1) With the help of a diagram explain the different levels of data abstraction. (3 marks)

- Physical level

It describes how a record is stored.

- Logical level

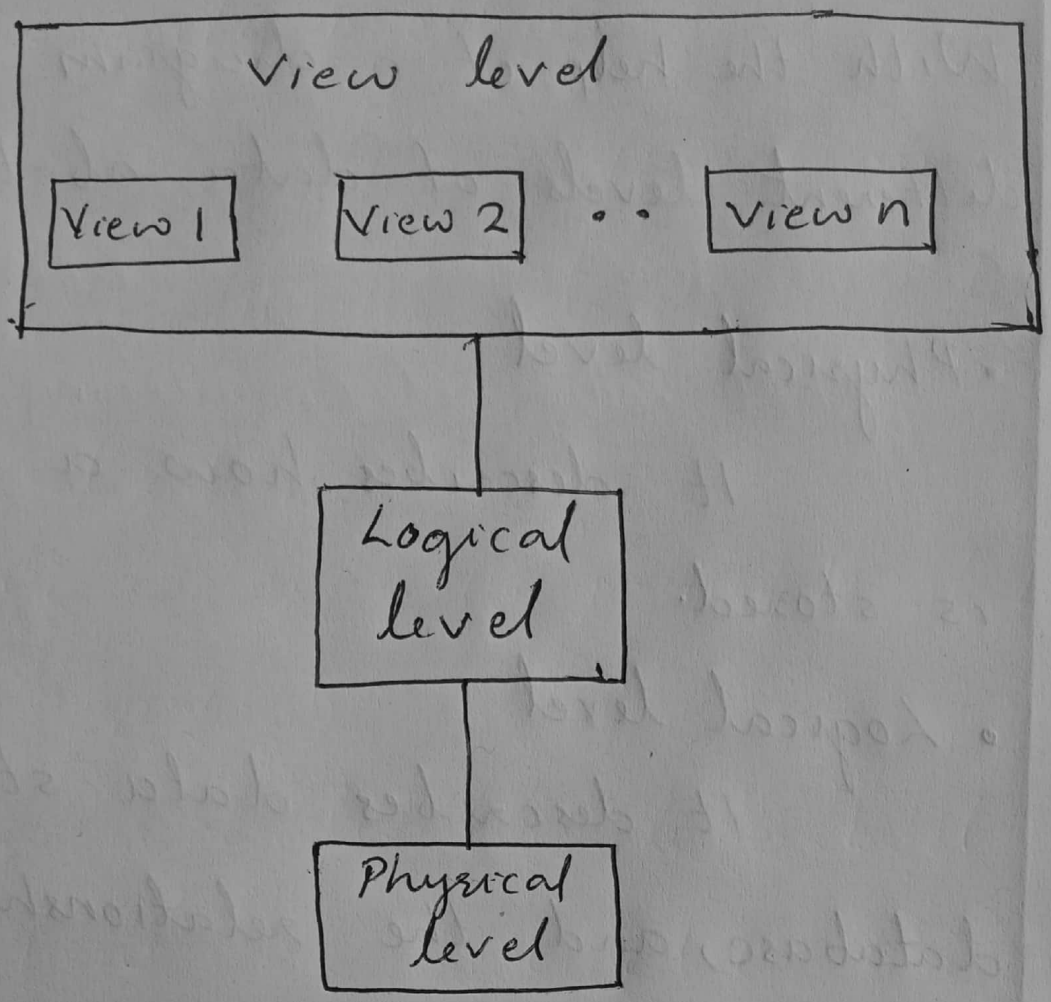
It describes data stored in database, and the relationships among the data.

```
type customer = record
        name : string;
        street : string;
        city : integer;
    end;
```

- View level

Application programs hide details of data types. Views can also hide information (eg:- salary) for

security purposes.



2) Write briefly on any six advantages of database approach over conventional file based approach. (6 marks)

- Data redundancy and inconsistency

Multiple file formats, duplication of information in different files.

- Difficulty in accessing data.

Need to write a new program

to carry out each new task.

