

# Addis Ababa University

## Addis Ababa Institute of Technology

### School of Electrical and Computer Engineering

#### Database Systems Project

Title: - Electronic commerce (Online retailer website)

Phase one:- Requirements Analysis and Conceptual Design

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## 1 Introduction:

Electronic commerce, also known as ecommerce is an industry where buying and selling of a product is conducted over electronic systems such as the internet.

## 2 Overall Description

### 2.1 Description:

- Anyone can view products and their prices on the website.
- Users (customer) should be able to search for a product on the website by using related attributes for example book by author, movie by a title.
- Users (customer) who have created or registered to the website can use the website for viewing and purchasing or buying the products they want or need.
- Sellers can use the website for selling and buying products they can remove edit and add items to their selling list.
- Contact us page which has contact information of sellers is available for people who have purchased a product to contact the seller for queries regarding their product.
- The roles available are : Visitor, Users(Sellers and buyers)
  - Any Visitor can view available products and also search through the database using key words to find product they want to buy or check out.
  - User can view and purchase products.
  - A seller has some more privilege including
    - They can sell products, they also have privilege of visitor and user.
    - Sellers can add new products to the website, edit existing products content and also remove products.
    - Sellers can contact users about queries (orders) and purchased item.

The system should provide a way to

- Keep records customers and admins information.
- Keep what the sellers have sold and what the buyer has bought or purchased products.
- Keep data about all the products up for sell in their prospective category.
- Show how much sellers have profited from their sell history.

### 2.2 Web Pages details:

- ✓ Home Page
  - On this page the visitor can view and scroll through the different featured products.
  - Have access to register as a buyer on a seller or supplier.
- ✓ About Us Page
  - This gives the general description of the website, services it provides and its goals and plans for the future.

- ✓ Product Page
  - Detail of the product page explains more about the product and its specifications to the potential buyer.
  - Category page divides the products on the database based on the category (departments) for example it could have a electronics section a book section etc.
- ✓ Shopping cart Page
  - The cart will show the buyer the products in their cart from there they could either chose to check out and buy the products or remove them from the cart.
  - Cash out page after the buyer has decided to check out on this page the buyers fills out the necessary payment information.
- ✓ Seller(Supplier) Page
  - On this page the supplied can import the products they want to sell on the website by filling the necessary information
- ✓ Sign up (Register) Page
  - This page is used by visitors so they can register and either buy or sell products on the website.
  - They will create user name (email address in this case) and password so they can sign in and use the website for selling or buying products.
- ✓ Login Page
  - It is used to log in to the website by using user name (email address in this case) and password.
  - The user can change his password if he forgets it.

### 3 Conceptual Design

#### 3.1 Customer (Buyer)

**Customer** is an individual or business that purchases another company's goods or services. Customers are important because they drive revenues; without them, businesses cannot continue to exist. In our case, we consider our customers to be the possible users of our application.

**customer attributes** are:

1. First Name {multivalued attribute because it has city, street, postal code}

2. Last Name
3. Address
4. Email
5. Password {the customer can use his email as both username and password for login or sign up}
6. Phone
7. Customer ID {is primary key which is used to identify customer}

Here is an example of what our customer attributes would look like:

First Name: Elias

Last Name: Ali

Address: Ethiopia, Addis Ababa, Piazza, Street 13/1265, POBOX1011 ....

Email: [example613@gmail.com](mailto:example613@gmail.com)

