

60CS402 - Database

Management Systems - 3 credits

1 - Introduction and conceptual Modeling

1.1 - Introduction to database, Applications of DBMS

1.2 - Different views of Data, Database System Architecture

1.3 - Database Administrator

1.4 - Entity Relationship Model

1.5 - Relational Model

1.6 - Tuple and Domain Relational calculus

1.7 - E-R Diagram Banking application

1.8 - Hierarchical Model

1.9 - Network Model

2 - Relational Model

2.1 - Structure Query language introduction

2.2 - Data Definition language

2.3 - Data Manipulation language - Select with where and order by

2.4 - Select using aggregate function

2.5 - Select using group by and having clause

2.6 - Sub query and views

2.7 - triggers

2.8 - Function and procedures

2.9 - Normalization

3 - Data storage and Indexing concepts

3.1 - Fixed and Variable length record structure

3.2 - File organization

3.3 - RAID

3.4 - Static and Dynamic Hashing

3.5 - Indexing - Single, Multilevel & Mutable

3.6 - Dense and Sparse Index

3.7 - B and B+ tree Index

3.8 - Heap organization

4 - Transaction Management

4.1 - Transaction concept and ACID properties

4.2 - Transaction States and schedule

4.3 - Conflict and view serializable
schedule.

4.4 - Recoverability

4.5 - Concurrency control introduction - Share lock,
exclusive lock, compatibility Matrix,
upgrade and down grade

4.6 - Two-phase and Time stamp based
locking protocol

4.7 - Recovery Technique - Immediate update

4.8 - Recovery Technique - Deferred update

5 - Current Trends

Object Oriented Database, Distributed Database
concept and types - Distributed Transaction;
Two-phase commit protocol - D., Threephase-
Distributed data storage - Data mining
concept and Applications - classification &
clustering Algorithms - Data warehouse
concept & pre processing - Data warehouse
Schema Models - Designing three dimensional
OLAP cube with its operations

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Data

The collection of raw facts that have not been organized.

Data lacks its contacts and meaning.

Eg : text, numbers, images / multi media.

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Information

Information is the processed and organised form of data.

That has contacts, relevants and the meaning for the specific purpose.

Eg ; customer Ram ph no is

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This is the processed data & gives specific information to the relevant data.

Database :

Database is a structured collection of inter related data and stored in a systematic manner for efficient retrival and management of data.

DDL comments - create, delete

DML comments - manipulate the data.

DB + DBMS = DB system.

Syntax

D) CREATE :

create table table-name (

column1 datatype ,

column2 datatype ,

column n datatype

);

Ex :

```
CREATE TABLE EMPLOYEE (
    empid INTEGER PRIMARY KEY,
    name TEXT NOT NULL,
    dept TEXT NOT NULL
);
```

E) ALTER :

ALTER TABLE table-name ADD column-name
datatype;

Ex :

```
INSERT INTO EMPLOYEE VALUES(0001,  
'John Doe', 'Sales');
```

F) TRUNCATE :

TRUNCATE table table-name ;

G) DROP :

DROP TABLE table-name ;

H) RENAME :

RENAME TABLE table-name to
new-table-name ;

6) COMMENT

single-line comments
-- Line1 ;

Multi-Line comments :

/* Line1
line2 */

DML commands :

7) INSERT

INSERT INTO table-name (column1, column2 ..)
VALUES (value1, value2);

NOTE : column names are optional

Ex : INSERT INTO EMPLOYEE VALUES (0001, 'Abi',
sales');

2) SELECT

SELECT column1, column2,
FROM table-name

[where condition];

Ex : SELECT * FROM EMPLOYEE where
dept = 'Sales';

3) UPDATE

UPDATE table-name
SET column1 = value1, column2 = value2,
WHERE condition;

Ex : UPDATE EMPLOYEE SET dept = 'Sales'
WHERE empId = 0001;

4) DELETE :

DELETE FROM table-name where condition;

Ex :

DELETE FROM EMPLOYEE WHERE empId = 0001;

- DBMS advantages :
- * to handle large amount of data
 - * Data consistency
 - * Data Integrating
 - * concurrency control - read - write is allowed
read - read → It allows inconsistency error
 - * Data security
 - * Data sharing
 - * Backup & recovering
 - * Data controlization
 - * Eliminate Duplication of the data
The problem should be eliminate of the duplicate data.
- Q) Difference between file processing & DBMS ?
- * Inconsistency, consistency
 - * Data should be accuracy of the data,
Integrating should be maintain

DBMS :

Database Management System is a software application that enables user to interact with database facilitate creation maintenance manipulation of data base which allows users store retrieve to create update, delete and manage data efficiently.

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Management of data includes defining structure of the data which is used.

Database system applications :

