**Database Assignment 01:**

**Question 01:**

Answer a:

The problems with file-system data management are as follows:

1. **Security Issues:**

* Provides only application-level security, with no fine-grained access control.
* Anyone accessing a file may also gain unauthorized access to sensitive information.

1. **Difficulties in Retrieval and Querying of Data**

* Lacks a standard query language.
* Retrieving specific information requires writing custom scripts or programs, which is time-consuming and inefficient.

1. **Data Redundancy**

* Leads to unnecessary duplication of data.
* The same information may be stored multiple times in different files, wasting storage and creating consistency problems.

1. **Data Isolation**
   * + Data is scattered across multiple files and folders.
     + Combining or integrating this data at a central level is complex and difficult.

Answer b:

**Definition:**

A **composite key** is formed when two or more columns are combined to act as a single primary key.

* A single column alone is not sufficient to uniquely identify a record.
* By combining multiple columns, uniqueness is ensured.

**Example:**

You have a library management system

Table **Book\_Loans** has:

* BookId (INT)
* MemberId (INT)
* LoanDate (DATE)
* ReturnDate (DATE)

**Why Composite Key?**

* MemberId alone => not unique (a member borrows many books).
* BookId alone => not unique (a book is borrowed by many members).
* LoanDate => adds uniqueness if the same member borrows the same book again.

**Composite Key:**  
(MemberId, BookId, LoanDate) uniquely identifies each loan record

Answer c:

Operations by application program when DBMS is used  
The application program doesn’t handle files directly. It just sends requests to the DBMS, like inserting, updating, deleting, or retrieving data. The DBMS itself takes care of things like security, concurrency, integrity, and recovery, so the program mainly focuses on user interaction and business logic.

Answer d:

Physical data independence (changing how data is stored without affecting the logical design) is generally easier. Logical data independence (changing the conceptual schema without affecting external views or application programs) is harder to achieve. For example, if we split a “Name” column into “FirstName” and “LastName,” user views and programs depending on “Name” would break and need changes

Answer e:

A superkey is any set of attributes that uniquely identifies a record, but it can have extra attributes. A key is the minimal superkey, with no unnecessary attributes.  
Example: In a Student table (RollNo, Name, Phone):

* {RollNo} is a key.
* {RollNo, Name} is a superkey, but not a key, since RollNo alone is enough.