**AAI-Lab model questions**

1. How does Python handle variable scope within functions? Write a program that demonstrates the difference between global and local variables.

2. List Python’s built-in data types. Provide examples of each data type and demonstrate how type conversion is done between them.

3. Explain the concept of shallow copy and deep copy in Python. Write a program that demonstrates both methods using lists.

4. What is the primary difference between lists and tuples in Python? Write a program that shows how lists can be modified while tuples remain immutable.

5. How does Python handle exceptions? Write a Python function that uses `try-except` blocks to handle a potential division by zero error.

6. What are list comprehensions? Write examples that show how to create lists using both comprehensions and traditional `for` loops.

7. What are sets in Python, and how do they differ from lists? Demonstrate how to perform union, intersection, and difference operations using sets.

8. What is a lambda function in Python? Write a program that uses a lambda function to sort a list of tuples based on the second element of each tuple.

9. Explain the `filter()`, `map()`, and `reduce()` functions in Python. Write examples of how to use each of these functions on a list of integers.

10. How do you work with files in Python? Write a program that creates a text file, writes some data to it, and reads the data back.

11. What are the rules for naming identifiers in Python? Provide examples of valid and invalid identifiers, and explain the importance of following these rules.

12. How does the `assert` keyword assist in debugging? Write a Python function that uses `assert` to validate input values before performing a division operation.

13. Demonstrate how arithmetic and logical operators are used in Python by providing examples of addition, subtraction, comparison, and logical AND/OR operations.

14. Write Python code that shows how to add elements to a list, remove elements from a list, and extract a portion of a list using slicing.

15. How do you create a tuple with a single element and with multiple elements in Python? Explain what happens if you forget the trailing comma in a single-element tuple.

16. What are key-value pairs in Python dictionaries? Write a program to add, update, and remove key-value pairs in a dictionary.

17. Explain the difference between mutable and immutable objects in Python. Provide examples of both types and demonstrate how their behavior differs.

18. How do you work with nested data structures in Python? Write a program that accesses and manipulates values in a nested list or dictionary.

19. What are Python decorators, and how are they used? Write a Python function and apply a decorator to modify its behavior.

20. What are generator functions in Python, and how do they differ from regular functions? Write a generator that yields the first 10 numbers in the Fibonacci sequence.