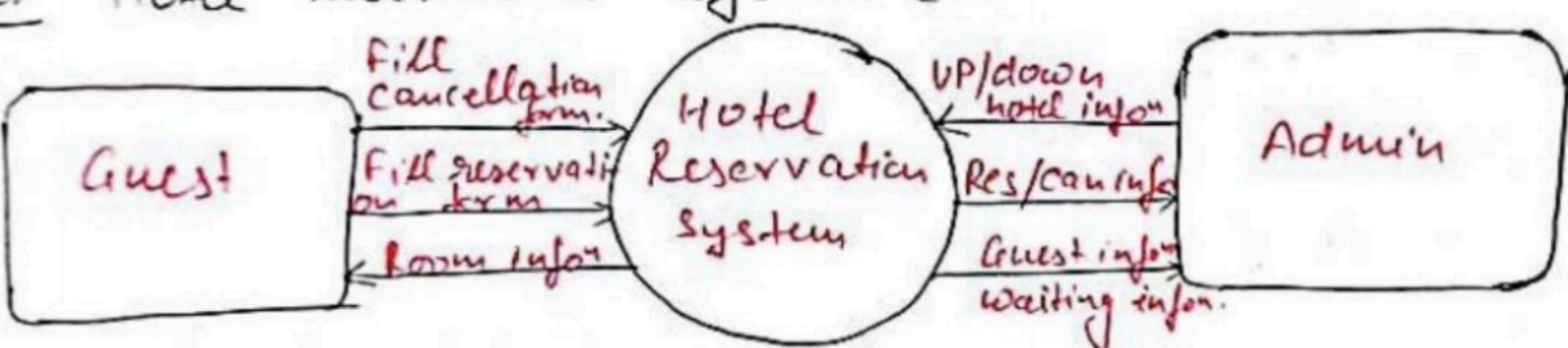
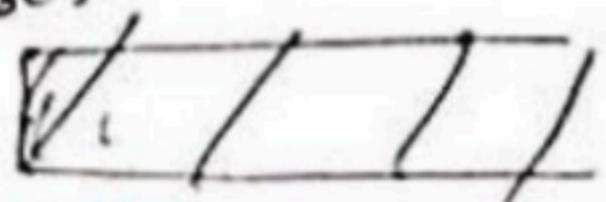


- * Levels of DFD: Levels of DFDs are used to denote how much info about the data flow is available at that particular time.
- * A DFD can dive into progressively more details by using levels.
- * DFD levels are numbered 0, 1 or 2 and occasionally go to level 3 or beyond.
- * There is no fixed levels in DFD, it all depends upon the scope of what work we want to accomplish.

- 1) Level 0 DFD: In this complete system is represented as single process.
 - * It is also k/a context Diagram.
 - * Generally it describes the basic overview of the whole system or process being modeled.
 - * It describes the high level view of any system with its relationship to external entities.
- ex:- Hotel reservation system (Level 0 DFD).



- 2) Level 1 DFD:
- * Level 1 provides a more detailed view of the Level 0 DFD.
- * In this we can break the processes into its subprocesses, but external entities must remain same.
- * In this level, we can also show the data storage of some processes.



Rules for drawing:

- 1- First of all identify all the processes and external entities.
- 2- Identify data flow and data storage.
- 3- we can repeat any entity to any no. of times, but can not add new entity.

