Unit-I

DBMS: Database Management Systems

Introduction

1, Data: Data is a collection of raw facts and figures
2, Database: database is a collection of interrelated data.
3, DBMS: Database management system is a collection of interrelated data and set of programs that can Access that system.

Database System Applications:

1, Banking and finance: All transactions
   i, credit card transaction: generation of monthly statements
   ii, finance: storing information about holding and sales.
2, Universities: registration, grades
3, Reservation systems: reservations, schedules
4, Telecommunications: keeping records of calls made, generating monthly bills.
5, Enter price information:
   i, sales: customers, products, purchases
   ii, Accounting: payments, receipts, account balance, assets.
   iii, Human Resources: employee records, salaries, tax deductions
   iv, Manufacturing: production, inventory, orders, supply chain
   v, Online Retails: order tracking, customized recommendations

Purpose of Database systems

* Drawbacks of using file systems to store data

(OR)

DBMS VS file system.

1. Data redundancy and inconsistency: Multiple file formats, duplication of information in different files
2. Difficulty in accessing data: Need to write a new program to carry out each new task.
3. Data isolation: Multiple files and formats.
4. Integrity problems: Hard to add new constraints or change existing ones
5. Atomicity of updates: failure may leave data base in an inconsistent state with partial updates carried out. Tranfer of funds from one account to another should either complete or) not happen at all 6. "concurrent access anomalies": 7. security Problem.

Table.1
```
Create table student (
    HTNO int primary key,
    Name varchar (20),
    address varchar (20));
```

Table.2
```
create table facuty (
    fid int primary key,
    NAME varchar(20),
    fsub varchar (20),
     HTNO int,
     foreign key (HTNO) References student (HTNO));
```

Syntax:

1, create table tablename (fieldname datatypes());
2, Alter table

Table: 1

Create table employee(
eid int primary key,
ename varchar(20),
esal varchar(20));

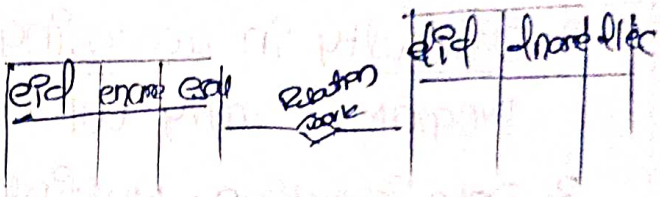


Table: 2

Create table deptement(
did int primary key,
dname varchar(20),
dloc varchar(20),
eid int,
foreign key(eid) References emp(eid));

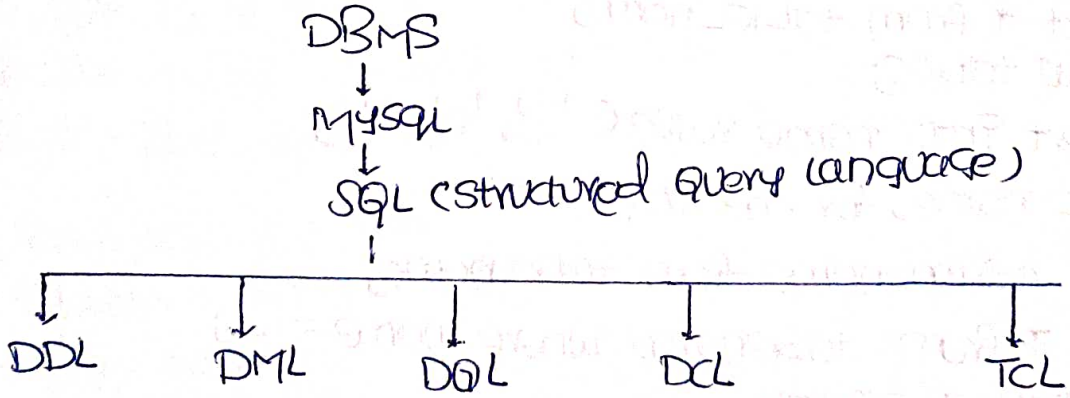
1, Student → HTNO, Name, address, Grade, Phone
2, faculty → fid, fname, fsubject, fdept
3 Dept → DeptId, Dname, DLOC
4, course → CID, cname, cduration, cfee
5, Lib → LibID, Lname, no.of books, NO OF values.

