Gurjus Singh

MSDS 420 – DATABASE SYSTEMS

EXERCISE 2: ER DIAGRAMS



1. Based on the Crow's Foot ERD below: a) discuss the entities (5 points) for each entity,  b) discuss the attributes (5 points), c) the relationship cardinalities (5 points) and d) the primary and foreign keys (5 points).

**ANSWER:**

**A.)** The entities in the diagram include:

* CUSTOMER
* INVOICE
* LINE
* VENDOR
* PRODUCT

**B.)** The attributes for CUSTOMER are:

* CUS\_CODE
* CUS\_LNAME
* CUS\_AREACODE
* CUS\_INITIAL
* CUS\_BALANCE
* CUS\_PHONE
* CUS\_FNAME

The attributes for INVOICE are:

* INV\_NUMBER
* INV\_DATE
* CUS\_CODE

The attributes for LINE are:

* INV\_NAME
* LINE\_NUMBER
* LINE\_UNITS
* P\_CODE
* LINE\_PRICE

The attributes for VENDOR are:

* V\_CODE
* V\_NAME
* V\_CONTACT
* V\_PHONE
* V\_ORDER
* V\_STATE
* V\_AREACODE

The attributes for PRODUCT are:

* P\_CODE
* P\_QQH
* P\_DISCOUNT
* V\_CODE
* P\_PRICE
* P\_MIN
* P\_DESCRIPTION
* P\_INDATE

**C.)** The relationship between CUSTOMER entity and INVOICE entity is a one to many where INVOICE has optional participation and there is a one and only one relationship between INVOICE and CUSTOMER.

The relationship between INVOICE entity and LINE entity is a one to many where each entity has mandatory participation and there is a one and only one relationship between LINE and INVOICE.

The relationship between LINE entity and PRODUCT entity is a many to many where LINE has optional participation and there is a one and only relationship between LINE and PRODUCT.

The relationship between VENDOR entity and PRODUCT entity is a many to many where PRODUCT has optional participation and there is one and only one relationship between PRODUCT and VENDOR.

**D.)** CUSTOMER entity has CUS\_CODE as its primary key, and no foreign keys

INVOICE entity has INV\_NUMBER as its primary key and CUS\_CODE as its foreign key.

LINE entity has two primary keys in INV\_NUMBER and LINE\_NUMBER which make up a composite key, and INV\_NUMBER is also a foreign key since it is a primary/candidate key of the INVOICE entity.

VENDOR entity has one primary key in V\_CODE and no foreign keys.

PRODUCT entity has one primary key P\_CODE and V\_CODE as its foreign key.

2.) Write the business rules that are reflected in the following Crow’s Foot ERD (10 points). An example of a business rule in the given ERD: ***Every customer can have many invoices.***

**ANSWER:**

A CUSTOMER has zero or more INVOICES. An INVOICE belongs to one and only CUSTOMER.

An INVOICE has one or more LINES. A LINE belongs to one and only one INVOICE.

Zero or more LINES contain details on one and only one PRODUCT. A PRODUCT entity is contained in zero or more LINES.

A VENDOR sells zero or more PRODUCTS. A PRODUCT is sold by one and only one VENDOR.