RAMAIAH
UNIVERSITY
OF APPLIED SCIENCES

ASSIGNMENT - 1

Course Code	19CSC302A
Course Name	Database Systems
Programme	B. Tech
Department	CSE
Faculty	FET

Name of the Student	K Srikanth
Reg. No	17ETCS002124
Semester/Year	5th Semester/3rd Year
Course Leader/s	Ami Rai E.

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Declaration Sheet			
Student Name	K Srikanth		
Reg. No	17ETCS002124		
Programme	B.Tech	Semester/Year	5th Semester/ 3rd Year
Course Code	19CSC302A		
Course Title	Database Systems		
Course Date	14/09/2020	to	16/02/2021
Course Leader	Ami Rai E.		

Declaration

The assignment submitted herewith is a result of my own investigations and that I have conformed to the guidelines against plagiarism as laid out in the Student Handbook. All sections of the text and results, which have been obtained from other sources, are fully referenced. I understand that cheating and plagiarism constitute a breach of University regulations and will be dealt with accordingly.

Signature of the Student		Date	
Submission date stamp (by Examination & Assessment Section)			

Signature of the Course Leader and date	Signature of the Reviewer and date

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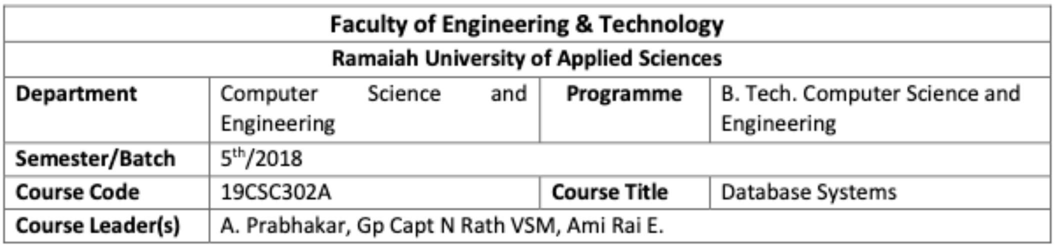
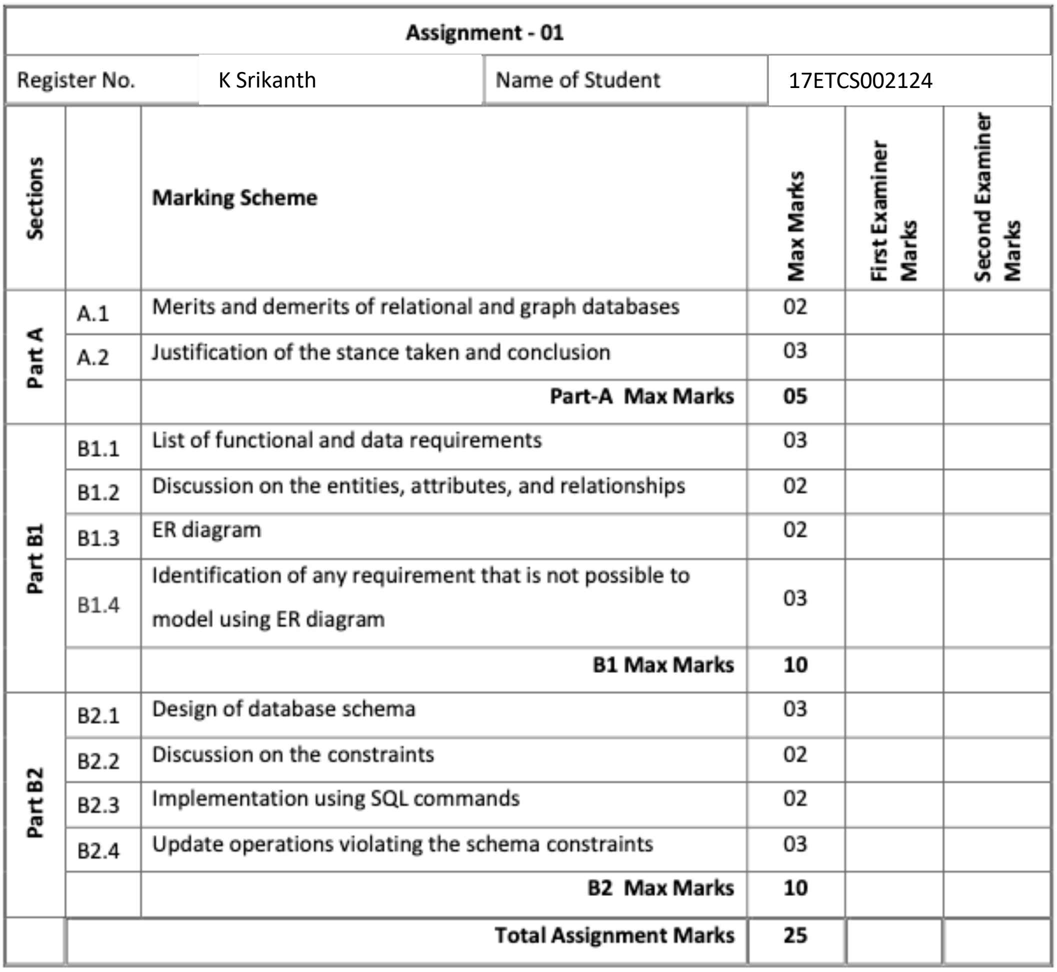


