DBMS

* A database mangement system is a collection of interrelated data & set of a programs to acess those data.

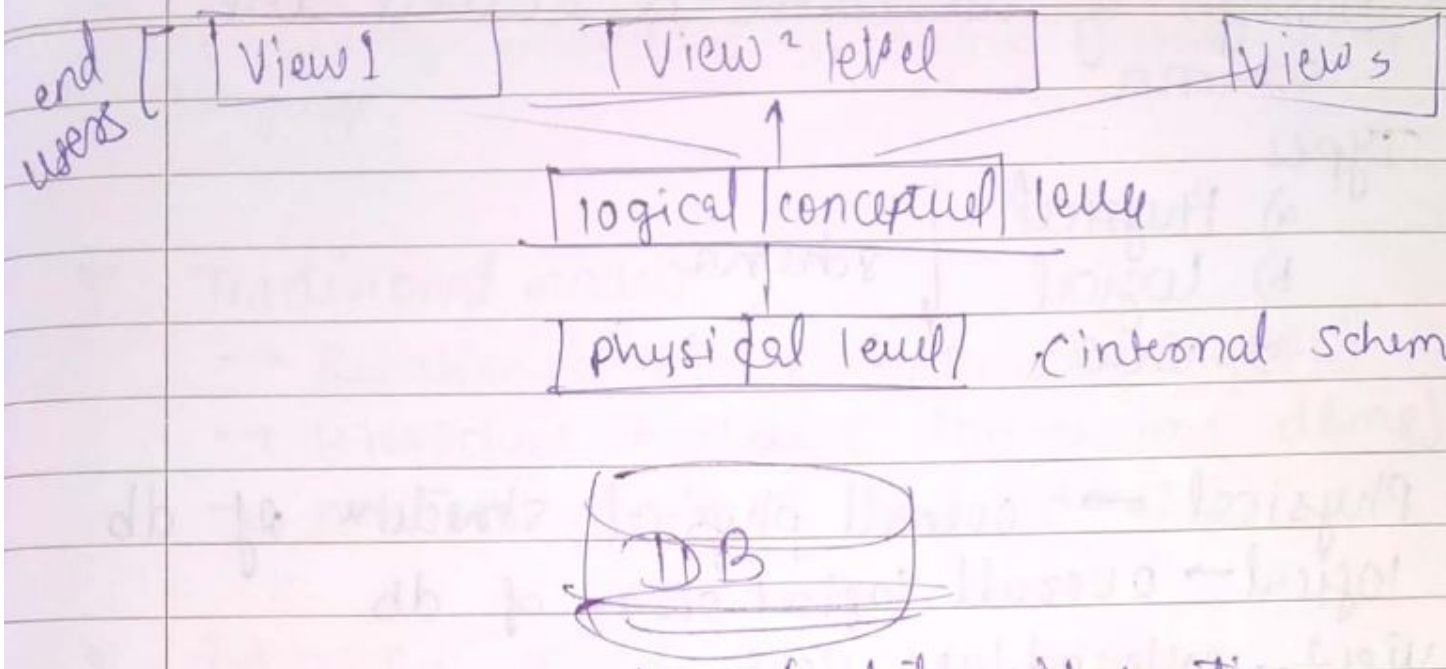
* Applications
  1) Banking (transactions)
  2) Airlines (booking)
  3) University (grades)
  4) Human resource (employee records)
  5) Multimedia db
  6) Geographical info system (GIS)
  7) Data warehouse

* Drawbacks of mig files
  → data redundancy & inconsistency
  → difficulty in data access
  → concurrent access by multiple user
  → Atomicity of updates

To overcomes this ↑ above we use Database

* Database Benifits
  1) controlling redundancy / flexible / Better private policy
  2) Providing backup & recovery
  3) Providing multiple user interface
  4) Enforcing integrity constrain
  5) Providing storge sufficient query processing

* Architectural for database Systems



levels of data Abstraction

1) Physical level :
describe how record is stored

2) Logical level :
describe data stored in database & relationship among data

3) View level :
application program hide details of data type. (for security purposes)

