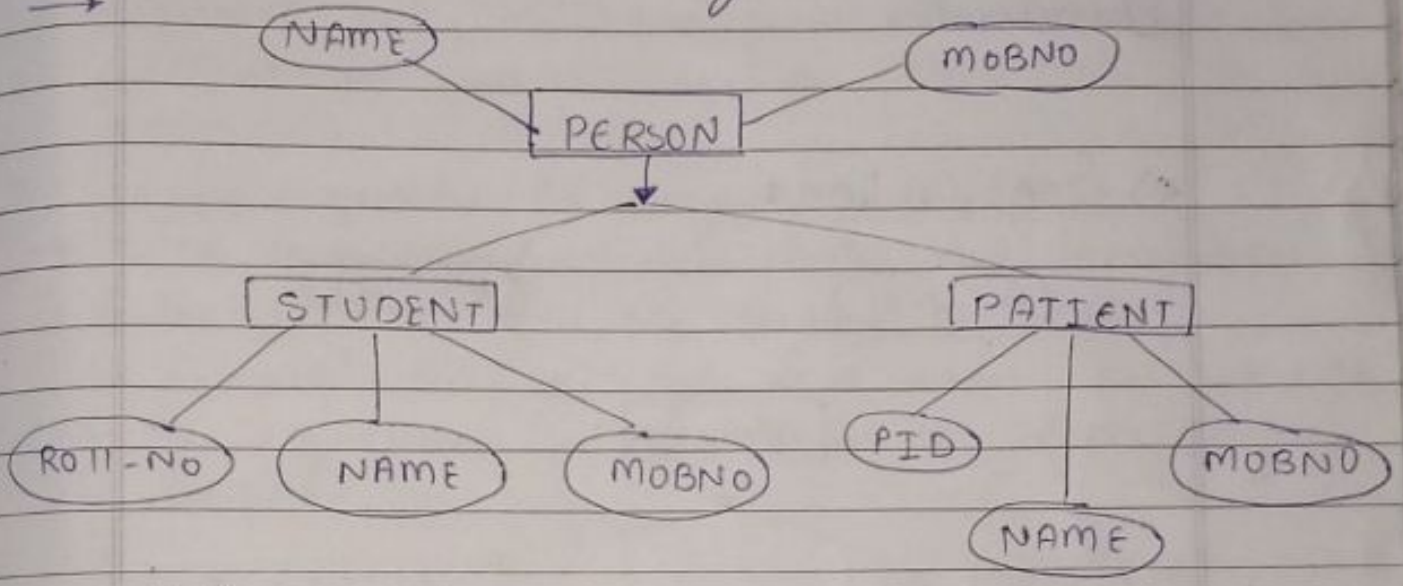
Name :- Sanjivani Singh

Assignment no - 2

[A] Define generalization and specialization with example wrt ER diagram

→



1) Generalization :

- It works on the principal of bottom up approach
- In Generalization lower level functions are combined to form higher level function which is called as entities.
- This process is repeated further to make advanced level entities
- ~~to~~

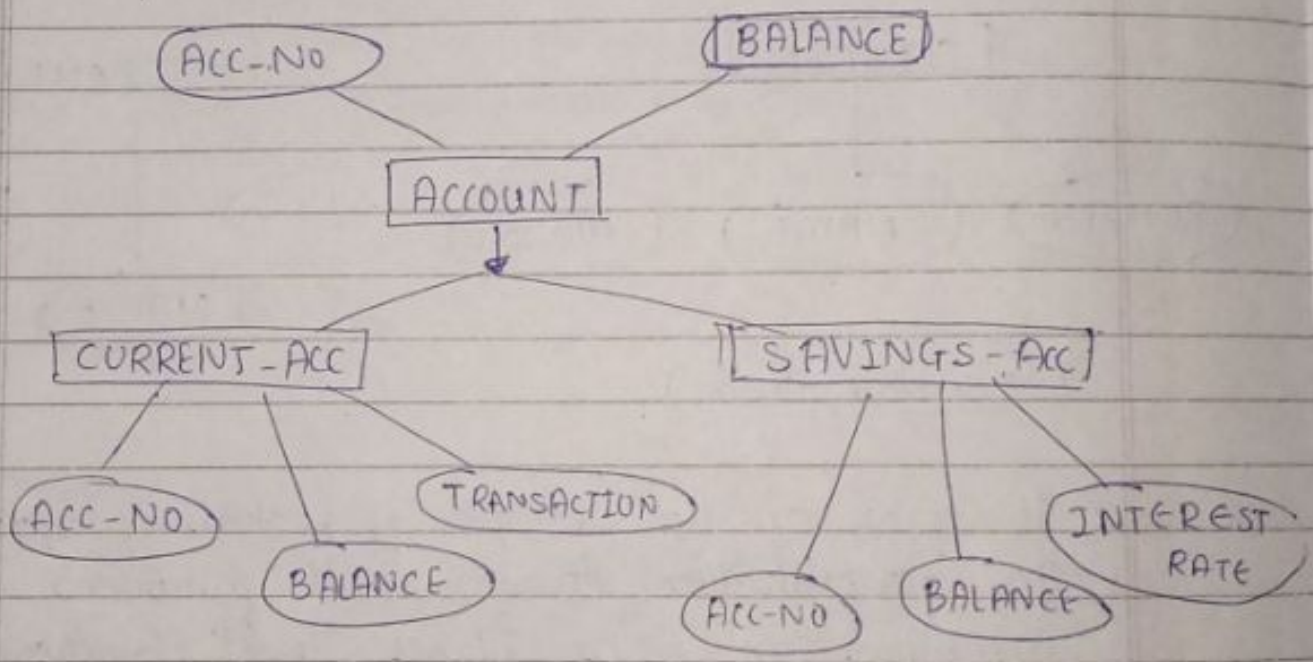
Example :

