

Customer(customer\_ID, customer\_first\_name, customer\_last\_name, customer\_user\_name, customer\_password, customer\_address)

Order(order\_ID, order\_date, order\_time, Customer.customer\_ID)

Payment(account\_ID, account\_Name, Customer.customer\_ID, Bank.bank\_ID, Card.card\_ID)

Bank(bank\_ID, account\_number, routing\_number, payment.account\_ID)

Card(card\_number, expiration\_date, cvv, payment.account\_ID)

Product(product\_ID, product\_name, product\_price, Vendor.vendor\_ID, Discount.discount\_ID, Order.order\_ID)

Vendor(vendor\_ID, vendor\_name, vendor\_URL)

Discounts(discount\_ID, percent\_off, start\_date, end\_date, Vendor.vendor\_ID)

Constraints:

Not Null: customer\_ID, order\_ID, account\_ID, product\_ID, store\_ID, discount\_ID, bank\_ID, card\_ID

Unique: customer\_ID, order\_ID, account\_ID, product\_ID, vendor\_ID, discount\_ID, bank\_ID, card\_ID, customer\_username, account\_num, card\_num

Functional Dependencies:

**Customer table:**

F= {customer\_ID -> customer\_first\_name, customer\_last\_name, customer\_address, customer\_username, customer\_password

customer\_username -> customer\_first\_name, customer\_last\_name, customer\_ID

}

**Order Table:**

F= {Order\_ID -> order\_date, order\_time, Customer.customer\_ID}

**Payment Table:**

F= {account\_ID -> account\_Name, Customer.customer\_ID, Bank.bank\_id, Card.card\_id}

**Bank account Table:**

F= {bank\_account\_number -> bank\_routing\_number, payment.account\_ID)

**Card Table:**

F= {card\_number -> card\_expiration\_date, card\_ccv, payment.account\_ID}

**Product Table:**

F= {product\_ID -> product\_name, product\_price, Vendor.vendor\_ID, Discounts.discount\_ID}

**Store Table:**

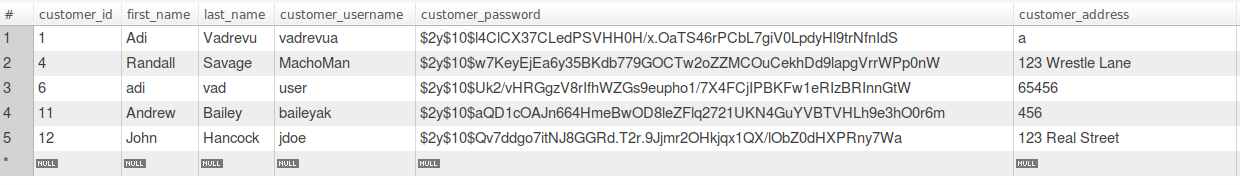
F= {store\_ID -> store\_name, store\_URL,

store\_URL -> store\_ID, store\_name}

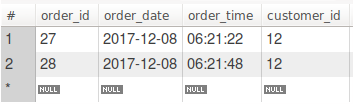
**Discounts Table:**

F= {discount\_ID -> percent\_off, start\_date, end\_date, Vendor.vendor\_ID}

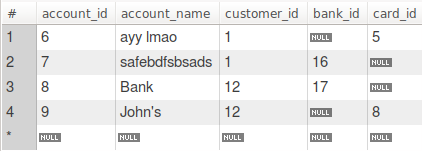
Decomposition is not necessary because all relations are in BCNF and 4th Normal Form.

Customer Table:

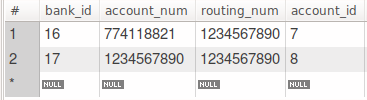
Order Table:



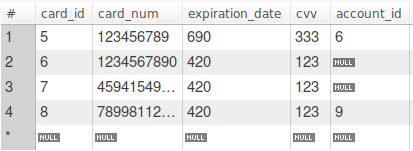
Payment Account Table:



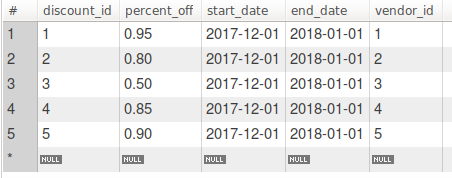
Bank Account Table:



Card Account Table:

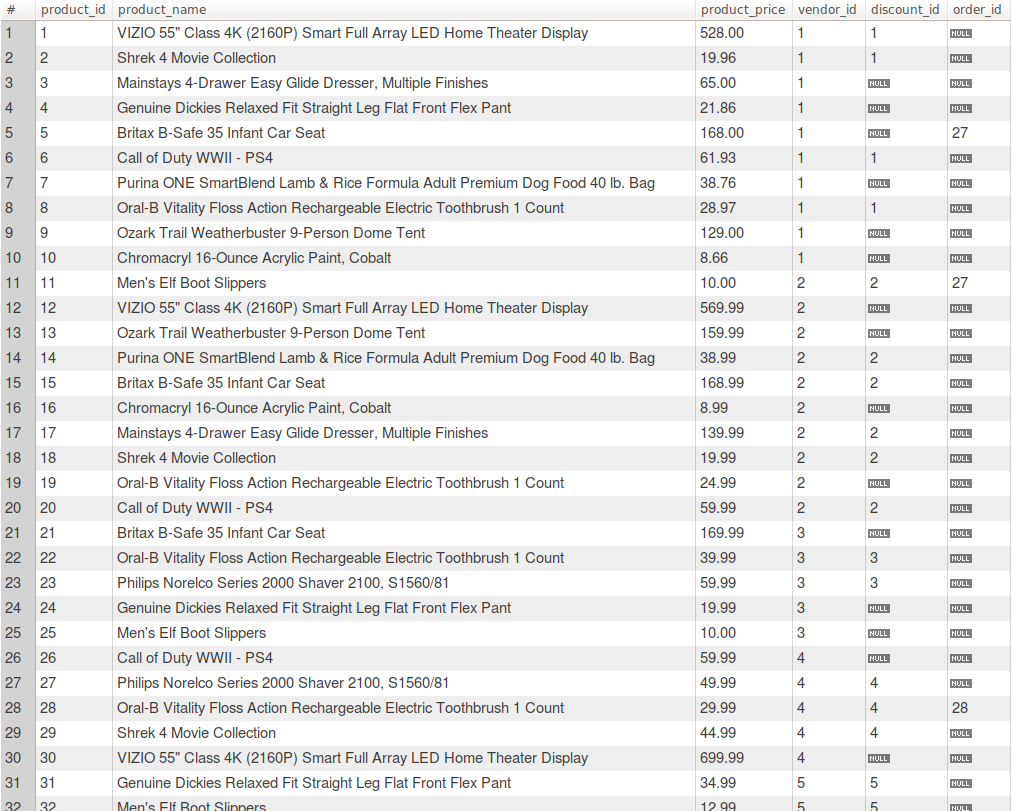


Discount Table:



Vendor Table:



Product Table: