SNS COLLEGE OF TECHNOLOGY

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COIMBATORE-641 035, TAMIL NADU

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Course Code & Name : 23ITB202 & PYTHON PROGRAMMING

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Question Bank

Part A- 2 Mark Questions

1. Write a Python function to compute the square root of a given number without using the math library.
2. Define list slicing with an example. How does it differ from cloning a list?
3. Differentiate between linear search and binary search in terms of efficiency.
4. State two dictionary methods commonly used in data processing and give examples.
5. What is the purpose of aliasing in Python lists? Give a small code snippet.
6. Write a Python function to perform exponentiation (x^n) without using the built-in pow() function.
7. What is the difference between a tuple and a list in Python? Give one industry scenario where tuples are preferable.
8. How does binary search reduce the number of comparisons compared to linear search? Illustrate with an example of searching in a sorted list.
9. Explain list comprehension with an example that generates squares of numbers from 1 to 10.
10. What is meant by a function parameter in Python? Differentiate between positional and keyword parameters with examples.

Part B - 13 Mark Questions

1. Write a Python program using functions to compute the GCD of two numbers. Extend it to handle multiple test cases in a single run.
2. You are tasked to implement a search engine snippet that highlights a given keyword in a large text using string functions. Demonstrate your solution with Python code.

3. A retail store wants to generate a bill for purchased items. Write a Python program using dictionary to store item–price pairs and calculate the final bill with GST.
4. Write a Python program to generate a histogram of student marks using list comprehension and dictionary operations. Include proper formatting of output.
5. Write a Python program using a function that sums an array of numbers. Extend the function to also return the average of the numbers.
6. Write a Python function that accepts a string and returns a frequency dictionary of all characters. Show how this is useful in data compression or text analytics.
7. Create a Python program to manage a students' marks statement using dictionaries:
    a. Store student name as key and marks as value.
    b. Display the topper's name and marks.
8. Implement a simple sorting program using lists (without using sort() function). Explain how your method compares with built-in sorting functions in terms of time complexity.

Part C - 14 Mark Questions

1. A fintech company (e.g., PayPal) wants to build a secure authentication system where user passwords are validated by checking string patterns (must include uppercase, lowercase, digits, and symbols). Design and implement a Python function that validates passwords and analyze its time complexity.
2. Netflix maintains user watch history as lists, tuples, and dictionaries.
   - Lists → Movies watched
   - Tuples → User credentials (immutable)
   - Dictionaries → User ratings (movie: rating)

   Design a Python program that:
   1. Adds a new movie to the watch history.
   2. Updates user rating for an existing movie.
   3. Displays the highest-rated movie by that user.
3. Apple wants to implement a spell-checker feature for its text editor. Write a Python function that takes a word list and a user-typed word, and checks whether it exists in the dictionary using binary search. Extend your solution to suggest the closest word (hint: use string similarity).
4. An e-commerce platform (like Flipkart) maintains inventory as:

   List → product IDs

   Dictionary → product ID : stock quantity

   Tuple → immutable product details (ID, name, price)

Write a Python program that:

Adds a new product to inventory.

Updates stock after a purchase.

Displays the product with the highest stock remaining.