

GENERAL AWARENESS COURSE III: 3A13BCA DATABASE MANAGEMENT**COURSE OUTCOME**

CO1: Understand the basic concepts in DBMS.

CO2: Skill in designing database.

CO3: Familiarization of different DBMS models.

CO4: Skill in writing queries using MySQL.

Unit I:

Introduction – purpose of Database systems. View of Data, data Models, transaction management, database structure, DBA, Data Base Users.

Unit II:

E-R model, Basic concepts; design issues; Mapping Constraints; Keys; Primary, Foreign, candidate, E-R diagram; Weak entity set; Extended E-R features. Normal forms – 1NF, 2NF, 3NF and BCNF; functional dependency, Normalization.

Unit III:

Relational model – Structure of Relational database. Relational Algebra; Fundamental operations; Relational calculus; Tuple and domain calculus.

Unit IV:

SQL: database languages; DDL; create, alter, Drop, DML, Insert into, Select, update, Delete, DCL commands, Data types in SQL; Creation of database and user. Case study: MySQL.

Unit V:

Developing queries and subqueries; Join operations; Set operations; Integrity constraints, views, Triggers, functions and Sequences. Case study: MySQL

DATA

Data can be defined as a set of isolated and unrelated raw facts with an implicit meaning. Data can be anything such as ,name of a person, a number ,images etc.

When the data is processed and converted into a meaningful and useful form it is known as **information**.

A **Data Base Management System (DBMS)** is an integrated set of programs used to create and maintain a database. The main objective of a DBMS is to provide a convenient and effective method of defining , storing, retrieving and manipulating the data contained in the database. The database and DBMS software are collectively known as **database system**.

ADVANTAGE OF DATABASE SYSTEM:

- Controlled Data Redundancy.
- Enforcing data integrity.
- Data sharing
- Ease of application development.
- Data security.
- Multiple User Interface.
- Backup and recovery.
- Program data independence.
- Data abstraction.
- Support multiple views of the data.

APPLICATIONS

- Airlines & railways.
- Banking
- Education
- Telecommunication
- Credit card transactions.
- E-commerce
- Finance
- Sales

DATABASE USERS

- **Naïve users** :The users who query and update the database by invoking some already written application programs.
- **Sophisticated users** : The users such as business analyst,scientist etc.who are familiar with the facilities provided by a DBMs interact with the system without writing any application programs.

- **Specialized users:**The user who writes specialized database programs,which are different from traditional data processing applications such as banking and payroll management which use simple datatypes.
- **DataBaseAdministrator (DBA)**

DBA is a person who has central control over both data and application programs. Responsibilities of DBA are

- **Schema definition and modification:**The overall structure of the database is known as database schema.It is the responsibility of the DBA to create the database schema by executing a set of data definition statements in DDL.
- **New software installation:**It is the responsibility of the DBA to install new DBMS software ,application software,and other related software.After installation DBA must test the new software.
- **Security enforcement and administration**
- **Data analysis :**DBA is responsible for analyzing the data stored in the database,and studying its performance and efficiency in order to effectively use indexes,parallel query execution etc.
- **Preliminary database design :**The DBA works along with the development team during the database design stage due to which many potential problems that can arise later(after installation) can be avoided.
- **Physical organization modification**
- **Routine maintenance check.**

PURPOSE OF DATABASE SYSTEMS

Disadvantages of file processing system:

Consider a bookstore that uses a file processing system to keep track of all the available books.The system maintains a file named **BOOK** to store information related to books.This information include book title,ISBN,price,year of publishing,copyright date,category,number of pages,author,name and address of publisher.Another file named **PUBLISHER** that includes name,address,phone number and Email id of publisher.

Data redundancy and inconsistency

- The same information may be duplicated in several places (files). For example, The name and address of publisher are stored in BOOK file as well as PUBLISHER file.This duplication of data is known as **data redundancy**.

Suppose a publisher request a change in his address. Since the address of the publisher is stored in BOOK as well as PUBLISHER file ,both the file must be updated.If the address of the publisher is not modified in any of the two files,then the same publisher will have different address in two different files.This is known as **data inconsistency**.

Difficulty in accessing data***Data isolation***

In file processing system the data are scattered in various files, and files may be in different formats, writing new application programs to retrieve the appropriate data is difficult.

Integrity problems

Data integrity means the correctness and completeness of the data.

Atomicity problems

A computer system, like any other mechanical or electrical device, is subject to failure.

Concurrent-access anomalies

For the sake of overall performance of the system and faster response, many systems allow multiple users to update the data simultaneously.

Security problems

Every user of the database system should not be able to access all the data. For example, in a banking system, payroll personnel need to see only that part of the database that has information about the various bank employees. They do not need access to information about customer accounts. But, since application programs are added to the file-processing system in an ad hoc manner, enforcing such security constraints is difficult.

These are the disadvantages of file-processing systems and purpose of database systems.

VIEW OF DATA

A major purpose of a database system is to provide users with an abstract view of the data. That is, the system hides certain details of how the data are stored and maintained.

Data Abstraction :For the system to be usable, it must retrieve data efficiently. Many database-system users are not computer trained, developers hide the complexity from users through several levels of abstraction, to simplify user's interactions with the system.

Physical level [internal level]:

- The lowest level of abstraction describes **how the data are actually is stored**. The physical level describes complex low-level data structures in detail.

Logical level[conceptual level]

- The next-higher level of abstraction describes **what data are stored** in the database, and what relationships exists among those data.

View level[external level]

- The highest level of abstraction describes only part of the entire database. At the view level, users see a set of application programs that hide details of the data types. Views can also hide information (e.g., salary) for security purposes. The system may provide many views for the same database to simplify their interaction with the system.

3 SCHEMA ARCHITECTURE [ANSI/SPARC/3 LEVEL ARCHITECTURE]

