CS-457

AGENDA

- What is the Insta-Cart Design
- Why ER/EER model?
- What is ER Model?
  - ER diagram Notations
  - Components of ER model
  - Relationship cardinalities
  - Participation Constraints
- Entities and their Constraints
- EER diagram of Insta-Cart
- Explain EER Model?
  - Sub and Super Class
  - Specialization & Generalization
  - Category and Union
- Question?

INSTA-CART DESIGN

- Insta-cart is one of the leading grocery delivery companies.
- User can order online and it can get delivered to the user's doorstep.
- Insta-cart business model rotates around 3 main actors:

1.The Customers

2.The Grocery Shoppers/ Delivery Personnel

3.The Retail Partners

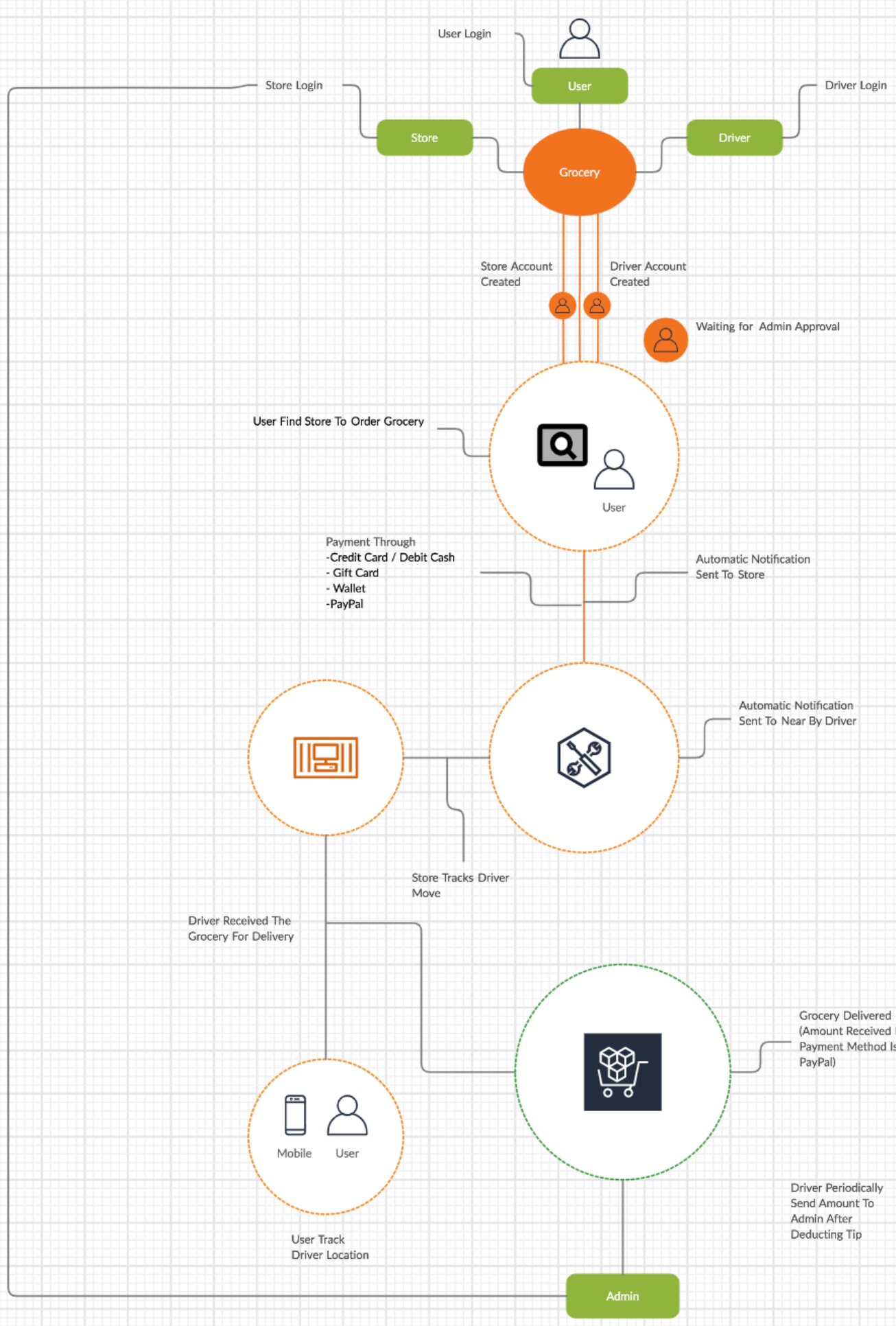


Fig: INSTA-CART WORK FLOW

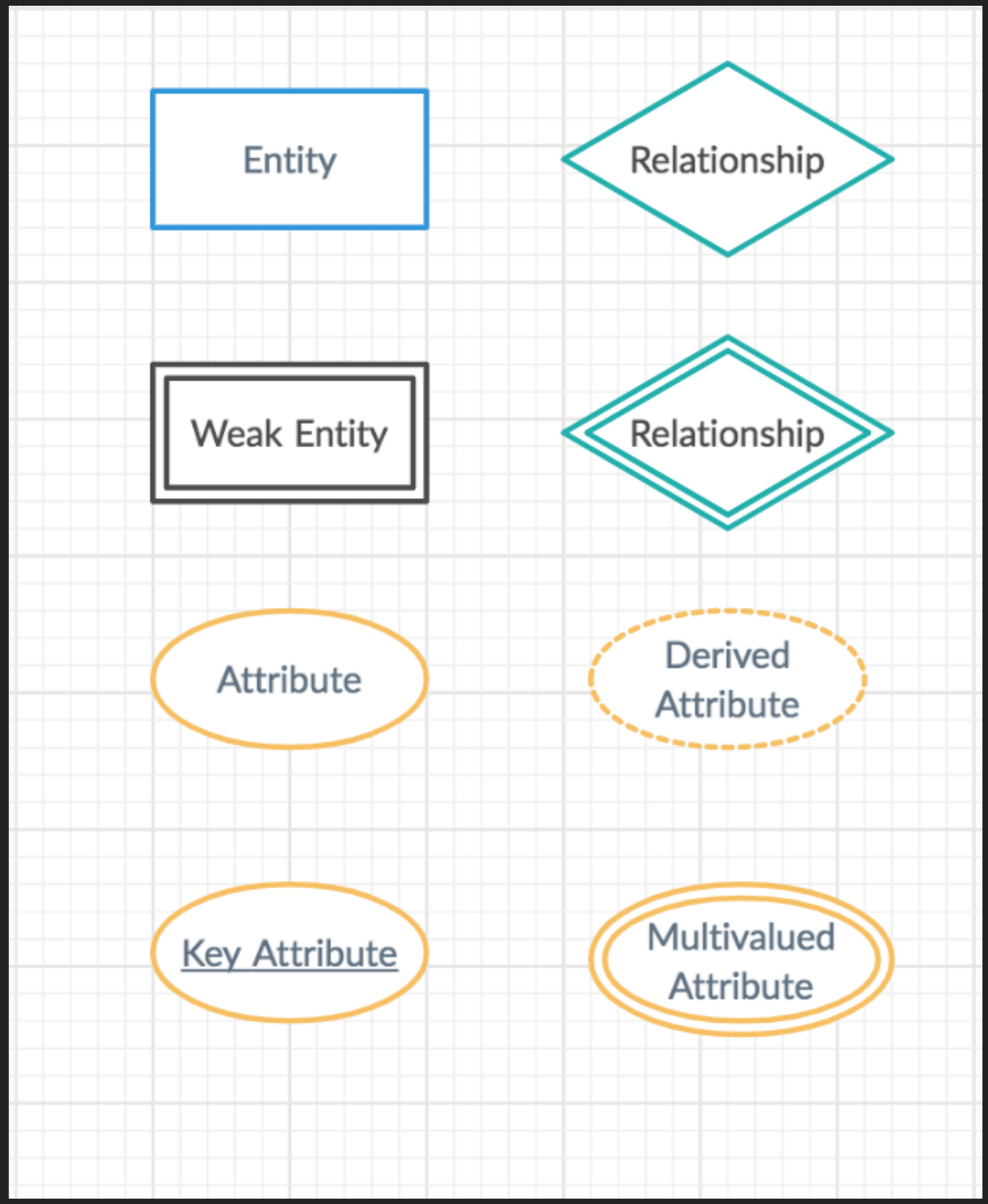
WHY WE CHOOSE ER/EER MODEL

- EER creates a design more accurate to database schemas
- It reflects the data properties and constraints more precisely.
- It includes all modeling concepts of the ER model.
- Diagrammatic technique helps for displaying the EER schema.
- It includes the concept of specialization and generalization.
- Each entity, attribute, and relationship, should have appropriate names that can be easily understood by the non-technical people as well.