* disadvantage of dbms
1) cost high
2) complexity
3) Performance

* Instances & Schema

→ Design of database is called the schema

Types
- a) Physical
- b) Logical
- c) View

} schema

a) Physical → overall physical structure of db
b) logical → overall logical stru of db
c) view → external/use view
Separate for individual user

→ Instance: Collection of information stored in the database at a particular moment is called as instance of the data base

* Data model:

It is a collection of conceptual tools for describing data, data relationships, basic operations & consistency constraints

Types
- a) High level / conceptual
- b) Representational / implementation
- c) low level / Physical

} data model

Relational models mostly use (table structure)

* SQL
→ most widely used commercial language
→ To be able to compute complex fun° SQL is usually embedded in some higher-level language.

* Traditional models
→ Relational models (Oracle, MySQL)
→ Hierachical models (ibm's ims dbms)
→ network models (ids & idms)

* Advanced mods
→ Object oriented mode (ObjectStore)
→ Object relational model (oracle, versant)
→ semi structured data (XML markup lang)

* DDL: data definition lang
To specify database schema

* DML: data manipulation lang
To express database queries & updates
→ Retrieval → deletion
→ insertion → modification

* Types:
a) Procedural DML:
require user specify what data are needed & how to get those data.
b) Declarative dML:
require user to specify what data data are needed without specify how to get those data.

* Query:
It is a statement requesting the retrieval of information

* DPL:
→ consistency constrains
→ integrity constraints
→ domain constrains
→ assertions
→ authorizations

* Data independence of DBMS.
→ it is the property that helps you to change the db schema at one level of a database system without requiring to change schema at higher level.
→ it helps u to keep data separated from all programs that makes use of it.

Types.
a) Physical] data
b) Logical] independence

a) Physical
→ helps to separe conceptual level from physical level
→ compared to logical inde it is easy to achive physical data inde

Ex: technique
1) Modifying fill organization in database

b) Logical

→ the ability to change the conceptual schema without chaging external views

Ex:
1) Merging 2 records into 1
2) Breaking existing record into 2 or more

Logical	Physical
1. difficult to retrieve data	1. Easy
2. concerned with conceptual schema	2. Internal Schema
3) Ex: Add / modify / delete new attribute	3) Ex: chage in compression technique, hashing algorithms, storage device.

* Imp of date independence

→ improves quality of data
→ dbs maintanace becomes affordable
→ improves db security
→ improves states which is undamaged / undividedable

* E-R models

→ entities : collection of objects
: set of database

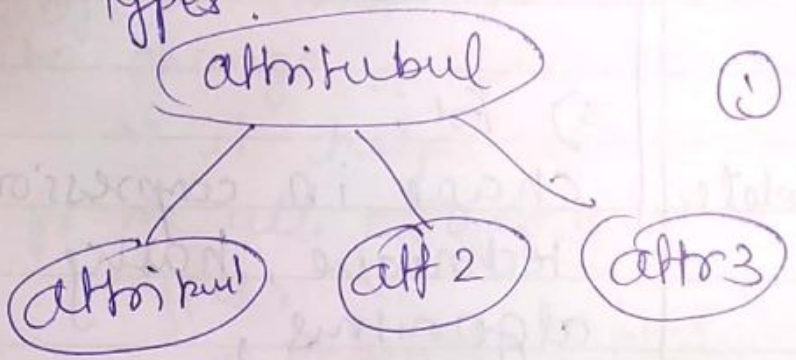
→ lines → relationship

→ e-R diagram represents overall logical structure of schema

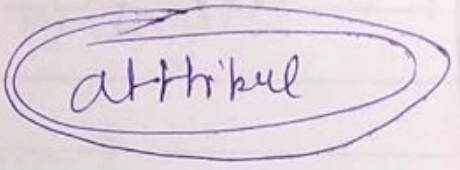
→ entity : entity type is an abstraction
: independent existance

→ attribute : each attri has domain from which values from this atti are drawn

Types :



① composite attribute



② multi-valued attribute

relationship : degree 2
: most relapshp sets in dbs are binary
:
:

* Mapping cardinality

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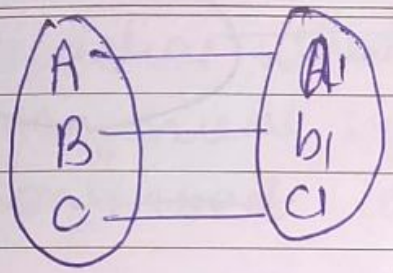
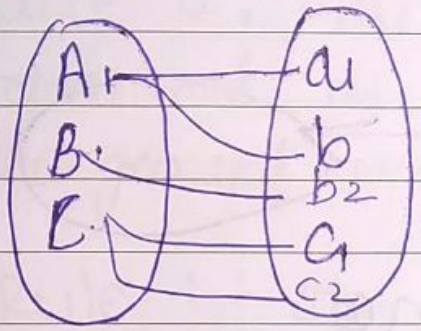
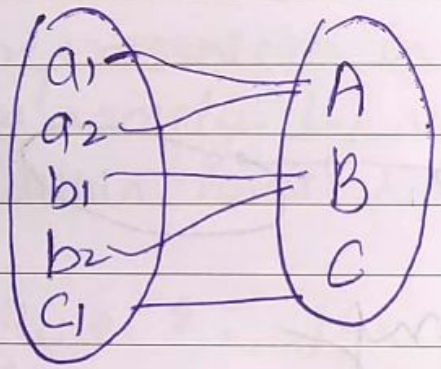
1. 

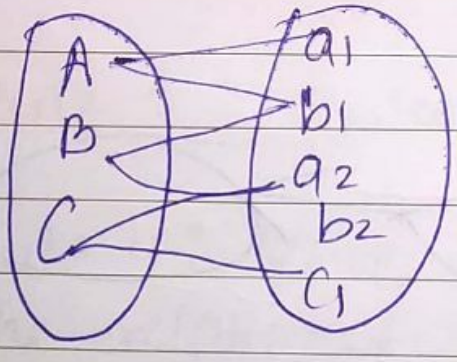
one - to - one

2. 

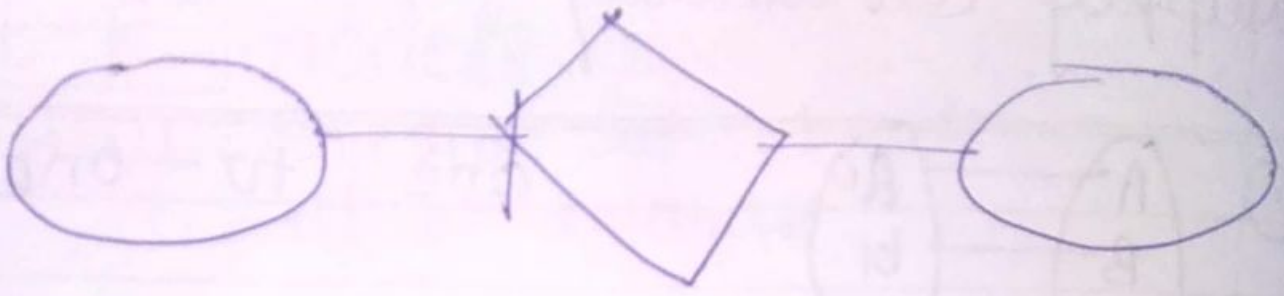
one - to - many

3. 

many - to - one

4. 

many - to - many

1. 

Many - TO - many

2. 

many - to - one

3. 

One - to many

4. 

One - to one

5. 

specification / generalization

* Codd's Rule:

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are the set of 13 rules designed to define what is required from a database mangement system in order for it to be ~~continued~~ considered relational i.e. Rdbms

0) Rule 0: The system must qualify as relational, as a database, & as an mangement system.

1) Rule 1: The information rule:
All info in the database is to be represented in one & only one way, ~~n~~ namely by values in column positions within rows & table.

2) Rule 2: The guaranteed access rule:
All data must be accessible.

3) Rule 3: Systematic treatment of null values

4) Rule 4: Active online catalog based on the relational model:

5) Rule 5: The comprehensive data sublanguage rule:

6) Rule 6 : The view updating rule
All views that are theoretically updatable must be updatable by the system.