Password: 1234abcd

Phone: 0911970797

Customer ID: CS0017

**customer attributes** are useful to:

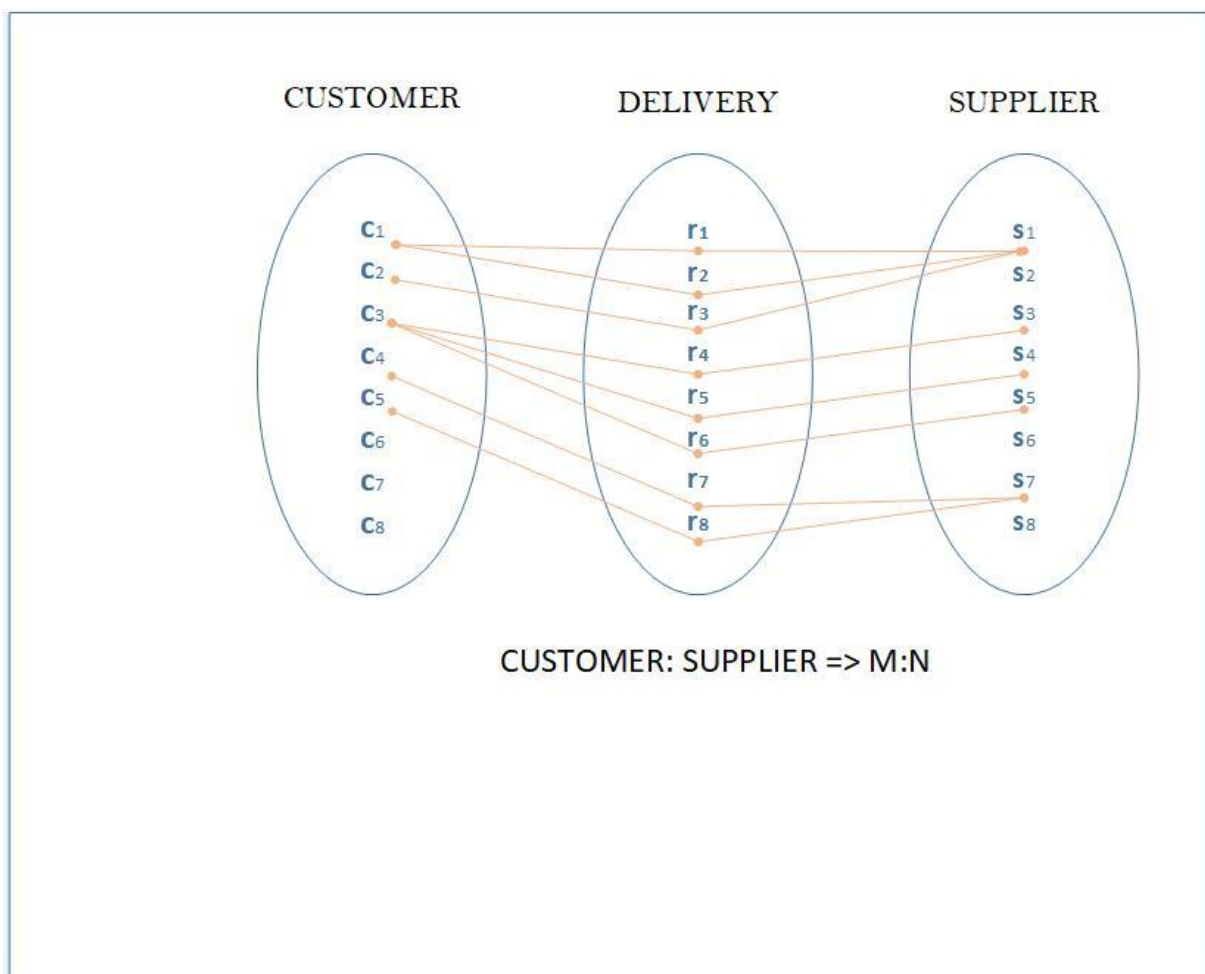
- Segment your users into groups.
- Combine attributes to build filtered down lists.
- Kick-off campaigns to automate your marketing workflow.
- Send newsletters and text messages direct to tagged people

Customer relationships.

- relationship between **customer** and **order** entity can be described as follows:
- A customer can place one to many orders. The purchase order can be placed by only one customer. For example, the ordered object can be linked with only one customer

but can be associated with many orders. The **class** of order is associated with **class** of customers.

- The relationship between the **customer entity** and the **order entity** is an example of a **one-to-many** type of relationship. A **customer** can place many **orders**, but an **order** can contain only one **customer**.
- There is also relationship between customer entity and the cart entity. **Customer** can add his favorites into **cart** to buy different products at different time or remove products from **cart**.



### 3.2 Supplier (Seller)

In a supply chain (a network between a company and its supplier to produce and distribute a specific product or service), a supplier is a seller in an enterprise that contributes goods or services. A supplier is usually a manufacturer or distributor. Mostly, suppliers do not interact

with consumers directly, leaving that task to sellers, selling platform (ecommerce) or shop owners. Supplier is an entity which has many attribute like an identifying number, a name, contact information, address and the like.