- Data isolation – multiple files and formats.
- Integrity problems

Integrity constraints (eg:- account balance > 0) become part of program code.

Hard to add new constraints or change existing ones.

- Atomicity of updates.

Failures may leave database in an inconsistent state with partoal updated carried out.

eg:- transfa of funds from one account to another should either complete or not happen at all.

- Concurrent access by multiple users

Concurrent accessed needed for performance.

Uncontrolled concurrent accesses

can lead to inconsistencies.

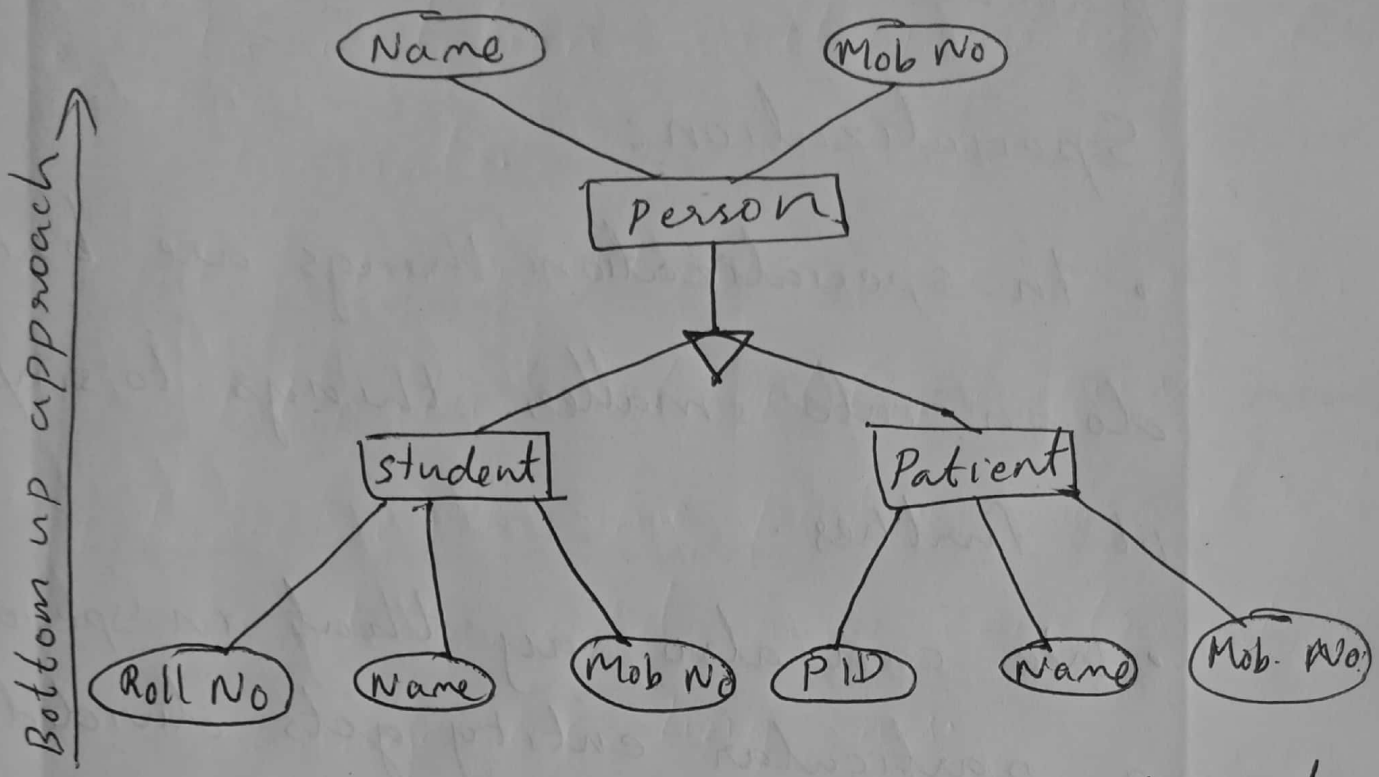
- Security problems.

