Padasalai’s Telegram Groups!

(தகவல்பிற்கு குறிப்பிட்டு வாக்கிட்டு விளக்க முடிகிறது பணியாணு தீர்வுமல்லாம்!)

- Padasalai's NEWS - Group
  https://t.me/joinchat/NlIfCqVRBNj9hhV4wu6_NqA

- Padasalai's Channel - Group
  https://t.me/padasalaichannel

- Lesson Plan - Group
  https://t.me/joinchat/NlIfCqVWwo5iL-21gpzrXLw

- 12th Standard - Group
  https://t.me/Padasalai_12th

- 11th Standard - Group
  https://t.me/Padasalai_11th

- 10th Standard - Group
  https://t.me/Padasalai_10th

- 9th Standard - Group
  https://t.me/Padasalai_9th

- 6th to 8th Standard - Group
  https://t.me/Padasalai_6to8

- 1st to 5th Standard - Group
  https://t.me/Padasalai_1to5

- TET - Group
  https://t.me/Padasalai_TET

- PGTRB - Group
  https://t.me/Padasalai_PGTRB

- TNPSC - Group
  https://t.me/Padasalai_TNPSC
Choose the best answer

1. Which is a python package used for 2D graphics?
   a. matplotlib.pyplot  
   b. matplotlib.pip  
   c. matplotlib.numpy  
   d. matplotlib.plt  

2. Identify the package manager for Python packages, or modules.
   a. Matplotlib  
   b. PIP  
   c. plt.show()  
   d. python package  

3. Read the following code: Identify the purpose of this code and choose the right option from the following.

   C:\Users\YourName\AppData\Local\Programs\Python\Python36-32\Scripts>pip – version
   a. Check if PIP is Installed  
   b. Install PIP  
   c. Download a Package  
   d. Check PIP version  

4. Read the following code: Identify the purpose of this code and choose the right option from the following.

   C:\Users\Your Name\AppData\Local\Programs\Python\Python36-32\Scripts>pip list
   a. List installed packages  
   b. list command  
   c. Install PIP  
   d. packages installed  

5. To install matplotlib, the following function will be typed in your command prompt.

   What does “–U” represent?
   Python –m pip install –U pip  
   a. downloading pip to the latest version  
   b. upgrading pip to the latest version  
   c. removing pip  
   d. upgrading matplotlib to the latest version  

6. Observe the output figure. Identify the coding for obtaining this output.

   a. import matplotlib.pyplot as plt
   plt.plot([1,2,3],[4,5,1])
   plt.show()  
   b. import matplotlib.pyplot as plt
   plt.plot([1,2],[4,5])
   plt.show()
c. import matplotlib.pyplot as plt
   plt.plot([2,3],[5,1])
   plt.show()

d. import matplotlib.pyplot as plt
   plt.plot([1,3],[4,1])
   plt.show()

7. Read the code:
   a. import matplotlib.pyplot as plt
   b. plt.plot(3,2)
   c. plt.show()

Identify the output for the above coding.

8. Which key is used to run the module?
   a. F6    b. F4    c. F3    d. F5

9. Identify the right type of chart using the following hints.
   Hint 1: This chart is often used to visualize a trend in data over intervals of time.
   Hint 2: The line in this type of chart is often drawn chronologically.
   a. Line chart   b. Bar chart   c. Pie chart   d. Scatter plot
10. Read the statements given below. Identify the right option from the following for pie chart.

Statement A: To make a pie chart with Matplotlib, we can use the plt.pie() function.

Statement B: The autopct parameter allows us to display the percentage value using the Python string formatting.

a. Statement A is correct
b. Statement B is correct
c. Both the statements are correct
d. Both the statements are wrong

Answer the following questions (2 Marks)

1. Define: Data Visualization.
   - Data Visualization is the graphical representation of information and data.
   - The objective of Data Visualization is to communicate information visually to users using statistical graphics.

2. List the general types of data visualization.
   - Charts
   - Tables
   - Graphs
   - Maps
   - Infographics
   - Dashboards

3. List the types of Visualizations in Matplotlib.
   - Line plot
   - Scatter plot
   - Histogram
   - Box plot
   - Bar chart and
   - Pie chart

4. How will you install Matplotlib?
   - Matplotlib can be installed using pip software.
   - Pip is a management software for installing python packages.
   - Importing Matplotlib using the command: import matplotlib.pyplot as plt
   - Matplotlib can be imported in the workspace.
5. Write the difference between the following functions:

\[ \text{plt.plot([1,2,3,4])}, \text{plt.plot([1,2,3,4], [1,4,9,16])}. \]

<table>
<thead>
<tr>
<th>plt.plot([1,2,3,4])</th>
<th>plt.plot([1,2,3,4], [1,4,9,16])</th>
</tr>
</thead>
<tbody>
<tr>
<td>It refers y value as [1,2,3,4]</td>
<td>It refers x and y values as ([1,2,3,4], [1,4,9,16])</td>
</tr>
<tr>
<td>Indirectly it refers x values as [0,1,2,3] (0,1) (1,1) (2,3) (3,4)</td>
<td>Directly x and y values are given as (1,1) (2,4) (3,9) (4,16)</td>
</tr>
</tbody>
</table>

Section-C

Answer the following questions (3 Marks)

