DBMS Project
Supermarket

Team E

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Contribution:

1. Arpit Singh: Database Design, decide roles and privileges, write functions
2. Sparsh Jain: Schema Development, decide roles and privileges, write triggers
3. Pankaj Kumar: Insert Values, front end development, BCNF checking, write procedures

Requirements:

Who are the users of this system?

1. Admin
2. Managers
3. Cashiers
4. Non-Login Users (Customers, Other Employees)

Roles:

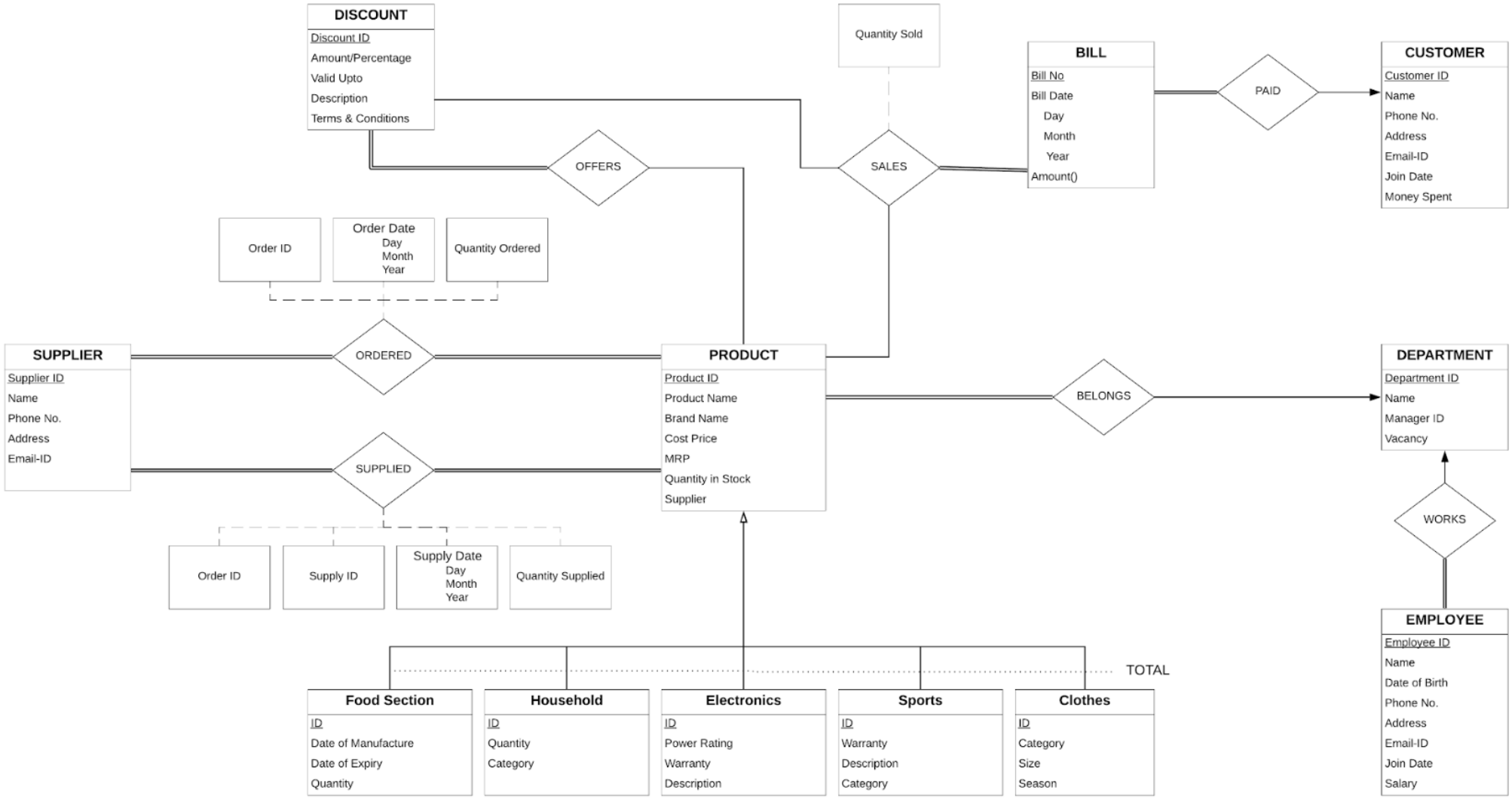
1. Admin: Can Access and Modify all entries of the database.
2. Managers: Can Hire/Fire Employees of his own department, Update vacancies in his department, Update Employee details of his department, Can add/remove/modify/order a product from its suppliers, and update the supply table when product is supplied. Can create a new discount or modify an existing one. Has read access to all the tables and Modify access to only tables required to do the above tasks for his own department only.
3. Cashiers: Can create a new bill, add/remove items from a bill, may apply discount if applicable, has read access to products, discounts, and customer details. Can also add/modify the details of a customer. On customer request, he can also produce details of a bill.
4. Non-Login Users can check details of a product and applicable discounts.

Update the stock of the product automatically when an order is supplied.

The order can be fulfilled through multiple supplies, and multiple orders can be fulfilled through a single supply.

Update the stock of the product automatically when it is added/removed from a bill.

An interface for the admin and managers (for his own department) to perform few important combination of queries such as profit/loss in a given time period, etc.


DISCOUNT
Discount ID
Amount/Percentage
Valid Upto
Description
Terms & Conditions
Quantity Sold
BILL
Bill No
Bill Date
Day
Month
Year
Amount()
PAID
CUSTOMER
Customer ID
Name
Phone No.
Address
Email-ID
Join Date
Money Spent
OFFERS
SALES
Order ID
Order Date
Day
Month
Year
Quantity Ordered
SUPPLIER
Supplier ID
Name
Phone No.
Address
Email-ID
ORDERED
PRODUCT
Product ID
Product Name
Brand Name
Cost Price
MRP
Quantity in Stock
Supplier
BELONGS
DEPARTMENT
Department ID
Name
Manager ID
Vacancy
SUPPLIED
WORKS
Order ID
Supply ID
Supply Date
Day
Month
Year
Quantity Supplied
EMPLOYEE
Employee ID
Name
Date of Birth
Phone No.
Address
Email-ID
Join Date
Salary
TOTAL
Food Section
ID
Date of Manufacture
Date of Expiry
Quantity
Household
ID
Quantity
Category
Electronics
ID
Power Rating
Warranty
Description
Sports
ID
Warranty
Description
Category
Clothes
ID
Category
Size
Season

View details

1. Create views for employees of different department to see the details of products of their respective departments (5 x {department}Details) = 5 views
2. Create view for customer to see relevant details of products of all departments (5 x view{department} + 1 viewProduct) = 6 views
3. Create a view viewDiscount to see all valid discounts applicable across products
4. Create views for manager to update product/employee details in their own departments (5 x [product/employee]{department} + employeeCashier) = 11 views
   Total - 23 views

Roles

1. Admin role (all privileges)
2. Individual managers of 5 product department + cashier
3. Customer
4. Cashier
5. Employees of each department

Privileges

1. All privileges to admin with grant option

2. Select on bill to all managers
3. Select on customer to all managers
4. All privileges on discount to all managers
5. All privileges on offers to all managers
6. All privileges on ordered to all managers
7. Select on department to all managers
8. Update only vacancy in department to all managers
9. Select on sales to all managers
10. All privileges on supplier to all managers
11. All privileges on supplied to all managers

12. All privileges of Cashier to Cash Manager with admin option
13. All privileges on employeeCashier to Cash Manager

14. All privileges of foodEmployee to foodManager with admin option
15. All privileges on foodSection to foodManager
16. All privileges on productFood to foodManager
17. All privileges on employeeFood to foodManager

18. All privileges of householdEmployee to householdManager with admin option
19. All privileges on householdSection to householdManager
20. All privileges on productHousehold to householdManager
21. All privileges on employeeHousehold to householdManager

22. All privileges of sportsEmployee to sportsManager with admin option
23. All privileges on sportsSection to sportsManager
24. All privileges on productSports to sportsManager
25. All privileges on employeeSports to sportsManager

26. All privileges of electronicsEmployee to electronicsManager with admin option
27. All privileges on electronicsSection to electronicsManager
28. All privileges on productElectronics to electronicsManager
29. All privileges on employeeElectronics to electronicsManager

30. All privileges of clothesEmployee to clothesManager with admin option
31. All privileges on clothesSection to clothesManager
32. All privileges on productClothes to clothesManager
33. All privileges on employeeClothes to clothesManager

34. All privileges of customer to all employees
35. Select on discount to all employees
36. Select on offers to all employees

37. Select on foodDetails to foodEmployee
38. Select on householdDetails to householdEmployee
39. Select on sportsDetails to sportsEmployee
40. Select on electronicsDetails to electronicsEmployee
41. Select on clothesDetails to clothesEmployee

