Practice Sheet
Lecture 1: Chapter 1 and 2

1. Explain the three-schema-architecture with an illustrative diagram.
2. What is Data Independence? Explain the different types of data independence with examples.
3. Consider the following scenarios and explain whether they achieved logical data independence or physical data independence:
   a. You added a new column called "age" in the employee table of the company database. The company uses an Employee management system for attendance, leaves, salary, projects etc. The "age" information will not appear to any users using the system.

   Solution: Logical Data Independence. Adding an age column changes the conceptual schema, but since it does not appear to users, the external schema remains unchanged.
   b. Your company is upgrading their system. They previously used HDD (hard disk drive) for data storage. Now they shifted to SSD(solid state drive) for more efficient data management. The company uses a Database System for employee attendance, leaves, salary, projects etc.

   Solution: Physical Data Independence. Changing the data storage type will change the internal schema, but the database structure remains unchanged, so the conceptual schema remains unchanged.
4. Explain the difference between Schema and State with an example. Mention which of the following tasks will impact the schema and which will impact the state of a database:
   a. Insert a column in a table
   b. Insert new data or row in a table.
   c. Change the position of a column in a table
   d. Retrieve some data from the table.
   e. Delete a column from the table.
   f. Delete an existing data from a table.
   g. Change the name of a column
   h. Change the data type of a column
   i. Change the data value in a particular row/column.

5. State three differences between file-based approach and database approach for data management.
6. State two advantages of database approach for data management.
7. Consider the following scenarios and explain with respect to the given informations and conditions whether you should use a database approach or a file-based approach for data management:
   a. You will collect and store the birthdays and phone numbers of all your close relatives. You have around 60 close relatives. You are not concerned about security and you are the only one who will access this data.

      b. You are hired by the government to collect and store information about all citizens in the country. The data should not be accessed by everybody. Multiple government offices will need to access different data for different purposes.

8. Explain program-data independence with an example.
9. Explain Data Abstraction.
10. Explain Data Model. State and Explain the different types of Data Models.

11. Explain DDL and DML. State which of the following tasks are DDL and which are DML with brief explanation:
    a. Insert a column in a table
    b. Insert new data or row in a table.
    c. Change the position of a column in a table
    d. Retrieve some data from the table.
    e. Delete a column from the table.
    f. Delete an existing data from a table.
    g. Change the name of a column
    h. Change the data type of a column
    i. Change the data value in a particular row/column.