-Author of DBMS ? "Raghu Ramakrishna".

1. DBMS — DATA BASE MANAGEMENT SYSTEMS
2. DBMS was invented by "E.F. codd"
3. "Data" is a collections of Raw facts and figures
4. "Database" is a collections of interrelated data.
5. DBMS → Database mangement system is a collection of interrelated data of set of programs that can be access in the system.

-Application of DBMS?

1. Banking & finance: All transaction
2. Universities
3. Reservation system
4. Hospital system
5. Telecommunication
6. Enter price Information
7. Sports



1. DDL = Data defination language } → Main
2. DML = Data manuplation lange
3. DQL = Data query language
4. DCL = Data control language
5. TCL = Transaction control language

Command in DDL

1. create
2. Alter → Add, drop. → Modify
3. drop
4. Truncate
5. Rename

Commands in DML :

1. Insert
2. Update
3. delete.

Commands in DQL :

1. Select

* create database ajay;
* use ajay;
* create (function) table;
* select * from table_name;
* show tables;
* Insert into name value(' ', ' ', ' ');
* desc name; for checking table
* select column_name from table_name;
* select * from tablename where name = —;

To delete a column:

alter table table_name

→ drop column column_name;

Student

HT NO	Name	Address	phno.

```
create table student(
    HTNO varchar(10),
    Name varchar(10),
    Address varchar(10));
```

Alter

* Alter table student add (phno, int);
* Alter table student modify (phno, varchar(10));
* Alter table student drop address;
* drop table student;
* truncate table student;
* rename table student to stu1;
* update table_name set column = ' ' where column = ' ';

1. tuples = records = rows
2. attributes = fields = columns
3. entity = table
4. retrive = displaying.

To delete a particular column
alter table student drop phno;

To delete a particular row
delete from table_name where eid = '58';

Adding of phno
update table_name set phno = ' ' where name = ' ';

To checking the data type
desc table_name;

1. The two types of insertion.

i, insert into table_name values (' ', ' ');

this is academic level

ii, insert into table_name (column_name) values (' ', ' ');

2. Delete from table_name where column_name = ' ';

for a particular row deletion.

3. Deletion from table_name where column_name = ' ' and column_name = ' ';

for deleting two particular rows

DQL: (select command is temporary)

1. select * from emp;

display's all records (or) attributes

2. select id from emp;

only shows id column

id
1
2
3

3. select * from emp where id=1;

this shows displays only its particular row

4. select id from emp where id=1

this display only a particular value

5. select * from emp where sal <(or)> 40;

this points the rows which is greater (or) lesser than 40

6. Select * from emp where sal between 30 and 50
→ this gives the between the values and including the first & last value
not between print the value which is not between the value

7. Update table_name set column_name = 'updating value' where column_name = 'updating row';

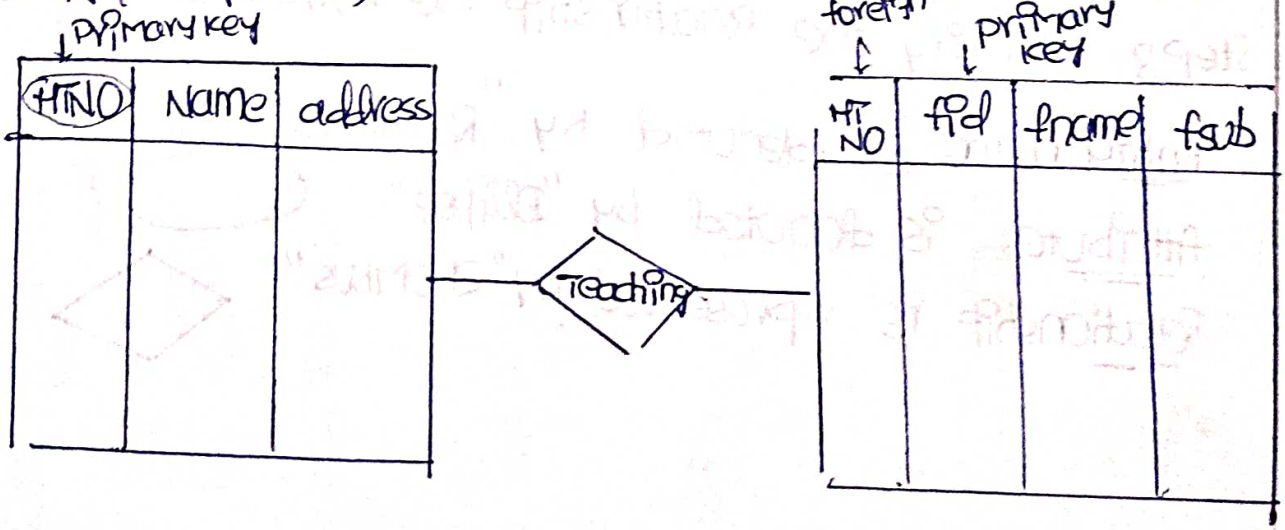
Primary key:
It is a key which is unique & NOT NULL

foreign key:
It is a key. for relate from one table to another table.

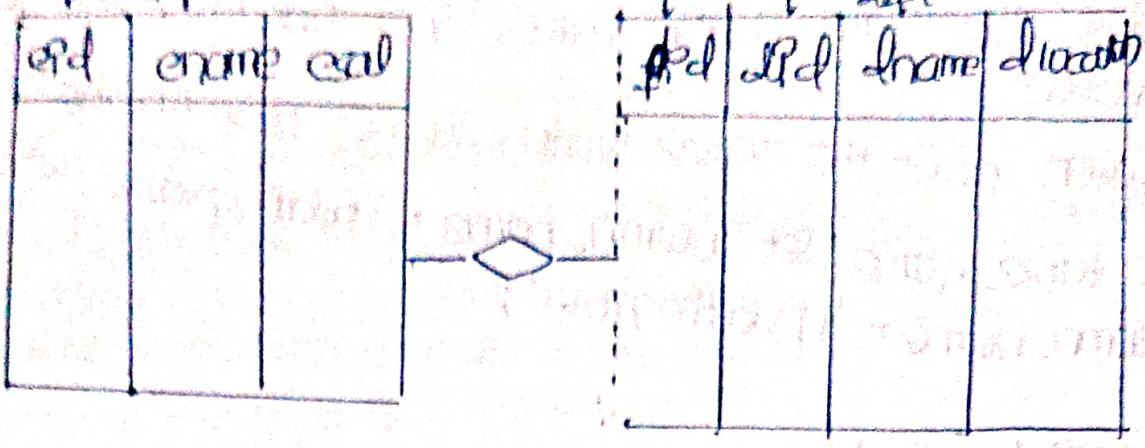
```
Create table student(
HTNO int primary key,
Name varchar(20),
address varchar(20));
```

```
create table faculty(
fid int primary key,
Name varchar(20),
fsub varchar(20),
HTNO int,
foreign key(HTNO) Reference student (HTNO));
```

Ex:1



Eg: FK emp



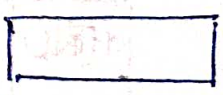

```
Create table emp (
 eid int primary key,
ename varchar(20),
 esal int);

Create table dept(
 did int primary key,
 dname varchar(20),
 dlocation varchar(20),
 did int,
 foreign key (eid) Reference emp(eid));
```

2. E-R Model diagram:

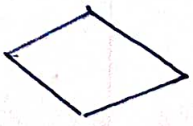
Step1: Identify the major Entity

Step2: Identify the Attributes

Step3: Identify the Relationship the Entities.

Entity name is denoted by "Rectangle" 

Attributes is denoted by "Ellipse" 

Relationship is represented by "Rhombus" 

Aggregate-functions:

find out the Max, Min value in a table, we use

* Aggregate-functions - Return only single value.

there are 6 Aggregate functions.

1. Min()- used to find Min value
2. Max()- used to find Max value
3. Avg()- used to find Avg of a particular attributes
4. sum()- used to do SUM of the value in particular attribute
5. count()- used to know total values in a attributes.
   It is count in column level value.
6. count(*)- used to count the value (or) records in row level value.

Syntax:

1. select max(col_name) from tablename;
2. select min(col_name) from table_name;
3. select SUM(col_name) from table_name;
4. select Avg(col_name) from table_name;
5. select count(col_name) from table_name; [col level count]
6. select count(*) from table name; [Row level count]

Sub Query: Query with in the query is known as sub query.