- Consider two entities student and patient. These two entities will have some characteristics of their

Sanjivani Singh

two entities will have some characteristics of their own. for example Student entity will have Roll-No, Name and Mof-No. while patient will have PId, Name and Mof-No characteristics.

2.) Specialization:



- we can say that specialization is oppusite of Generalization.
- we can also say that specialization a paticular entity gets divided into suf entites and its done on the basis of its characteristics.

key
disadvantage

Example:-

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 and Savings-Ac.

Q8 explain extended ER diagram

→ EER is a high-level data model that incorporates the extensions to the original ER model

- Enhanced ERD are high level models that represent the requirements and complexities of complex database.

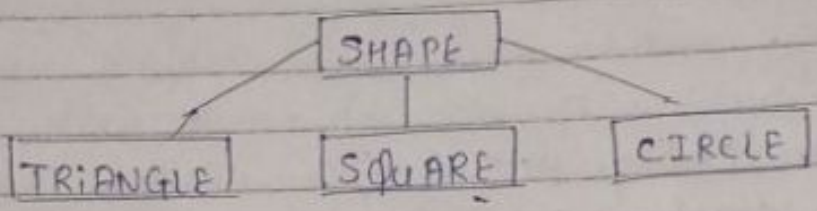
In addition to ER model concepts EE-R includes

- Subclasses and Super classes
- Specialization and Generalization
- Category or union type
- Aggregation

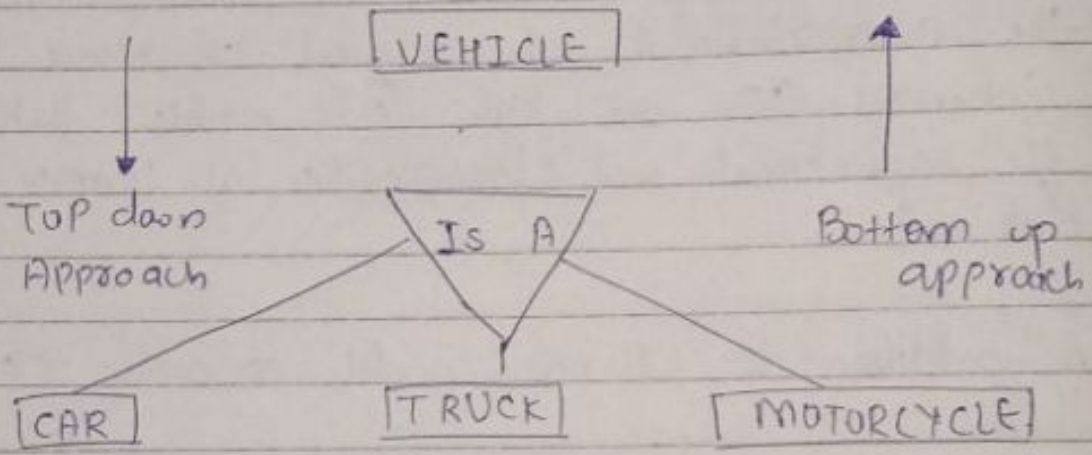
* Subclassed and Super class

- Super class is an entity that can be divided into further subtype.