WHAT IS ER DIAGRAM

ER-DIAGRAM NOTATIONS

- Rectangle: represents the Entity.
- Double Rectangle: represents the weak entity.
- Diamond: It represents the Relationship.
- Double Diamond: Weak relationship
- Oval :Attribute
- Double ovals : Multi valued Attribute:
- Dashed oval :Derived Attribute



COMPONENTS OF ER-DIAGRAM

- There are three main components
- ENTITY
- An entity is an object or component of data.
  - Strong Entity: An entity which doesn't depend on other entity.
  - Weak Entity: An entity that cannot be uniquely identified by its own attributes and relies on the relationship with other entity is called weak entity.

ATTRIBUTES

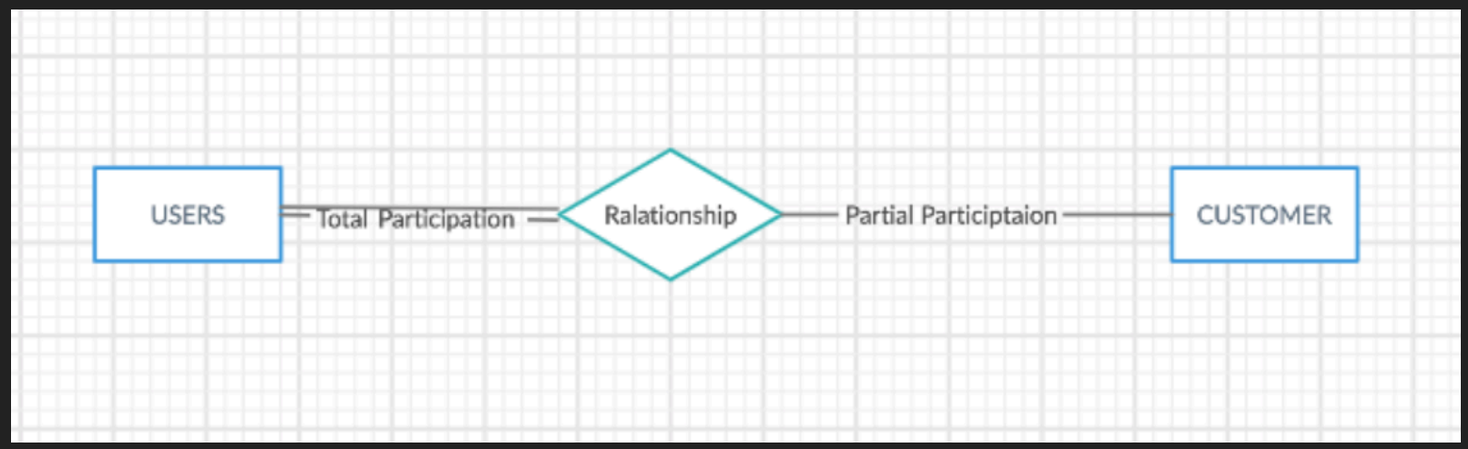
- An attribute describes the property of an entity.
  - Key Attribute: represents key attribute of an entity which have a unique value in a table.(Primary Key)
  - Derived Attribute: It represents the derived attribute which can be derived from the value of related attribute.
  - Multi valued Attribute:It represents multi valued attribute which can have many values for a particular entity.
  - Composite attribute:

RELATIONSHIP CARDINALITY

- It shows the relationship among entities. There are four types of relationships:
  - One to One: When a single instance of an entity is associated with a single instance of another entity then it is called one to one relationship
    - 1 to 1
  - One to Many: When a single instance of an entity is associated with more than one instances of another entity then it is called one to many relationship.
    - 1 to N
  - Many to One: When more than one instances of an entity is associated with a single instance of another entity then it is called many to one relationship.
    - N to 1
  - Many to ManyWhen more than one instances of an entity is associated with more than one instances of another entity then it is called many to many relationship.
    - M to N

PARTICIPATION CONSTRAINTS

- Total Participation – Each entity is involved in the relationship. Total participation is represented by double lines. Ex: User in Insta-Cart has total participation. A user must be a customer, driver or admin
- Partial participation – Not all entities are involved in the relationship. Partial participation is represented by single lines.Ex: Payment to card type it is a partial participation.



