# Problem 2:

The Sam’s Store store sells seasonal decorative items through its website. The online system contains all the information needed to accommodate sales.

Each product the company stocks and sells has a unique product id. Each product also has a description, price and quantity in stock.

* Each online customer has a unique id, name address, e-mail address, and password to login to the website
* Each customer order has a unique order number. Each order contains customer name, products ordered, quantity of each product ordered and total amount of the order.

## Solution:

### Relational Schema:

Product (productid, product­\_description, product\_price, product\_quantity\_in\_stock)

SetofFDs: product\_id 🡪product\_desc, product\_price, product\_quantity\_in\_stock

Since every product is supposed to have a separate ID it is better to have that as a primary key.

Customer (customer\_name, customer\_address, customer\_email, customer\_password)

SetofFDs: customer\_email 🡪 customer\_name, customer\_address, customer\_password

Since no repetition is possible, Email ID can be conveniently used as primary key.

Customer\_Order (order\_id, customer\_email, product\_id, quantity\_ordered)

SetofFDs: order\_id+customer\_email+product\_id 🡪 quantity\_ordered

Sine customer can always order multiple products, this provides ability to perform loss-less join to re-constitute one order at a time (not very intensive operation in a database).

Transaction (order\_id, amount)

SetofFDs: order\_id 🡪 amount

Since order IDs cant be repeated so as to keep track of the orders. It forms a favourable key for a primary key.

Since all variables are atomic, every schema is in 1NF

### 3NF or BCNF:

1. Product (product\_id, product\_desc, product\_price, product\_quantity\_in\_stock)

Since product\_id is primary key and has no subset it is a super key.

Product Schema is in 3NF and BCNF

1. Customer (customer\_id, customer\_name, customer\_address, customer\_email, customer\_password)

Since customer\_id is the primary key and has no subset it is a super key

Customer schema is in 3 NF and BCNF

1. Transaction (order\_id, amount)

Since order\_id is the primary key and has no subset it is a super key

Transaction schema is in 3 NF and BCNF

1. Customer\_Order (order\_id, customer\_id, product\_id, quantity\_ordered)

Order\_id, customer\_id, product\_id is a combined primary key.

Any subset (1 or 2 parameters cannot be used to identify the quantity of an item ordered by a customer in a specific order. i.e. no subset of the candidate key can be a candidate key.)

Therefore, (Order\_id, customer\_id, product\_id) is a super key.

Therefore, it is in 3NF and BCNF