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MSDS-420; Dr. Atef Bader
Exercise #2
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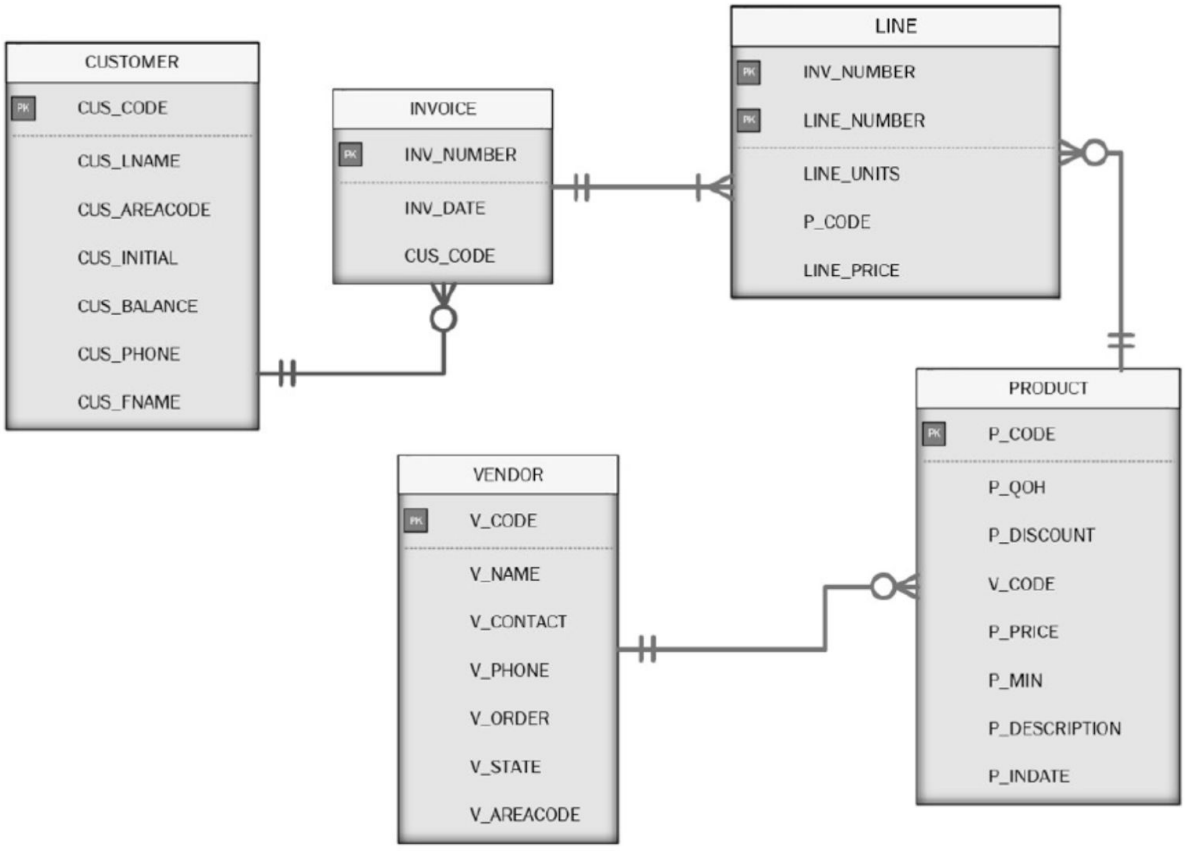

1. The above is an entity-relationship diagram that represents the relationships between entities (tables) within a database schema and how they relate to one another. The first table I would like to mention is the customer table. This table is composed of a primary key, CUS_CODE, which represents each observation within the table uniquely. This table has additional attributes that describe the customer such as the customer's last name, area code, initials, balance, phone number, and first name. This ERD has made the labeling of each attribute very intuitive for the downstream consumer of this documentation. The customer table has an optional one-to-many relationship with the invoice entity. A customer can exist without having an invoice. The attribute CUS_CODE within the invoice entity acts as the foreign key which creates the relationship between the two tables. INV_NUMBER is the primary key that uniquely identifies each row and INV_DATE is the final attribute that provides the date of the invoice (assumption). The invoice table has a mandatory one-to-many relationship with the Line table, where INV_NUMBER in the Line table acts as the foreign key that creates the relationship between the two tables. The Line table also has two primary keys which are composed of INV_NUMBER

from the Invoice table and LINE_NUMBER; this composite key helps identify each observation uniquely. They are additional attributes in the Line table but one I would like to highlight is P_CODE, the foreign key which creates the relationship between Line and Product. The Product table has an optional one-to-many relationship with the Line table. One product can be found in many invoices (multiple customers buying the same product). As I alluded to earlier, P_CODE is the primary key in the Product table and the foreign key in the Line table. The product table has additional attributes that describe the product such as price and description but vendor code (V_CODE), is the foreign key that builds the relationship between the Product and Vendor table. V_CODE is the primary key in the Vendor table which has an optional one-to-many relationship with the Product table; a vendor has the opportunity to produce multiple products. The vendor table also has additional descriptive attributes such as vendor name (V_NAME), a person of contact (V_CONTACT), and more.

2. Below will highlight the business rules that are derived from the ERD diagram.
    - A customer can have many invoices but is not required to have any
    - An invoice can only belong to one customer
    - An invoice can have multiple line items but must have at least have one
    - Each line item can only be part of one invoice
    - Each line item belongs to one product
    - Each product can belong to multiple line items but is not required to belong to any
    - Each vendor can have one or more products but is not required to have any
    - Each product can only belong to one vendor