USER ENTITY:

- CONSTRAINTS OF USER TABLE

USER_ID	F_NAME	L_NAME	PASSWORD	PHONE_NO	EMAIL	ADDRESS	ZIPCODE

- Primary Key: USER_ID
- NULL values are not accepted by the table for all the attributes
- F_NAME AND L_NAME: VARCHAR character range 45
- PASSWORD: Minimum 8 characters and at least one upper case letter and It should not contain any special characters
- PHONE_NO.: VARCHAR and not should be greater than 10 digits.
- ZIPCODE: VARCHAR 10 digits

DELIVERY DRIVER ENTITY:

- CONSTRAINTS OF DRIVER TABLE

DRIVER_ID	F_NAME	L_NAME	PASSWORD	PHONE_NO	EMAIL	ADDRESS	GENDER	DL_NO.	SALARY	AVG_RATING

- Primary Key: DRIVER_ID
- F_NAME AND L_NAME: VARCHAR character range 45
- PASSWORD: Minimum 8 characters and at least one upper case letter and It should not contain any special characters
- PHONE_NO.: Integer and not should be greater than 10 digits. NOT NULL
- DL_NO: Unique Key and Must be 8 Character NOT NULL
- SALARY: NUMERIC (15,2)
- ZIPCODE: VARCHAR 10 digits

STORE_ADMIN ENTITY:

- CONSTRAINTS OF ADMIN TABLE

ADMIN_ID	F_NAME	L_NAME	PASSWORD	PHONE_NO	EMAIL	ADDRESS	GENDER	SALARY

- Primary Key: ADMIN_ID
- F_NAME AND L_NAME: VARCHAR character range 45
- PASSWORD: Minimum 8 characters and at least one upper case letter and It should not contain any special characters
- PHONE_NO.: Integer and should not be greater than 10 digits.
- ZIPCODE: Integer 10 digits
- SALARY: NUMERIC (15,2)
- GENDER: M , F or other

STORES ENTITY:

CONSTRAINTS OF STORE TABLE

STORE_ID	STORE_NAME	S_PHONE	EMAIL	OWNER	ZIPCODE	CITY	STATE

- Primary Key: STORE_ID
- STORE_NAME : VARCHAR character range 45
- PHONE_NO. : VARCHAR(13) and not should be greater than 10 digits.
- ZIPCODE: VARCHAR (10)
- CITY, STATE and EMAIL : VARCHAR

DEPARTMENT ENTITY:

- CONSTRAINTS OF DEPARTMENT TABLE

DEPT_ID	DEPT_NAME

- DEPT_ID: Primary Key
- DEPT_NAME : VARCHAR range 45

PRODUCT ENTITY:

- CONSTRAINTS OF PRODUCT TABLE

PRODUCT_ID	DEPT_ID	PRODUCT_NAME	AISLE_ID

- PRODUCT_ID: Primary Key
- DEPT_ID: FOREIGN KRY References from Department table
- PRODUCT_NAME : VARCHAR character range 45
- AISLE_ID: INTEGER (4)

ORDER ENTITY:

- CONSTRAINTS OF ORDER TABLE

ORDER_ID	USER_ID	ORDER_STATUS	ORDER_DATE	SHIPPED_DATE	STORE_ID	DRIVER_ID

- ORDER_ID: Primary Key
- USER_ID: FOREIGN Key References from User table
- ORDER_STATUS : In process, Delivered, Canceled, Return or Dispatched in VARCHAR
- STORE_ID: FOREIGN Key References from Stores table
- DRIVER_ID: FOREIGN Key References from Driver table
- SHIPPED_DATE and ORDER_DATE: Date Format (YYYY-MMDD)

ORDER ITEMS ENTITY:

- CONSTRAINTS OF ORDER_ITEM TABLE

PRODUCT_ID	ORDER_ID	QUANTITY	PRICE

- PRODUCT_ID:FOREIGN Key References from Product table
- ORDER_ID: FOREIGN Key References from Order table
- QUANTITY: Integer
- PRICE: Numeric(15,2)