42. All privileges of customer to cashier with admin option
43. Select on product to cashier
44. Update only quantity in stock on product to cashier
45. Select on discount to cashier
46. Select on offers to cashier
47. Select on viewDiscounts to cashier
48. All privileges on sales to cashier
49. Select on bill to cashier
50. Insert on bill to cashier
51. Update only amount on bill to cashier
52. Select on customer to cashier
53. Insert on customer to cashier
54. Update on customer to cashier

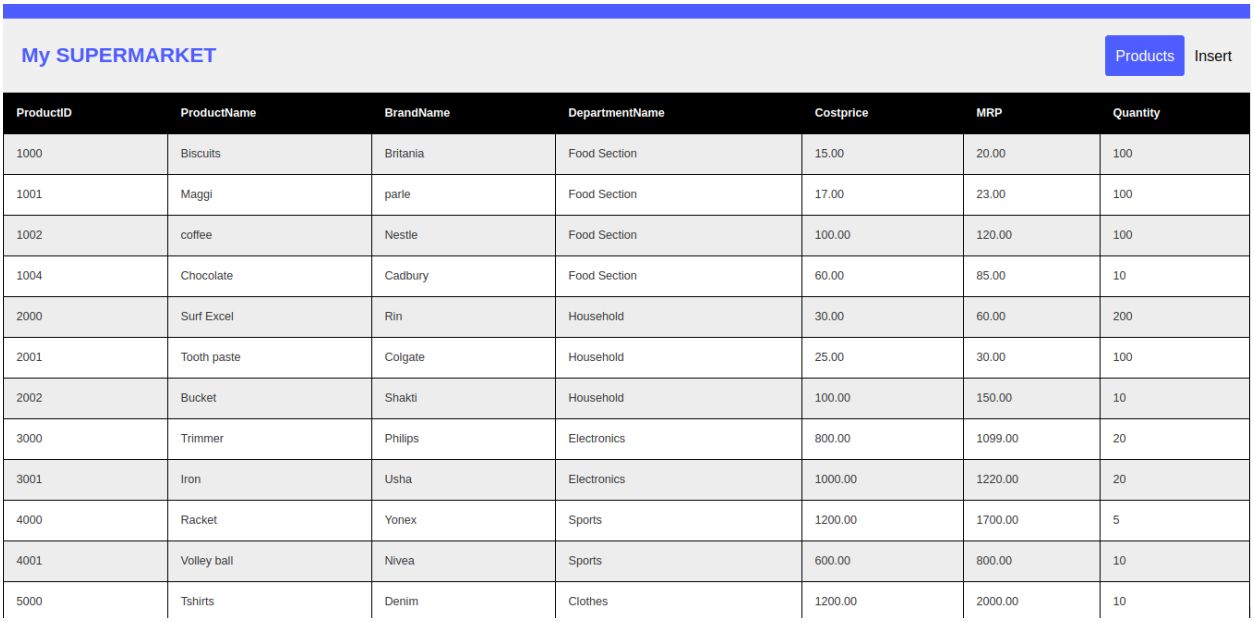
55. Select on viewFood to customer
56. Select on viewHousehold to customer
57. Select on viewSports to customer
58. Select on viewElectronics to customer
59. Select on viewClothes to customer
60. Select on viewProducts to customer
61. Select on viewDiscounts to customer

Triggers

1. Managers can be able to edit ‘offers’ table for the products of their own department only
2. Managers can order products of their own department only
3. Managers can update vacancy in their own department only
4. Managers can edit ‘supplied’ table for the products of their own department only
5. Trigger to automatically add department specific default info when a new entry is added in Product Table