For-example - consider shape Super class

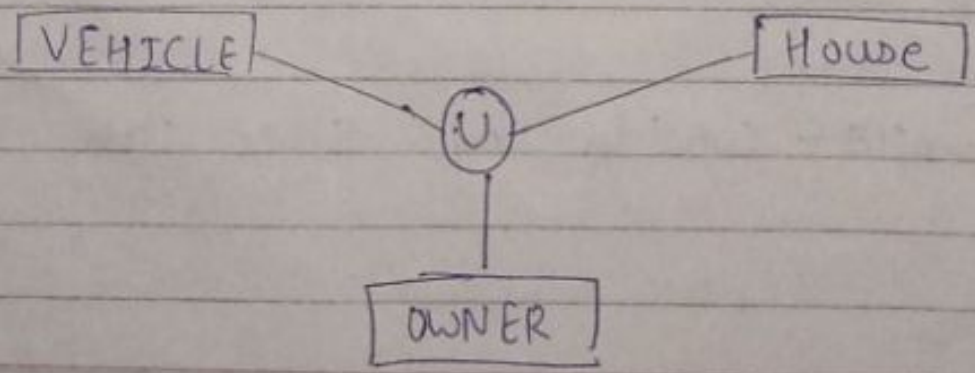


* Specialization and Generalization
→ Generalization is a process of generating an entity which contains generalized attributes or properties of generalized entities



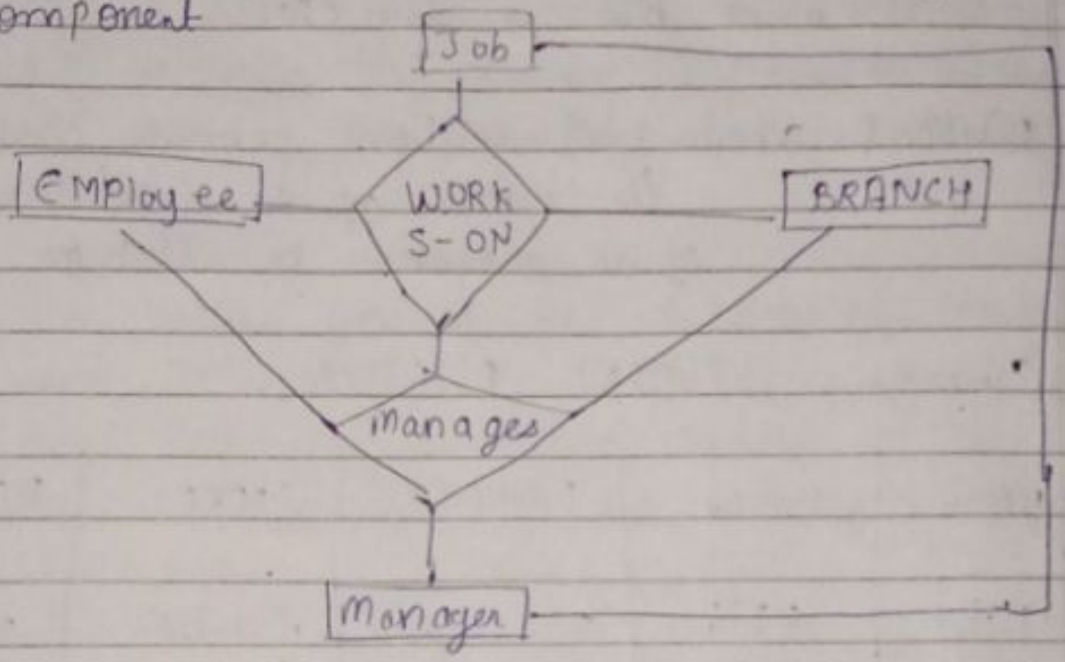
• Specialization is a process of identifying subset of an entity that share some diff characteristic

* category or Union
→ Relationship of one super or sub class with more than one super class



* Aggregation

→ Represents relationship betⁿ a whole object and its component



- Consider a ternary relationship works-on betn Employee, Branch and Managers. Now the best way to model this situation is to use aggregation

QC Define Relational model. Explain through example

→

Relational model can represent as a table with columns and rows. Each row is known as a tuple. Each table of column has a ~~man~~ name or attribute

Domain :- It contains a set of atomic values that an attribute can take

Attribute : It contains the name of a column in a particular table. Each attribute AP must have a dom (AD)

Relational Schema : A relation schema contain the name of the relation and name of all columns or attributes.

Example : STUDENT RELATION

NAME	Roll-No	PHONE-NO	ADDRESS	AGE
Rohit	2516	3485650710	Mumbai	21
Surbhi	2517	9678127091	Gurugaon	42
Aman	2524	6216561231	Delhi	36

- In the given table, NAME, ROLL-NO., PHONE-NO, ADDRESS, and AGE are the attributes.
- The instance of schema STUDENT has 3 tupies.
- t1 = < Rohit, 2516, 3485650710, Mumbai, 21

Properties of Relations

- Name of the relation is distinct from all other relations.