7) Rule 7 : High-level insert, update & delete:

8) Rule 8 : Physical data independence.

9) Rule 9 : Logical data independence:

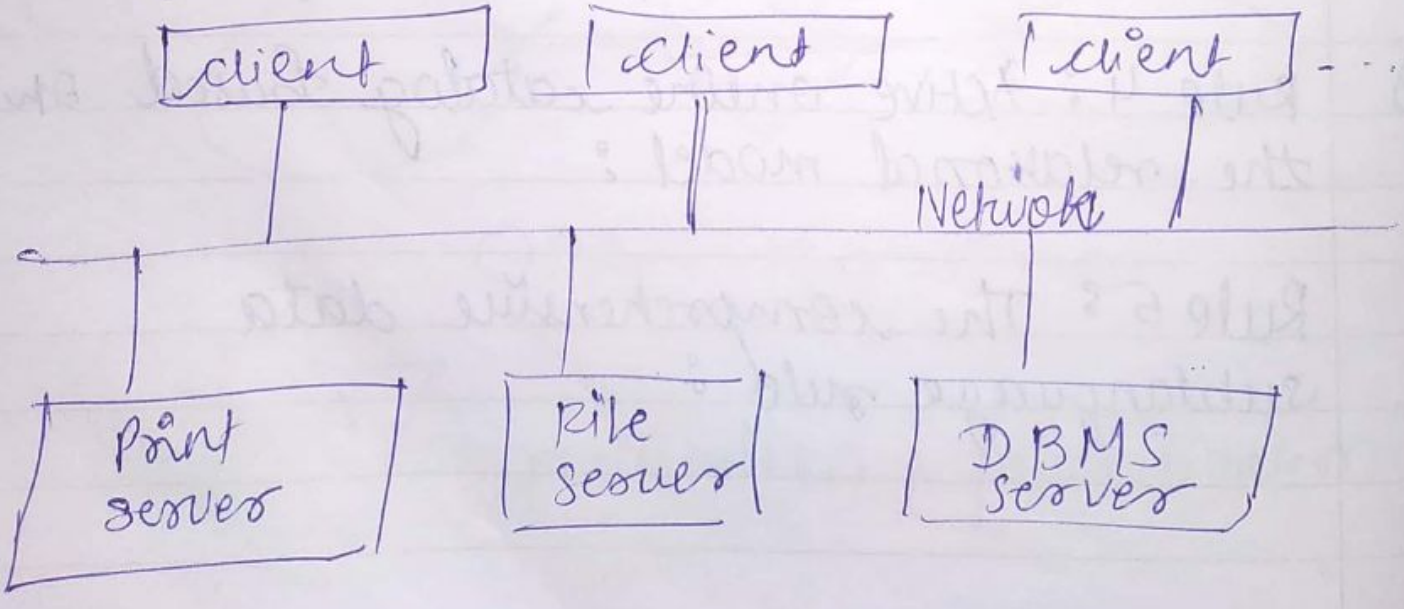
10) Rule 10 : Integrity independence

11) Rule 11 : Distribution independence

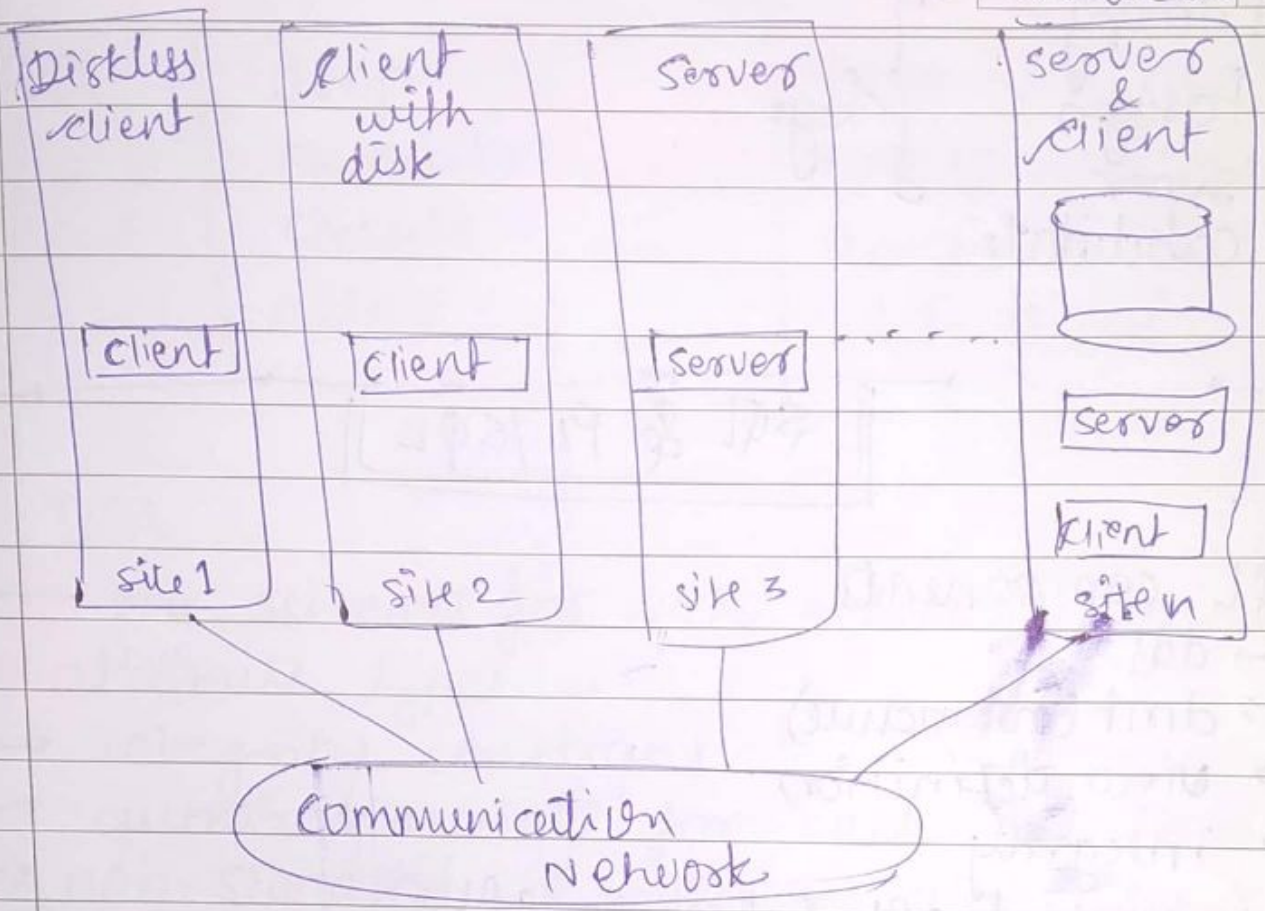
12) Rule 12 : The non subversion rule

Physical centralized architecture

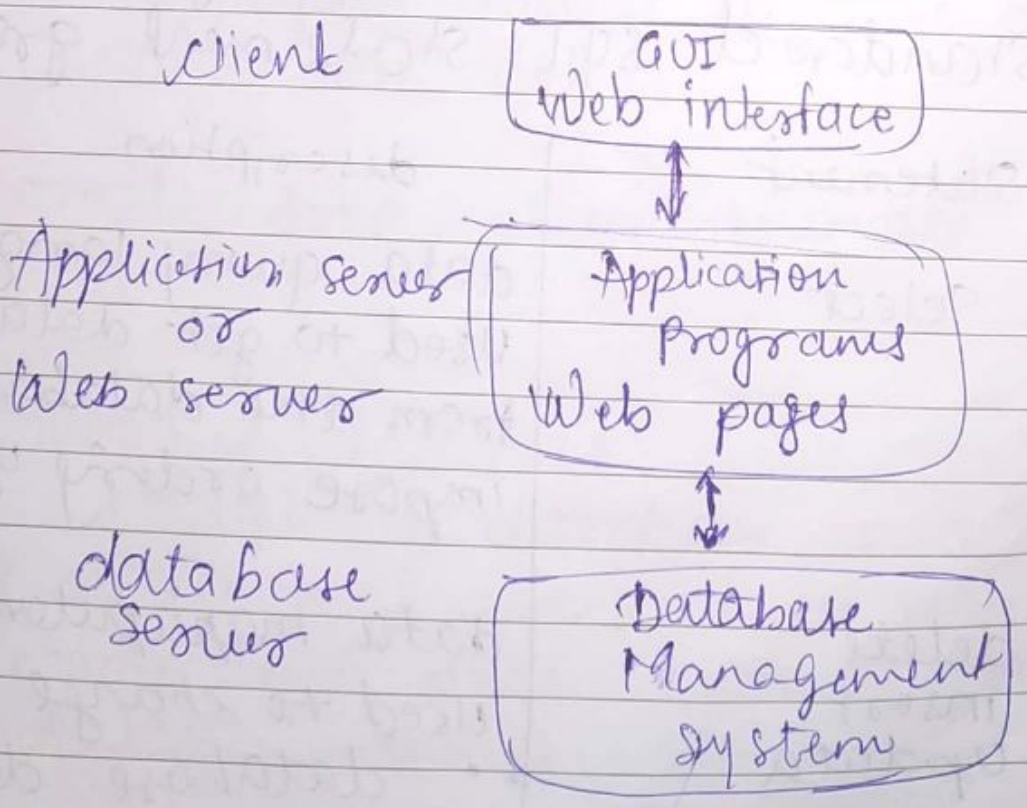
1) Logical two-tier / client-server archi



2) Physical two-tier client-server architecture



3) Logical three-tier client/server archi



* keys

① Primary
② Foreign
③ super
④ candidate

} keys

SQL & PL/SQL

SQL components
→ ddl
→ dml (interactive)
→ view definition
→ integrity
→ embedded SQL & dynamic SQL
→ authorization

SQL : Structured Query language

Some standard SQL statement groups

Group	Statement	description
① DQL	select	data query lang used to get data from the database & impose ordering upon it
② DML	delete insert updata	data manipulation lang used to change database date

③	DDL	drop truncate create alter	data definition lang used to manupulate structure & definitions

1) DDL
→ the schema for each relation, including attribute types.
→ integrity constrains
