x-axis

57. 107. Which of the following is the return type of the `matplotlib.pyplot.subplot()` function? a) A Figure object. b) An Axes object. c) A list of Figure objects. d) A list of Axes objects.

58. 109. Consider the following Matplotlib code snippet: `import matplotlib.pyplot as plt plt.figure(figsize=(10, 5)) ax1 = plt.subplot(1, 2, 1) ax2 = plt.subplot(1, 2, 2)` What is the correct way to plot a histogram on the first subplot (`ax1`)? a) `plt.hist(data)` b) `ax1.plot.hist(data)` c) `ax1.hist(data)` d) `plt.subplot(1, 2, 1).hist(data)`

59. 155. Which Matplotlib function is typically used to create a bar chart, representing categories with rectangular bars? (a) `plt.pie()` (b) `plt.hist()` (c) `plt.bar()` (d) `plt.plot()`

60. 152. To create a simple line plot of data points (x, y), which Matplotlib.pyplot function would you use? (a) `plt.bar(x, y)` (b) `plt.hist(x)` (c) `plt.plot(x, y)` (d) `plt.scatter(x, y)`

61. 118. What is the fundamental difference between `plt.plot()` and `ax.plot()` when an Axes object `'ax'` has been obtained from `plt.subplot()`? a) `plt.plot()` always creates a new figure, while `ax.plot()` plots on the existing Axes. b) `plt.plot()` plots on the currently active Axes, while `ax.plot()` explicitly plots on the `'ax'` Axes. c) There is no functional difference; they are interchangeable. d) `ax.plot()` is only used for 3D plots, whereas `plt.plot()` is for 2D plots.

62. 108. You are analyzing the performance of several machine learning models and want to visualize their accuracy over epochs side-by-side for comparison within a single window. Which Matplotlib function is most appropriate for this task? a) `matplotlib.pyplot.plot()` b) `matplotlib.pyplot.subplot()` c) `matplotlib.pyplot.show()` d) `matplotlib.pyplot.bar()`

63. 84. To create a bar chart where the bars extend horizontally rather than vertically, which Matplotlib function should be used? a) `pyplot.barv()` b) `pyplot.barh()` c) `pyplot.horizontal_bar()` d) `pyplot.bar(orientation='horizontal')`

64. 65. By default, what color are the grid lines displayed by `plt.grid()` if no color argument is explicitly provided? (a) Black (b) Blue (c) Gray (d) Red

65. 18. Consider the following code snippet: `import matplotlib.pyplot as plt plt.plot([1, 2, 3]) plt.show()` What will be the x-axis values in the resulting plot? (a) 0, 1, 2 (b) 1, 2, 3 (c) The indices of the list elements plus one. (d) An empty range, as x-values are not explicitly provided.

66. 94. Which statement accurately highlights a key difference between `plt.hist()` and `plt.bar()`? a) `plt.hist()` is used for categorical data, while `plt.bar()` is for numerical data. b) `plt.bar()` automatically calculates frequencies for bins, while `plt.hist()` requires pre-calculated frequencies. c) `plt.hist()` groups data into bins and shows frequency distribution, while `plt.bar()` displays the values of distinct categories. d) `plt.hist()` can only plot positive values, whereas `plt.bar()` can handle negative values.

67. 3. Which function in `matplotlib.pyplot` is specifically used to draw a line plot for given data points? a) `plot_line()` b) `draw_line()` c) `plot()` d) `line_graph()`

68. 57. Which of the following correctly sets the X-axis label to "Time (seconds)" with a font size of 12? (a) `plt.xlabel("Time (seconds)", size=12)` (b) `plt.xlabel(text="Time (seconds)", fontsize=12)` (c) `plt.xlabel("Time (seconds)".fontsize = 12)` (d) `plt.xlabel("Time (seconds)", font_size=12)`

69. 128. Consider a dataset where the sum of values passed to `plt.pie()` is not 100. How does `plt.pie()` handle this? (a) It raises an error, requiring values to sum to 100. (b) It automatically normalizes the values so they represent parts of a whole. (c) It displays the chart but truncates any values that exceed 100. (d) It only displays the first few wedges until their sum reaches 100.

70. 113. Which combination of Matplotlib functions allows you to display a bar chart, a histogram, and a pie chart simultaneously in different panels within a single figure? a) `plt.bar()`, `plt.hist()`, `plt.pie()` without `subplot()`. b) `plt.figure()`, `plt.subplot()`, and then `ax.bar()`, `ax.hist()`, `ax.pie()`. c) `plt.subplot()` only, with data for all three charts passed at once. d) `plt.plot()` for all three types by changing the 'kind' parameter.

