Python

1. Explain the concept of list comprehension and provide an example.

Ans:-

**List comprehension is a concise way to create lists in Python. It allows you to generate a new list by applying an expression to each item in an existing list or iterable.**

**Ex:-**

**# Create a list of squares for numbers 1 through 5**

**squares = [x\*\*2 for x in range(1, 6)]**

**print(squares) # Output: [1, 4, 9, 16, 25]**

1. What are decorators in Python? Provide an example.

Ex:-

**Decorators are a way to modify or enhance functions or methods without changing their actual code. They are often used for logging, access control, and instrumentation.**

1. What are indexes in SQL and how do they improve query performance?

Ans:-

**Indexes are special lookup tables that the database search engine can use to speed up data retrieval. They improve query performance by allowing the database to find data without scanning every row in a table.**

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

Ans:-

**The Global Interpreter Lock (GIL) is a mutex that protects access to Python objects, preventing multiple native threads from executing Python bytecodes at once. This means only one thread can execute Python code at a time, which can be a limitation in CPU-bound and multi-threaded programs.**

1. Explain the difference between deep copy and shallow copy.

ans:-

**Shallow copy: Creates a new object, but inserts references into it to the objects found in the original.**

**Deep copy: Creates a new object and recursively adds copies of the objects found in the original.**

**Ex:-**

**import copy**

**original\_list = [1, [2, 3], 4]**

**shallow\_copy = copy.copy(original\_list)**

**deep\_copy = copy.deepcopy(original\_list)**

**# Modifying the inner list in the original affects the shallow copy but not the deep copy**

**original\_list[1][0] = 'changed'**

**print(shallow\_copy) # Output: [1, ['changed', 3], 4]**

**print(deep\_copy) # Output: [1, [2, 3], 4]**

SQL

1. What are indexes in SQL and how do they improve query performance?

Ans:-

**Indexes are special lookup tables that the database search engine can use to speed up data retrieval. They improve query performance by allowing the database to find data without scanning every row in a table.**

1. How do you handle transactions in SQL?

Ans:-

**Transactions in SQL are handled using the following commands:**

* **BEGIN TRANSACTION: Starts a new transaction.**
* **COMMIT: Saves all changes made during the transaction.**
* **ROLLBACK: Undoes all changes made during the transaction if an error occurs.**

1. How do you connect to a SQL database using Python? Provide a code example.

Ans:-

**You can connect to a SQL database using libraries like sqlite3 for SQLite or psycopg2 for PostgreSQL.**

**import sqlite3**

**# Connect to SQLite database**

**conn = sqlite3.connect('example.db')**

**cursor = conn.cursor()**

**# Execute a query**

**cursor.execute("SELECT \* FROM my\_table")**

**# Fetch and print results**

**rows = cursor.fetchall()**

**for row in rows:**

**print(row)**

**# Close the connection**

**conn.close()**

1. Write a Python script to execute a SQL query and retrieve data from a database.

Ans:-

**Example with sqlite3:**

**import sqlite3**

**def fetch\_data(query):**

**conn = sqlite3.connect('example.db')**

**cursor = conn.cursor()**

**cursor.execute(query)**

**results = cursor.fetchall()**

**conn.close()**

**return results**

**data = fetch\_data("SELECT \* FROM my\_table")**

**print(data)**

1. Describe how recursive queries work in SQL. Provide an example scenario where a recursive query would be beneficial.

ex:-

**Recursive queries in SQL, often implemented using Common Table Expressions (CTEs), allow a query to reference itself. This is useful for hierarchical or tree-structured data.**

Excel

1. What is a Cell Reference?

Ans:-

**A cell reference in Excel refers to a cell or a range of cells on a worksheet and can be used in formulas to retrieve data from those cells.**

1. How can you identify duplicates?

Ans:-

**You can identify duplicates in Excel using the Conditional Formatting feature or by using the COUNTIF function**.

1. What's the difference between SUM, SUMIF, and SUMIFS?

Ans:-

**SUM: Adds all numbers in a range.**

**SUMIF: Adds numbers in a range that meet a single condition.**

**SUMIFS: Adds numbers in a range that meet multiple conditions.**

1. What's the difference between SUBSTITUTE and REPLACE?

Ans:-

**SUBSTITUTE: Replaces occurrences of a specified text in a string with another text.**

**REPLACE: Replaces part of a string, based on the number of characters you specify.**

1. How do you protect a Workbook?

Ans:-

**To protect a workbook in Excel:**

1. **Go to the Review tab.**
2. **Click Protect Workbook.**
3. **Set a password and choose the options you want to protect (e.g., structure or windows).**