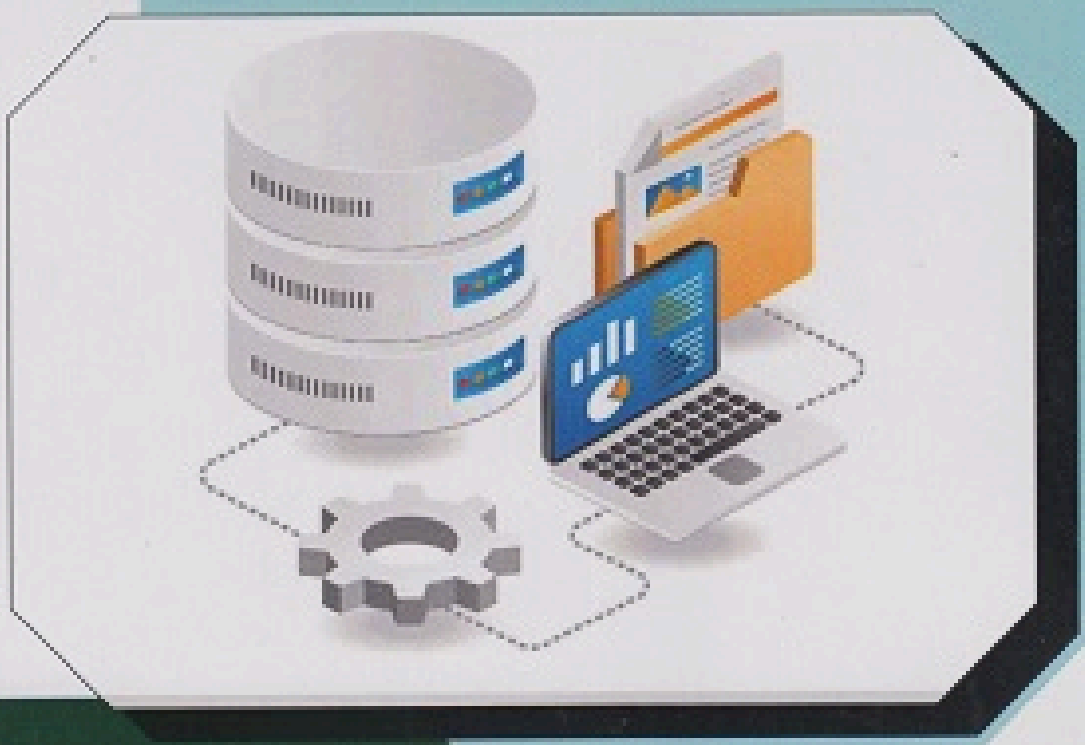
As Per NEP
New Syllabus

B.Com. : COMPUTER APPLICATION & BBA (CA) (AICTE)

SEMESTER - I



DATABASE MANAGEMENT SYSTEMS

Dr. Ms. MANISHA BHARAMBE

ABHIJEET D. MANKAR

NIRALI PRAKASHAN
ADVANCEMENT OF KNOWLEDGE

NEP NEW SYLLABUS

DATABASE MANAGEMENT SYSTEMS

for

B.Com. (Computer Application) and BBA (CA) - AICTE

Semester - I

As Per NEP Syllabus w.e.f. Academic Year 2024-25

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Preface ...

We take an opportunity to present this Text Book on "Database Management Systems" to the students of First Semester B.Com. (Computer Applications) as per NEP-2020 New Syllabus (2024 Pattern). The objective of this book is to present the subject matter in a most concise, compact, to the point and lucid manner.

This book aims at clarifying and explaining the fundamental concepts of designing and implementing databases, which is helpful throughout the life time as a student and professional.

Extensive exercises and numerous case studies are provided at the end of each chapter, which helps to develop the skills of database application design and implementation. Without normalization database is of no use. This book clears the concept and enhance the ability of designing normalized database.

We are very much thankful to our Publisher **Shri. Dineshbhai Furia** and **Shri. Jignesh Furia** for publishing this book in minimum possible time.

Any suggestions for improving the content shall be gratefully received and highly appreciated.

Authors

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1...

Introduction to Databases Management and Data Models

Learning Objectives...