71. 112. After creating a subplot using `ax = plt.subplot(2, 2, 1)`, how would you typically set the title for only this specific subplot? a) `plt.title("My Subplot Title")` b) `ax.set_title("My Subplot Title")` c) `ax.title("My Subplot Title")` d) `plt.subplot(2, 2, 1).title("My Subplot Title")`

72. 28. What happens if you pass only one list of numerical values, say `data = [10, 20, 15, 25]`, to `plt.plot(data)`? (a) It will raise a `ValueError` because both x and y values are required. (b) The list will be used for the y-axis, and the x-axis will automatically be generated as `[0, 1, 2, 3]`. (c) The list will be used for the x-axis, and the y-axis will be all zeros. (d) It will plot a single point at (10, 20) and ignore the rest.

73. 92. In Matplotlib's `pyplot` module, which function is specifically designed to create a histogram? a) `plt.plot()` b) `plt.bar()` c) `plt.hist()` d) `plt.scatter()`

74. 41. How does `plt.show()` relate to the concept of the "current figure" and "current axes" in Matplotlib's state-based interface? a) It explicitly creates a new current figure and axes, discarding previous ones. b) It displays the content of the currently active figure and its axes. c) It automatically selects the largest figure available to display. d) It only displays figures that have been explicitly named or assigned to a variable.

75. 80. After creating a bar chart with `pyplot.bar()`, which function from `pyplot` would you use to add a descriptive label to the horizontal axis? a) `pyplot.title()` b) `pyplot.ylabel()` c) `pyplot.xlabel()` d) `pyplot.text()`

76. 42. Beyond displaying plots, what is a crucial function of `plt.show()` related to system resources in a long-running script that generates many plots? a) It optimizes the rendering process by pre-caching plot data. b) It

helps in releasing resources (like figure windows and associated memory) once plots are viewed and closed. c) It automatically compresses plot data before display. d) It synchronizes plot generation across multiple CPU cores.

77. 156. When visualizing the distribution of a single numerical variable by dividing it into bins and counting observations in each bin, which Matplotlib function is most appropriate? (a) `plt.bar()` (b) `plt.pie()` (c) `plt.hist()` (d) `plt.plot()`

78. 81. You have created a bar chart and want to save it as an image file named "my_bar_chart.png". Which function from Matplotlib's pyplot module is most appropriate for this task? a) `pyplot.save_image("my_bar_chart.png")` b) `pyplot.export_plot("my_bar_chart.png")` c) `pyplot.savefig("my_bar_chart.png")` d) `pyplot.write_file("my_bar_chart.png")`

79. 78. Which parameter in the `pyplot.bar()` function is used to control the thickness of the bars? a) `height` b) `align` c) `width` d) `edgecolor`

80. 140. Which parameter in `plt.savefig()` is used to prevent extra white space around the saved figure and make it fit snugly to the plot elements? (a) `crop_inches='tight'` (b) `bbox_inches='tight'` (c) `padding='none'` (d) `border_size=0`

81. 11. Describe the purpose of the `matplotlib.pyplot.subplot()` function.

82. 45. What interactive capability does `plt.show()` generally enable for the user with the displayed plot window (assuming a standard backend)? a) Allowing the user to modify the plot's data values directly. b) Providing options for zooming, panning, and saving the plot image through the window interface. c) Automatically generating a report based on the plot. d) Enabling real-time collaboration with other users on the plot.

83. 24. What is the effect of calling `plt.grid(True)` after plotting data with `plt.plot()`? (a) It adds a background image to the plot. (b) It places a grid of lines on the plot for easier data reading. (c) It aligns the plot with the page grid when printing. (d) It makes the plot interactive, allowing zoom and pan.

84. 32. If a Matplotlib script generates a plot using `plt.plot()` but does not include `plt.show()`, what is the typical outcome when run in a non-interactive Python environment (e.g., a standard script)? a) The plot window will automatically appear and then close immediately. b) The plot will be generated but will not be displayed on the screen. c) An error will be raised indicating that `show()` is missing. d) The plot data will be printed to the console as text.

85. 100. The `'rwidth'` parameter in `plt.hist()` controls: a) The rotation angle of the x-axis labels. b) The relative width of the bars as a fraction of the bin width. c) The total width of the histogram plot. d) The minimum width for each bin.

86. 79. To set the color of the bars in a `pyplot.bar()` chart to blue, which parameter should be used? a) `bar_color='blue'` b) `color='blue'` c) `fill='blue'` d) `hue='blue'`

87. 159. A pie chart is best suited for visualizing which type of data? (a) Trends over time for multiple variables. (b) Distribution of a single categorical variable as parts of a whole. (c) Relationship between two continuous variables. (d) Frequency distribution of a continuous variable.

88. 70. From a machine learning perspective, what is a key benefit of using grid lines in data visualization? (a) They reduce the memory footprint of the plot, making it more efficient. (b) They make it easier to precisely read data point values and estimate trends or distributions. (c) They automatically normalize the data displayed on the plot, which is useful for comparisons. (d) They are primarily for aesthetic purposes and have no practical benefit for data analysis.

89. 83. In a Machine Learning context, if you want to visualize the distribution of different classes in a dataset (e.g., how many instances of 'Class A', 'Class B', 'Class C' exist), which Matplotlib plot type is most suitable? a) Line plot using `pyplot.plot()` b) Scatter plot using `pyplot.scatter()` c) Bar chart using `pyplot.bar()` d) Pie chart using `pyplot.pie()`

90. 119. A student wants to ensure that each subplot in a 2x2 grid has its own independent X and Y labels and grid. How should they manage this using the Axes objects returned by `subplot()`? a) Call `plt.xlabel()`, `plt.ylabel()`, and `plt.grid()` after each `plt.subplot()` call. b) Call `ax.set_xlabel()`, `ax.set_ylabel()`, and `ax.grid(True)` on each specific Axes object. c) Call `plt.xlabel()`, `plt.ylabel()`, and `plt.grid()` once at the end, and Matplotlib will automatically apply them independently. d) This level of independent customization is not possible with `subplot()`; subplots share common properties.

91. 144. After calling `plt.savefig('output.png')`, if you then call `plt.clf()` and then `plt.savefig('another_output.png')`, what will be the content of 'another_output.png'? (a) A copy of the 'output.png' content, as `plt.clf()` only clears the active figure for display. (b) An empty plot, as `plt.clf()` clears the current figure's content. (c) A plot with default Matplotlib axes but no data, as `plt.clf()` resets everything. (d) An error will occur because you cannot save an empty plot.

92. 47. In Matplotlib, what type of argument does the `xlabel()` function primarily expect to define the axis label? (a) An integer representing an index (b) A list of strings for multiple labels (c) A single string value (d) A boolean to enable or disable the label

93. 142. If you have created multiple subplots using `plt.subplot()` within a single figure, and then call `plt.savefig('combined_plots.pdf')`, what will be saved? (a) Only the last active subplot will be saved. (b) An error will occur as subplots cannot be saved together this way. (c) All subplots within the current figure will be saved into one PDF file. (d) Each subplot will be saved as a separate page within the PDF.

94. 101. In the context of Machine Learning data preprocessing, analyzing a histogram can help identify: a) The optimal hyper-parameters for a model. b) The presence of outliers or unusual data points. c) The accuracy score of a classification model. d) The correlation between two independent features.

95. 13. True or False: The `matplotlib.pyplot.ylabel()` function is used to add a title to the entire plot.

96. 46. Which of the following Matplotlib functions is used to set the label for the horizontal axis of a plot? (a) `plt.ylabels()` (b) `plt.xlabel()` (c) `plt.x_axis_label()` (d) `plt.horizontal_label()`

97. 67. Consider a scenario where a plot is created without explicitly calling `plt.grid()`. What is the default state of grid lines in a typical Matplotlib plot? (a) Grid lines are always visible by default. (b) Grid lines are never visible by default. (c) Grid lines are visible only if major ticks are present. (d) The default visibility depends on the Matplotlib style sheet in use.

98. 72. In Matplotlib's object-oriented interface, if 'ax' is an Axes object, what is the relationship between `plt.grid()` and `ax.grid()`? (a) They are completely independent; `plt.grid()` has no effect on a specific 'ax' object. (b) `plt.grid()` is a convenience function that ultimately calls `ax.grid()` on the current active Axes. (c) `ax.grid()` is a deprecated function; `plt.grid()` should always be used for modern plots. (d) `ax.grid()` can only modify major grid lines, while `plt.grid()` modifies both major and minor by default.

99. 76. Which of the following Matplotlib functions is primarily used to display the distribution of categorical data or compare discrete values across different categories? a) `pyplot.plot()` b) `pyplot.bar()` c) `pyplot.hist()` d) `pyplot.scatter()`

100. 9. State one primary reason why data visualization is crucial in the initial stages of a Machine Learning project.