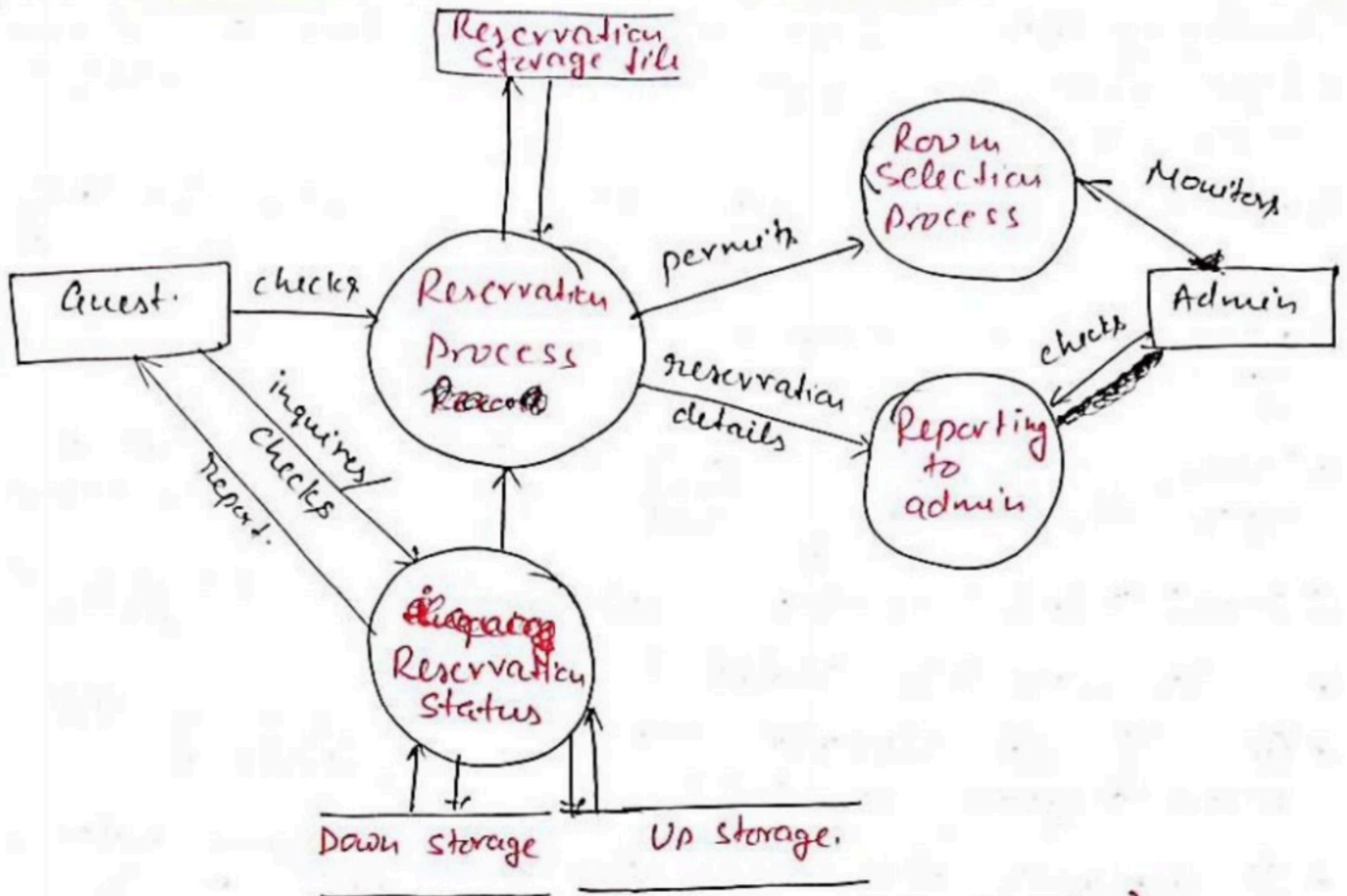


Fig- Level 1 DFD (Reservation System)

Level - 2 DFD's

- * Level-2 DFD goes one step deeper into parts of level 1.
 - * It consists of more detailed description of the system as compared to level -1.
 - * It can be used to plan or record the specific details about the system's functioning.



Frg - Level - 2 DFD

Entity-Relationship Diagrams (E-R Diagram) - ERD:

2-9

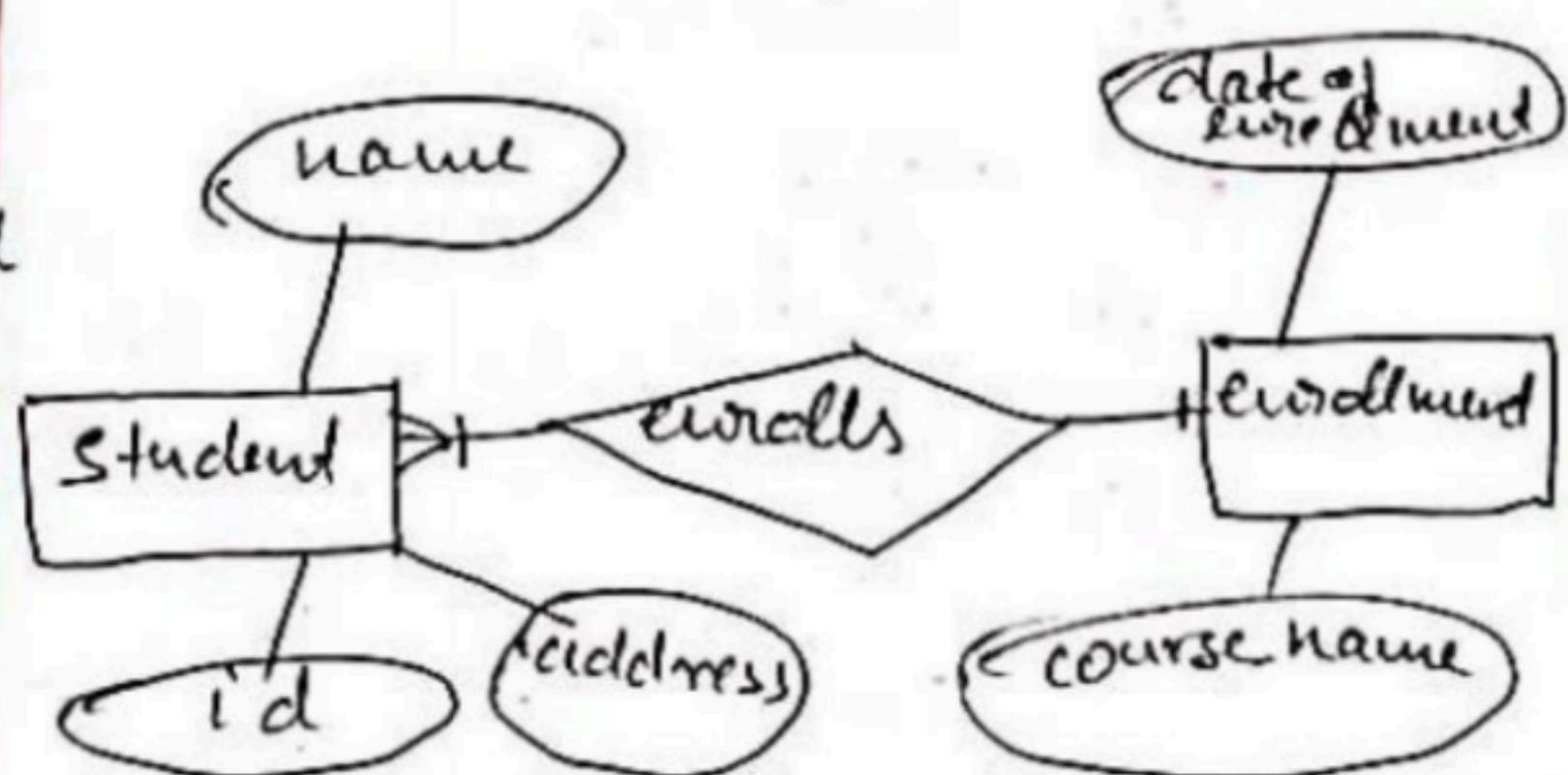
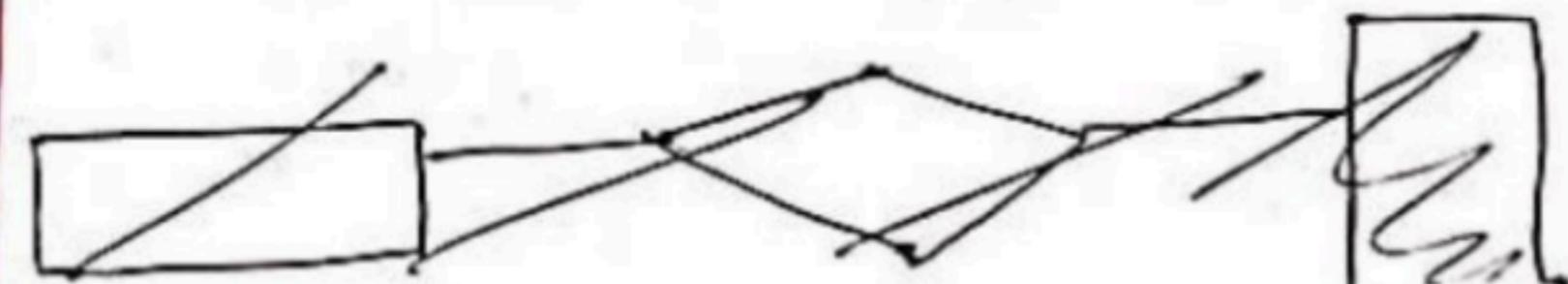
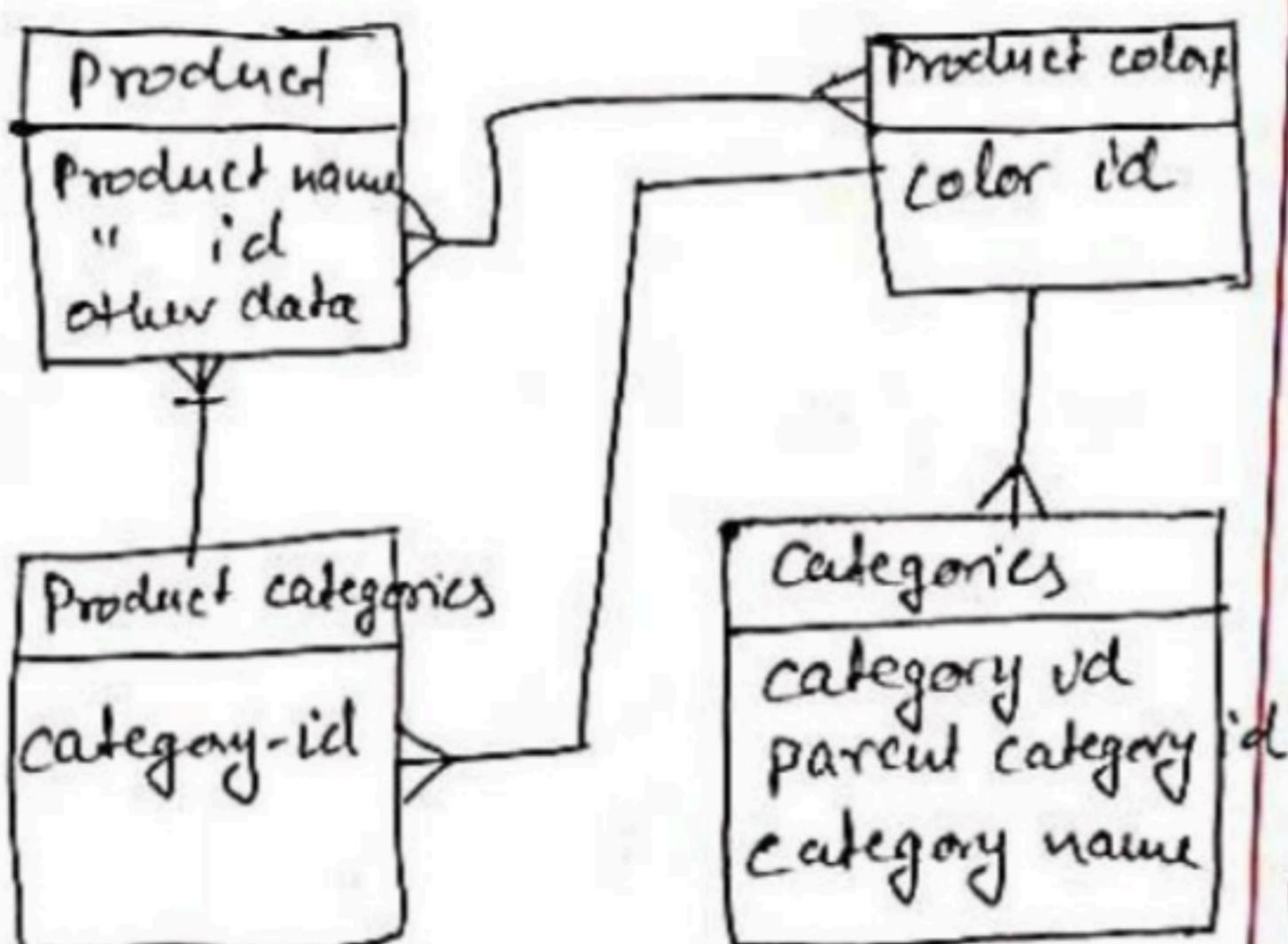
- * An E-R Diagram is a visual representation of different entities within a system and how they are related to each other.
 - * It is a data modeling technique which represents the relationships that exists among entities. ~~for database design~~
 - * It was proposed by Peter Chen in 1970's.
 - * Generally it is used in software engg. and in database design for serving purposes.
- ER Model in database design
- In database design they are used to design relational databases.
- In abms, an entity is a table or attribute of table in database, so by showing relationship among tables and their attributes, E-R diagram shows the complete logical structure of a database.
- Ex: Product sales.