- To understand basic concept of data.
- To know about DBMS and its applications and users.
- To study different views of data and data relationships.
- To learn different data models.
- To understand basic concepts of Relational Model.
- To get familiar with basic terms used in Relational Model.
- To know different types of keys of relation.

1.1 INTRODUCTION

- In typical business environment, it is always essential to be able to produce the right information at the right time with minimum efforts.
- The database shows a change in storage, access and management of data.
- A DBMS (Database Management System) is a complex software system that is used to manage, store, and manipulate data in the database.
- It is utilized by a large variety of users, to retrieve and manipulate data under its control.
- The users could be utilizing that database concurrently from on-line terminals and/or in a batch environment via application programs written in a high-level language.

1.2 APPLICATIONS OF DBMS

- DBMS is used for organizing, analyzing and modifying the information stored in a database.
- There are various applications available. These are listed below:

- Computerized Library System. To maintain information of books, author.
- Automated Teller Machines (ATMs).
- Airlines (flight) Reservation System for reservations and schedule info.
- Inventory Management System.
- Fashion designing.
- Banking for customer information, account activities, payments, deposits, loans.
- Universities – Registration, Grades, student info.
- Sales – for Customer, Product, Purchases, information.
- Manufacturing – Production, Inventory status, Orders, Supply Chain and many more.

1.3 ADVANTAGES OF DBMS

- Using DBMS, we have following advantages:
  1. Cost of software development is reduced.
  2. User can get proper logical organization of dataset.
  3. Centralization for multi-user is available.
  4. Centralized data reduces management problems and duplication of data also.
  5. Data is independent.
  6. User can monitor database performance.
  7. Data redundancy and consistency are controllable.
  8. Program and data interdependency is decreased.
  9. Data flexibility is increased.
  10. Data integrity and its quality are maintained.
  11. Inconsistency of data is avoided.
  12. Same data can be shared by many application programs.
  13. Security to data is provided.

1.4 USERS OF DBMS

- The users of database system can be classified on the basis of degree of expertise or the mode of their interactions with DBMS.
- There are 4 groups of users of DBMS:
  1. Database designers.
  2. Applications programmers.
  3. Sophisticated users.
  4. End users.

1.4.1 Database Designers

- There are two main database designers.
  (i) Database manager.
  (ii) Database administrator.

1.4.1.1 Database Manager

- A database manager is supervising authority over the Database Administrator.
- A database manager manages and updates a database. The database manager has some knowledge about the database, but need not be having the same expertise as the database administrator.
- Actually the database administrator takes care of the database. The database administrator can create, delete and update a database.

1.4.1.2 Database Administrator (DBA)

- The DBA is an individual person or group of persons (a team) who must have a good knowledge in data processing. DBA must have sufficient technical knowledge to make decisions in the organization.
- The DBA must manage the staff to ensure orderly development of the database project, to satisfy database users and to plan for future database requirements.

Responsibilities of DBA:

1. Deciding information contents of the database i.e. decide conceptual and internal schema. The data dictionary is created by DBA, so users can query the dictionary.
2. DBA decides the storage structures and access strategy i.e. which user can retrieve what.
3. Defines authorization checks and validation procedures. DBA checks validity before giving access.
4. Define strategies for backups and recovery.
5. Define security and integrity rules.
6. DBA monitors the system performance.

1.4.2 Application Programmers

- They are computer professionals.
- They are responsible for the development of application programs.
- For the development of application program, they use a general purpose programming language like C, COBOL and Pascal.
- By using these programs, these people handle or manipulate the databases.

1.4.3 Sophisticated Users

- These people are also computer professional but they do not write programs. To interact with the system, they use query languages like SQL.

1.4.4 Specialized Users

- They are sophisticated users. They write specialized database application programs.
- For example: Computer-aided design system, knowledge base and expert systems, etc.

1.4.5 End Users

- End users are unaware of the presence of database system or any other system.
- These users are called as unsophisticated users who interact with the system through already written permanent programs.
- They are also called as Naive users.

1.5 VIEWS OF DATA

- A database management system is a collection of interrelated files and a set of programs that allow users to access and modify these files.
- A main purpose of a database management system is to provide users with an abstract view of the data.

