

### Basic Python Concepts:

1. What is Python, and why is it popular for data analysis?
2. Explain the differences between Python 2 and Python 3.
3. How do you comment out multiple lines of code in Python?
4. What is PEP 8, and why is it important for writing clean code?
5. What is a Python virtual environment, and why would you use one?
6. Describe the Global Interpreter Lock (GIL) in Python and its implications.
7. What is the purpose of the `if __name__ == "__main__":` statement in Python scripts?

### Data Types and Variables:

8. Name some commonly used data types in Python for data analysis.
9. How do you declare a variable in Python?
10. Explain the difference between mutable and immutable data types in Python.
11. What is typecasting, and how is it done in Python?
12. How do you swap the values of two variables without using a temporary variable?

### NumPy:

13. What is NumPy, and why is it used in data analysis?
14. How do you install NumPy?
15. What is a NumPy array, and how is it different from a Python list?
16. Explain broadcasting in NumPy.
17. How can you generate random numbers using NumPy?



## Pandas:

18. What is pandas, and why is it useful for data analysis?
19. How do you install pandas?
20. What are Series and DataFrame in pandas?
21. How can you read data from a CSV file into a DataFrame using pandas?
22. What is the difference between ``loc`` and ``iloc`` in pandas?
23. How do you handle missing data (NaN) in a pandas DataFrame?
24. What is the purpose of the ``groupby`` function in pandas?

## Data Cleaning and Manipulation:

25. How can you remove duplicate rows from a pandas DataFrame?
26. Explain how to merge two DataFrames in pandas.
27. What are the methods for renaming columns in a DataFrame?
28. How can you filter rows in a DataFrame based on a condition?
29. What is the ``apply`` function in pandas used for?

## Data Visualization:

30. Name some popular Python libraries for data visualization.
31. How do you create a basic plot using Matplotlib?
32. What is Seaborn, and how does it complement Matplotlib?
33. How can you create a scatter plot in Matplotlib?
34. What is the purpose of a heatmap in data visualization?

## Data Analysis:



- 35. What is the difference between mean, median, and mode?
- 36. How can you calculate the correlation between two columns in a DataFrame?
- 37. Explain the concept of pivot tables in pandas.
- 38. What is the purpose of the `describe` method in pandas?

