Python Coding and Theoretical Questions with Solutions

1. Beginner Level

Theoretical Questions:

1. What is Python? List its key features.

2. What are Python's data types?

3. What is the difference between mutable and immutable objects? Provide examples.

4. Explain the use of the `print()` function in Python.

5. What is the purpose of indentation in Python?

Coding Questions:

1. Write a Python program to swap two variables without using a third variable.

2. Write a program to check if a number is even or odd.

3. Write a program to reverse a string.

4. Write a Python program to check if a number is a palindrome.

5. Write a program to find the largest number in a list.

2. Intermediate Level

Theoretical Questions:

1. Explain the difference between a list and a tuple.

2. What are Python decorators?

3. What is the difference between shallow copy and deep copy in Python?

4. What are *args and **kwargs in Python?

5. Explain the use of Python's `with` statement.

Coding Questions:

1. Write a Python program to find the factorial of a number using recursion.

2. Write a Python program to count the frequency of each word in a string.

3. Write a program to implement a simple calculator.

4. Write a Python program to check if two strings are anagrams.

5. Write a Python function to find the second largest number in a list.

3. Advanced Level

Theoretical Questions:

1. What is the Global Interpreter Lock (GIL) in Python?

2. What are metaclasses in Python?

3. Explain the difference between `is` and `==` in Python.

4. How is memory managed in Python?

5. What are Python's built-in data structures?

Coding Questions:

1. Write a Python program to implement a binary search.

2. Write a Python program to generate Fibonacci numbers up to `n` using a generator.

3. Write a program to solve the Tower of Hanoi problem.

4. Write a Python function to merge two sorted lists.

5. Write a Python program to implement quicksort.

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4. Machine Learning with Python

Theoretical Questions:

1. What is the difference between supervised and unsupervised learning?

2. Explain the difference between NumPy and Pandas.

3. What is the role of Scikit-learn in Python?

4. What is overfitting, and how can it be avoided?

5. What are the common metrics used to evaluate classification models?

Coding Questions:

1. Write a Python program to perform linear regression using scikit-learn.

2. Write a Python program to load a CSV file and calculate the mean of a column using Pandas.

3. Write a Python program to create a confusion matrix for a classification problem.

4. Write a Python program to normalize a dataset using NumPy.

5. Write a Python program to implement k-means clustering.