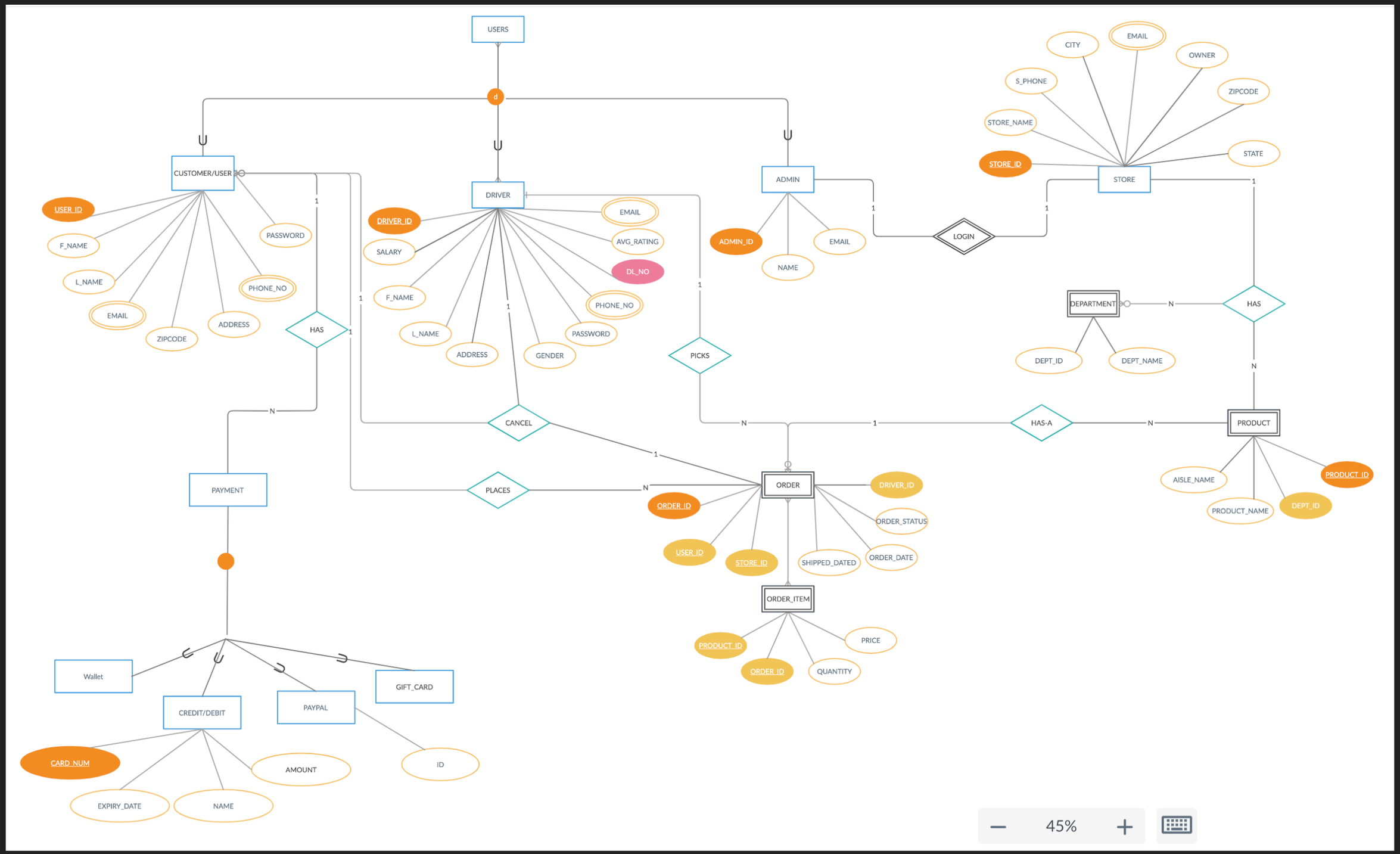
PAYMENT METHOD:

- CONSTRAINTS OF PAYMENT TABLE

CARD_NUM	EXPIRY_DATE	NAME	ADDRESS	AMOUNT	TYPE_OF_CARD

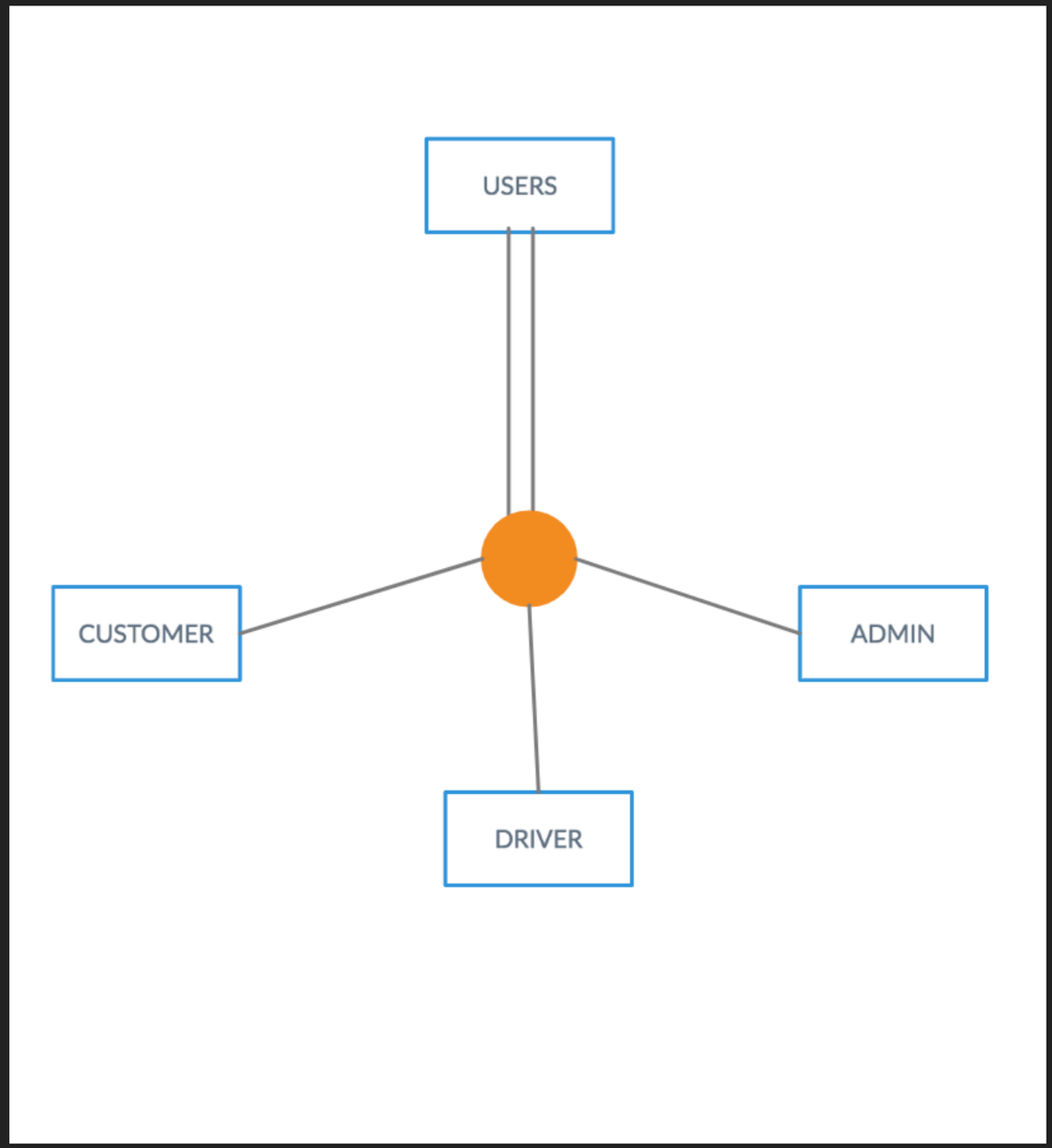
- CARD_NUM: Primary Key
- EXPIRY_DATE: Date greater than current date
- ADDRESS: VARCHAR not more than 45 character long
- AMOUNT: Numeric
- TYPE_OF_CARD: GiftCard, Wallet, Debit or Credit

ER DIAGRAM FOR INSTA-CART



EXPLAIN EER MODEL

- Following are the main techniques to display the concept in EER model.
- Sub Class and Super Class:
- Sub class and Super class relationship leads the concept of Inheritance.
- The relationship between sub class and super class is denoted with d symbol.
- Super class is an entity type that has a relationship with one or more subtypes.
- Sub class inherits properties and attributes from its super class.
- Ex:In Insta Cart USER entity is a Super class and Customers, Delivery Driver, and Store Admin are the Sub Classes.