101. 52. If you call `plt.xlabel("First Label")` and then later in the same script call `plt.xlabel("Second Label")` for the same plot, what will be the final label displayed on the X-axis? (a) "First Label" will be displayed. (b) Both "First Label" and "Second Label" will be displayed. (c) Only "Second Label" will be displayed. (d) An error will occur due to duplicate calls.

102. 127. After creating a pie chart using `plt.pie()`, which Matplotlib function is typically called to display the chart? (a) `plt.display()` (b) `plt.render()` (c) `plt.show()` (d) `plt.view()`

103. 160. If you call `plt.plot([1, 2, 3, 4])` in Matplotlib, what will be the default values used for the x-axis? (a) [1, 2, 3, 4] (b) [0, 1, 2, 3] (c) [0, 0, 0, 0] (d) The plot will not be generated due to missing x-values.

104. 19. Which parameter is used in `plt.plot()` to specify the color of the line? (a) `type` (b) `line_color` (c) `c` (d) `color`

105. 54. In a Matplotlib script, where should `plt.xlabel()` and `plt.ylabel()` typically be placed relative to `plt.plot()` and `plt.show()` for them to be effective? (a) Before `plt.plot()` but after `plt.show()`. (b) After `plt.plot()` but before `plt.show()`. (c) Both before `plt.plot()` and before `plt.show()`. (d) Only after `plt.show()`.

106. 25. When would you typically prefer using `plt.plot()` over `plt.bar()` for data visualization? (a) When showing the distribution of a single categorical variable. (b) When comparing discrete quantities across different categories. (c) When visualizing trends or relationships between continuous variables. (d) When displaying parts of a whole as proportions.

107. 62. Which argument in the `matplotlib.pyplot.grid()` function is specifically designed to control the overall visibility of grid lines (True for visible, False for hidden)? (a) `status` (b) `enable` (c) `show_grid` (d) `b`

108. 59. Is it common or generally recommended to use `plt.xlabel()` and `plt.ylabel()` for a standard pie chart (`plt.pie()`)? (a) Yes, absolutely, to label the different slices. (b) No, because pie charts represent proportions of a whole and typically do not have distinct X and Y axes in the traditional sense. (c) Only if the pie chart is part of a subplot. (d) It is optional and depends entirely on the aesthetic preference of the user.

109. 55. For a subplot created using `plt.subplot()`, how do you set the x and y labels for a specific subplot? (a) Use `plt.xlabel()` and `plt.ylabel()` directly after creating the subplot but before switching to another. (b) Use `fig.xlabel()` and `fig.ylabel()` where `fig` is the figure object. (c) Use `ax.set_xlabel()` and `ax.set_ylabel()` where `ax` is the Axes object of the subplot. (d) Labels cannot be set independently for subplots; they apply to the entire figure.

110. 116. In the context of machine learning, when would a data scientist most likely use `matplotlib.pyplot.subplot()` for data visualization? (a) To create a single large plot for a very complex dataset. (b) To show the distribution of multiple features of a dataset using histograms arranged in a grid. (c) To generate separate plot files for each model's performance metric. (d) To animate the training process of a neural network.

111. 123. Which of the following scenarios is generally best suited for visualizing with a pie chart? (a) Showing the trend of stock prices over time. (b) Comparing the distribution of several categories as parts of a whole. (c) Displaying the correlation between two continuous variables. (d) Visualizing the frequency distribution of a single numerical feature.

112. 103. Which function is used to save a Matplotlib plot, such as a histogram, to a file (e.g., PDF, PNG)? (a) `plt.storefig()` (b) `plt.export()` (c) `plt.savefig()` (d) `plt.output()`

113. 136. Which of the following Matplotlib functions is used to save the currently active figure to a file? (a) `plt.export()` (b) `plt.saveplot()` (c) `plt.savefig()` (d) `plt.savefigure()`

114. 143. In a machine learning project, why might you prefer using `plt.savefig()` over `plt.show()` during model training or evaluation? (a) `plt.savefig()` executes faster than `plt.show()` for real-time analysis. (b) `plt.savefig()` allows for interactive manipulation of the plot, which is useful during training. (c) `plt.savefig()` enables automated generation of visual reports and comparison across different model runs without manual intervention. (d) `plt.savefig()` automatically clears the figure after saving, which is efficient for memory management.