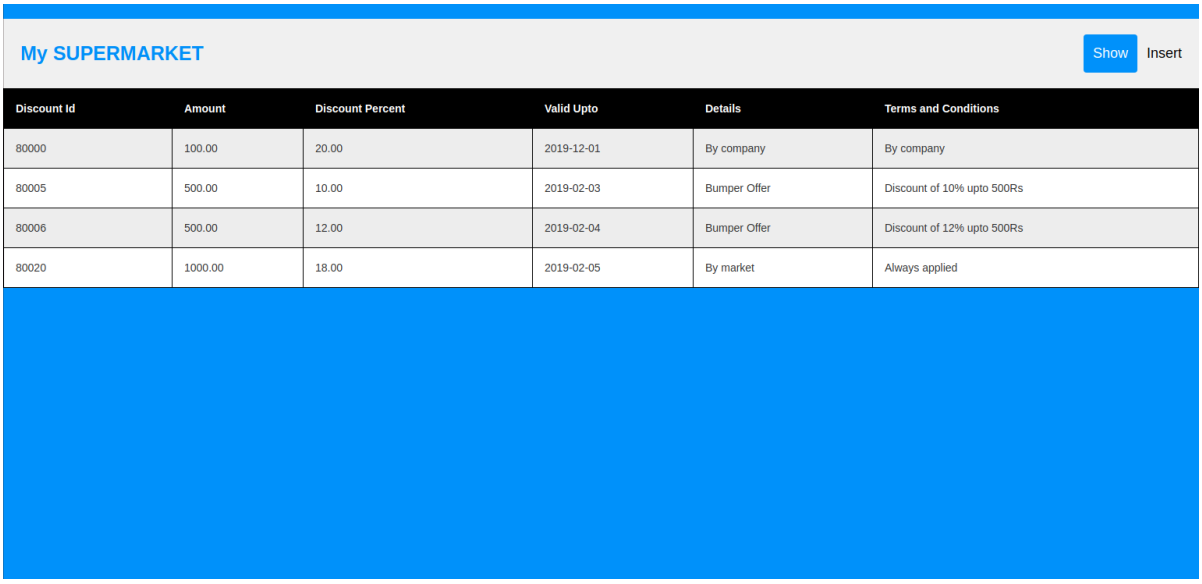
Graphical Interface

1. Show Product Table



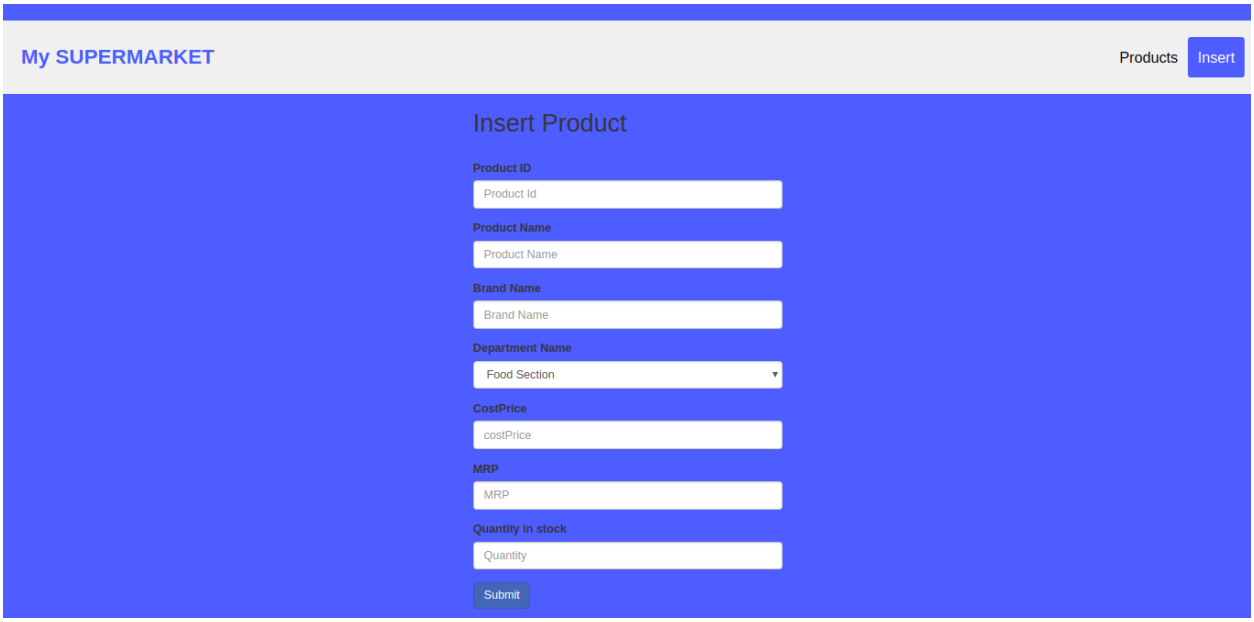
ProductID	ProductName	BrandName	DepartmentName	Costprice	MRP	Quantity
1000	Biscuits	Britania	Food Section	15.00	20.00	100
1001	Maggi	parle	Food Section	17.00	23.00	100
1002	coffee	Nestle	Food Section	100.00	120.00	100
1004	Chocolate	Cadbury	Food Section	60.00	85.00	10
2000	Surf Excel	Rin	Household	30.00	60.00	200
2001	Tooth paste	Colgate	Household	25.00	30.00	100
2002	Bucket	Shakti	Household	100.00	150.00	10
3000	Trimmer	Philips	Electronics	800.00	1099.00	20
3001	Iron	Usha	Electronics	1000.00	1220.00	20
4000	Racket	Yonex	Sports	1200.00	1700.00	5
4001	Volley ball	Nivea	Sports	600.00	800.00	10
5000	Tshirts	Denim	Clothes	1200.00	2000.00	10