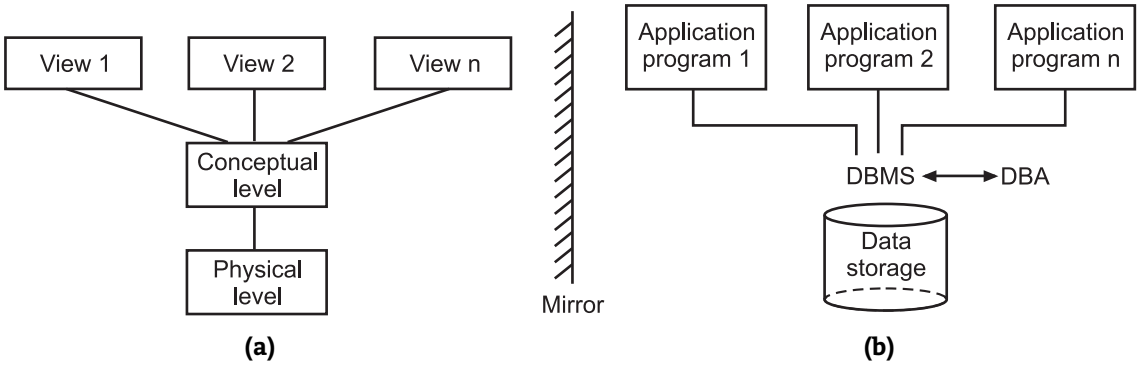


Fig. 1.1: Architecture of DBMS [Note: (b) is Mirror Image of (a)]

- Data abstraction means hiding the implementation details from the end users. DBMS uses the same principle.
- It hides the complex details of how the data is actually stored on the secondary storage device in DBMS.
- There are three levels of data abstraction, Refer Fig. 1.1.

1.5.1 Physical Level

- Physical level is the lower level of Architecture of DBMS.
- This level describes how the data is actually stored in a database. This level defines the data structure used to store the data on secondary storage device.

1.5.2 Conceptual Level

- The conceptual level describes the structure of the whole database.
- The structure of each table is specified in terms of its attributes. Attribute type is specified in terms of logical structure of the database (Fig. 1.2). This level is decided by Database Administrator (DBA).
- This level also describes the relationships between various tables.
- For example,

```
Struct Emp              →   defines data structure for a record in a table.
{
        int emp_id;
        char name [20];  } Shows type of attributes stored.
        float salary;
};
```

Fig. 1.2: Logical definition of database in 'C' Language

1.5.3 View Level

- In multi-user system, many users do not use entire database, but read some fields of it.
- For security purpose DBMS allows to create different views of single table.
- Because of this facility users will have separate logical structure (Fig. 1.3), so original database remains as it is. This access is provided by DBA only.

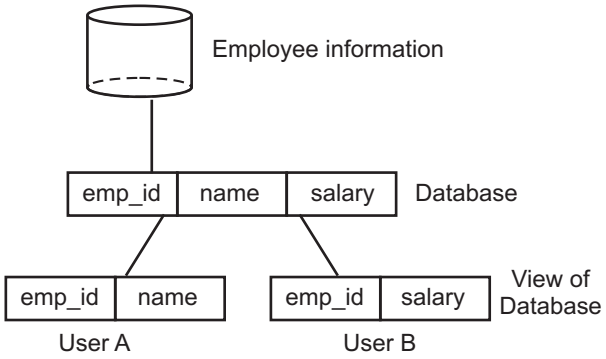


Fig. 1.3: View Level in detail

- At the physical level, employee record can be described as a block of consecutive storage location (For example: word or bytes).
- At the conceptual level, each record is described by a type definition and in view level, different views of the database are defined.
- For example, ATM machines in a bank see only that part of the database that has information on customer accounts.
- They cannot access information concerning salaries of employees.

Data Independence:

- Data independence means is the ability to change the overall logical or physical structure of the data without changing the application programs or views of data i.e. the views created for users does not have any change.
- There are two levels of data independence, physical and logical data independence.

(i) Physical Data Independence:

- It is the ability to change the internal schema without having to change the conceptual or external schemas.
- For improving performance, we need to reorganize some physical files. This requires to implement changes to the internal schema.
- In this, the conceptual schema separates the users from the changes in the physical storage of the data.
- Physical data independence is easier to achieve as compared to logical data independence.