***Assignment 28***

1. What is a Database? Explain with an example on why should we need a database.

A database is a structured collection of data that is used in computer systems for storing, managing and retrieving information. A database typically includes tables, each of which has columns and rows that store related data. For example, a company might have a database that includes tables for employee records, product details, and customer information. Databases are used for efficient storage and retrieval of large volumes of data and for ensuring data consistency, security and integrity. They are important for businesses, government organizations, educational institutions and other organizations for their data management needs.

1. Write a short note on File base storage system. Explain the major challenges of a File-based storage system.

A file-based storage system is a basic method of data management where the data is stored in files on a computer's hard disk or other storage medium. It consists of individual files that must be managed separately, and data is often duplicated across different files, leading to redundancy and inconsistency. The major challenges of a File-based storage system include difficulty in managing large amounts of data, redundancy, inconsistency, dependency on procedural languages for data access and constraints on concurrent access.

1. What is DBMS? What was the need for DBMS?

DBMS stands for Database Management System. It is a software system used for managing, storing and retrieving information from a database. The need for DBMS arose due to the complexity and volume of data used in modern applications. DBMS provides a structured, efficient, and secure way for storing and managing data needed by various applications. It also provides features like data sharing, data security, data consistency, and data integrity, which are crucial for organizational information management.

1. Explain 5 challenges of file-based storage system which was tackled by DBMS.

The 5 challenges of file-based storage systems which were tackled by DBMS include redundancy, inconsistency, difficulty in data access, security, and data independence. DBMS eliminates redundancy by storing a single copy of data in the database, which can be accessed by multiple applications. It also ensures data consistency by providing a mechanism for controlling data updates. DBMS provides an efficient method for data access, and it can manage security by providing access controls and user authentication. Lastly, DBMS provides data independence by abstracting the data from the applications that use it, allowing changes to be made to the data model without affecting the application code.

1. List out the different types of classification in DBMS and explain them in depth.

The different types of classification in DBMS include the following: - Relational database: A database consisting of tables where data is stored as rows and columns. - Object-oriented database: A database system where data is stored in objects, which have attributes and methods. - Hierarchical database: A database that organizes data in a tree-like structure with parent-child relationships. - Network database: A database that organizes data in a network-like structure with many-to-many relationships. - Distributed database: A database that is spread across multiple computers connected in a network.

1. What is the significance of Data Modelling and explain the types of data modeling.

Data modeling is the process of creating a conceptual representation of data objects and their relationships. It helps in designing an efficient database structure and defining relationships between tables. The types of data modeling include: - Conceptual data modeling: A high-level model of the data that focuses on the core concepts and entities involved. - Logical data modeling: A detailed model of the data, independent of any physical schema, that focuses on the relationships between entities, attributes and constraints. - Physical data modeling: A detailed model of the data that provides a physical representation of the logical model, including details such as storage, indexing, and access methods.

1. Explain 3 schema architecture along with its advantages.

The three-schema architecture is a database architecture that separates the three levels of database system design: the external level, the conceptual level, and the internal level. The advantages of the three-schema architecture include the following: - Data independence: Changes to the physical storage of data do not impact the way the data is viewed or used by end-users. - Security: Access to data is controlled at each level, preventing unauthorized access to sensitive information. - Flexibility: The architecture allows the database to be easily updated and modified without affecting existing applications.