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📊 Interactive Quiz: Matplotlib & Probability

Instructions:

- Answer MCQs by writing the option letter.
- For coding questions, write Python code.
- For interpretation questions, explain briefly.

🔹 Section 1: Matplotlib Basics

Q1. Which library is used for creating plots in Python?
A. NumPy
B. Pandas
C. Matplotlib
D. TensorFlow

Q2. Which function is used to create a simple line plot?
A. plt.draw()
B. plt.line()
C. plt.plot()
D. plt.graph()

Q3. Coding Question:
Write code to plot the following data:

x = [1,2,3,4,5]
y = [2,4,6,8,10]

Add:

- Title: "Simple Line Plot"
- X label: "X values"
- Y label: "Y values"

Ans: import matplotlib.pyplot as plt
x = [1, 2, 3, 4, 5]
y = [2, 4, 6, 8, 10]
plt.plot(x, y)
plt.title("Simple Line Plot")
plt.xlabel("X values")
plt.ylabel("Y values")
plt.show()

Q4. Which function displays the plot?
A. plt.display()
B. plt.show()
C. plt.render()
D. plt.output()

🔹 Section 2: Types of Charts

Q5. Which chart is best to show frequency distribution?
A. Pie chart
B. Histogram
C. Line chart
D. Scatter plot

Q6. Coding Question:
Create a histogram using random exam scores between 0 and 100.

import numpy as np
import matplotlib.pyplot as plt
np.random.seed(42)
scores = np.random.randint(0, 101, 100)

```
plt.figure()
plt.hist(scores, bins=10)
plt.title("Distribution of Random Exam Scores")
plt.xlabel("Exam Score")
plt.ylabel("Number of Students")
plt.show()
```

Q7. Which chart shows relationship between two variables?

A. Scatter plot

B. Pie chart

C. Histogram

D. Bar chart

Q8. Coding Question:
Create a scatter plot of:

```
hours_studied = [1,2,3,4,5]
marks = [40,50,65,70,85]
```

```
import matplotlib.pyplot as plt
hours_studied = [1, 2, 3, 4, 5]
marks = [40, 50, 65, 70, 85]
plt.scatter(hours_studied, marks)
plt.title("Hours Studied vs Marks")
plt.xlabel("Hours Studied")
plt.ylabel("Marks")
plt.show()
```

🔹 Section 3: Probability Basics 🎲

Q9. Probability value always lies between:

A. −1 and 1

B. 0 and 1

C. 1 and 10

D. 0 and 100

Q10. Probability of getting a head when tossing a fair coin:
A. 0
B. 0.25
C. 0.5
D. 1

Q11. Coding Question:
Simulate tossing a coin 100 times using NumPy and plot the results using a bar chart.

```
import matplotlib.pyplot as plt
hours_studied = [1,2,3,4,5]
marks = [40,50,65,70,85]
plt.scatter(hours_studied, marks)
plt.xlabel("Hours Studied")
plt.ylabel("Marks")
plt.title("Hours Studied vs Marks")
plt.show()
```

◆ Section 4: Distributions

Q12. Which distribution is used for coin toss outcomes?
A. Normal
B. Binomial
C. Uniform
D. Exponential

Q13. Coding Question:
Generate 1000 random numbers from a normal distribution and plot histogram.

```
import numpy as np
import matplotlib.pyplot as plt
# Generate 1000 random numbers from a normal distribution
np.random.seed(42)
data = np.random.normal(loc=0, scale=1, size=1000)
plt.figure()
plt.hist(data, bins=20)
plt.title("Histogram of 1000 Random Numbers (Normal Distribution)")
plt.xlabel("Value")
plt.ylabel("Frequency")
```

```
plt.show()
```

Q14. Interpretation Question:
If a histogram looks bell-shaped, which distribution is it?

🔹 Section 5: Real-World Scenario 📈

A company recorded website visitors per day:

visitors = [120, 135, 150, 160, 180, 200, 210]

Q15. Coding Question:
Create a line chart showing visitor trend.

```
import matplotlib.pyplot as plt
visitors = [120, 135, 150, 160, 180, 200, 210]
days = ["Day 1", "Day 2", "Day 3", "Day 4", "Day 5", "Day 6", "Day 7"]
plt.figure()
plt.plot(days, visitors, marker='o')
plt.title("Website Visitors Trend")
plt.xlabel("Day")
plt.ylabel("Number of Visitors")
plt.grid(True)
plt.show()
```

Q16. Interpretation:
If visitor numbers increase steadily, what does it indicate?

A. Declining traffic
B. Stable traffic
C. Growing traffic
D. Random traffic

🔹 Section 6: Advanced Thinking

Q17. Which plot is best to visualize probability distribution shape?
A. Histogram

B. Line plot
C. Pie chart
D. Bar chart