Faculty of Engineering & Technology			
Ramaiah University of Applied Sciences			
Department	Computer Science and Engineering	**Programme**	B. Tech. Computer Science and Engineering
Semester/Batch	5th/2018		
Course Code	19CSC302A	**Course Title**	Database Systems
Course Leader(s)	A. Prabhakar, Gp Capt N Rath VSM, Ami Rai E.		



Assignment - 01					
Register No.	K Srikanth	Name of Student	17ETCS002124		
Sections		**Marking Scheme**	**Max Marks**	**First Examiner Marks**	**Second Examiner Marks**
Part A	A.1	Merits and demerits of relational and graph databases	02		
	A.2	Justification of the stance taken and conclusion	03		
		Part-A Max Marks	**05**		
Part B1	B1.1	List of functional and data requirements	03		
	B1.2	Discussion on the entities, attributes, and relationships	02		
	B1.3	ER diagram	02		
	B1.4	Identification of any requirement that is not possible to model using ER diagram	03		
		B1 Max Marks	**10**		
Part B2	B2.1	Design of database schema	03		
	B2.2	Discussion on the constraints	02		
	B2.3	Implementation using SQL commands	02		
	B2.4	Update operations violating the schema constraints	03		
		B2 Max Marks	**10**		
		Total Assignment Marks	**25**		

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Course Marks Tabulation				
Component-1(B)Assignment	First Examiner	Remarks	Second Examiner	Remarks
A				
Marks (out of 10)				
Signature of First Examiner				Signature of Second Examiner

Please note:

1. Documental evidence for all the components/parts of the assessment such as the reports, photographs, laboratory exam / tool tests are required to be attached to the assignment report in a proper order.
2. The First Examiner is required to mark the comments in RED ink and the Second Examiner's comments should be in GREEN ink.
3. The marks for all the questions of the assignment have to be written only in the **Component – CET B: Assignment** table.
4. If the variation between the marks awarded by the first examiner and the second examiner lies within +/- 3 marks, then the marks allotted by the first examiner is considered to be final. If the variation is more than +/- 3 marks then both the examiners should resolve the issue in consultation with the Chairman BoE.

Assignment - 01

Instructions to students:

1. The assignment consists of **3**questions: Part A –**1** Question, Part B- **2**Questions.
2. Maximum marks is **25**.
3. The assignment has to be neatly word processed as per the prescribed format.
4. **Submission Date:** 28/11/2020
5. **Submission after the due date is not permitted.**
6. **IMPORTANT**: It is essential that all the sources used in preparation of the assignment must be suitably referenced in the text.
7. Marks will be awarded only to the sections and subsections clearly indicated as per the problem statement/exercise/question