115. 71. Which combination of arguments would effectively hide the grid lines for the y-axis only, while ensuring they are visible for the x-axis? (a) `plt.grid(axis='y', b=False)` (b) `plt.grid(axis='x', b=True)` and `plt.grid(axis='y', b=False)` (c) `plt.grid(axis='both', b=True, axis='y', b=False)` (d) This level of selective control is not directly supported by the `grid()` function.

116. 148. Consider a Python script that generates several plots. After each plot is generated and saved using `plt.savefig()`, what is a good practice to prevent memory leaks and ensure subsequent plots are generated on a fresh canvas? (a) Call `plt.close('all')` after each `plt.savefig()`. (b) Call `plt.hold(False)` after each `plt.savefig()`. (c) Call `plt.clear_all()` after each `plt.savefig()`. (d) Call `plt.reset_figure()` after each `plt.savefig()`.

117. 50. Which function is typically used in conjunction with `xlabel()` and `ylabel()` to provide an overall description of the plot? (a) `plt.legend()` (b) `plt.grid()` (c) `plt.title()` (d) `plt.text()`

118. 5. When creating a bar chart using `matplotlib.pyplot`, which function is typically employed? a) `plt.plot_bar()` b) `plt.bar()` c) `plt.histogram()` d) `plt.column_chart()`

119. 154. What is the primary purpose of calling `plt.grid(True)` in Matplotlib? (a) To disable axis ticks. (b) To display a grid on the plot for better readability. (c) To clear the current plot. (d) To set the plot background color.

120. 165. When using `plt.savefig('my_plot.pdf')`, what is the expected return value of the `savefig()` function if successful? (a) A boolean `True`. (b) The file path of the saved image. (c) `None`. (d) An integer indicating the number of bytes written.

121. 30. After creating a plot using `plt.plot()` and customizing it with labels and title, what is the purpose of using `plt.savefig('my_plot.png')`? (a) It displays the plot in a non-interactive window. (b) It saves the plot data as a CSV file. (c) It stores the generated image of the plot to a file named 'my_plot.png'. (d) It exports the plot as a PDF document only.

122. 35. From which Matplotlib module is the `show()` function most commonly imported as part of a general plotting workflow? a) `matplotlib.image` b) `matplotlib.pyplot` c) `matplotlib.artist` d) `matplotlib.figure`

123. 133. Which of the following correctly sets up the 'autopct' parameter to display percentages with one decimal place, followed by a percentage sign? (a) `autopct='%.1f'` (b) `autopct='%1.1f%%'` (c) `autopct=lambda p: f'{p:.1f}%'` (d) Both (b) and (c) are valid ways to achieve this.

124. 139. Consider the following sequence of Matplotlib commands: `plt.plot([1, 2, 3])` `plt.show()` `plt.savefig('my_plot.png')` What will be the outcome regarding the saved image? (a) The plot will be saved successfully, but it will be an empty image because `plt.show()` closes the figure. (b) The plot will be saved successfully with the data, as `plt.show()` does not clear the figure. (c) An error will occur because `plt.savefig()` must be called before `plt.show()`. (d) The plot will be saved, but it might not contain all elements rendered due to asynchronous execution.

125. 114. When using subplot(), if you create multiple subplots in a figure, and then call plt.xlabel() without explicitly referencing an Axes object, to which subplot will the label typically be applied? a) The first subplot created. b) The last active subplot. c) All subplots in the figure. d) No subplot; it will raise an error.

126. 27. Consider the code: import matplotlib.pyplot as plt x = [1, 2, 3, 4] y = [2, 4, 1, 3] plt.plot(x, y, color='green', linestyle=':', marker='s') plt.xlabel('Experiment Number') plt.ylabel('Result Value') plt.title('Performance Trend') plt.grid(True) plt.show() What will be the appearance of the line in the generated plot? (a) A solid green line with square markers. (b) A dotted green line with square markers. (c) A dashed green line with triangular markers. (d) A solid blue line with default circular markers.

127. 77. When using matplotlib.pyplot.bar(x, height), what does the 'x' argument typically represent? a) The numerical values of the bars' heights. b) The categories or positions on the x-axis for each bar. c) The width of each individual bar. d) The color intensity of each bar.

128. 22. What is the role of plt.show() after one or more calls to plt.plot()? (a) It saves the plot to a default file named 'plot.png'. (b) It closes the current figure and frees up memory. (c) It renders and displays the accumulated plot elements in a window. (d) It resets the plot parameters to their default values.

129. 26. Which scenario is best suited for plt.plot() rather than plt.hist()? (a) Visualizing the frequency distribution of a continuous dataset. (b) Showing the progression of a machine learning model's loss over epochs. (c) Analyzing the number of occurrences of values within bins. (d) Displaying the shape of a probability distribution.