3) How specialization differs from generalization? Explain with the help of an ER diagram? (6 marks)

Generalization:

- It works on the principle of bottum up approach.
- In Generalization lower level functions are combined to form higher level functions which is called as entities. This process is repeated further to make advanced level entities.
- In the generalization process properties are drawn from particular entities and thus we can create generalized entity.
- We can summarize Generalization process as it combines subclass to

form superclass.

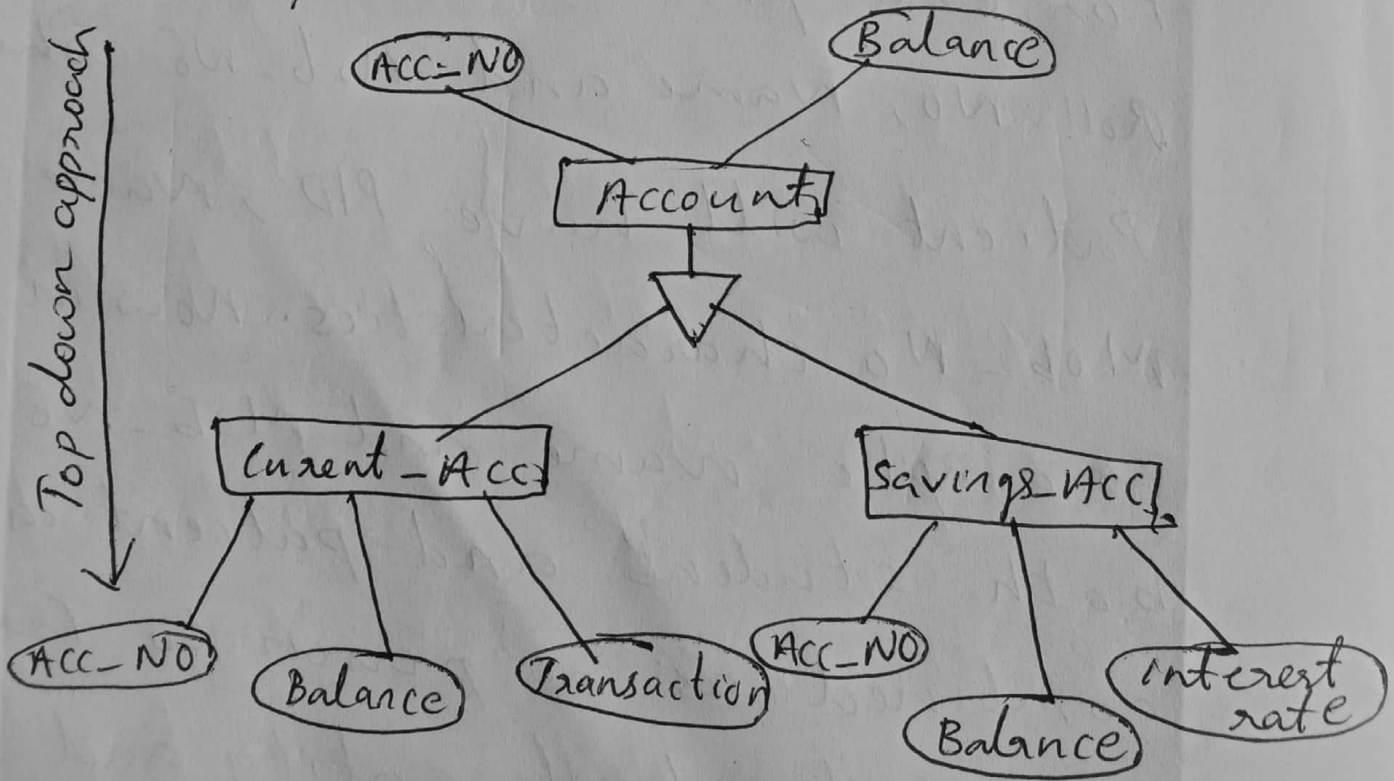


Consider 2 entities student and patient. These 2 entities will have some characteristics of their own. For example student entity will have Roll_No, Name and Mob_No while Patient will have PID, Name and Mob_No characteristics. Now in this example name and Mob_No of both student and patient can be combined as a person to form one higher level entity and this

process is called as Generalization process.