E-R Diagram in SW engineering.

In SW engg E-R diagrams are used during the planning stages of the SW project for defining requirements.

They help us to identify different system elements and their relationship with each other.

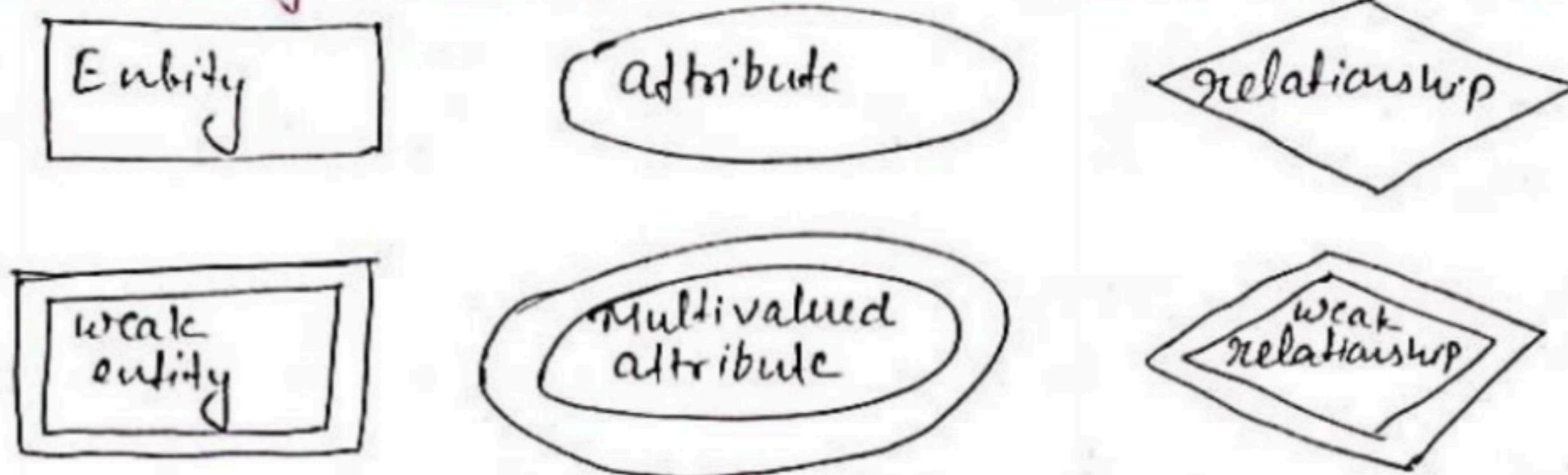
Ex: Student enrollment system.