Specialization and Generalization:

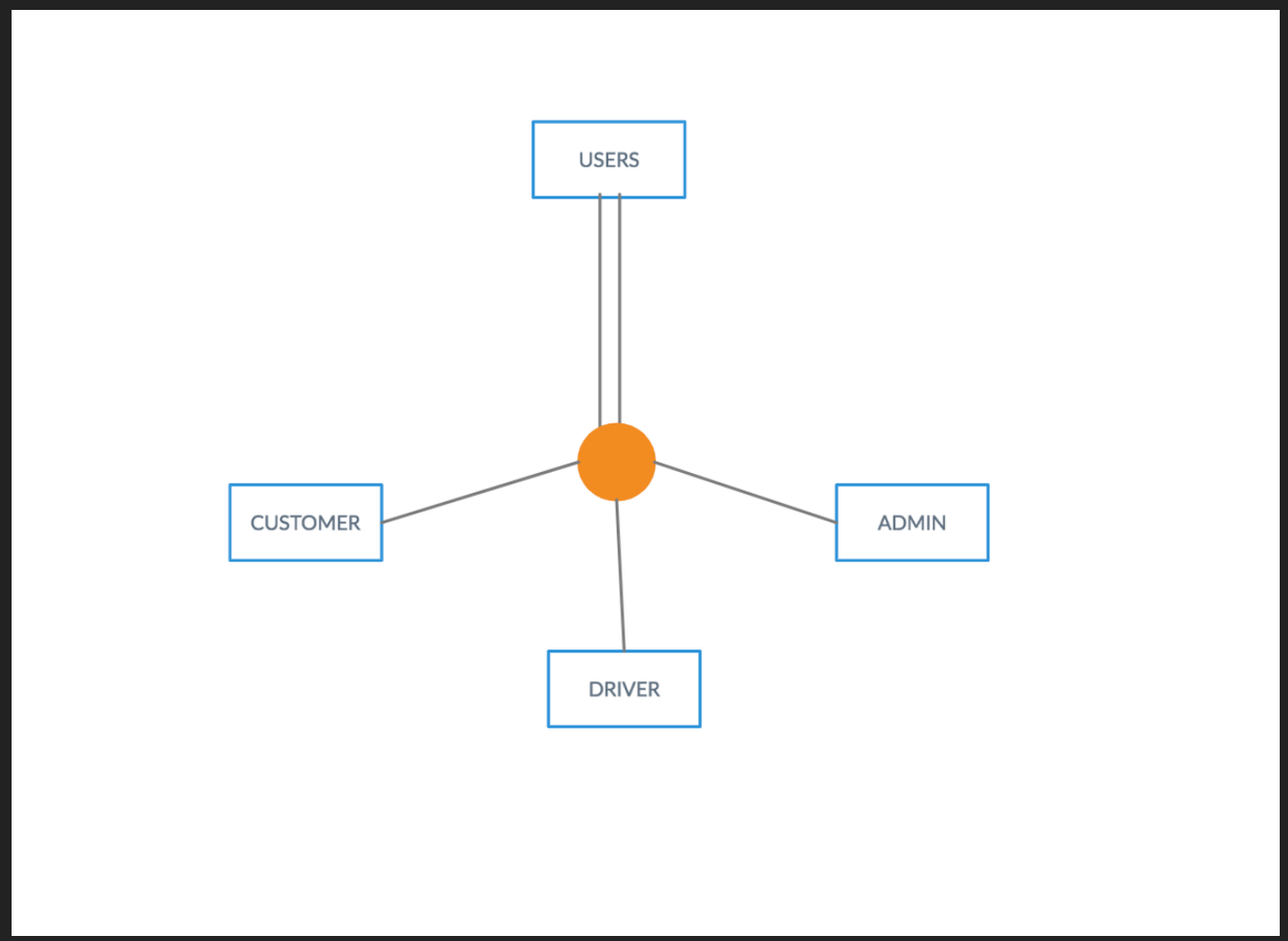
- Generalization is the process of generalizing the entities which contain the properties of all the generalized entities means two lower level entities combine to form a higher level entity.
- Ex: Customers, Drivers, and Admin can all be generalized as USERS
- Specialization is a process that defines a group entities which is divided into sub groups based on their characteristic. Which means, one higher entity can be broken down into two lower level entity.
- Ex: USERS can be specialized as Admin or Driver , based on what role they play in an Organization.