130. 63. To show grid lines only along the y-axis in a Matplotlib plot, which of the following calls to grid() is correct? (a) plt.grid(axis='y') (b) plt.grid(axes='y') (c) plt.grid(orientation='vertical') (d) plt.grid(side='y')

131. 8. The function matplotlib.pyplot.grid(True) is used to: a) Turn off the grid on the plot b) Make the plot background transparent c) Display a grid on the plot d) Arrange multiple plots in a grid layout
Section: Short Answer and True/False Questions

132. 20. To display circular markers at each data point along with a dashed line, which format string or keyword arguments would you use in plt.plot()? (a) 'o--' (b) marker='circle', linestyle='dashed' (c) 'circle-dashed' (d) 'c--'

133. 29. Which of the following is NOT a valid way to specify a line style in plt.plot()? (a) linestyle='--' (b) ls='dotted' (c) 'line-style' (d) '-'

134. 23. You have plotted a graph of 'Temperature vs. Time'. Which Matplotlib functions would you use to label the horizontal and vertical axes respectively? (a) plt.title() and plt.legend() (b) plt.xtext() and plt.ytext() (c) plt.xlabel() and plt.ylabel() (d) plt.axis_x() and plt.axis_y()

135. 104. When is a histogram generally a more suitable visualization than a simple line plot for understanding the distribution of a single continuous variable? a) When comparing the values of two different categories. b) When showing a time series trend. c) When you want to see the frequency or density of data points across different ranges. d) When visualizing the relationship between two categorical variables.

136. 74. When plotting data with a logarithmic scale on one of the axes (e.g., plt.yscale('log')), how does a default call to plt.grid() behave with respect to major and minor grid lines? (a) It only displays major grid lines corresponding to the logarithmic scale. (b) It automatically adjusts to show both major and minor grid lines for the logarithmic scale. (c) Grid lines are entirely disabled when using logarithmic scales to avoid clutter. (d) Logarithmic scaling only affects the data points, not the grid lines themselves.

137. 88. By default, when using pyplot.bar(x, height), how are the bars typically aligned with respect to their 'x' positions? a) The left edge of the bar is at the 'x' position. b) The right edge of the bar is at the 'x' position. c) The

center of the bar is at the 'x' position. d) The bars are stretched to fill the available space.

138. 135. What is a common limitation of using pie charts? (a) They cannot display negative values. (b) It is difficult to accurately compare sizes of many small wedges. (c) They are not suitable for displaying categorical data. (d) They always require percentages to be manually calculated beforehand.

139. 149. If you save a plot as 'plot.svg' using `plt.savefig('plot.svg')`, what is the primary advantage of this format over 'plot.png' for presentation in a report? (a) SVG files are typically smaller in file size than PNGs. (b) SVG files maintain vector graphics quality when scaled to different sizes, while PNGs become pixelated. (c) SVG files load faster in web browsers than PNG files. (d) SVG files can directly embed interactive elements, which PNGs cannot.

140. 48. Consider the following Python code snippet: `import matplotlib.pyplot as plt`
`plt.plot([1, 2, 3], [4, 5, 6])`
`plt.xlabel("X-axis Data")`
`plt.ylabel("Y-axis Data")`
`plt.show()`
What would happen if the `plt.xlabel()` and `plt.ylabel()` lines were omitted from this code? (a) The plot would not be generated. (b) The plot would be generated, but without labels on the X and Y axes. (c) Matplotlib would automatically infer and add default labels. (d) An error would occur, as axis labels are mandatory.

141. 4. To permanently save a Matplotlib plot to a file, such as a PDF, which function should be used? a) `plt.export()` b) `plt.save()` c) `plt.savefig()` d) `plt.save_plot()`

142. 146. What happens if you attempt to save a plot to a non-existent directory using `plt.savefig('/non_existent_dir/my_plot.png')`? (a) Matplotlib will automatically create the directory and save the plot. (b) The plot will be saved to the current working directory instead. (c) A `FileNotFoundError` or similar exception will be raised. (d) The command will execute without error, but no file will be saved.

143. 39. If multiple figures are created in a script without calling `plt.show()` until the very end, how does a single final `plt.show()` call handle them? a) It will only display the very last figure created. b) It will display all open figures sequentially, one after another, as their windows are closed. c) It will display all open figures simultaneously in separate windows. d) It will merge all figures into a single window for display.