#### Supplier attributes

- Phone
- Email
- Name
- Supplier ID
- Password
- Address

#### Supplier attributes with its explanation

- ✓ Phone – phone number of the supplier.
- ✓ Email – email address of the supplier to provide information about the supplied product.
- ✓ Seller Name – it is the name of a supplier. It can be either the shop(store) name or what the seller wants
- ✓ Supplier ID – it is the primary key which identifies a particular supplier from others.
- ✓ Password – password is needed to enable supplier to register on the platform and login using it to its account another time to provide another product through the medium.
- ✓ Address – address of the supplier it may be an organizations address or single individual's address. Address also is a composite valued attribute it includes ZIP code, country, city, street address (street address is also a composite attribute that has attributes like number, street name and apartment number).

#### Examples on the above attributes:

- ✓ Phone +251900550637
- ✓ Email [daniel44@gmail.com](mailto:daniel44@gmail.com)
- ✓ Seller Name MY electronics, Natnael, GM movies
- ✓ Supplier ID 324451
- ✓ Password ddese567E!
- ✓ Address Country: Ethiopia  
City: Addis Ababa  
ZIP Code: 1000

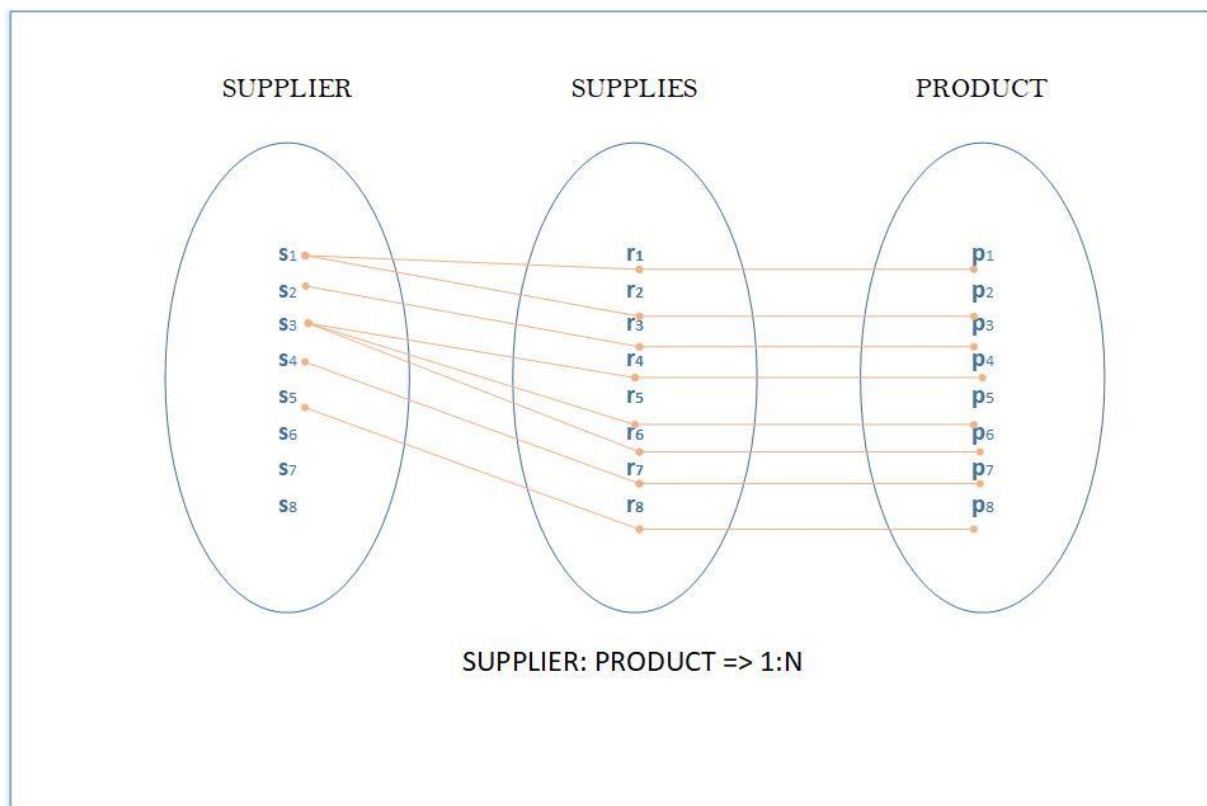
Street address: Number – 345Gd  
Street name – King George  
Apartment - 1340

### Supplier Relationship:

Supplier has relationships with other entities like costumers, products and orders. A supplier delivers to customers supplied products and waits for other orders from costumers. In other words supplier uploads products with its description and price, to consumers in order for them to buy it meaning supplier delivers to consumers. Here we have note that one supplier can deliver too many consumers. So, supplier has one to many relationships with the consumer. Supplier supplies different kinds of products. Here we have to notice that supplier have a one to many relationships with the product. Supplier also has many orders. These orders are mainly from different consumers. This means one supplier can have many orders at the same time. Thus we can conclude that all of the three relationship supplier has with different entities mentioned are a one to many relationships.

### Examples on supplier relationships:

- ✓ Daniel delivers to all consumers that uses that specific platform
- ✓ Daniel supplied different t-shirts with different size and trousers
- ✓ Consumers orders trousers, shoes...





### 3.3 Products

Products are considered as the items that are going to be sold on the website. They are created when a seller logs in to our website and puts an item for sell. Products are considered as an entity. When an item is entered from the seller it has its own name, description etc. we consider this to be the attributes that define our product

Attributes for product include:

- Product ID:-a product will have a unique key for identifying it. This key is the primary key.
- Product name:-is a name provided by the seller when the seller puts up the product in the website for sell.
- Product description:-this is a description detailed to a product that the seller writes regarding the product features and other important aspect.
- Product cost price:- is the cost price that the seller has spent on the product this and the product selling price will later be used to calculate the profit so that the seller can have some financial feedback from the system(website).
- Product selling price:-this is the selling price that the seller gives a product and it is also the price the customer sees with the other product features.
- Published Date:-this is the date the product was first published on the site by the seller.
- Product year: - is the year that each product was made.
- Quantity: - the number of product that are available for sell.
- Product Type: - what type of product it is inside its category subclass.

Example on the product attributes with:-

- Product id:-4562.
- Product name:-Database Design for Mere Mortals: A Hands-On Guide to Relational Database Design 3rd Edition, Kindle Edition.
- Product description (features):-the best book about database design, Length: 765 pages, Enhanced Type setting and page Flip: Enabled.
- Products cost price:-450 birr.
- Products selling price:-500 birr.
- Published Date:-April 17, 2021.
- Product year:-Feb 14, 2013.
- Quantity: 50 copies.
- Product Type:-computer science, educational.

Other entities which will have all the attributes of the product entity and they are disjointed from it are the entities that are considered to be the categories of product they are considered to be the subclasses they include: Books, Electronics and Movies

When a seller enters information about the product that they are going to sell they will have to assign the product to the above categories (departments) to create a well-organized database.

From the subclass entities each of them have their own unique attributes:

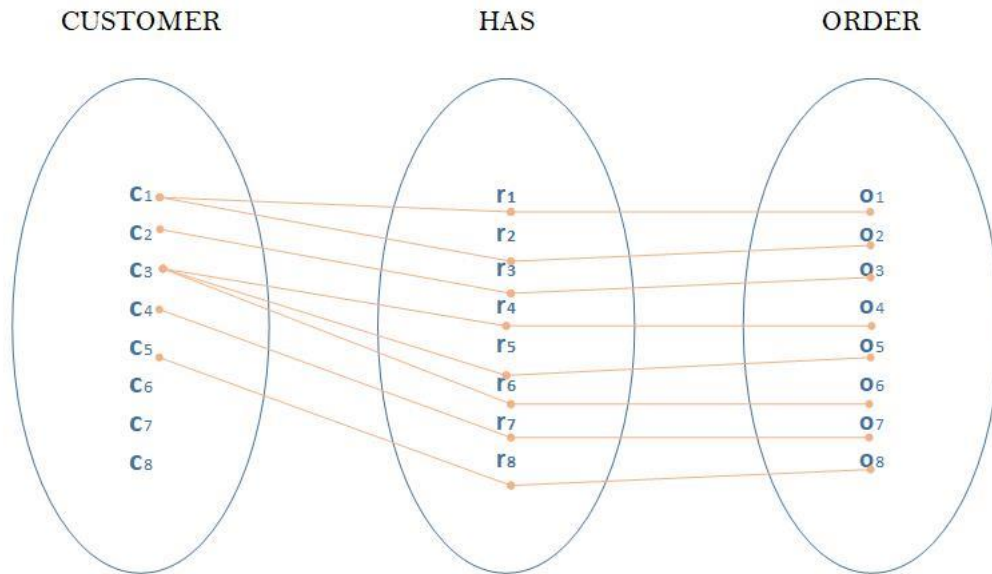
Book has an Author as a multi valued attribute because one book could be written by different writers.

Movies also has its own unique multi valued attributes such as Genre and

Electronics have a specification attribute that is used to store the specification of the product provided by the suppliers.

