

LEVEL: 2ND YEAR BACHELOR'S IN COMPUTER SCIENCE (2025/2026)
MODULE: DATABASES
TD NO 1: INTRODUCTION TO DATABASES

EXERCISE 1: Answer with **True or False** and correct the false propositions:

1. A database is an organized collection of related data.
2. File systems completely eliminate data inconsistency.
3. The hierarchical model organizes data in the form of tables.
4. SQL is only used to retrieve data from a database.
5. Primary keys uniquely identify each record in a table.
6. NoSQL databases are mainly designed for structured data only.
7. One advantage of databases is improved data security.
8. Transaction management helps maintain data consistency even after system failures.
9. In the relational model, data is stored in graphs.
10. Scalability refers to the ability of a system to handle growing amounts of data efficiently.
11. A DBMS is mandatory for data management in a database.
12. Database normalization is a process aimed at increasing data redundancy.
13. Foreign keys establish links between different tables in a database.
14. A relational database can be graphically represented as an entity-relationship diagram.
15. Distributed databases are designed to be stored on a single server.
16. The DBMS must be installed on the same server as the database.
17. In a company using a database, each employee will access the same data as their teammates.
18. The Excel spreadsheet is the easiest DBMS to use.

Exercise 2 : Answers to the questions

1. What is data integrity?
2. What are the purposes of DML, DDL, and DCL?
3. What are the three levels of data description defined by the ANSI/SPARC standard?
4. Provide examples of DBMS.

SOLUTIONS

Exercise 1 :

1. A database is an organized collection of related data.

True

2. File systems completely eliminate data inconsistency.

False → File systems often create data inconsistency due to redundancy.

3. The hierarchical model organizes data in the form of tables.

False → It organizes data in a tree-like structure with parent-child relationships.

4. SQL is only used to retrieve data from a database.

False → SQL is used to define, manipulate, and control access to data.

5. Primary keys uniquely identify each record in a table.

True

6. NoSQL databases are mainly designed for structured data only.

False → They are designed to handle unstructured and semi-structured data.

7. One advantage of databases is improved data security.

True

8. Transaction management helps maintain data consistency even after system failures.

True

9. In the relational model, data is stored in graphs.

False → Data is stored in tables composed of rows and columns.

10. Scalability refers to the ability of a system to handle growing amounts of data efficiently.

True

11. A DBMS is mandatory for data management in a database.

True

12. Database normalization is a process aimed at increasing data redundancy.

False → Database normalization aims to reduce data redundancy by organizing the data in a way that avoids anomalies and improves consistency.

13. Foreign keys establish links between different tables in a database.

True

14. A relational database can be graphically represented as an entity-relationship diagram.

True

15. Distributed databases are designed to be stored on a single server.

False → Distributed databases are designed to be stored on multiple servers, often geographically distributed. They allow for data distribution to improve system performance, availability, and resilience.

16. The DBMS must be installed on the same server as the database.

False → The database files can be placed on a different server or storage arrays.

17. In a company using a database, each employee will access the same data as their teammates.

False: Each employee will have their own external view (ANSI SPARK architecture).

18. The Excel spreadsheet is the easiest DBMS to use.

False: Excel is not a DBMS.

Exercise 2 :

1. Data integrity refers to the accuracy, consistency, and reliability of data stored in a database.

2. The purposes of DML, DDL, and DCL are:

- **DML (Data Manipulation Language):** Used for manipulating data in a database, including operations like inserting, updating, retrieving, and deleting data.

- **DDL (Data Definition Language):** Used to define and modify the database structure, including creating tables, adding constraints, and modifying schemas.

- **DCL (Data Control Language):** Used to manage data access rights, including defining access permissions and security levels.

3. **The three levels of data description defined by the ANSI/SPARK standard are:**

- Physical level, also known as the internal level

- Conceptual or logical level.

- External level or views.

4. **Some DBMS examples:**

- | | | |
|------------------------|--------------|------------------------------|
| • MySQL | • PostgreSQL | • SQL Server Express |
| • Microsoft SQL Server | • MongoDB | • Cassandra |
| • Oracle Database | • SQLite | • Firebase Realtime Database |
| | • MariaDB | |