Specialization:

- In specialization things are broken down into smaller things to simplify it further.
- We can also say that in specialization a particular entity gets divided into sub entities and it's done on the basis of it's characteristics.
- Also in specialization inheritance takes place.



Consider an entity Account. This will have some attributes consider them Acc_No and Balance. Account entity may have some other attributes like current_Acc ~~may have~~ and savings_Acc. Now Current_Acc may have Acc_No, balance and transactions while Savings_Acc may have Acc_No, Balance and interest rate. hence forth we can say that specialized entities inherits characteristics of higher level entity.

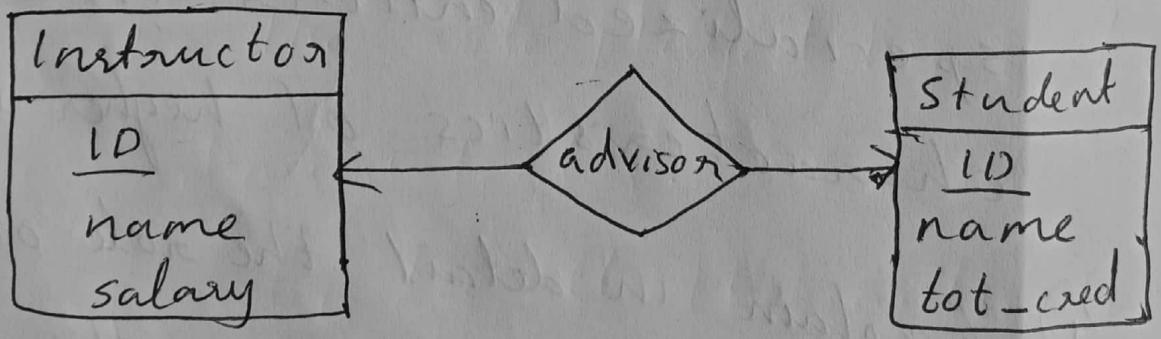
4) Explain in detail the role of E-R diagram in expressing the overall logical structure of a database graphically. (6 marks)

We can express the overall logical structure of a database graphically with an E-R diagram.

It's components are :-

- rectangles representing entity sets.
- eclipses representing attributes.
- diamonds representing relationship sets.
- lines linking attributes to entity sets and entity sets ~~to~~ to relationship sets.

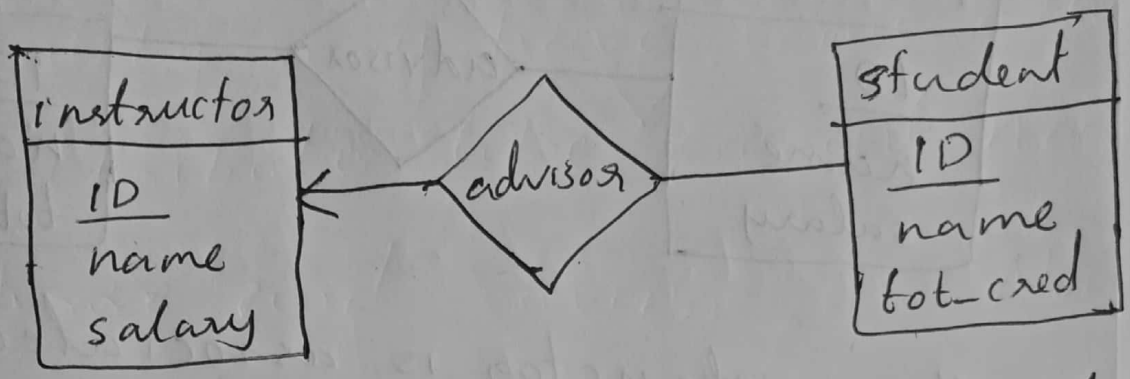
→ One-to-One



- A student is associated with atmost one instructor via the relationship advisor.