→ authorization info for each relation.
→ non-standard sql extensions also allow speaticion of
1) the set of indices to be maintied for each ratichs
2) the physical storage structure of each relation on disk.

create, drop, alter, truncate

* Managing database.
Mysql, a database is a collection of objects that are used to store and manipulate data such as tables, databases views etc.

MySQL > create database (if not exist) database_name;
MySQL > show databases;
MySQL > use database-name;
mysql > drop database (if exists) database_name;

* Numeric data types
  - Tinyint
  - SMALLINT
  - BigINT
  - MEDIUMINT
  - FLOAT
  - INT
  - DOUBLE
  - DECIMAL

* string data type
  - char (fixed length non-binary string)
  - varchar (a variable length non-bin string)
  - Tinyblob (very smal BLOB (binary large object)
  - Text (small non-binary string)

* date & time data types
  - → date : CCYY-MM-DD
  - → time : hh:mm:ss
  - → datetime : ccyy-mm-dd hh:mm:ss
  - → timestamp : ccyy-mm-dd hh:mm:ss
  - → year : CCYY or YY format spatial data types

CC - is 2 digit century

* create table command

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create table <table_name>
(
columnName1 datatype(size) constraint,
:
columnNameN datatype(size) constraint,
Table level constraints
);

Ex.

```
create table student
(
   sid char(20),
   name char(30),
   age integer,
   gpa number(5,2).
);
```

* Data constraints.

primary → automatically insures not null
foriegn
Null
Not null
unique
check
default

ALTER

⊙ Add

Alter table tablename add (column datatype, column datatype)

⊙ Modify

Alter table table_name modify (column datatype, ... column date_type)

⊙ drop

Alter table table_name drop (column name)

ALTER

- sql > alter table emp add primary key (empno);
- sql > alter table student add (ph_no number(10));
- sql > alter table student modify roll_no integer(10);
- sql > alter table emp drop address;

✱ drop table

- e.g DROP student
- drop definition and data also

✱ Truncate table table_name;

- E.g Truncate table student;
- delete all the data from table but not

* DML
→ insert
→ update
→ delete

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Insert

- single row insertion
  → insert into student (sid, name, login)
  values (null, 'smith', 'smith@pict')

- Multiple row
  → insert into student values (1,'abc'), (2,'xyz')
  →

- single & default all insert
  → insert into student values (530, 'smith'..)

