

Based on the Crow's Foot ERD below: a) list the entities (8 points), b) list the attributes per entity (8 points), c) list the four relationships and their cardinalities (8 points) and d) list the primary and foreign keys per entity (8 points).

a. Entities:

Customer, Invoice, Line, Vendor, Product

b. Attributes:

Customer attributes:

cus_code = code that identifies a customer

cus_lname = customer last name

cus_areacode = area code of the 7 digit phone number of a customer **cus_initial** = customer middle initial

cus_balance = balance to be paid by the customer

cus_phone = customer's 7 digit phone number

cus_fname = customer first name

Invoice attributes:

inv_number = number representing an invoice **inv_date** = invoice date

cus_code = code that identifies a customer

Line attributes:

inv_number = number representing an invoice

line_number = an invoice contains many items of sale; each sale is written as a line in an invoice with a number that identifies the particular sale line. N.B.: The lines numbers (1, 2, 3, etc.) just determine the position of the line within a particular invoice.

line_units = number of units bought of the particular product in that line p_code = product code

line_price = price of the product (assume equal to p_price - p_discount)

Vendor attributes:

v_name = vendor name

v_code = vendor code

v_contact = contact info of vendor

v_phone = vendor's 7 digit phone number

v_order = flag indicating whether they vendor was previously used (Y or N) v_state = vendor state

v_areacode = vendor area code

Product attributes:

p_code = product code

p_QOH = Quantity On Hand (for stock purposes)

p_discount = product specific discount

v_code = vendor code

p_price = price of the product

p_min = minimum number of units to be in stock (for ordering purpose) p_description = product description

p_indate = when the product came in last time

C) Relationships and Cardinalities

- 1 and 2 - customer and invoice

One customer will have zero or more invoices, zero or more invoices

can belong to one customer (1 and only 1 : zero or many).

- 3 and 4 - invoice and line

One invoice will have one or many lines, one or many lines will

belong to one and only one invoice (1: 1 or many).

- 5 and 6 - line and product

One line will have zero or many products, one and only one product

will have zero or many lines (1: zero or many).

- 7 and 8 - product and vendor

One vendor supplies zero or many products, and zero or many

products are supplied one vendor (1: zero or many). D) Primary and Foreign Keys per Entity

- Customer entity
 - primarykey-Cus_Code ○
- Invoice entity

○ primarykey-Inv_Number

○ foreignkey-Cus_Code(Invoice.Cus_Code relates to primary

key in Customer.Cus_Code) • Line entity

- primary key–Inv_Number and Line_number serve as the composite key
- foreign key–P_Code(Line.P_Code relates to primary key in Product.P_Code)
 - Product entity
 - primary key–P_Code
 - foreign key–V_Code(Product.V_Code relates to primary key in Vendor.V_Code)
 -
 - Vendor entity
 - primarykey–V_Code
- 2. Write the eight business rules that are reflected in the following Crow's Foot ERD (8 points). Note the red **1- 8** below represents eight business rules. An example of a business rule in the given ERD: ***Every customer can have many invoices.***
 1. Every customer can have zero or more invoices.
 2. Zero or many invoices are generated for a customer.
 3. Every invoice can have one or many lines.
 4. One or many lines can be generated for an invoice.
 5. Zero or many lines can belong to one product.
 6. One product can have zero or many lines.
 7. Zero or many products are supplied by a vendor.
 8. One vendor supplies zero or many products.