**Product Relationships:**

There are two basic relationship here: one is with the supplier, the supplier supplies the product by adding new products on the database, removing products from database, or updating product status that himself uploaded on to the database. The other relationship is the one where the customer makes with the products. The customer or user can view and order (buy) products or add them to his/her cart.



CUSTOMER: ORDER => 1:N

### 3.4 ORDERS

ORDER is a product which customer has paid for it. Therefore it has to be delivered to customer through the supplier who upload the product on the website. Order has its own attribute such as order date, profit and others. Since it is ordered by a customer and every product has supplier it has also Customer ID, Product ID and Supplier ID.

Attributes of Order is: -

- Order number: - is unique id to identify each order from any other orders
- Order date: - the day when the customer owns the product through online payment.
- Profit: - is derived attribute form product attributes of cost price and selling price. It is used here to help the supplier in order to analyse the business

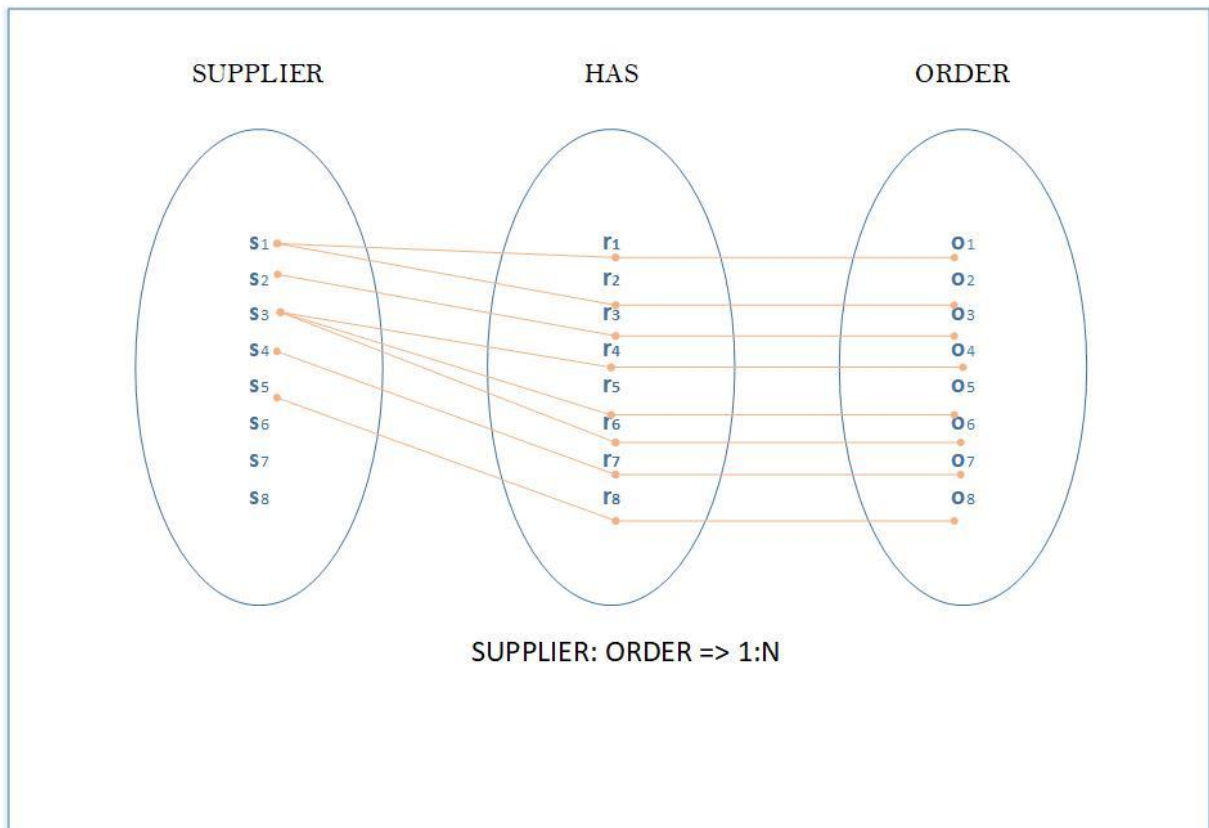
Example:

Order number: 23154

Order date: 4/17/2021

Profit: \$50

Order relationships: - Order has relationship with the supplier since every product has its own supplier. The order has to be delivered to the customer through the supplier after few days of the order date.



### 3.5 Cart

A customer adds a product to favourites for later purchase or to keep track of the status of the product whether it is in the market or if it is out of stock, then the product's Id, the customer Id and suppliers Id gets registered on this cart entity set with a cart id given for each cart.

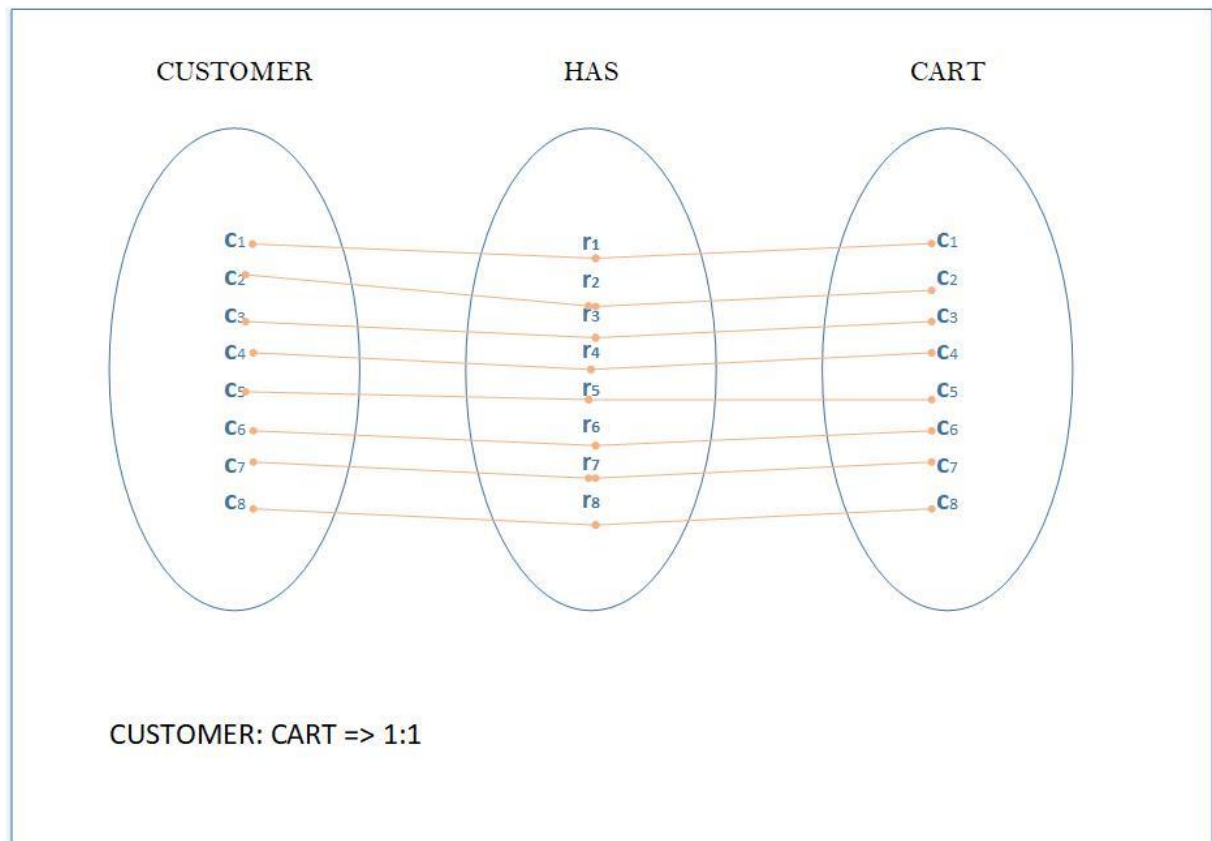
CART attributes:

Quantity: is the amount of products the customer selected

Cart Id: to specify every cart there is.

There is a relationship between the customer and the cart entity set which we called the “HAS” relationship. Which could be read as a customer with an Id number of 12xxxx HAS a cart with an Id number of 08xxxx. The cardinality between the two entity sets the customer and the cart is one to one, one customer will have one cart with a cart id.

There is also relationship between the product and cart. The relationship is one to many, because a cart can have number of products. And a product can be found only in a cart.



## **Participation constraints and Existence dependencies**

- Every supplier must deliver an order
- Every customer has the right to be delivered
- Every supplier must supply product
- Every product has supplier
- Every cart has customer
- Every customer has no cart
- Every customer doesn't order
- Every order has customer
- Every supplier has no order
- Every order has supplier
- Every cart has product
- Every product isn't in cart
- Every order has product
- Every product isn't ordered

