1 Dec 2022   DBMS

roo CRUDE — Create Read update Delete Execute

Defn - ① Database

* Intro -
- The Database magenegment system is required *(Defing)* as software system that allous usen to define Create, manted and control access to the database.

- DBMS makes it possible for end usered to Create, read, update, delete in database. *(data)*

Avant Advantages - DBMS
① Reducing data Redundancy (Repitition)
meaning → The file base DBMS contained multiple files that work stored in many different location in a system.
→ because of this there must work sometimes multiple copies of same file which lead to data Redundancy.
→ This is preveted in Database as there is a Signal database and any change in it is reflected imenditty.
→ Because of this there is no change of encounter duplicate data.

② Sharing of data
→ In a database, the users of the database can share the data among themself.
→ There are various levels of authorization to access the data and consequently the data can only be shared based on the currect autherisation protocals to be followed.

→ ③ Data integrity -
→ - It means that the data is accurate and consistenat in the database.
→ It is very important as there multiple databases in a DBMS and it is visible to multiple users.
→ so, it is necerany to ensured that data is correct in all the databases and for all the users.

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④ Data security -
- It is a vital (important) concept in a database.
- only authorized user's should be allow to access the database and there identity should be authenticated using the username and passwd.

⑤ privacy -

⑥ Backup and recovery
- DBMS automathecaly take care of the backup and recovery.
- The users don't need to backup data periodicaly bt tt because this is taken case by DBMS and it also restores the database after a crash or d system Palier.

motherboard
magnetic disk   handel - change is tha
access   No, changing
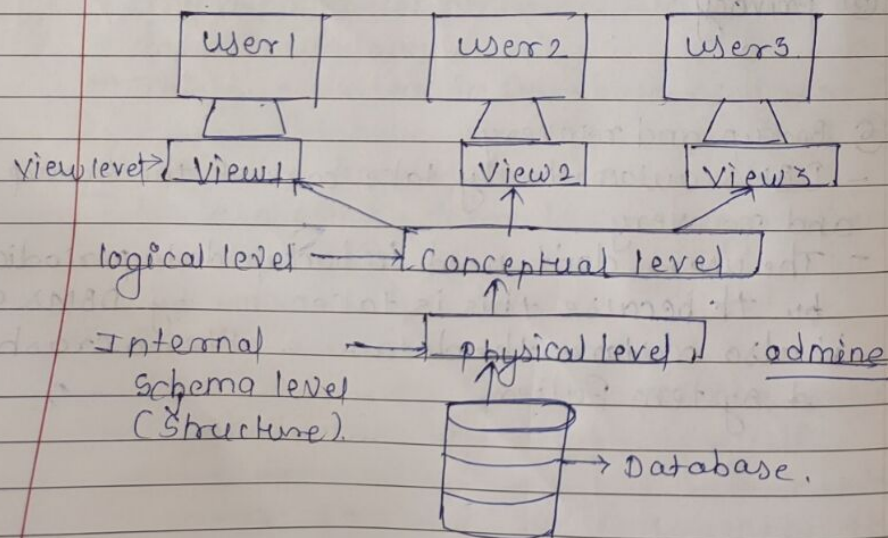
* Abtraction in DBMs -

- It is refers to the processes of hiding in. irrelavant details from the user.

For ex:-
- If we te want to access any mail from our gmail there we don't know where the data is physically stroed. that is the data is present in india or USA.
- We are not afer cosinedabout this thinks and hence location of data and data models are irrelvant to us, and in data abtraction we do this only.
- There are 3 Levels of data flabtraction,
  1) View level.
  2) conceptual
  3) physical level.

view level → View1

logical level → conceptual level

Internal Schema level (Structure). → physical level → admine

→ Database.

1) View level :-
- This level tell's the application how the data should be shown to the user.
eg:-
  - If we have a login id and passwd in a university system. then as a student, we can view our marks, free structure. etc.
- but the faculty of university have different view. we will have options like edit marks of student enter attendence etc
- so both the student and faculty have a differ view, and by view so the security and privany of the system is maintied.