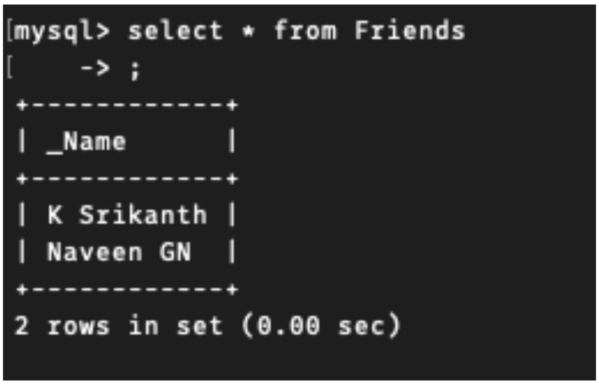
Name: K Srikanth Registration Number: 17ETCS002124

Question A

A1.1)

Introduction

Relational Database: A relational database is a collection of data items with pre-defined relationships between them. These items are organized as a set of tables with columns and rows.
Example: MySql which uses relational database concept and is written using Structured Query Language

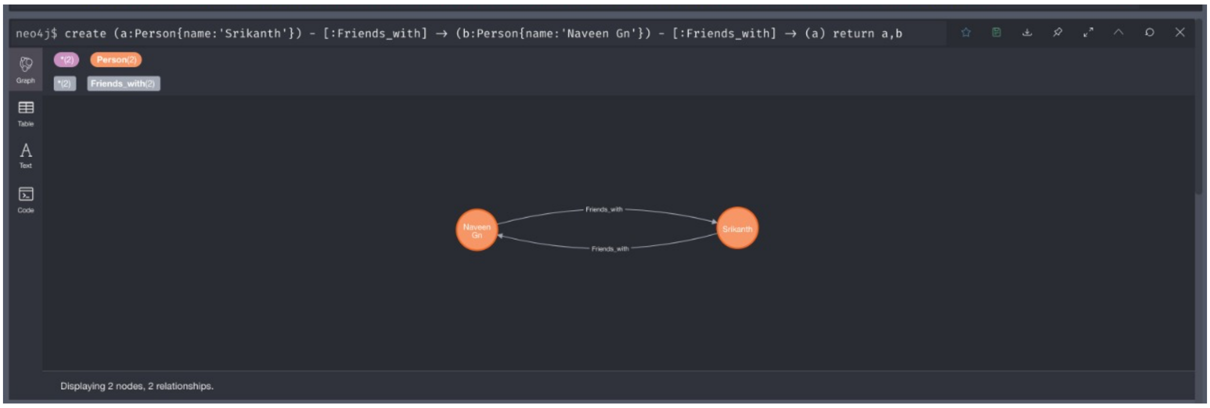


```
[mysql> select * from Friends
[    -> ;
+-------------+
| _Name       |
+-------------+
| K Srikanth |
| Naveen GN   |
+-------------+
2 rows in set (0.00 sec)
```

Figure 1 Example of a Relational Database

Graph Database: A graph database is a database designed to treat the relationships between data as equally important to the data itself. Here all the data is stored in nodes and connected using relations with a pre-defined model.

Example: Neo4j which uses Graph Database concept and is written using cypher query language



```
neo4j$ create (a:Person{name:'Srikanth'}) - [:Friends_with] → (b:Person{name:'Naveen Gn'}) - [:Friends_with] → (a) return a,b
```

Displaying 2 nodes, 2 relationships.

Figure 2 Example of a Graph Database

Now let’s talk about the Merits and demerits of relational and graph databases

Merits of using relational database

- Easy to use when compared with graph database
- If you have simple model which is consistent then its better to go for relational database
- Data Manipulation is easy to do in relational database when compared with graph database

Merits of using graph database

- If the data has lot of relations represented as many to many it is easier to connect when you lot of relations using a graph database
- If you have a large number of data scale like “Facebook”. Graph database is the best way to go because of low latency when you have a large scale of data.
- Graph databases can be used for real time data when the latency and processing time matter as they use tree techniques like Breadth First Search and Depth First Search

Demerits of using relational database

- Performance is slow for a large-scale data compared to graph database
- The memory to create tables and rows take a lot of physical memory to store the data

Demerits of using graph database

- If there are any unrelated data then graph database is not the right way
- If you are looking for a fixed data set like a train reservation system where you have fixed number of columns then graph database is not the right way

A1.2)