2. Show Discount Table

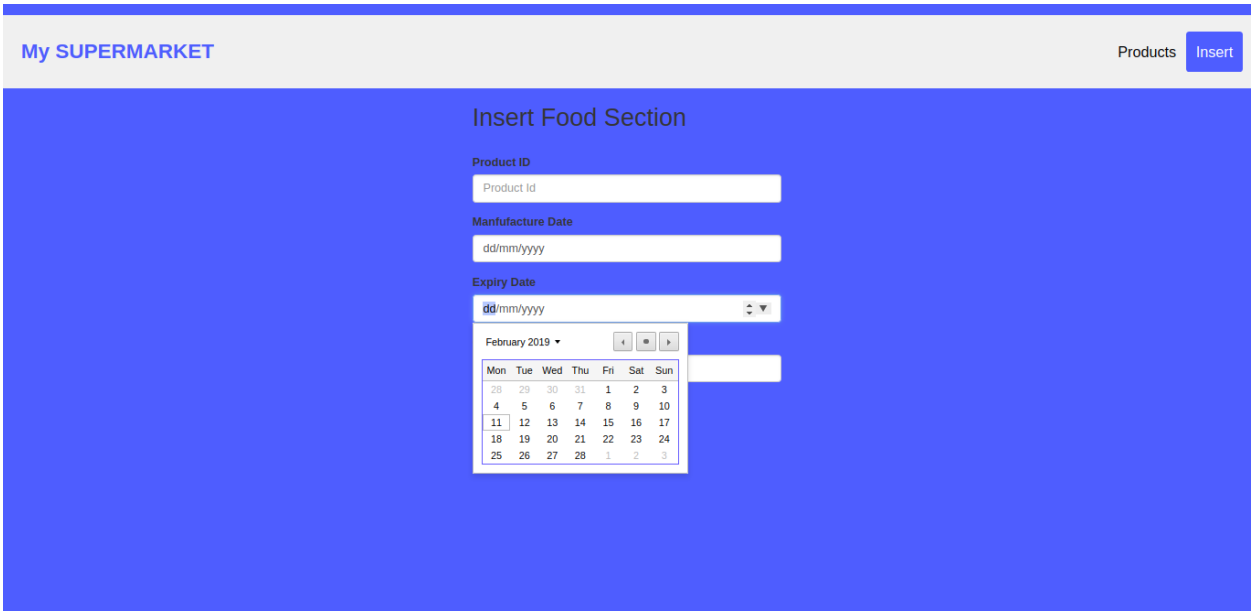


Discount Id	Amount	Discount Percent	Valid Upto	Details	Terms and Conditions
80000	100.00	20.00	2019-12-01	By company	By company
80005	500.00	10.00	2019-02-03	Bumper Offer	Discount of 10% upto 500Rs
80006	500.00	12.00	2019-02-04	Bumper Offer	Discount of 12% upto 500Rs
80020	1000.00	18.00	2019-02-05	By market	Always applied

3. Insert in Product Table



4. Insert in Food Section Table



Use Cases

1. Show all Available discounts

```
MariaDB [superMarket]> select productID, productName, brandName, discountID, amount, discountPercent, MRP, validUpto, details, termsAndConditions
    -> from discount natural join offers natural join product
    -> where quantityStock > 0 and validUpto >= (select curdate());
+-----------+-------------+-----------+------------+--------+-----------------+-------+------------+-----------+--------------------+
| productID | productName | brandName | discountID | amount | discountPercent | MRP   | validUpto  | details   | termsAndConditions |
+-----------+-------------+-----------+------------+--------+-----------------+-------+------------+-----------+--------------------+
|      1000 | Biscuits    | Britania  |      80000 | 100.00 |           20.00 | 20.00 | 2019-12-01 | By company | By company         |
+-----------+-------------+-----------+------------+--------+-----------------+-------+------------+-----------+--------------------+
1 row in set (0.002 sec)
```