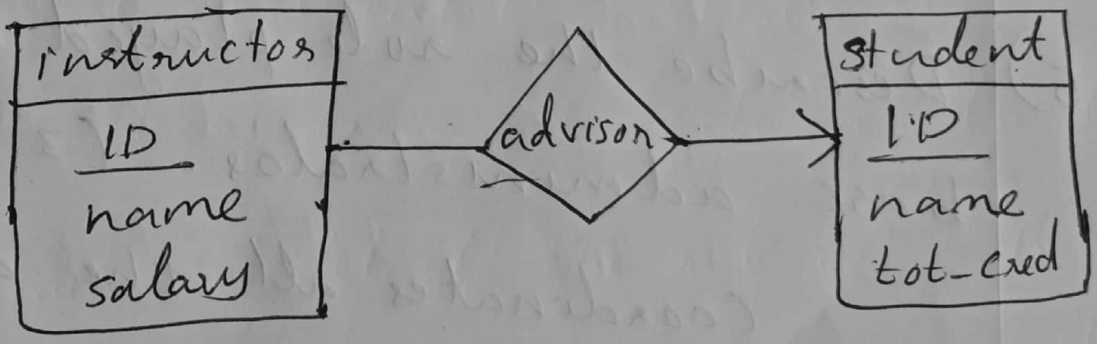
- A student is associated with at most one department via stud_dept.

→ One-to-Many



- an instructor is associated with several students via advisor.
- a student is associated with at most one instructor via advisor

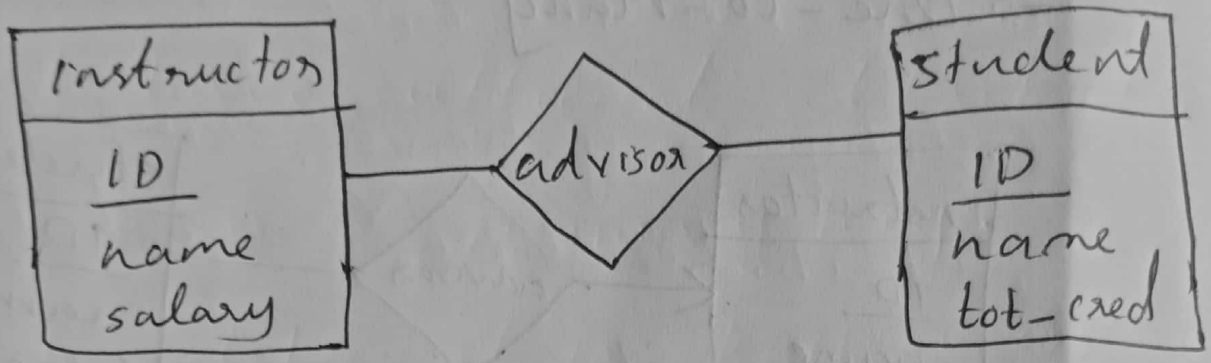
→ Many-to-one



- an instructor is associated with at most one student via advisor.
- and a student is associated

with several instructors via advisor.

→ Many-to-Many



- An instructor is associated with several (possibly 0) students via advisor.
- A student is associated with several (possibly 0) instructors via advisor.

5) Describe the role played by data base administrator. (3 marks)

Coordinates all the activities of the database system; the database administrator has a good understanding of the enterprise's

information resources and needs.

Database administrator roles are:-

- Schema definition.
- Storage structure and access method definition.
- Scheme and physical organization modification.
- Granting user authority to access the database.
- Specifying integrity constraints.
- Acting as liaison with users.
- Monitoring performance and responding to changes in requirements

6) Define entity. Explain weak entity with example.

Entity:- Any 'thing' that is an object, a being or an event that has an independent existence in the real world.

eg:- student, employee.

Weak entity:- An entity set may not have sufficient attribute to form a primary key. Such entity set is known as weak entity set.

eg:- Consider an entity set payment which has 3 attributes.

Pay_id, pay_date, pay_amt.

Pay_id is a sequential number separated for each loan. So we can't consider Pay_id as a primary key and the entity set payment is a weak entity set.