**Business Rules**

Business rules for a database are brief descriptions of policies that define what and how the data and information in a database are entered, stored, and processed. The online shopping database system consists of ten major entities; Customer, Employee, Orders, Zip, Stores, Region, Payment, Order item, Product, and Product category. Business rules are put into place during the design phase of a database system. Some of the business rules are as follows:

* A customer has one and only one zip

Each zip belongs to zero or many customers

* A customer can place one or many orders

Each order belongs to one and only one customer

* Each order has one or more payment

A payment belongs to one and only one order

* An order can have one or more items

Each item belongs to one and only one order

* Each order item belongs to one and only one product

A product has zero or more items

* An employee can place zero or many orders

Each order must be placed by one and only one employee

* An employee is assigned for only one store

Each store has zero or many employees

* A region has zero or more stores

Each store belongs to one and only one region

* A product can only belong to one category

Each category has zero or more products

* An employee can only belong to one zip

Each zip is assigned for zero or many employees

* A store has one and only one zip

Each zip belongs to zero or many stores

These are some of the basic business rules that we should implement to design a database. These business rules control the relationships and constraints of the database. Business rules also must be updated on time to stay aware of the operational condition of the business. There must be a good relationship among the major entities. The creation of the logical data model is key to the understanding how the rest of the design process will work. A physical database model (relational schema) shows all table structures, including *column name, column data type, column constraints, primary key, foreign key,* and *relationships* between tables. Features of a physical data model include:

* Specification of all tables and columns.
* Foreign keys are used to identify relationships between tables.

The steps for physical data model design are as follows:

-Convert entities into tables.

* Convert relationships into foreign keys.
* Convert attributes into columns.
* Modify the physical data model based on physical constraints / requirements.

***Relationship and Cardinality among Entities***

The following association exists between entities.

* customer and orders: *zero or many to one* relationship
* customer and zip: *one and only one to zero or many* relationship
* orders and payment: *one or many to only one* relationship
* orders and orders item: *one or many to only one* relationship
* order item and product: *only* *one to zero or many* relationship
* Product and product category: *one and only one to zero or many* relationship
* Stores and region: *one and only one to zero or many* relationship
* Employee and stores: *one and only one to zero or many* relationship
* Employee and orders: *zero or many to one and only one* relationship
* Employee and zip: *one and only one to zero or many* relationship
* Zip and stores: *zero or many to one and only one* relationship

***Keys***

* The primary key for *customer table* would be the CUSTMERID
* The primary key for *orders table* would be ORDERID. The foreign keys for this table would be CUSTMERID and SALES\_EMP\_SS.
* The primary key for *payment table* would be PAYMENTID. The foreign keys for this table would be ORDERID.
* The primary key for *order item* *table* would be ORDERID. The foreign key for this table would be ORDERID and PRODUCTID.
* The primary key for *product table* would be PRODUCTID. The foreign key for this table would be PRODCATID.
* The primary key for *product category table* would be PRODCATID.
* The primary key for *region table* would be REGIONID.
* The primary key for *stores table* would be STOREID. The foreign key for this table would be ZIPCODE.
* The primary key for *employee table* would be SALES\_EMP\_SS. The foreign key for this table would be ZIPCODE and STOREID.
* The primary key for *zip table* would be ZIPCODE.

Therefore, these tables are related to one another through important keys. In this way, the entire online shopping database system is integrated within a single database.

**Entity relationship diagram (ERD)**