144. 17. To plot a simple line graph showing data points (1, 2), (2, 4), and (3, 6), which arguments are typically passed to `plt.plot()`? (a) A single list of y-values only. (b) Two lists, one for x-values and one for y-values. (c) Three lists, one for x-values, one for y-values, and one for z-values. (d) A string representing the data source file path.

145. 44. Which of the following commands typically precedes `plt.show()` in a standard Matplotlib plotting sequence for a simple line graph? a) `plt.close()` b) `plt.figure()` and `plt.plot()` c) `plt.waitforbuttonpress()` d) `plt.ginput()`

146. 6. What is the main purpose of the `matplotlib.pyplot.show()` function? a) To clear the current plot b) To save the plot to disk c) To display the generated plot on the screen d) To add a legend to the plot

147. 121. Which Matplotlib function is primarily used to create a pie chart? (a) `plt.plot()` (b) `plt.pie()` (c) `plt.bar()` (d) `plt.hist()`

148. 157. To create multiple plots within the same figure window, which Matplotlib function is commonly used? (a) `plt.figure()` (b) `plt.show()` (c) `plt.subplot()` (d) `plt.grid()`

149. 10. True or False: Matplotlib is primarily designed for advanced 3D rendering and animations.

150. 99. To manually define the edges of the bins for a histogram, which parameter of `plt.hist()` would you use? (a) `range` b) `bins` (by providing an array-like object) c) `edges` d) `interval`

151. 85. You are creating a dashboard with multiple visualizations. To display two separate bar charts side-by-side within the same figure, which Matplotlib function would you typically use in conjunction with `pyplot.bar()`? a) `pyplot.grid()` b) `pyplot.legend()` c) `pyplot.subplot()` d) `pyplot.twinx()`

152. 91. Which of the following best describes the primary purpose of a histogram in data analysis? a) To show trends over time b) To display the distribution of a single numerical variable c) To compare categories of data d) To visualize relationships between two continuous variables

153. 82. What is the primary difference in purpose between `pyplot.bar()` and `pyplot.hist()`? a) `pyplot.bar()` is for continuous data, while `pyplot.hist()` is for categorical data. b) `pyplot.bar()` displays discrete categories, while `pyplot.hist()` shows the distribution of a single numerical variable by binning data. c) `pyplot.bar()` creates horizontal bars, while `pyplot.hist()` creates vertical bars. d) `pyplot.bar()` is used for 3D plots, while `pyplot.hist()` is for 2D plots.

154. 33. How does `plt.show()` typically behave regarding program execution flow when called in a standard Python script? a) It is a non-blocking call, allowing the script to continue immediately. b) It is a blocking call, pausing script execution until the plot window is closed. c) It initiates a background process, and the script terminates. d) It only executes if the script is run in an interactive shell.

155. 21. If you want to plot two different sets of (x, y) data on the same axes, how can you achieve this using `plt.plot()`? (a) Call `plt.plot()` once with both datasets combined into a single larger list. (b) Call `plt.plot()` twice, once for each dataset, before calling `plt.show()`. (c) Use a separate subplot for each dataset to avoid overlapping. (d) This functionality is not available directly with `plt.plot()`; you must use a different function.

156. 137. If you call `plt.savefig('my_plot')` without specifying a file extension, what is the most common default file format Matplotlib will use to save the image? (a) PNG (b) JPG (c) PDF (d) SVG

157. 36. Which statement accurately describes the relationship between `plt.show()` and `plt.savefig()` when both are used in a script? a) `plt.show()` must always be called before `plt.savefig()` to save the plot correctly. b) `plt.savefig()` must always be called before `plt.show()` to ensure the saved image includes the final state. c) Calling `plt.show()` before `plt.savefig()` may result in a blank image being saved, or the saved image reflecting an earlier state. d) Calling `plt.savefig()` after `plt.show()` is generally recommended, as `show()` finalizes the plot state.

158. 158. After creating a plot, which Matplotlib function allows you to save the generated image to a file (e.g., PDF, PNG)? (a) `plt.export()` (b) `plt.save()` (c) `plt.savefig()` (d) `plt.write()`

159. 40. What is the typical behavior if plotting commands (e.g., `plt.plot()`, `plt.xlabel()`) are executed after `plt.show()` in a non-interactive script that was previously blocking? a) The changes will be applied to the already displayed plot dynamically. b) The changes will create a new, separate plot window with the updated content. c) The changes will not be visible, as `plt.show()` usually closes the figure and resets the state for the current plot. d) An error will occur because the plotting context is no longer valid.

160. 12. To create a histogram of a dataset, which specific function from the `pyplot` module would you use?