Note: The designing concepts and symbols are same for both i.e. in GR model in database or E-R diagram in SW.

Components of E-R Diagram / Symbols and Notations :-

2-10



There are 3 basic elements of ER Diagram —

- ⇒ Entity
- ⇒ Attribute
- ⇒ Relationship

There are more elements which are based on the main elements.

- ⇒ weak entity
- ⇒ multivalued attribute
- ⇒ weak relationship

⇒ Cardinality or ordinality are two more notation notations that are used in E-R diagram for further defining relationship.

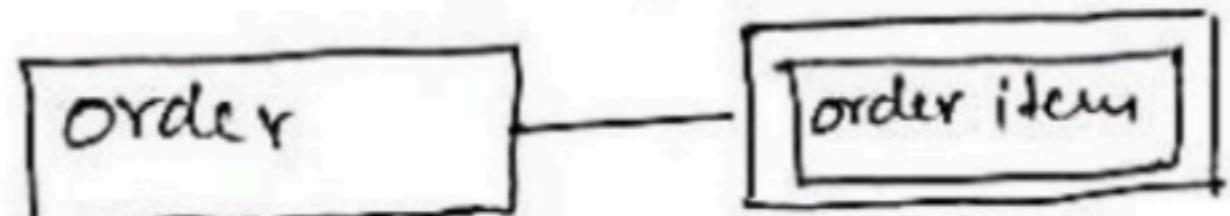
1) Entity :-

- * An entity can be any person, place, event or any object that is relevant to a given system.
- * A school system may include - student, teacher, major courses fees, or any other items.
- * Entities are represented using rectangles and named using singular nouns.

Weak entity :-

A weak entity is an entity that depends on the existence of another entity. It uses a foreign key combined with its attribute to form a primary key.

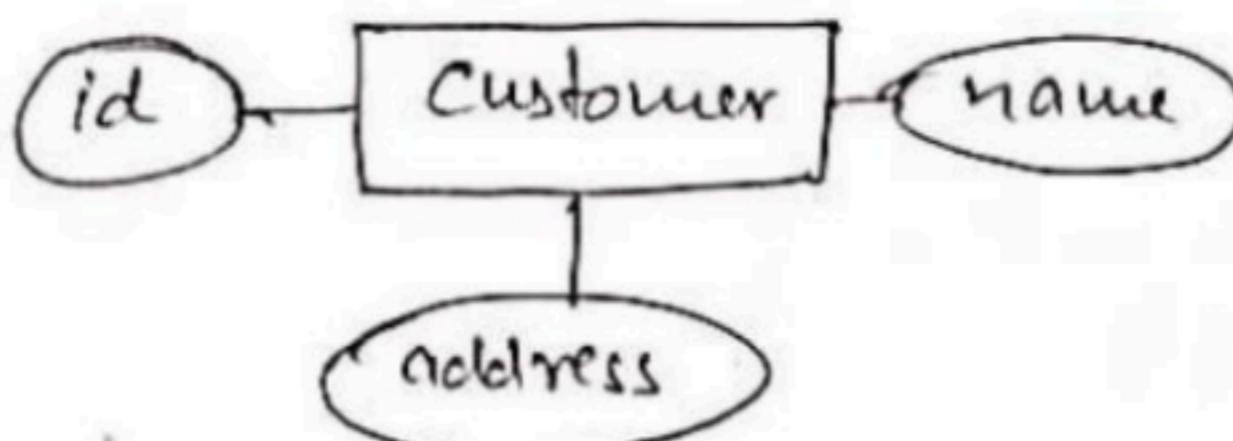
ex:-



order-item cannot exist without order.