To get all Max values in the table, we use sub query.

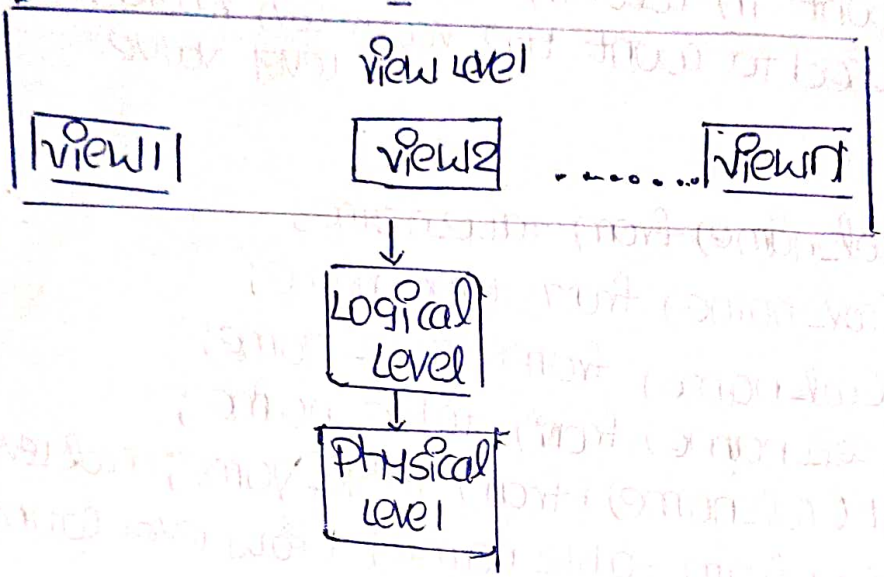
** select * from table_name where col_name =
(select. max(col_name) from table_name);

1. select is used for temperory
2. update is used for permant.

View of Data?

1. A data is a collection of interrelated data and set of program that allow users to access and modify these data.
2. Major purpose of a database system is to provide users with an abstract view of the data.
3. that is,

Data Abstraction (Hiding the data)

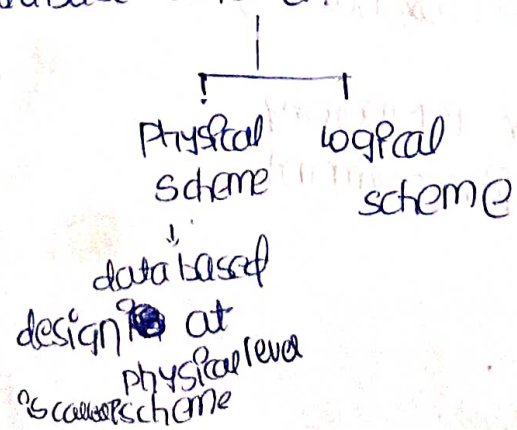


permission based on the user information access the data

Instance: the collection of information stored in the database at a particular movement is called an instance of the database.

similar to types and variable in programming language

Schema: the overall design of the database is called the database schema.



Data Models

Data Model
Underlying the structure of a database is the data Model.

2 A collection of conceptual tools for describing data, data relationships, data semantics and consistency constraints //

Relation Model
the relational Model uses a collection of tables to represent both data and the relationships among those data Each table has Multiple columns, and each column has a unique name, Tables are also known as relations.

2 Entity-Relational model: the Entity-RelationshipCE-R) data model

Keys:
P.K → It is a key, which is unique, NOT NULL.
f.k → It is a key, which is used to give relationship
Composite key → we assume n number of primary key.
Candidate key → It is a key, with is a subset of primary key
Super key → It is a key superset of primary key
Alter key → It is a key Alternative of primary key.