To start off with both the databases have their own significance depending on the data the user has but using a relational database is easy when compared with graph database I feel like graph databases are somehow going to replace relational database at any point just like **Python over C language** because of its latency and efficiency and handling a large data set is easier when compared with a relational database so I can conclude saying that both of the databases have their own significance in their way it all depends on the data.
Graph Database was really fun to try (Figure 2)

Question B

Question B1)

B1.1) **Functional Requirements**

Table 1.1: Functional Requirement 1

Requirement Tag	FR1
Requirement Description	The system should have an interface where user can be able to create an account
Dependent on Requirements	-
User/System interacting with the requirement	User

Table 1.2: Functional Requirement 2

Requirement Tag	FR2
Requirement Description	The system should have an interface where user can be able to login using existed or newly created account
Dependent on Requirements	FR1
User/System interacting with the requirement	User

Table 1.3: Functional Requirement 3

Requirement Tag	FR3
Requirement Description	The system should be able to store user data.
Dependent on Requirements	FR1
User/System interacting with the requirement	System

Table 1.4: Functional Requirement 4

Requirement Tag	FR4
Requirement Description	The system should have an interface where user can see all the products
Dependent on Requirements	-
User/System interacting with the requirement	User

Table 1.5: Functional Requirement 5

Requirement Tag	FR5
Requirement Description	The System should have a search bar where user can search for a particular product
Dependent on Requirements	FR4
User/System interacting with the requirement	User

Table 1.6: Functional Requirement 6

Requirement Tag	FR6
Requirement Description	The System should have an interface where they can view their cart
Dependent on Requirements	FR4, FR5
User/System interacting with the requirement	User

Table 1.7: Functional Requirement 7

Requirement Tag	FR7
Requirement Description	The System should have an interface where user can make payments for their order
Dependent on Requirements	FR6
User/System interacting with the requirement	User

Table 1.8: Functional Requirement 8

Requirement Tag	FR8
Requirement Description	The System should have an interface where Admin can Add / Update and delete the products
Dependent on Requirements	FR4
User/System interacting with the requirement	Staff / Admin

Table 1.9: Functional Requirement 9

Requirement Tag	FR9
Requirement Description	The System should display to user if the product is available or unavailable
Dependent on Requirements	FR4.FR5
User/System interacting with the requirement	User / System

Data Requirements

Table 2.1: Data Requirement 1

Requirement Tag	DR1
Item Name	User ID
Item Description (Where/How used)	This is Unique Number used to identify users
Item type	Int
User/System interacting with the item	User

Table 2.2: Data Requirement 2

Requirement Tag	DR2
Item Name	Password
Item Description (Where/How used)	To Login the user has to enter their password which can consist of numbers, alphabets and special characters
Item type	Char Array
User/System interacting with the item	User

Table 2.3: Data Requirement 3

Requirement Tag	DR3
Item Name	First Name
Item Description (Where/How used)	This data contains First Name of the user
Item type	Char Array
User/System interacting with the item	User

Table 2.4: Data Requirement 4

Requirement Tag	DR4
Item Name	Last Name
Item Description (Where/How used)	This data contains Last Name of the user
Item type	Char Array
User/System interacting with the item	User

Table 2.5: Data Requirement 5

Requirement Tag	DR5
Item Name	Phone Number
Item Description (Where/How used)	This data contains Phone Number of the user
Item type	Long Int
User/System interacting with the item	User

Table 2.6: Data Requirement 6

Requirement Tag	DR6
Item Name	Address
Item Description (Where/How used)	This data contains Address of the user
Item type	Char Array
User/System interacting with the item	User

Table 2.7: Data Requirement 7

Requirement Tag	DR7
Item Name	Admin ID
Item Description (Where/How used)	This is Unique Number used to identify Admin
Item type	Int
User/System interacting with the item	Admin

Table 2.8: Data Requirement 8

Requirement Tag	DR8
Item Name	Admin Password
Item Description (Where/How used)	To Login the Admin has to enter their password which can consist of numbers, alphabets and special characters
Item type	Char Array
User/System interacting with the item	Admin

Table 2.9: Data Requirement 9

Requirement Tag	DR9
Item Name	Product ID
Item Description (Where/How used)	This is Unique Number used to identify Products
Item type	Int
User/System interacting with the item	Admin / User

Table 2.10: Data Requirement 10

Requirement Tag	DR10
Item Name	Product Name
Item Description (Where/How used)	This data contains Product Name
Item type	Char Array
User/System interacting with the item	Admin / User

Table 2.11: Data Requirement 11

Requirement Tag	DR11
Item Name	Availability Status
Item Description (Where/How used)	This data contains if the product is available or out of stock
Item type	Boolean
User/System interacting with the item	System / User

Table 2.8: Data Requirement 12

Requirement Tag	DR8
Item Name	Order ID
Item Description (Where/How used)	This data contains the Order ID which is generated after a successful transaction
Item type	Int
User/System interacting with the item	System / User

B1.2)

Entities

1. Admin: This Entity contains all the attributes required for an administrator

2. User: This Entity contains all the attributes required for a user

3. Products: This Entity contains all the attributes required for a product

Attributes

User Entity

1. User ID: This attribute is used to stores the User ID which is auto incremented and this attribute is also our primary key for this entity.

2. Password: This attribute is used to stores the password of the user to check if the user entered password is valid or invalid.

3. First Name: This attribute contains the first name of the user.

4. Last Name: This attribute contains the last name of the user.

5. Phone Number: This attribute contains the phone number of the user.

6. Address: This attribute contains the address of the user.

Admin Entity

1. Admin ID: This attribute is used to stores the Admin ID and this attribute is also our primary key for this entity

2. Password: This attribute is used to stores the password of the admin to check if the user entered password is valid or invalid.

Products Entity

1. Product ID: This attribute is used to stores the Product ID which is auto incremented and this attribute is also our primary key for this entity.

2. Product Name: This attribute contains the name of the product.

3. Manufacturer: This attribute contains the manufacturer name of the product.

4. Availability Status: This attribute contains a flag which tells us if the product is available or out of stock.

5. Quantity: This attribute contains the current stock quantity of the product

6. Description: This attribute contains the description of the product in a detailed view.

7. Product Price: This attribute contains the price of the product

Relationships

1. Add Product: This relation is 1: N from admin to product where admin can add product.

2. Update Product: This relation is 1: N from admin to product where admin can update product.

3. Delete Product: This relation is 1: N from admin to product where admin can delete product.

4. Orders: This relation is M: N from User to Products such that **"M"** number of users can order **"N"** number of Products with attributes containing **Order ID** and a primary key and Time/ Date as an attribute.

Note: Here M is not equal to N

B1.3)

Entity Relation Diagram

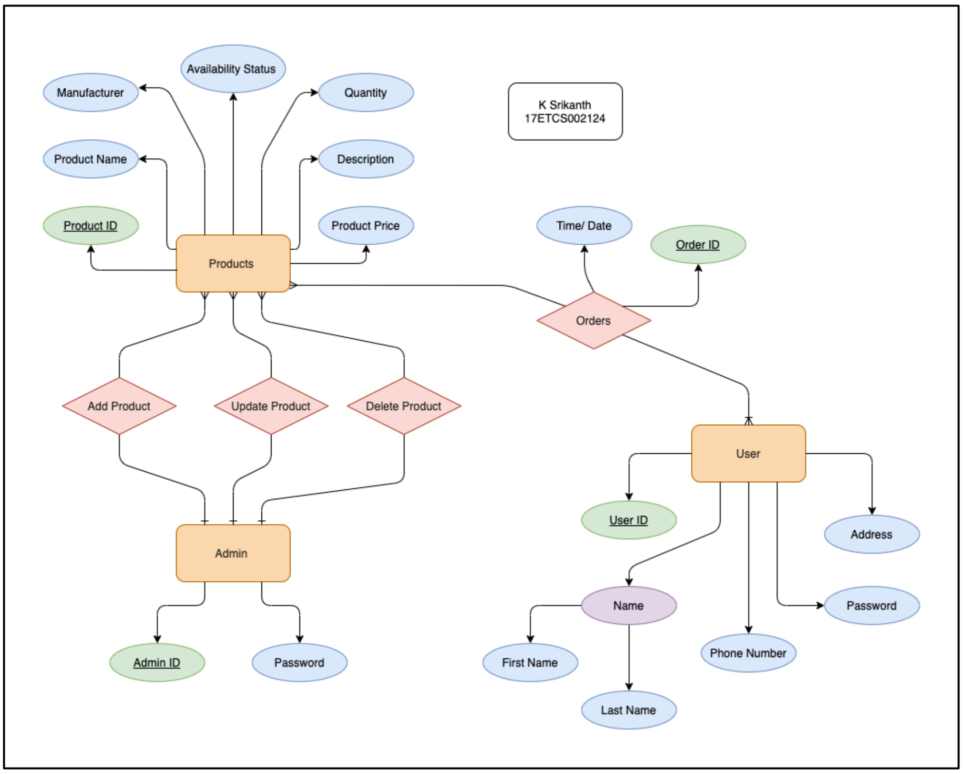


Figure 3 Entity Relation Diagram for the given problem statement

B1.4)

Identification of the requirement:
Entity Relation diagram doesn't stratify some of the requirements constraints some of them include,
1. Entity relation diagram cannot show us the response we get after the input
2. Verification process can't be shown using entity relation diagram
3. Entity relation diagram doesn't let us know the sequence of which the user has to follow

Alternative Suggestion
There are many UML conceptual data models but I choose to go with Sequence Diagram

Sequence Diagram
Sequence diagrams are the better way of doing UML because they focus on lifelines, or the processes and objects that live simultaneously, and the messages exchanged between them to perform a function before the lifeline end
Sequential Diagrams are used to represent time sequence of the objects like what order is the user is going to interact with the system,

Sequence Diagram (User)

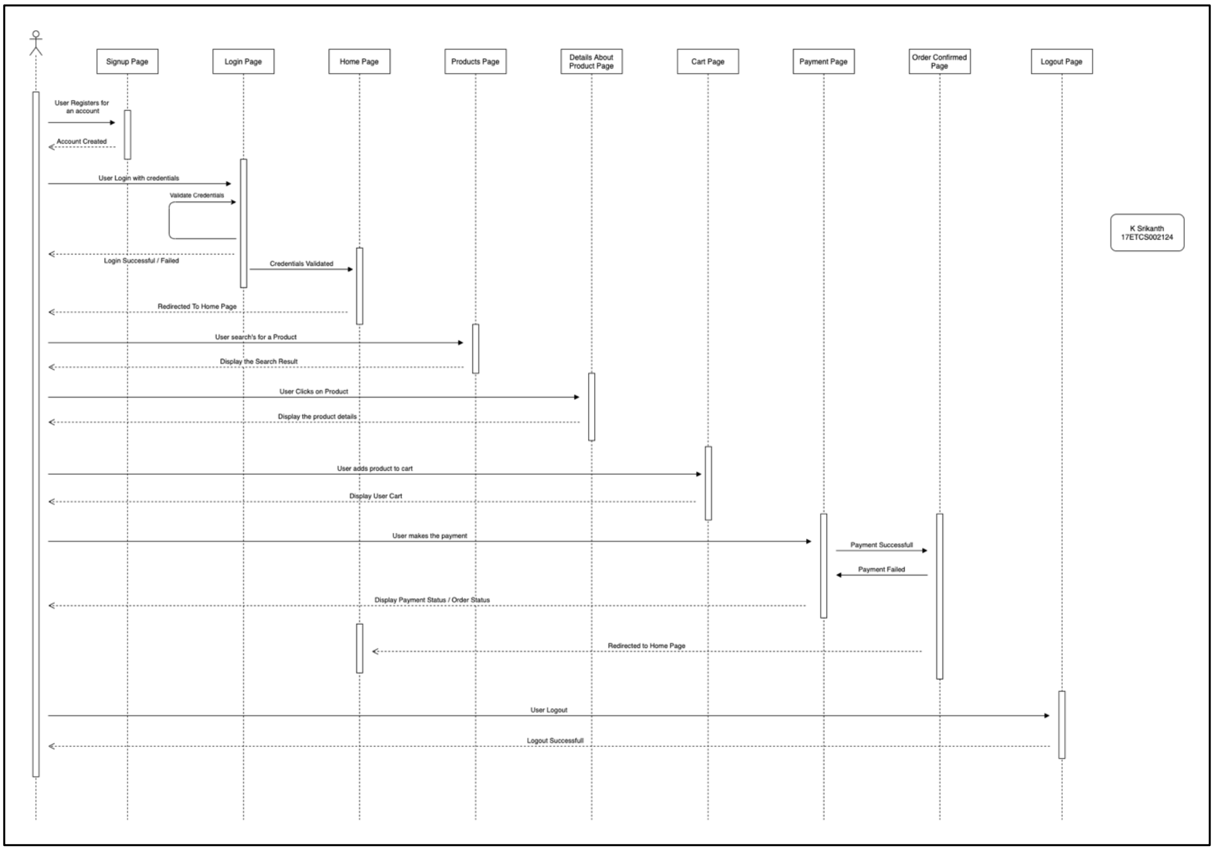


Figure 4 Sequence Diagram of the given problem statement for User Access

There are two types of users in our case here
1. Customer / User
Let's see how a customer interacts with our system (Furniture Website),
Firstly, the user has to register using the interface provide by the system which includes filling up all the necessary details to get started. After registration now user can be able to sign in using the interface provide by our system and system is going to verify if the user's credentials are valid or not and it will display a prompt to the user with a dialog box stating that the user has logged in or failed to

login. If the user has failed to login then the user can again enter their credentials on login page. If dialog box says that successfully logged in then the user will be redirected to the homepage of furniture shopping website where the user can search for their preferred furniture product and system will display the results. Now when user clicks on a product it will be able to displays fully detailed information about the product and user can know about the product much better if they are not aware of the product that they are looking at and user can add the product to the cart section of the website after knowing the details about the product now user have an option where they can be able to buy or using a payment gateway if the payment is successful then user will receive an order ID followed by the list of products they have purchased after this they would be redirected to the home page of Furniture Home Page and if the payment is failed then user will have to try the payment again. Finally, if the user is done with their shopping, they can logout of the system.

Sequence Diagram (Admin)

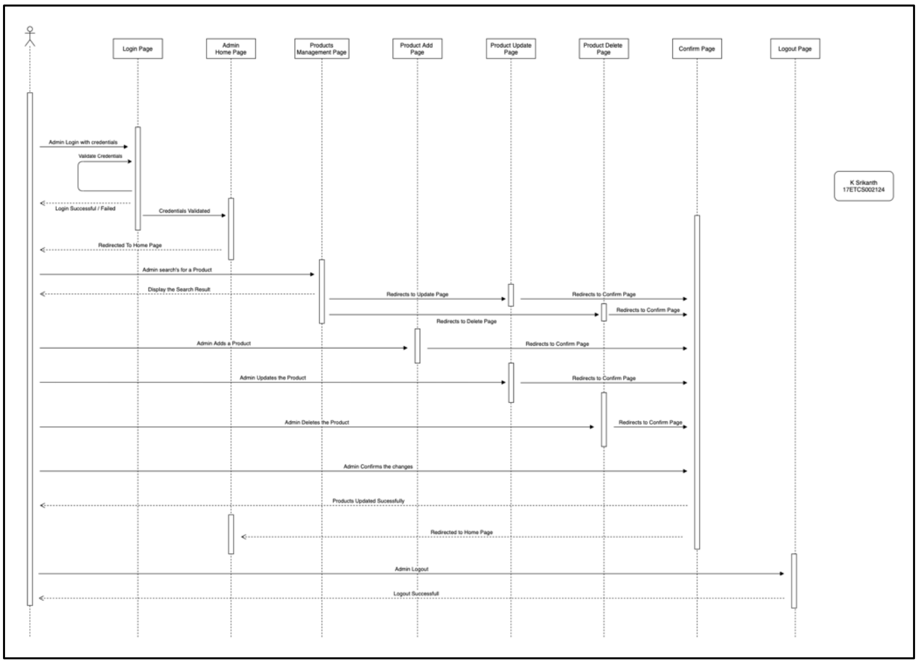

Login Page
Admin Home Page
Products Management Page
Product Add Page
Product Update Page
Product Delete Page
Confirm Page
Logout Page
K Srikanth 17ETCS002124
Admin Login with credentials
Validate Credentials
Login Successful / Failed
Credentials Validated
Redirected To Home Page
Admin search's for a Product
Display the Search Result
Redirects to Update Page
Redirects to Confirm Page
Redirects to Confirm Page
Redirects to Delete Page
Admin Adds a Product
Redirects to Confirm Page
Admin Updates the Product
Redirects to Confirm Page
Admin Deletes the Product
Redirects to Confirm Page
Admin Confirms the changes
Products Updated Sucessfully
Redirected to Home Page
Admin Logout
Logout Successfull