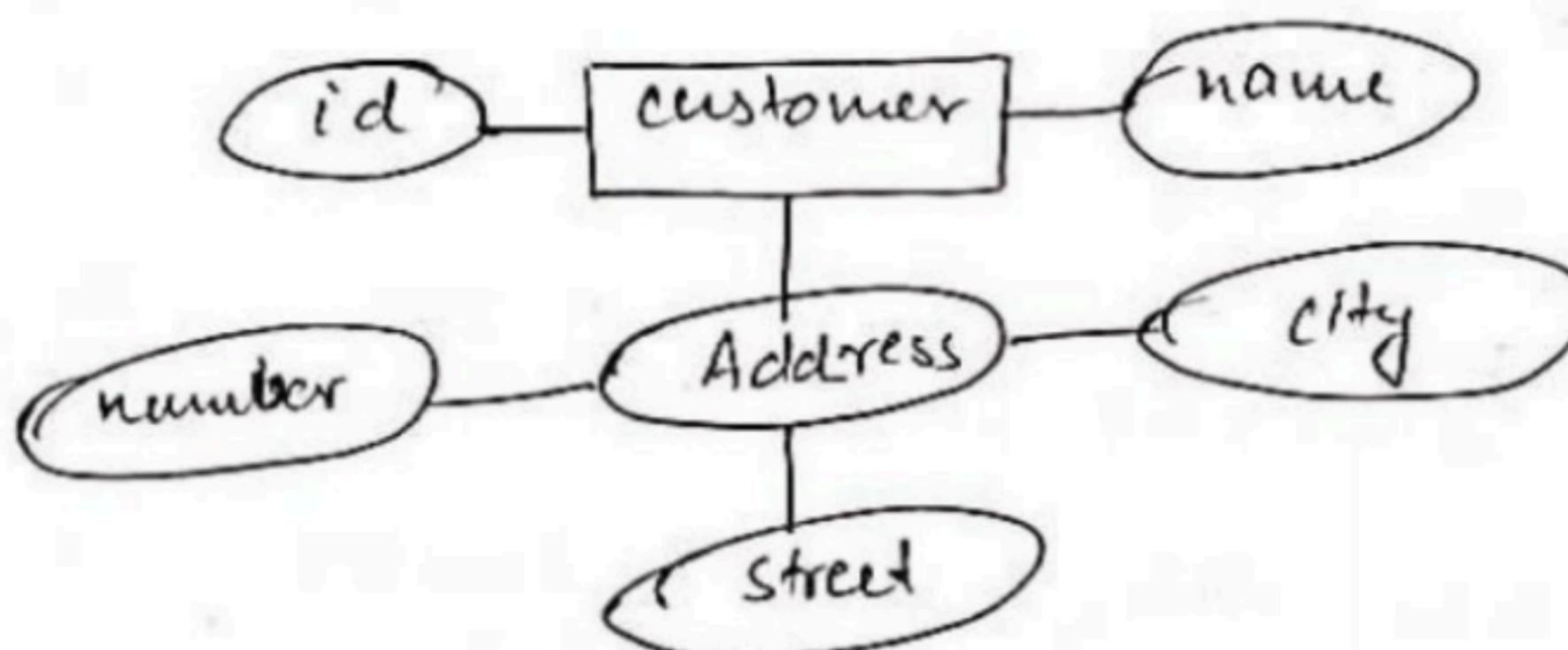
Attribute:

- * An attribute is a property, trait or characteristics of an entity, relationship or another attribute.
- * An entity can have as many attributes as necessary.

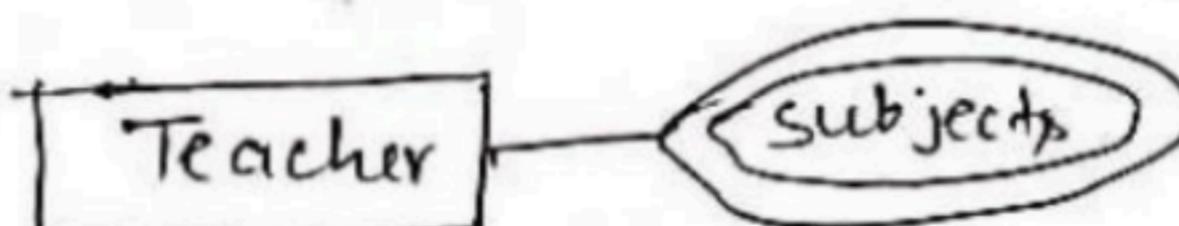
Ex:

- * Attributes can also have their own specific attributes.