Category and Union:

- Category represents a single super class or sub class relationship with more than one super class.
- It can be a total or partial participation.
- Ex. In Payment method inherits the attributes from Gift card, Debit/Credit card, Wallet, or PayPal account depending on the superclass to which Payment method user will choose to do Payments for their shopping.

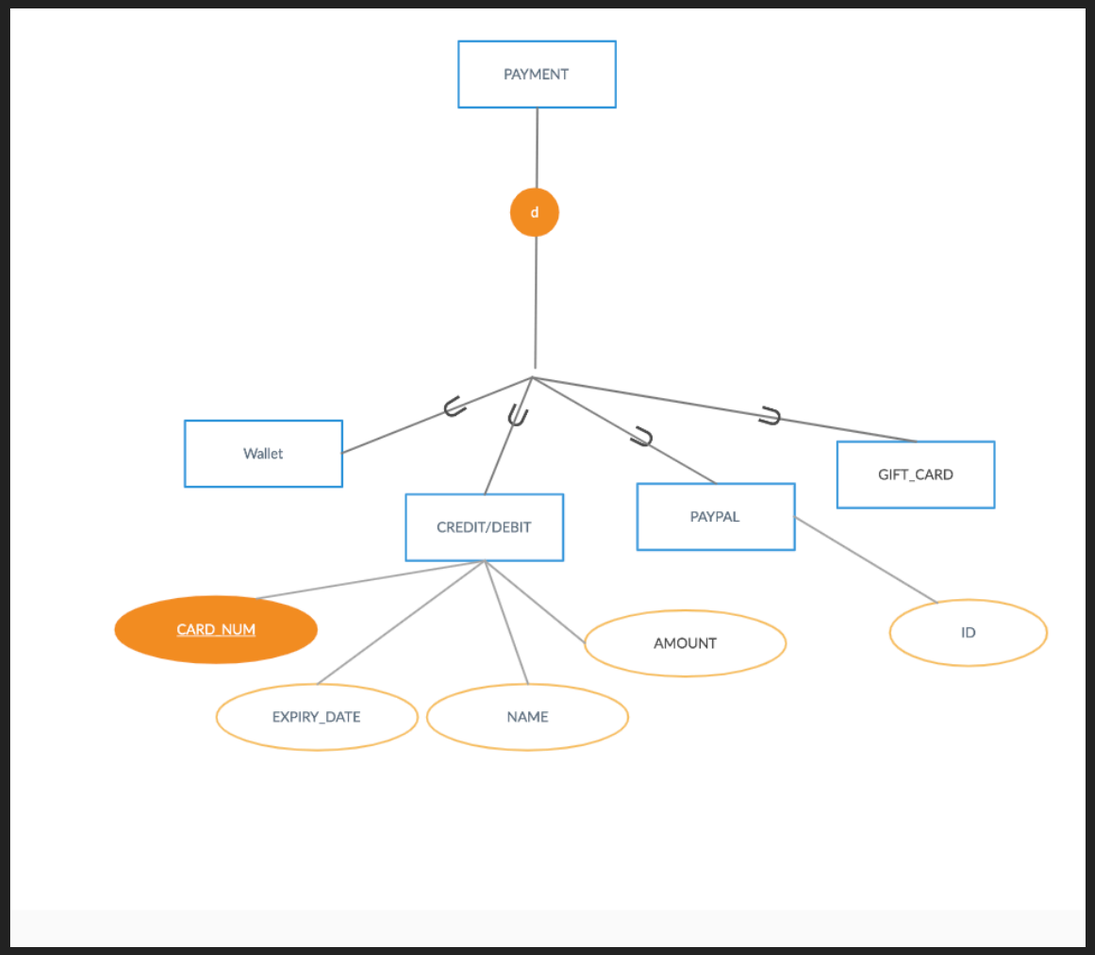
UNION SPECIALIZATION

- A User can be a Customer or a Delivery Driver at the same tome



DIS-JOINT SPECIALIZATION

- Disjoint means payment can't be more than one at a time.
- User can use only one payment type at a time



THANK YOU!!!

QUESTIONS ?