1. Draw the output for the following data visualization plot.

```python
import matplotlib.pyplot as plt
plt.bar([1,3,5,7,9],[5,2,7,8,2], label="Example one")
plt.bar([2,4,6,8,10],[8,6,2,5,6], label="Example two", color='g')
plt.legend()
plt.xlabel('bar number')
plt.ylabel('bar height')
plt.title('Epic Graph\nAnother Line! Whoa')
plt.show()
```

OUTPUT:

![Graph Image]

2. Write any three uses of data visualization.
- Data Visualization help users to analyze and interpret the data easily.
- It makes complex data understandable and usable.
- Various Charts in Data Visualization helps to show relationship in the data for one or more variables.
3. Write the coding for the following:
   a. To check if PIP is Installed in your PC.
      - In command prompt type pip – version.
      - If it is installed already, you will get version.
      - **Command**: Python -m pip install -U pip

   b. To Check the version of PIP installed in your PC.
      - C:\Users\YourName\AppData\Local\Programs\Python\Python36-32\Scripts> pip version

   c. To list the packages in matplotlib.
      - C:\Users\YourName\AppData\Local\Programs\Python\Python36-32\Scripts> pip list

4. Write the plot for the following pie chart output.

```
import matplotlib.pyplot as plt
slices = [7,2,2,13]
activities = ['sleeping', 'eating', 'working', 'playing']
plt.pie(slices, labels=activities, autopct='%.1f%%')
plt.title('Interesting Graph Check It Out')
plt.show()
```

---

**Section - D**

**Answer the following questions:** (5 Marks)

1. Explain in detail the types of pyplots using Matplotlib.
   **Line Chart:**
   - A Line Chart or Line Graph is a type of chart which displays information as a series of data points called ‘markers’ connected by straight line segments.
   - A Line Chart is often used to visualize a trend in data over intervals of time – a time series – thus the line is often drawn chronologically.
Example:
```python
import matplotlib.pyplot as plt
total_populations = [8939007, 8954518, 8960387, 8956741, 8943721]
plt.plot(years, total_populations)
plt.title("Year vs Population in India")
plt.xlabel("Year")
plt.ylabel("Total Population")
plt.show()
```

In this program,
- `plt.title()` → specifies title to the graph
- `plt.xlabel()` → specifies label for X-axis
- `plt.ylabel()` → specifies label for Y-axis

Output:
![Graph showing Year vs Population in India](image)

Bar Chart:
- A BarPlot (or BarChart) is one of the most common type of plot.
- It shows the relationship between a numerical variable and a categorical variable.
- Bar chart represents categorical data with rectangular bars.
- Each bar has a height corresponds to the value it represents.
- The bars can be plotted vertically or horizontally.

- It’s useful when we want to compare a given numeric value on different categories.
- To make a bar chart with Matplotlib, we can use the `plt.bar()` function

Example:
```python
import matplotlib.pyplot as plt
labels = ["TAMIL", "ENGLISH", "MATHS", "PHYSICS", "CHEMISTRY", "CS"]
usage = [79.8, 67.3, 77.8, 68.4, 70.2, 88.5]
y_positions = range(len(labels))
plt.bar(y_positions, usage)
plt.xticks(y_positions, labels)
plt.ylabel("RANGE")
plt.title("MARKS")
plt.show()
```
Labels → Specifies labels for the bars.
Usage → Assign values to the labels specified.
Xticks → Display the tick marks along the x-axis at the values represented.
Then specify the label for each tick mark.
Range → Create sequence of numbers.

Pie Chart:
• Pie Chart is probably one of the most common type of chart.
• It is a circular graphic which is divided into slices to illustrate numerical proportion.
• The point of a pie chart is to show the relationship of parts out of a whole.
• To make a Pie Chart with Matplotlib, we can use the plt.pie() function.
• The autopct parameter allows us to display the percentage value using the Python string formatting.

Example:
import matplotlib.pyplot as plt
sizes = [89, 80, 90, 100, 75]
labels = ["Tamil", "English", "Maths", "Science", "Social"]
plt.pie(sizes, labels=labels, autopct="%.2f")
plt.axes().set_aspect("equal")
plt.show()
2. Explain the various buttons in a matplotlib window.

Home Button:
- The Home Button will help once you have begun navigating your chart.
- If you ever want to return back to the original view, you can click on this.

Forward/Back Buttons:
- These buttons can be used like the Forward and Back buttons in your browser.
- You can click these to move back to the previous point you were at, or forward again.

Pan Axis:
- This cross-looking button allows you to click it, and then click and drag your graph around.

Zoom:
- The Zoom button lets you click on it, then click and drag a square that you would like to zoom into specifically.
- Zooming in will require a left click and drag.
- You can alternatively zoom out with a right click and drag.

Configure Subplots:
- This button allows you to configure various spacing options with your figure and plot.

Save Figure:
- This button will allow you to save your figure in various forms.

3. Explain the purpose of the following functions:
   a. plt.xlabel
      - plt.xlabel() specifies label for X-axis
   b. plt.ylabel
      - plt.ylabel() specifies label for Y-axis
   c. plt.title
      - plt.title() specifies title to the graph
   d. plt.legend()
      - Calling legend() with no arguments automatically fetches the legend handles and their associated labels.
   e. plt.show()
      - Display a figure. When running in Python with its Pylab mode, display all figures and return to the Python prompt.

PREPARED BY

J. BASKARAN M.Sc., B.Ed. (C.S)  jbaskaran89@gmail.com
J. ILAKKIA M.Sc., M.Phil., B.Ed. (C.S)  jilakkia@gmail.com

****ALL THE BEST****