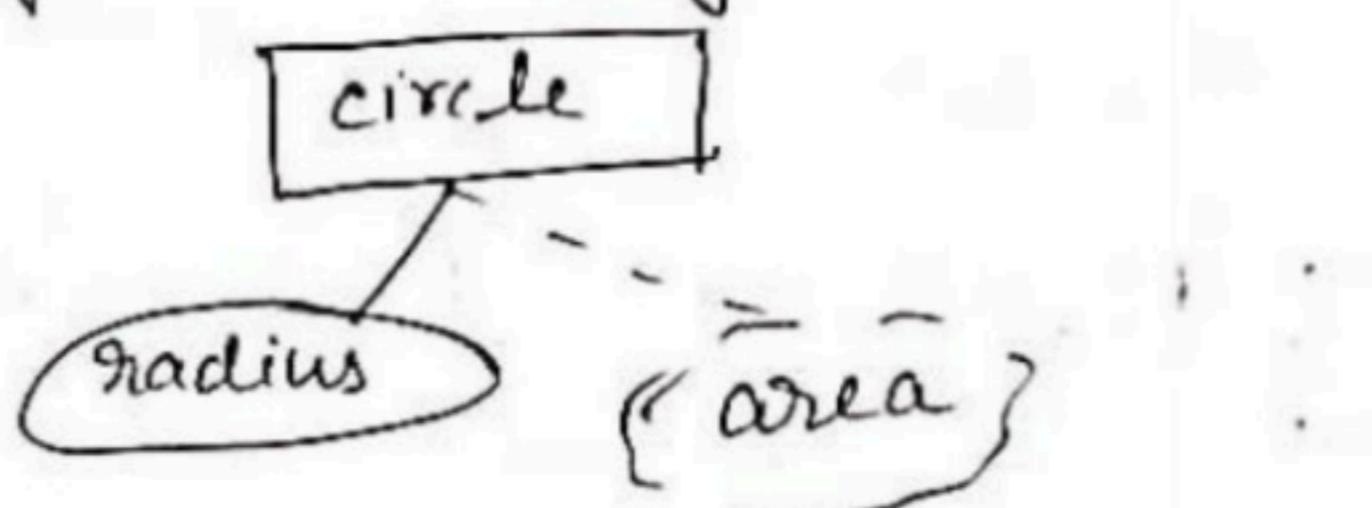
Ex: attribute address can have the attributes like street, city, and state etc.

Multivalued Attributes:

If an attribute can have more than one values, it is called multi-valued attribute.

Ex:Derived Attributes:

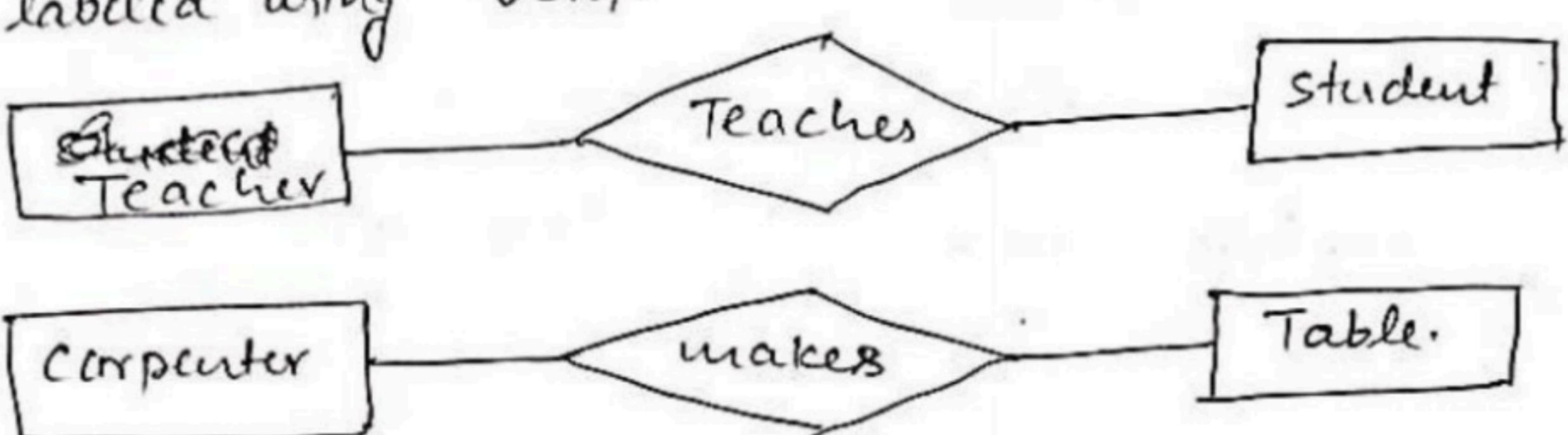
An attribute based on another attribute is k/a derived attribute. ex: a circle area can be derived from radius. But this is found rarely in the E-R diagrams.

Derived attribute example

Relationship:

- * A relationship describes how entities interact with each other.
- ex:- the entity "teacher" can be related to the entity "student" by the relationship "teaches" or "instructs".
- * Relationship is represented by diamond shapes and are labeled using verbs.