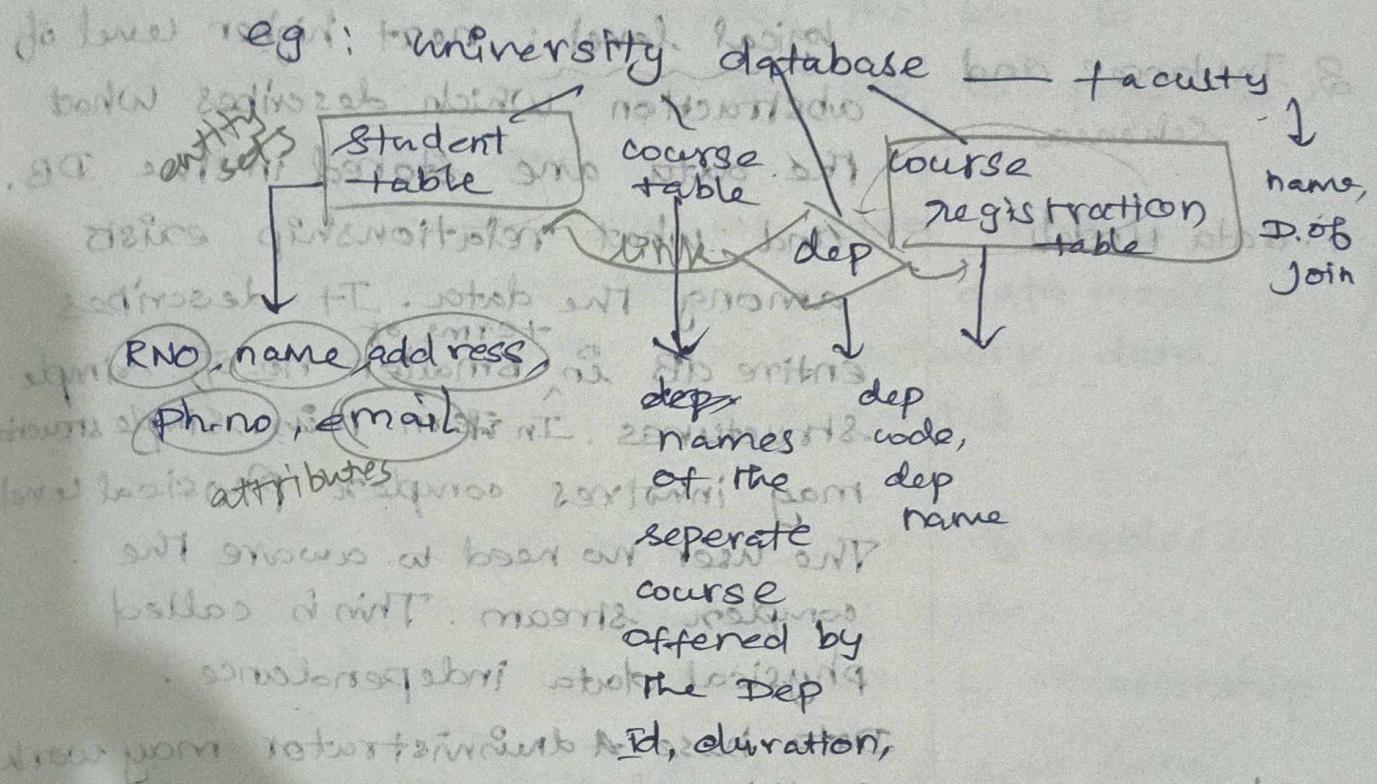
- Analysing the past history of the customer to increase the income.
Eg : Bank, any enterprises

Database is a collection of stored in the data which is highly valuable.

It allows the multiple users at the same time.

It contains large amount of data.

The dB applications are structured data



- * Q: disadvantages of file processing It can be overcome by
- ① * difficulty in accessing the data. using DBMS
- * data isolation (data scattered in many files)
- * each file may be in diff file format .
- * Inconsistency (not updated data)
- * consistency .
- * Integrated problems (data should be accurate)
- * atomicity problems
- * concurrent access issues
- * security problems. (can't be given restricted conditions)
- * redundancy (same value in many files)

1. compare file processing with DBMS.

2. views of data (or)
data abstraction
2/4/ big Q:

3. Instances and schema

4. data model

There are 3 level of data abstraction
Physical Level:
This is the lowest level of abstraction which describes how the data is actually stored.

This physical level describes complex loc level data structure in detail

Logical Level: next higher level of abstraction which describes what the data are stored in the DB, and what relationship exists among the data. It describes entire dB in terms of smaller no. of simple structures. In turn these simple structures may involves complex physical level.

The user no need to aware the complex stream. This is called physical data independence.

Data base administrator may work in this level, management and

View Level: The highest level of abstraction, describes the only part of the entire data base.

It simplifies the level of interaction with the database system.

The collection of info stored in DB at one movement is known as instance. The database changes over the time. (because we update; delete data)

The overall design of the database is called schema. Schemas change frequently

The data model provides the way to describe the design of the DB at physical, logical & view level.

There are [4] types of data model.

Relational data model, E-R data model, object based data model, network data model and hierarchical data model.

Relational data model

- * data represented in form of tables.
- * DB/DB+ contains collection of table.
- * table represents both data & relationship among the data.
- * describes data at logical & view level.
- * each table has new name
- * arrow in a table represents relationship among set of values.
- * each row in a table called tuple.
- * Relation used to refer a table

* tuple refers to a row - attributes refers to a column of a table.

Relation/Table is a set of tuples.

Domain :

it means for each attribute of an relation there is a set of permitted values, called domain of that attributes.

eg: month - attribute takes only values

Set of possible months - Domain

The domain of all attributes are to be atomic.

E-R Entity Relationship model

(big problem based question)

used to collection of entities and relation of the entities.

It is used to design overall structure design of database.

It is a conceptual database.

Entity :

entity is a thing or real world / concept they

Object : That is ~~lasting~~ distinguishable from other object.

Each person in a university is a entity.

student takes course. course is entity.

instructed course → instructed entity

each entity has set of properties

each attribute can be described as characteristics
↓
characteristic attribute

eg : entity → student

attribute - marks, roll no

Set of entities of the same type that share the same attributes / properties

Collection of student - entity set.

student - entity.

instructor → set of people who teaches us

Relationship

It is an association among entities.

Students enrolls course.
↓ ↓
entity relationship