∵ key field is also know primary key

∴ without PK is caled weak Entity

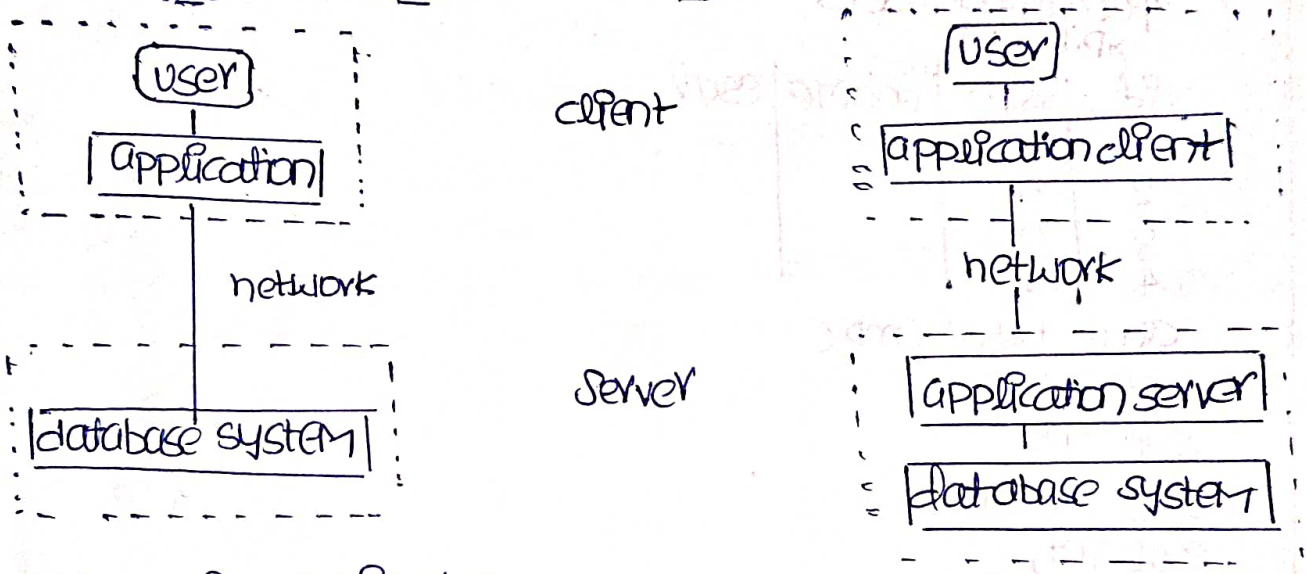
3 object-Based Data model.
4 semi

Entity

Database Architecture?

1. the Architecture of database systems is greatly influenced by the underlying computer system on which the database is run
2. Database system can be
   i. centralized
   ii. client-server
   iii. parallel (multiple processors and disks).
   iv. Distributed

Database Application Architectures?



a. two-tier Architecture.

b. three-tier Architecture

Database users and Administrators?

1. A primary goal of a database system is to retrieve information from and store new information into the database.
2. People who work with database can be categorized as database users or database administrators.

Database users and user Interfaces?

1. there are four types of database system users different field by the way the except to interact with system
2. Different type of user interfaces have been designed for the different types of users.

Database users?

1. Naive users
2. Application programmers
3. Sophisticated users
4. Specialized users

eid (P.K)	SSNO (P.K)	ename	esal
1	1		
2	2		
3	3		
4	4		

```
create table emp(
 eid int
 SSNO int
ename varchar(),
 esal int,
 primary key(eid,SSN));
```

* composite key is a key we can have 'n' number of primary key
* candidate key is a key which is subset of primary key.
* super key is a key which is superset of primary key.
* Alternate key is a key which is alternate key of primary key.

Create table emp as select eid,ename from emp;

Create table emp as select * from emp where eid=1;

DBMS-IV

Transaction Management & Concurrency control

Note:

1. check account balance
2. Insufficient balance is present request for withdrawal
3. Get the Money
4. calculate Balance = Balance - 100
5. Update the account balance with new balance

Ex: Transaction to Tranfer $50 from Account A to account B.

1. read(A)
2. A := A - 50
3. write(A)
4. read(B)
5. B := B + 50
6. write(B)

* A transaction is a unit of program execution that accesses and possibly updates various data items

Two main issues to deal with:

1. Failure of various kinds, such as hardware failure and system crashes
2. concurrent execution of multiple transactions.

ACID properties

1. Atomicity →
2. consistency
3. isolation
4. Durability.

1.

2. Consistency: