Proposal Phase Report

Category: Application Development

Title: Electronics Store Management System

List of Team Members

- *Rishab Jain* – **TEAM LEADER**
- *Aditya Vikram*
- *Yash Raj*
- *Harshita Hiremath*

Responsibilities

Aditya Vikram

- Communicating with the client and conveying his needs and requirements regarding the database system to the team.
- Worked on Problem Description and Requirements, Design Question [6 , 7].

Rishab Jain

- Worked on Design Questions [3 , 4 , 7].

Yash Raj

- Learning to develop client-side interface.

Harshita Hiremath

- Worked on Design Questions [1 , 2 , 7].

Problem Description

During a visit to a small electronics store to buy a phone charger, I noticed the fact that the sales person was using MS Excel to log the records. I approached him and asked about his business, and how many sales he makes on an average, per month. The number was surprisingly high, which prompted me to think that a mere spreadsheet is not the most efficient way to go about managing the store's data. That's when I decided to ask the sales person whether or not he'd be interested in learning and using a much better tool to manage his records, which would make his work a lot easier, to which he agreed immediately.

Requirements

With this DBMS, we aim to provide the following features to the admin:

- Ability to log new data.
- Ability to retrieve data based on parameters specified by the admin.
- Ability to manipulate existing data within the database.
- Integrated payment gateway to process e-transactions.
- Support multiple user logins, and provide relevant views to them.
- Make the database easily scalable to be able to withstand greater number of records.

Design Questions to be Answered

Question 1: From the problem description, identify the entities that need to be represented in the database, the attributes of each entity, the relationships between the entities, and the cardinality ratios of each relationship.

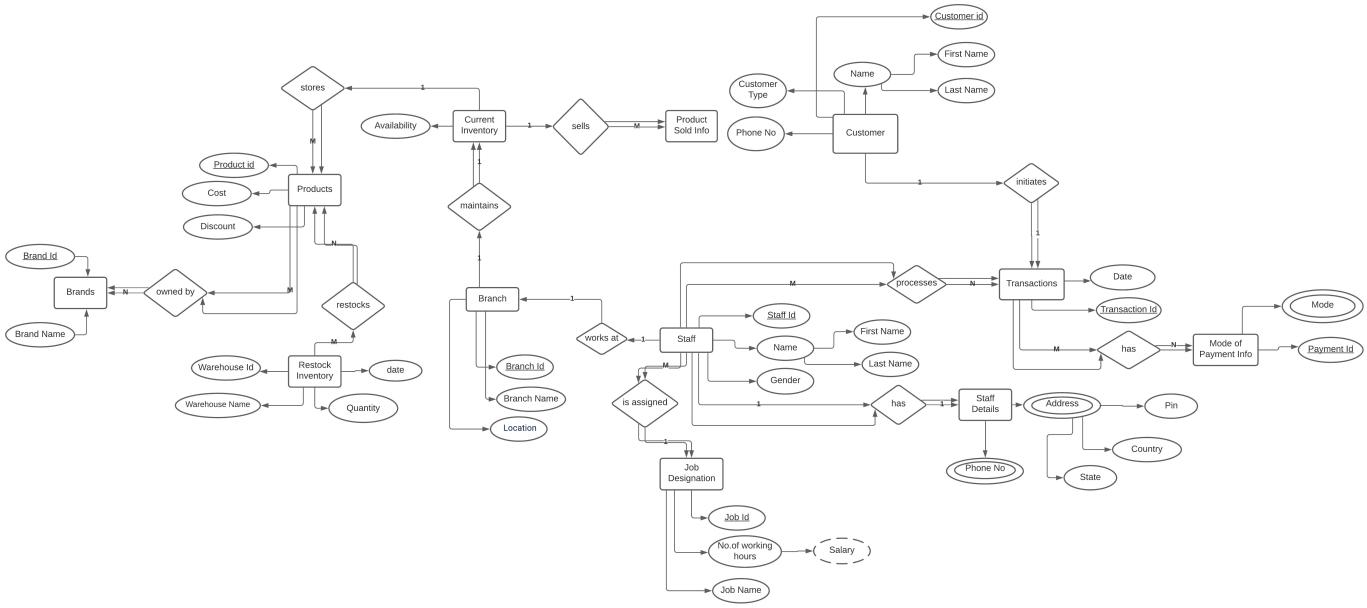
Entities that need to be represented in the database are:

- **Prime Entities:**
  - **Branch**
    1. Branch Id - PK
    2. Branch Name - Single Valued Attribute
    3. Location - Single Valued Attribute
  - **Staff**
    1. Staff Id - PK
    2. Branch Id - FK
    3. Job Id - FK
    4. Staff Name - Composite Attribute
    5. Gender - Single Value Attribute
  - **Product**
    1. Product Id - PK
    2. Product Name - Single Valued Attribute
    3. Brand Id - Single Valued Attribute
    4. Cost - Single Valued Attribute
    5. Discount - Single Valued Attribute
  - **Customer**
    1. Customer Id - PK
    2. Customer Name - Single Valued Attribute
    3. Phone Number - Multivalued Attribute
    4. Customer Type - Single Valued Attribute
  - **Transaction**
    1. Customer Id - FK
    2. Staff id - FK
    3. Transaction Id -PK
    4. Payment Id - Single Valued Attribute
    5. Date - Single Valued Attribute
- **Auxiliary Entities:**
  - **Brand**
    1. Brand Id - PK
    2. Brand Name - Single Attribute
  - **Job Designation**
    1. Job Id - PK
    2. Job Name - Single Valued Attribute
    3. Number of Working Hours - Single Valued Attribute
    4. Salary - Derived Attribute
  - **Staff Details**
    1. Staff Id - FK
    2. Address - Complex Attribute
    3. Phone Number - Multivalued Attribute
  - **Current Inventory**
    1. Product Id - FK
    2. Branch id - FK
    3. Availability - Single Value Attribute
  - **Restock Inventory**
    1. Product ID - FK
    2. Warehouse id - PK
    3. Warehouse Name - Single Value Attribute
    4. Quantity - Single Value Attribute
    5. Date - Single Valued Attribute
  - **Payment Info**
    1. Payment Id - PK
    2. Payment Mode - Multivalued Attribute

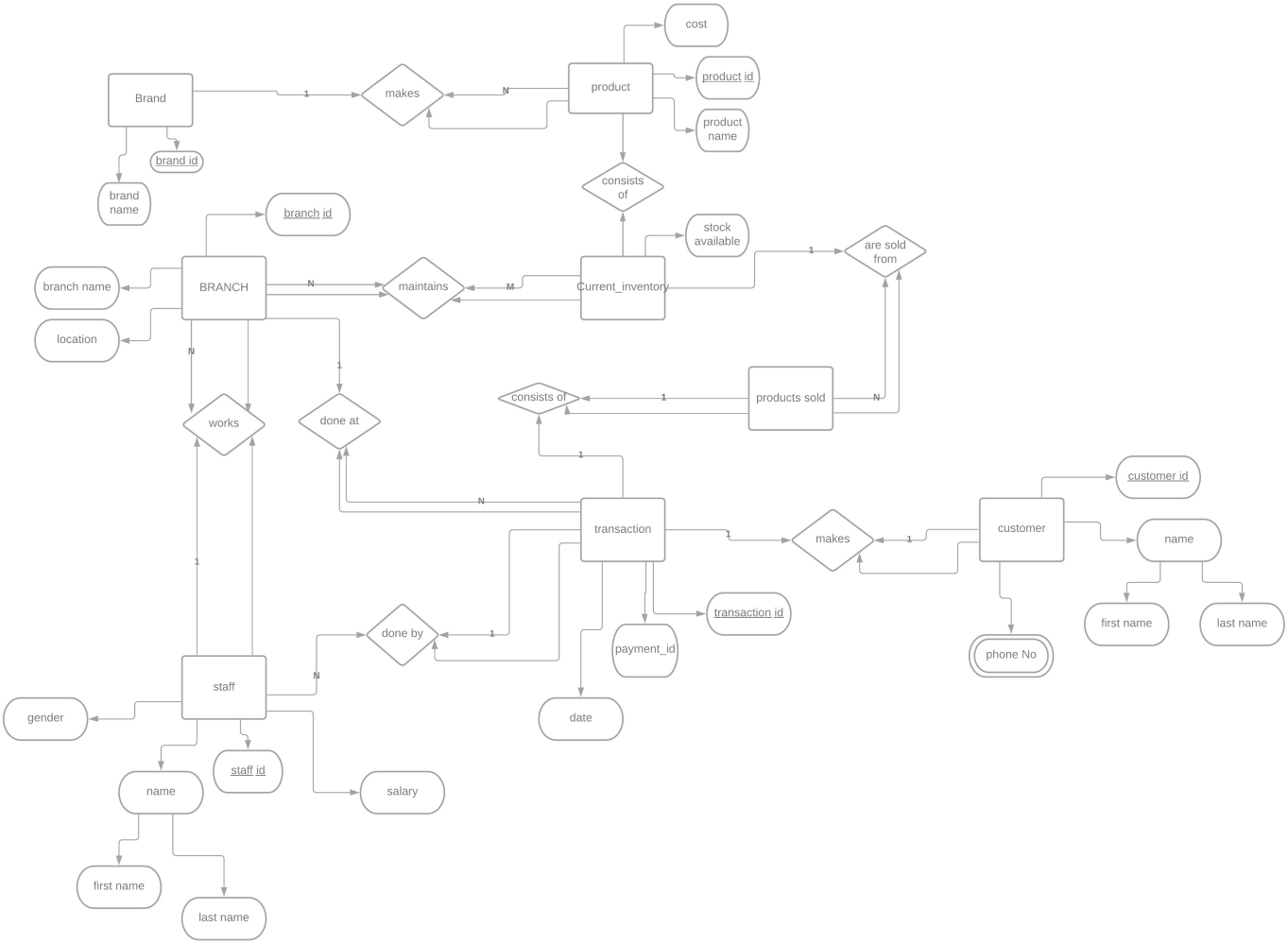
Relationships defined:

- Branch ***maintains*** current inventory - One to One relationship.
- Current Inventory ***stores*** products - Many to Many relationship.
- Restock Inventory ***restocks*** products - Many to many relationship.
- Product is ***owned*** by brand - Many to many relationship.
- Current Inventory ***sells*** available products - One to many relationship.
- Staff ***works*** at branch - One to one relationship.
- Staff ***has*** staff details - One to one relationship.
- Staff is ***assigned*** a job - Many to many relationship.
- Staff ***processes*** transactions - Many to many relationship.
- Customer ***initiates*** transaction - One to one relationship.
- Transaction ***has/is defined by*** a mode of payment - Many to many relationship.

Question 2: Draw an Entity-Relationship Diagram illustrating the information you have identified in Question 1.



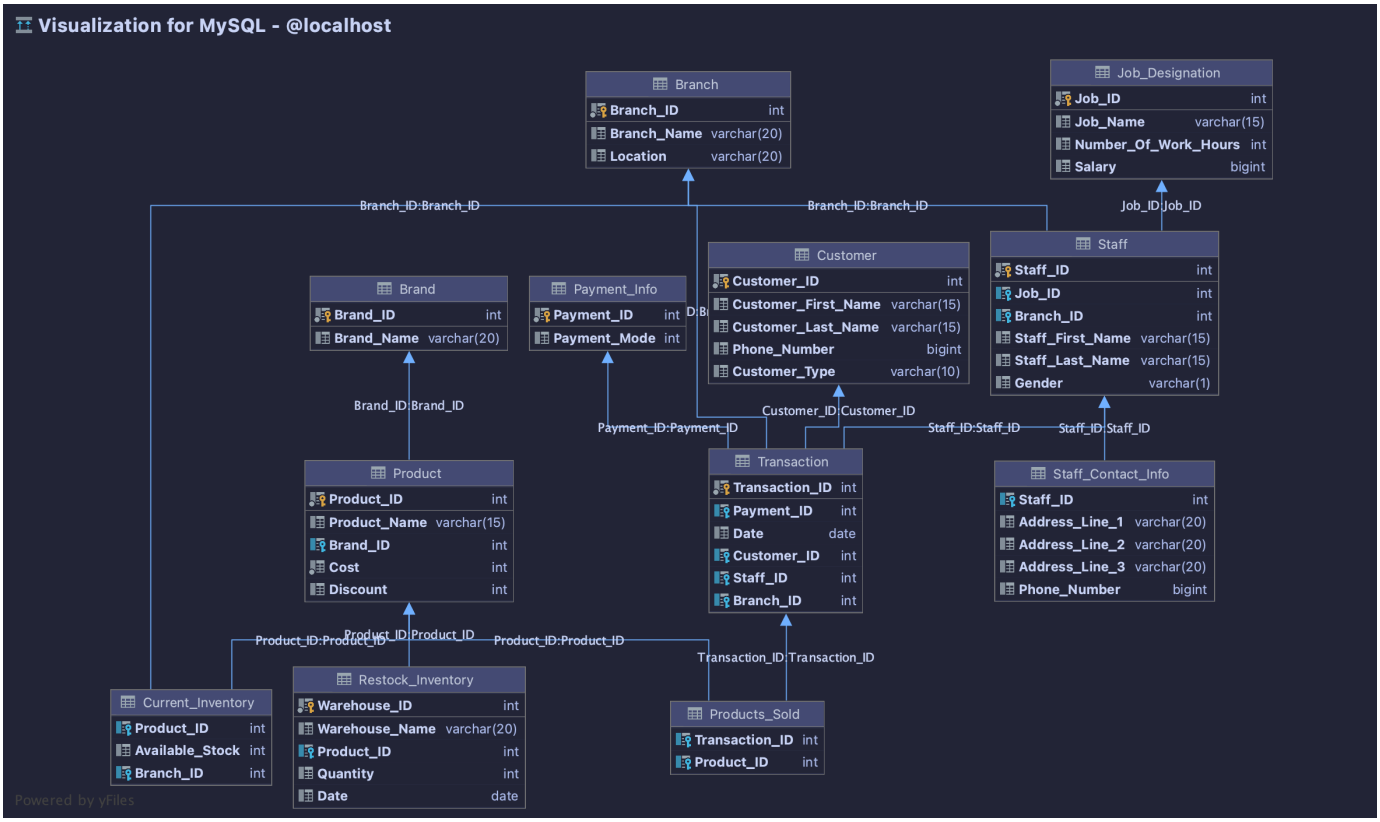
Question 3: Draw **alternate** Entity-Relationship Diagram illustrating the information you have identified in Question 1 that you think are most likely to occur.



Question 4: Choose the **optimal** Entity-Relationship Diagram from the designs provided above and justify why you think this is an optimal solution for your identified problem specification.

We feel the solution we have provided in the form of an Entity-Relationship Diagram above covers all necessary aspects that a database system for an electronics store must have to run smoothly. Thus, our optimal E-R Diagram is the one provided above.

Question 6: Draw an ER to Relation Mapping illustrating the information you have identified in Question 4.



Question 7: Draw a Data Dictionary illustrating the information you have identified in Question 6.

Object (Entity)	Name (Attribute)	Type	Description	Primary Key	Foreign Key
Branch	Branch ID	Integer	Unique ID for a particular branch	Yes	No
	Branch Name	String	Name of the branch	No	No
	Location	String	Location of the branch	No	No

Object (Entity)	Name (Attribute)	Type (Data type)	Description	Primary Key	Foreign Key
Job Designation	Job ID	Integer	Unique ID for a particular job	Yes	No
	Job Name	String	Name of the job	No	No
	Number of Working Hours	Integer	Total number of working hours for a job designation	No	No
	Salary	Integer	Salary paid to the staff for a particular job designation	No	No

Object (Entity)	Name (Attribute)	Type (Data type)	Description	Primary Key	Foreign Key
Staff	Staff ID	Integer	Unique ID for a particular staff	Yes	No
	Job ID	Integer	Unique ID for a particular job	No	Yes
	Branch ID	Integer	Unique ID for a particular branch	No	Yes
	First Name	String	Staff's first name	No	No

	Last Name	String	Staff's last name	No	No
	Gender	String	Staff's gender	No	No

Object (Entity)	Name (Attribute)	Type (Data type)	Description	Primary Key	Foreign Key
Transaction	Transaction ID	Integer	Unique ID for a particular transaction	Yes	No
	Staff ID	Integer	Unique ID for a particular staff	No	Yes
	Customer ID	Integer	Unique ID for a particular customer	No	Yes
	Branch ID	Integer	Unique ID for a particular branch	No	Yes
	Date	Date	Date on which transaction was processed	No	No
	Payment ID	Integer	Unique ID for a particular payment method	No	Yes

Object (Entity)	Name (Attribute)	Type	Description	Primary Key	Foreign Key
Brand	Brand ID	Integer	Unique ID for a particular brand	Yes	No
	Branch Name	String	Name of the brand	No	No

Object (Entity)	Name (Attribute)	Type	Description	Primary Key	Foreign Key
Payment Info	Payment ID	Integer	Unique ID for a particular payment mode	Yes	No
	Payment Mode	String	Description of the payment mode (CC/DC /UPI/Cash)	No	No

Object (Entity)	Name (Attribute)	Type	Description	Primary Key	Foreign Key
Customer	Customer ID	Integer	Unique ID for a particular customer	Yes	No
	Customer_first_name	String	Customer first name	No	No
	Customer_last_name	String	customer last name	No	No
	Phone_Number	int	Mobile number	no	no

Object (Entity)	Name (Attribute)	Type	Description	Primary Key	Foreign Key
Product	Product ID	Integer	Unique ID for a particular product	Yes	No
	Product_Name	String	product name	No	No
	Brand_id	String	Brand id	No	yes
	cost	int	cost of the product	no	no
	Discount	int	discount on the product	no	no

Object (Entity)	Name (Attribute)	Type	Description	Primary Key	Foreign Key
Staff_Contact_info	Staff_id	Integer	Unique ID for a particular staff	No	yes
	Address_line_1	String	staff's address	No	No

	Address_line_2	String	staff's address	No	No
	Phone_Number	int	Mobile number	no	no

Object (Entity)	Name (Attribute)	Type	Description	Primary Key	Foreign Key
Current_inventory	Product_id	Integer	Unique ID for a particular product	no	yes
	Available_stock	int	stock available in the branch	No	No
	Branch_id	int	unique Id for a branch	No	yes

Object (Entity)	Name (Attribute)	Type	Description	Primary Key	Foreign Key
Restock_inventory	warehouse_id	Int	Unique ID for a particular warehouse	Yes	No
	warehouse_name	String	warehouse_name	No	No
	product_id	int	Unique ID for a particular product	No	yes
	Quantity	int	quantity available	no	no
	date	date		no	no

Object (Entity)	Name (Attribute)	Type	Description	Primary Key	Foreign Key
Products_sold	Transaction_Id	int	Unique ID for a particular transaction	no	yes
	product_id	int	Unique ID for a particular product	No	yes

References:

1. Jetbrains Datagrip
2. Lucidchart

Submission Date: 18 Apr 2021