DELETE

- Delete from table-name
  where (condition);

- delete all rows
  delete * from student;

- delete specific rows
  delete from student
  where name = 'smith';

UPDATE

- Update table name
  Set columnname = newvalue, [...]
  where columnname operator value ;

SQL basic structure

- General structure : select, all / distinct, *, as, from, where
- Comparsion : in, between, like, %
- output : into table / cursor to file (additive), to printer, to screen
- display order : order by, asc / desc

Basic Query Structure

- A typical query has the form :

  select $A_1, A_2, \ldots A_n$
  from $r_1, r_2 \ldots r_m$
  where p

  Ai represent attribute
  Ai represent a relation
  P is predicate

* Select Clause
→ List the attributes desired in the result of a query.

* Where clause
→ specifies condition that the result must satisfy
→ corresponds to the selection predicate of the relational algebra

* From clause
→ from clause lists the relations involved in the query
→ corresponds to the castelsan product operation of the relational algebra

DBMS – 2

Installig Mysql

Mysql is an open-source database management syemten.

1) sudo apt update
2) sudo apt install mysql-server
3) configuriy My-SQL
3) sudo mysql_secure_installation
   ↓
   set password for root there
   ↓
4) mysql -u root -p
5) mysql > create user 'username'@'host' identified with authentication_plugin by 'password';
6) Grant privilege on database.Table to 'username'@'host';

OR

7) mysql > Grant all privileges on *.* to 'username'@'host' with grant option;
8) Flush privileges; (clear chached memory)

DBMS-3

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study sqlite database & its uses & intallation.

1. sudo apt-get update
2. sudo apt-get install sqlite3
3. sqlite3 // check terminal will give you promt of sqlite
4. .open (filname).db // Goes to this folder & creates a database
5. .databases // check whether database created or not.
6. .quit // To quit
7. .help // for help

Implementation.

1. $ sqlite3 mydatabase.db
2. .databases
   main : /home/sakshi_dalvi/mydatabase.db
3. > create Table myTable (id integer, name varchar(10));
4. > insert into myTable values ("1", "ONE");
5. > select * from myTable;
6. > select * from myTable where name = "ONE";
7. > select name from myTable;
8. > select id from myTable;

(9) select rowid, id, name from myTable;

(10) delect from myTable where rowid = 2;
select rowid, id, name from myTable;

(11) UPDATE
alter table myTable add column college text;
select rowid, id, name, college from myTable;
(Table madhe navin column add honar college nav aselda, but tyat null values ashnar)

(12) SET
Update myTable set college = "PICT" where rowid = 1;
(college hya column madhe jaun rowid jithe 1 asel tithe PICT add honar

rowid	Name	college
1	A	Pict
2	B	Null
3	C	Null

(13) sqlite > .quit

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2) Structured Vs unstructured [Ex.]
3) ordbms Vs RDBMS
4) Ordbms or Rdbms
5) Limit Query ?

7) Auto increment allows a unique key to be generate automaticaly when new record inserted.

5) Where	Having
1) can be used without Group by Clause	1) can't be used without group by clause.
2) cannot contain aggregate fun"	2) Can contain aggregate fun"
3) Select, Update, delete, Statement..	3) Having only used with select statement
4) where implement in	4) Implement in column operation.

1) DDL → DDL (create, Alter, drop, Truncate, Rename, Comment) | DML (select, insert, update, delete, modify) | DCL (grant, revoke)

2) Views in SQL are considered as virtual table. A view contains rows & columns

```
create view view_name as
  select column1, column2 ....
  from table_name
  where conditions ;
```

3)

Unique	Primary Key
1) accept Null value also	1) Will not accept null value
2) Multiple unique key can be there	2) only 1 primary in a table

4) Foreign key is refred as the referential integrity constrain

5)

Alter	UPDate
~~DML~~ DDL	DML ~~DD~~ D
used to modify, delete add	to update entire record
change is table structure	change in data of inside table.

	Structured	Unstructured
1)	It is quantitative	It is qualitative
2)	Searchable data clearly defined	It is in native format
3)	Stored in data warehouse	Stored in data lake
4)	Easy to search & analyze	Needs more work to process & understand.

* duplicate values:
  1) Group by clause then count.

* ~~Import~~ import use to data into our db

=)

ORDMS	RDBMS

=) limit clause is used to select statement to constrain the number of rows to return.

Triger syntax:

```
create triger [trigor name]
    [befor | after]
    [inser) delete | update}
    on (table name)
      ( for each row]
        [triger body]
```

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* Types of db
  - Mysql
  - Oracle
  - Squel
  - Amazon aurora

* Tuple = row

* data sparsity is how much data we have for a particular dimension / entity of model.

* between keyword:
  is used to retrieve values within a range in select, insert, update, delete.
  Betn value 1 & value 2;

* Table:

* Schema: contains tables, metadata, data dictionary. for operational purpose.

ACID → atomicity, consistency, isolation, durability.

Drop	Truncate
1) DDL command	1) DDL
2) In this view of table doe.nt exist	2) View exist
3) Drop comnd is quick to perform but give rise to complications	3) This is faster than drop
4) To remove table definition & contents	4) To delete all rows from table..
5) drop definition & data also	5) delete data from table but not definition.

* Check constraint:

create table table_name (... constraint constraint_name check (predicate)).

mysql	sqlite
1) developed by C & C++	only in C lang
2) Client-server architecture	serverless
3) Can handle multiple connection simultaneously	4) can handle one connection at a time.

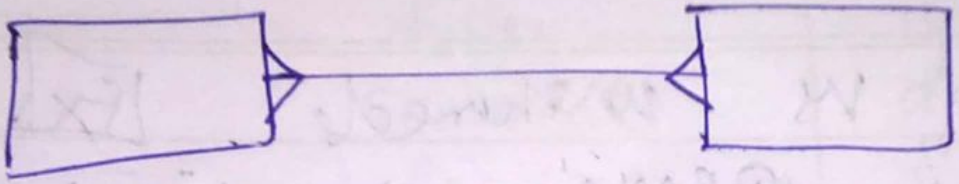
* control structure:
Use to control flow of execution. It is a like a program that analyses variables & chooses a direction in which to go based on parameter.

$$comm > \frac{60}{100} sal$$

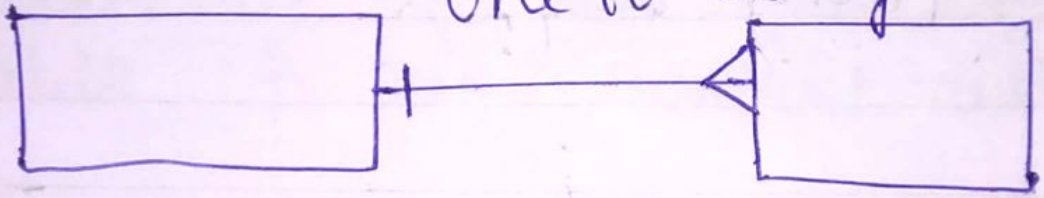
$$comm > 0.6 * sal$$

Sakshi Sondur

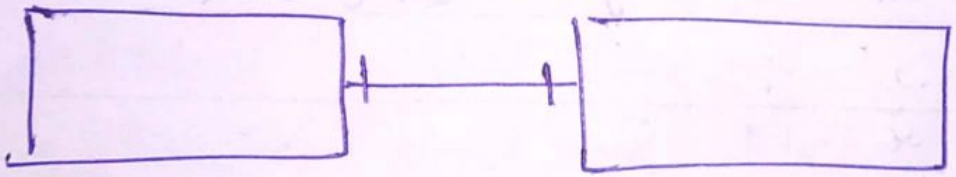
Many to many

1. 

2. one to many



3. one to one



Many to one