



AKSHAYA INSTITUTE OF TECHNOLOGY, TUMAKURU

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

- **VISION STATEMENT**

To empower the students to be technically competent, innovative and self-motivated with human values and contribute significantly towards betterment of society and to respond swiftly to the challenges of the changing world.

MISSION STATEMENT

- To achieve academic excellence by imparting in-depth and competitive knowledge to the students through effective teaching pedagogies and hands on experience on cutting edge technologies.
- To collaborate with industry and academia for achieving quality technical education and knowledge transfer through active participation of all the stake holders.
- To prepare students to be life-long learners and to upgrade their skills through Centre of Excellence in the thrust areas of Computer Science and Engineering.

Introduction To Database

Data

- The fact and figures that can be recorded in system and that have some special meaning assigned to it.
- Eg- Data of a customer is name ,telephone number , address,product purchased etc.

Database

- A database is a collection of related data items stored at one place.
- Eg- College database stores information about students ,teachers,classes,subjects(All related data).
- A database is nothing but set of data having some relation between them.

Sample Database Structure

- Student Table

Sid	Name	Class	Major
-----	------	-------	-------

Course Table

Cid	Name	Hours
-----	------	-------

Department Table

Did	Name
-----	------

Marks Table

Sid	Cid	Marks	Grade
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Database Management System (DBMS)

- DBMS is a software system that helps in the process of defining, constructing, manipulating the database.
- It is also known as computerized record-keeping system.
- DBMS have become an integral part of the information system of many organizations as it is used to handle huge amount of data.

Need of data in Database system

- Nowadays data have become an integral part of the information systems of many organizations , so it is very important to manage data in system.
- **Data- As a corporate resource**
Data management and control is very important for to the efficient working of the organization.
- **Data Availability**
As most of the organizational functions are computerized .Hence it increases the need to keep data available for user

- **Maintaining Complex data**

As complexity of the data grows complex relationships between them need to be managed in simpler way.

- **Data independence and efficient access.**
- **Data integrity and security.**
- **Concurrent access, recovery from crashes.**

Benefits of

Database System over File System

1. **Redundancy can be reduced**

- As we are using relational approach for data organization ,data is not stored at more than one location.
- Repetition of information can be avoided which in turn saves storage space.

2. **Inconsistency can be avoided**

- With the usage of database ,it is assured that all the users access actual or true data present in the database.

3. Data can be shared

- Multiple users can login at a time into the database to access information.
- They can manipulate the database in a controlled environment.

4. Security restrictions can be applied

- Security is the process of limiting access to the database server itself for some users.

5. Integrity can be maintained

- Through integrity ,one can ensure only accurate data is stored within the database.

Database Architecture

External View 1

SNo	Lname	Branch No
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External View 2

SNo	Fname	Lname	Age	Salary
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Conceptual Model

SNo	Fname	Lname	Age	Salary	BranchNo
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Internal View

```
Create table Employee  
(  
  Sno number,  
  Fname varchar(50),  
  Lname varchar(50),  
  Age number ,  
  Salary number,  
  BranchNo number  
)
```

Database Scheme levels

Schema

- A description of data in terms of a data model is called a schema.
- The description of a database is called database schema , which is specified during database design and it does not expected to change frequently.

Data Independence

- 1) Data Independence can be defined as the capacity to change one level of scheme without changing the schema at the next higher level.
- 2) Types :
 - a) **Logical Data Independence**
 - Logical data independence is a capacity to change the conceptual schema without having any changes to external schema.
 - Eg: We may change the conceptual schema by removing a data item. In this case the external schemas that refer only to the remaining data should not be affected.

b) Physical data independence

- Physical data independence is a capacity to change the internal schema without having any changes to conceptual schema.
- Eg: By creating additional access paths to improve the performance of retrieval .If the same data as before remains in the database ,we should not have to change the conceptual schema.

Relational DBMS (RDBMS)

Introduction

- Was introduced by Dr. E.F.Codd in 1970 .
- Standard for relational databases is published by ANSI(the American National Standard Institute)

Features

- A relational database is composed of many relations in the form of two-dimensional tables of rows and columns containing related tuples known as logical view.
- Tables/Relations are a logical structure which is a collection of 2-dimensional tables consists of horizontal rows and vertical columns.

Advantages

- Use of OOPs concept
- Highly secured data.
- Multiple users can access which is not possible in simple DBMS.
- Supports Data Independence.

Disadvantages

- Inability to handle application areas like spatial databases(eg-CAD) ,applications involving images etc.

Transaction Management

- A transaction is a series of small database operations that together form a single large operation.
- A transaction is started by issuing a `BEGIN TRANSACTION` command.
- Once this command is executed the DBMS starts monitoring the transaction.

Properties of Transaction

Atomicity

- If one part of the transaction fails, the entire transaction fails and the database state is left unchanged.
- Database modification must follow an “all or nothing” rule.

Consistency

- Ensure the database is clean at the end of the transaction .
- Ensures that any transaction that the database performs will take it from one consistent state to another.

Isolation

- Each transaction must remain unaware of other concurrently executing transaction.

Durability

- Ability of the DBMS to recover the committed transaction updates against any kind of system failure(hardware or software).
- Application programs use transaction to execute sequences of operations when it is important that all the operations are successfully completed.
- Eg During the transfer of money between two bank accounts it is unacceptable for the operation that updates the second account to fail.This would lead to the transferred money being lost.It will have been withdrawn from one account but not inserted into the second account.

BEGIN TRANSACTION transfer

Deduct Rs.100 from account A

Add Rs.100 to account B

If no errors then

 Save changes made by this operation

Else

 Delete changes made by this operation

End If

END TRANSACTION transfer