2) Conceptual level (logical).
create updation
- It tell's how the data is acutaly stored and structured

eg:-
  - If we use the relational model for storing the data we have to store the data of the student using columns in a student table naming it as the stu name, age, roll no, etc. these
- We have to define all this at level by creating the database hence the blueprintes is created at conceptual level.

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3) physical level -
- The physical level tell's us that where the data is actualy stored
Data Base admin
- The DBA decide that which data should be kept at which particular disk drive, how the data has to be fragmented, where it has be stored etc.

- They also decide if data has to be centralised or distributed hence + it depends on a DBA how he or she manages the database at the physical level.

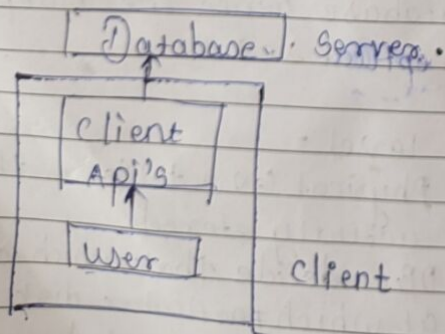* DBMS Architecture {
    1 tier
    2 tier
    3 tier
}

- It depends on how users are connected to the database to get their request done
- There are 3 types of DBMS Architecture
  ① 1 tier.
    - The database is directly avalable though the user.
    - It means that user can be directly handle the DBMS and used it.
    - It is use for development of the local application, where programers can directly communicate with the database for quict response.
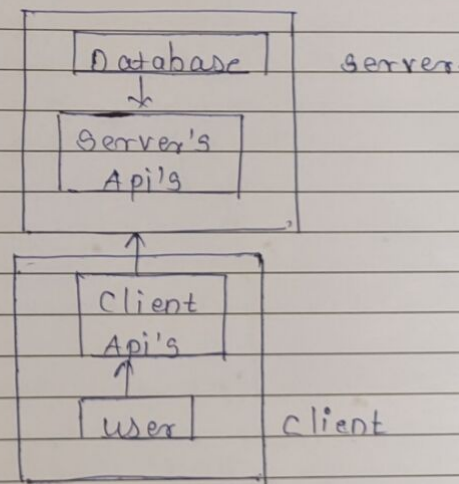
  ② 2 tier
    ⓓiagram -

[Database] Server.
```
    ┌──────────────┐
    │  [Database]  │  Server.
    │ ┌──────────┐ │
    │ │ client   │ │
    │ │ Api's    │ │
    │ └──────────┘ │
    │    ↑         │
    │ ┌──────────┐ │
    │ │ user     │ │  client
    │ └──────────┘ │
    └──────────────┘
```

- It is same as the basic client sever Architecture
- Here the client & directly communicate with the data at the server side. for this interaction Api's like sql, oracal, ODBC, JDBC
- The server side is responsible to provide the functionaties like quering processing & transaction managment.

③ 3 tier -
  ⓓiagram -

```
    ┌────────────────┐
    │ ┌──────────┐   │
    │ │ Database │   │  server.
    │ └────┬─────┘   │
    │      ↓         │
    │ ┌──────────┐   │
    │ │ Server's │   │
    │ │  Api's   │   │
    │ └──────────┘   │
    └────────────────┘
           ↑
    ┌──────────────┐
    │ ┌──────────┐ │
    │ │ Client   │ │
    │ │ Api's    │ │
    │ └──────────┘ │
    │    ↑         │
    │ ┌──────────┐ │
    │ │ user     │ │  client
    │ └──────────┘ │
    └──────────────┘
```