- Each relation cell contains exactly one atomic value.
- Tuple has no duplicate value.

Q0 what is a key in database - Differentiate between Super key, primary key, candidate key and foreign key with example

→

- They allow you to find the relation between two table
- Keys help you uniquely identify a row in a table by a combination of one or more columns in that table
- Database key is also helpful for finding unique record or row - from the table

* Type of Keys :-

- Super key :- A superkey is a group of single or multiple keys which identifies rows in a table.

EmpID	Emp phone - NO	Emp name
AC 01	9810265431	Raj
AC 05	2819567810	mukesh.

→ In above example, EmpID and Empphone - NO are Superkeys.

* foreign key : It is a column that created a relationship two tables. The purpose of foreign keys is to maintains data integrity and allow navigation between two different instances of an entity.

Example :

Dept code	DeptName
001	Maths
002	Science
003	English

Teacher ID	Fname	name
B002	David	Warner
B017	Sara	Joseph
B009	Mike	Brunton

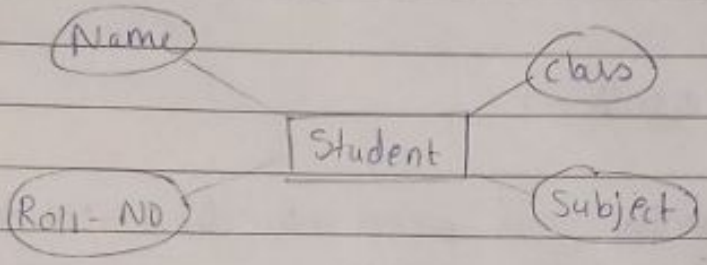
* Now we adding the foreign key in Deptcode to the Teacher name, we can create a relationship betn the two tables.

Teacher ID	Deptcode	Fname	Lname
B002	002	David	warner
B017	002	Sara	Joseph
B009	001	Mike	Brunton

ip [Q:] → Explain mapping of ER and EER model to relational model

ER Model, when conceptualized into diagrams, gives a good overview of entity relationship, which is easier to understand.

- ER entity is a real-world object with some attributes.



- An entity is a real-world object with some attributes

* Mapping Rules

- Create table for a relationship
- Add the primary keys of all participating entities as fields of table with their respective data types.
- If relationship has any attribute, add each attribute as field of table
- Declare all foreign key constraints.

Q.F:) Explain Set intersection, natural join, generalised projection and division operation in relational algebra with example

→

The relational algebra is a procedural query language. It consists of a set of operations that take one or two relations as input and produce a new relation as their result.

(i.) Set Intersection:

- Set Intersection is used to find intersecting tuples from two relations.
- Suppose that we wish to find all customers who have both a loan and an account. Using set intersection, we can write.

(ii.) Generalized Projection:

- The generalized projection operation extends the projection by allowing arithmetic functions to be used in the projection list.
- The generalized projection operation has the form $\Pi f_1, f_2, \ldots, f_n$ (E).

(iii) Division operator:

- The division operators, denoted by ÷ ps suited to queries that include the phase "for all".
- $r_1 = \Pi_{branch\text{-}name}(\sigma_{branch\text{-}city = "Mumbai"}(branch))$
- $r_2 = \Pi_{customer\text{-}name, branch\text{-}name}(depositor \bowtie account)$

~~(iv)~~

Q(7.) Explain rename and set difference operation with example.

→

Rename (P)

- rename is a unary operation used for renaming attributes of a relation.
- p(a/f)R will ~~Aem~~ rename the attribute 'f' of relation by 'a'

Notations:

P x (R)

where the symbol 'p' is used to denote the RENAME operator and R is the result of the sequence of operation or expressions which is saved with the name X.

- Example 1: Query to rename the relation student as male student and the attributes of student - Roll No, SName as (Sno, Name)

Sno	Name
2600	Ronny
2655	Raju

ρ(Male Student (sno, Name) Π Roll No, SName (σ Condition (student))

* Set Difference (−)

- Symbol denotes it. The result of A−B, is a relation which includes all tuples that are is A but not in B.

- The attribute name of A has to match with the attribute name in B

- The two-operand relations A and B should be either compatible or union compatible.

- It should be defined relation consisting of the ~~tuto~~ tuples that are in relation A, but not in B

Example: A−B

Table	A−B
Colum 1	Colum 2
1	2