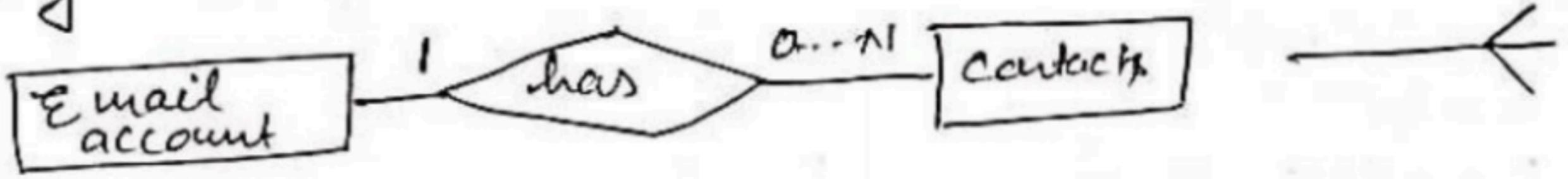
Ex:-



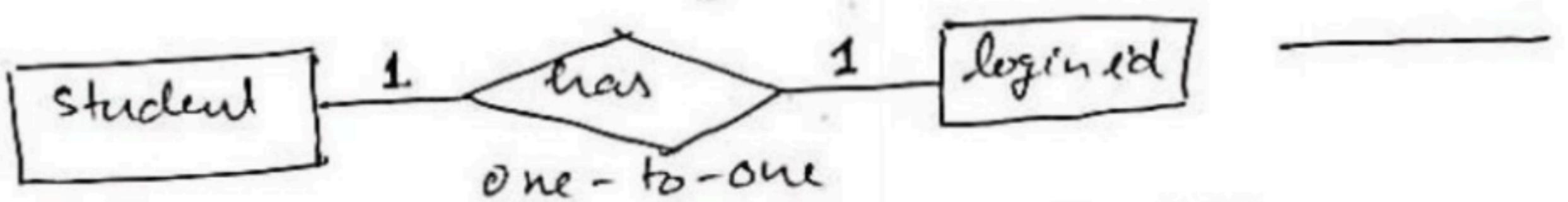
Cardinality and Ordinality:

- * It defines the possible number of occurrences in one entity which is associated with the number of occurrences in another.
- Ex:- one team has many players, so we can present it like one-to-many relationship.
- * Generally it can be defined as one-to-one, one-to-many, many-to-one and many-to-many.
- * There are number of notations that can be used for representing cardinality. like Chen, UML, crow's foot, Batchman etc. Following example uses UML to show cardinality.

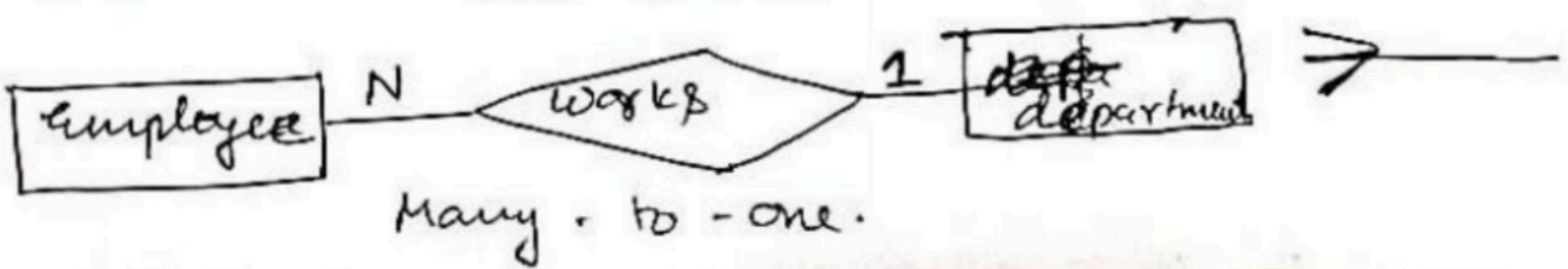
alternative notation.



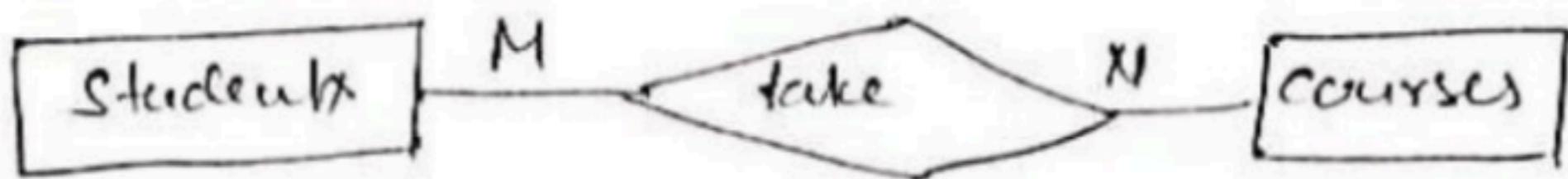
one-to-many relationship.



one-to-one



Many-to-one.



Many to many.

Rules for Drawing E-R Diagrams:

- 1- Identify all the entities
- 2- Identify all the relationships.
- 3- Add attributes .

On E-R Diagram for College Management system.
entities will be - student, course, subjects, lecturer.
relationship are :- attends, teaches, takes, has etc.-as per requirements.

Attributes we will define later.