- It contains another layer between the client and server
- In this architecture, client can not be directly communicate with server.
- end user has not idea about the existence of of the database beyond the application server
- The 3 tier architeture is used in case of large web application
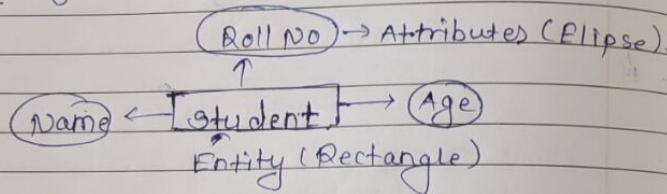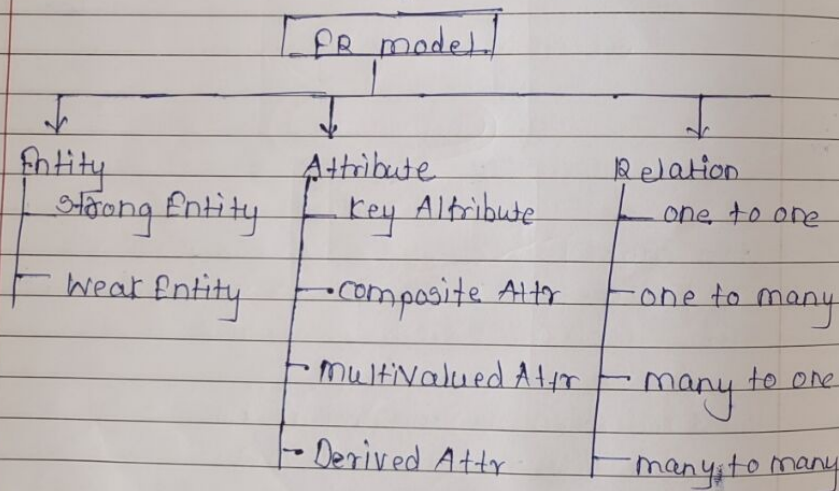
3 Dec 2022   Entity - Relationship Model
                    (ER Model)

- It is a high level data model
- This model is use to define the data elements, & relationship for a specified system.
- In ER modeling, the database structure is protted as a diagram called an ER diagram

Fg :-

Roll NO → Attributes (Ellipse)
            ↑
Name ← Student → Age
        Entity (Rectangle)

* Components of ER diagram.

ER model

Entity	Attribute	Relation
Strong Entity	key Altribute	one to one
Weak Entity	• composite Attr	one to many
	multiValued Attr	many to one
	Derived Attr	many to many

* Entity -
    - It is an object, class, person or place It can be represented in rectangles.
    - There are 2 types of Entity
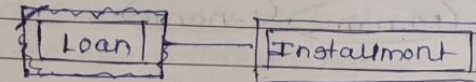depends ← ① Weak Entity
on another
entity

eg - tax money and busT.

- An entity is depends on the another entity is called as weak entity. It doesn't contain any key Attributes on it own.
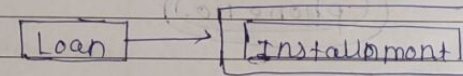- It is represented using ⬚ ba double rectangle.

eg :-

Loan —— Installment

② strong entity.
    - An entity is doesn't depends on the another entity is called as strong entity.
    · It contain key Attributes on it own.
    - It is represented using □ sigmal rectangle.

eg :-

Loan → Installment

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* key Attributes -
- The Attribute is use to di discribe the property of an entity
- elipse is used to resp represent the Attribute
- It is use to represent the main characteristic of an entity. it represents the primary key It is represented by an elipse with the test en undrline

model NO   student
    ↑   ↑
[car]   ⊗ [school] → blackboard
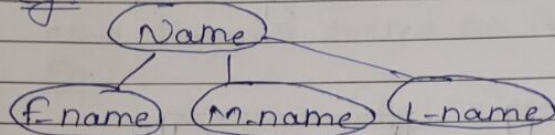   ↑   ↓
colour   principle

2) Composite Attribute -
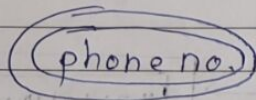- The Attribute that composite of many other attributes is known as a composite Attribute.