161. 111. If you call `plt.subplot(3, 1, 2)`, how many rows and columns are implicitly defined for the subplot grid, and which subplot position is being selected? a) 3 rows, 1 column, second subplot. b) 1 row, 3 columns, second subplot. c) 3 rows, 1 column, first subplot. d) 1 row, 3 columns, third subplot.

162. 163. The `Matplotlib.pyplot` module is most commonly imported with which alias for convenience? (a) `import matplotlib.pyplot as mp` (b) `import matplotlib.pyplot as pl` (c) `import matplotlib.pyplot as mat` (d) `import matplotlib.pyplot as plt`

163. 73. What happens if you call `plt.grid(True)` multiple times in a script for the same plot without any intermediate calls to `plt.grid(False)`? (a) Each subsequent call adds another layer of grid lines, making them visually darker. (b) Only the first call to `plt.grid(True)` has an effect; subsequent calls are ignored. (c) The grid lines are toggled on and off with each call, effectively making them disappear. (d) Subsequent calls simply ensure the grid remains visible with its current settings or update them if parameters change.

164. 120. Which Matplotlib function is often used in conjunction with `subplot()` to create a grid of subplots where each subplot shares the same X or Y axis for better comparison (e.g., when plotting time series data)? a) `plt.figure()` b) `plt.twinx()` c) `plt.subplots()` (note the 's') d) `plt.tight_layout()`

165. 96. Consider a histogram where the majority of bars are concentrated on the left side, with a long tail extending to the right. This distribution is typically described as: a) Uniformly distributed b) Negatively skewed (left-skewed) c) Positively skewed (right-skewed) d) Normally distributed

ANSWER KEY

1. (c)
2. (c)
3. (b)
4. (c)
5. (d)
6. (b)
7. (b)
8. (c)
9. (c)
10. (c)
11. (c)
12. (c)
13. (b)
14. (c)
15. (b)
16. (a)
17. (d)
18. (a)
19. (d)
20. (b)
21. (b)
22. False
23. (d)
24. (c)
25. (c)
26. (b)
27. (b)

- 28. (c)
- 29. (b)
- 30. (b)
- 31. A pie chart (or circular statistical graphic).
- 32. (b)
- 33. (b)
- 34. (c)
- 35. (d)
- 36. (b)
- 37. (b)
- 38. (c)
- 39. (c)
- 40. (b)
- 41. (c)
- 42. (b)
- 43. (c)
- 44. (c)
- 45. (c)
- 46. (c)
- 47. (b)
- 48. (b)
- 49. (c)
- 50. (c)
- 51. (b)
- 52. (c)
- 53. (d)
- 54. (b)
- 55. (a)

56. (b)

57. (b)

58. (c)

59. (c)

60. (c)

61. (b)

62. (b)

63. (b)

64. (c)

65. (a)

66. (c)

67. (c)

68. (b)

69. (b)

70. (b)

71. (b)

72. (b)

73. (c)

74. (b)

75. (c)

76. (b)

77. (c)

78. (c)

79. (c)

80. (b)

81. The subplot() function is used to create multiple plots within the same figure, allowing for the arrangement of several graphs in a grid.

82. (b)

83. (b)

84. (b)

85. (b)

86. (b)

87. (b)

88. (b)

89. (c)

90. (b)

91. (b)

92. (c)

93. (c)

94. (b)

95. False

96. (b)

97. (d)

98. (b)

99. (b)

100. To understand data distribution, identify patterns, detect outliers, or visualize relationships between features.
(Accept any one valid point related to exploratory data analysis)

101. (c)

102. (c)

103. (b)

104. (d)

105. (b)

106. (c)

107. (d)

108. (b)

109. (c)

110. (b)

111. (b)

112. (c)

113. (c)

114. (c)

115. (b)

116. (a)

117. (c)

118. (b)

119. (b)

120. (c)

121. (c)

122. (b)

123. (d)

124. (b)

125. (b)

126. (b)

127. (b)

128. (c)

129. (b)

130. (a)

131. (c)

132. (a)

133. (c)

134. (c)

135. (c)

136. (a)

137. (c)

138. (b)

139. (b)

140. (b)

141. (c)

142. (c)

143. (c)

144. (b)

145. (b)

146. (c)

147. (b)

148. (c)

149. False

150. (b)

151. (c)

152. (b)

153. (b)

154. (b)

155. (b)

156. (a)

157. (b)

158. (c)

159. (c)

160. hist()

161. (a)

162. (d)

163. (d)

164. (c)

165. (c)