2. Show food product details to customer

```
MariaDB [superMarket]> select productID, productName, brandName, MRP, manufactureDate, expiryDate, quantity
    -> from foodDetails
    -> where quantityStock > 0;
+-----------+-------------+-----------+-------+-----------------+------------+----------+
| productID | productName | brandName | MRP   | manufactureDate | expiryDate | quantity |
+-----------+-------------+-----------+-------+-----------------+------------+----------+
|      1000 | Biscuits    | Britania  | 20.00 | 2018-11-10      | 2019-12-31 | 100 gm   |
|      1001 | Maggi       | parle     | 23.00 | 2018-07-10      | 2020-12-31 | 200 gm   |
+-----------+-------------+-----------+-------+-----------------+------------+----------+
2 rows in set (0.002 sec)
```

3. Show orders and supply to check unfulfilled orders

```
MariaDB [superMarket]> select * from ordered natural left outer join supplied;
+---------+------------+-----------+------------+-----------------+----------+------------+-----------------+
| orderID | supplierID | productID | orderDate  | quantityOrdered | supplyID | supplyDate | quantitySupplied |
+---------+------------+-----------+------------+-----------------+----------+------------+-----------------+
|    1000 |       2000 |      1001 | 2019-01-01 |             100 |     1100 | 2019-01-26 |              80 |
|    1003 |       3008 |      4000 | 2018-12-01 |              10 |     1101 | 2019-01-24 |              10 |
|    5004 |       5001 |      5002 | 2019-02-04 |              10 |     NULL | NULL       |            NULL |
+---------+------------+-----------+------------+-----------------+----------+------------+-----------------+
3 rows in set (0.001 sec)
```

BCNF Checking

- product (*productID*, productName, brandName, departmentName, costPrice, MRP, quantityStock)
  Dependencies:
  1. productID -> product (productID is primary key, hence superkey)
  2. (productName, brandName) -> departmentName ((productName, brandName) is a superkey)

- foodSection (*productID*, manufactureDate, expiryDate, quantity)
  Dependencies:
  1. productID -> foodSection (productID is primary key)

- household (*productID,* quantity, category)
  Dependencies:
  1. productID -> household (productID is primary key)

- electronics (*productID*, powerRating, warranty, details)
  Dependencies:
  1. productID -> electronics (productID is primary key)

- sports (*productID,* warranty, details, category)
  Dependencies:
  1. productID -> sports (productID is primary key)

- clothes (*productID*, category, size, season)
  Dependencies:
  1. productID -> clothes (productID is primary key)

- department (*departmentName*, managerID, vacancy)
  Dependencies:
  1. departmentName -> department (departmentName is primary key)

- employee (*employeeID,* employeeName, DOB, phoneNo, employeeAddress, emailID, joinDate, salary, departmentName)
  Dependencies:
  1. employeeID -> employee (employeeID is primary key)

- supplier (*supplierID,* supplierName, phoneNo, supplierAddress, emailID)
  Dependencies:
  1. supplierID -> supplier (supplierID is primary key)

- ordered (*orderID,* supplierID, productID, orderDate, quantityOrdered)
  Dependencies:
  1. orderID -> ordered (orderID is primary key)

- supplied (*supplyID,* orderID, supplyDate, quantitySupplied)
  Dependencies:
  1. supplyID -> supplied (supplyID is primary key)

- discount (*discountID*, amount, discountPercent, validUpto, details, termsAndConditions)
  Dependencies:
  1. discountID -> discount (discountID is primary key)

- offers (*discountID, productID)*
  Dependencies:
  1. (discountID, productID) -> offers (trivial)

- customer (*customerID*, customerName, phoneNo, customerAddress, emailID, joinDate, moneySpent)
  Dependencies:
  1. customerID -> customer (customerID is primary key)
  2. (customerName, phoneNo) -> customer ((customerName, phoneNo) is super key)

- bill (*billNo,* billDate, customerID, amount)
  Dependencies:
  1. billNo -> bill (billNo is primary key)

- sales (*billNo, productID,* discountID, quantitySold)
  Dependencies:
  1. (billNo, productID) -> sales ((billNo, productID) is primary key)

Hence All Tables are in Boyce-Codd Normal Form!

Functions

1. Find current monthly profit per department: Takes input a department name and returns previous month profit from sales