eg:-

```
        (Name)
         /   |   \
 (F-name) (M-name) (L-name)
```

3) multivalued Attribute -

1 person many mobile No

- An attribute can have more than 1 value are known as multivalued Attribute. it is represented using double oval.

eg:-
→ A student can have more than 1 phone.No

```
        (phone no.)
```

4) Derived Attribute -
- An attribute can be derived from other attribute. it known as the derived attribute it is is represented as the dash ellipse

eg:-
A person's age changes over time and can be derived from other attribute such as birthdate

```
        (Birth.date)
             |
           (age.)
```

* Relationship -
- It is used to discribe the relation between entities, it is represented using ◇ diamonde
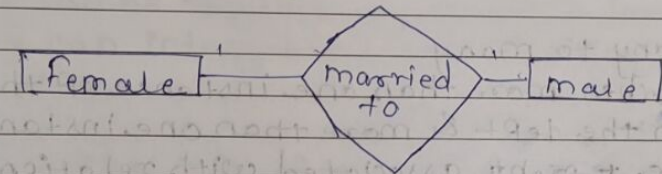
* Types *.

1) one to one - Number
- When one instance of an entity is associated with the relationship there it is known as one to one relationship.

1 country
1 capital

eg:-
A Female can marry to one male, and male can marry to one Female.
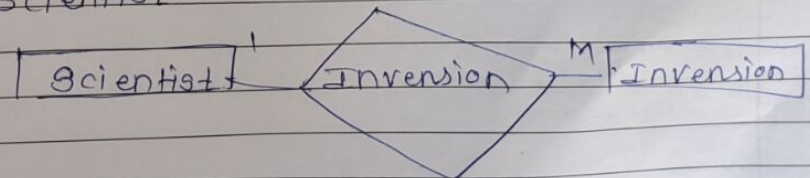
```
[Female]—[married to]—[male]
```

2) One to many
- When only one instance of the entity on the left it is, & more than 1 instance or an entity on the right associated with the relationship then this is known as one to many
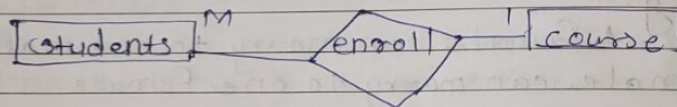
eg:-
scientist is one and inventions are many but the invention is done by only specific scientist.

```
[Scientist]¹—(Invention)—ᴹ[Invension]
```

3) many to one
   → When the ~~more than~~ only one instance of the
   entity on the right & more than instance
   of entity on the left is ~~associated with relation.~~ called as many
   to one relationship.
   eg:-
        Student and Rolles for only one course.
        but course can have many student.

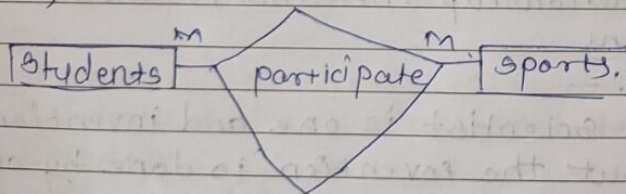[Students] M ⟨enroll⟩ 1 [course]

4) many to many
   → When more than one instance of the entity
   on the left & more than one instance on
   the & right associated with relation is called
   as many to many relationship.
   eg:-
        1) Students ~~are~~ was participate in more than
        one sports.
        2)

[Students] M ⟨participate⟩ M [sports.]

Diff entity vs Attribute

Entity	Attribute
1) An entity is a distinguishable real world object that exist	It discribes the elementary feature of an entity.
2) A row in a database table structure is an entity	It, A column header of a database table is an attribute.
3) It can be tangible or can intangible entity.	It is involed in forming a key.
4) Eg:- the info. of a signle student in a student table represents an entity	eg - name, roll No, etc; that forms the complete info. of the a student represent attribute.

Name;
Bool,
id,