Figure 5 Sequence Diagram of the given problem statement for Administrator Access

The staff administration are going to provide the credentials for admin account where they can make changes to the websites products stock now the admin has to sign in using the interface provide by the system and the system is going to verify if the admin's credentials are valid or not and it will display a prompt to a user with a dialog box stating that the user has logged in or failed to login if the user has failed to login then the user can again enter their credentials on login page. If dialog box says that successfully logged in then It will be redirected to the homepage of our admin where the admin where admin can search for their furniture product and system will display the results. The four major operations that admin can perform are

1. Add

If admin wants to add a new product for their website, they can do it via creating a new product and uploading the particular details about the product.

2. Update

If admin wants to update details of the product which is up online, they can be able to do it with an edit option on the product page.

3. Delete

If admin wants to delete the product which is up online, they can be able to do it with a delete option on the product page.

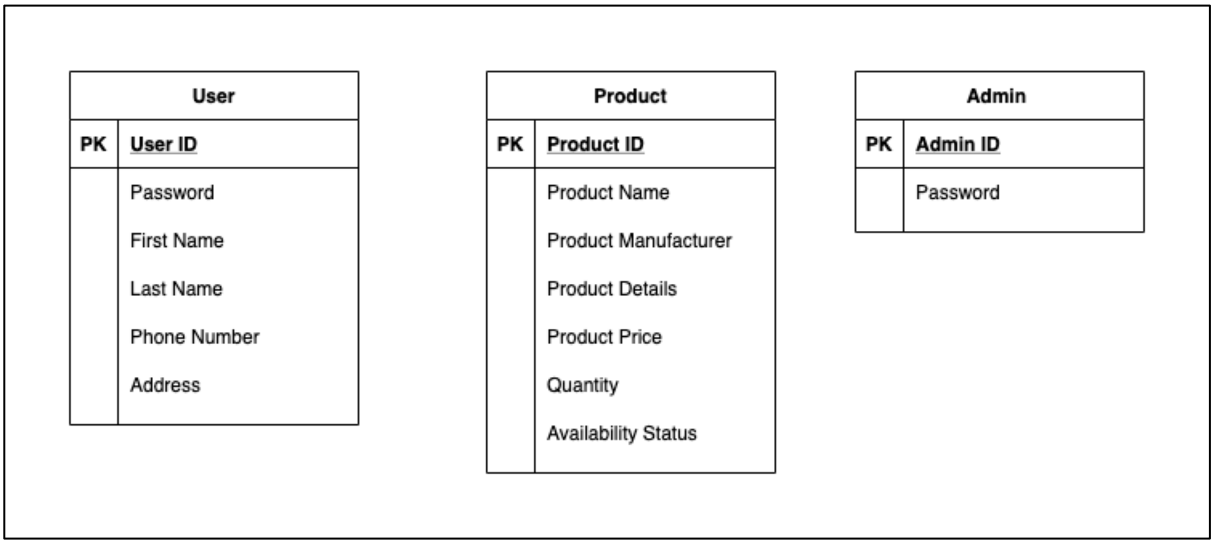
After Performing all the operations, the admin can verify everything like what changes that they made all together and make it online. Finally, if the admin is done making changes with their website, they can logout of the system.

Question B2)

B2.1)

To convert entity relation diagram into a relational schema there are 7 steps to be followed,

Step – 1)
Convert all the strong entities into tables
In Step 1 we just convert strong entities in to tables



User	
PK	User ID
	Password
	First Name
	Last Name
	Phone Number
	Address

Product	
PK	Product ID
	Product Name
	Product Manufacturer
	Product Details
	Product Price
	Quantity
	Availability Status

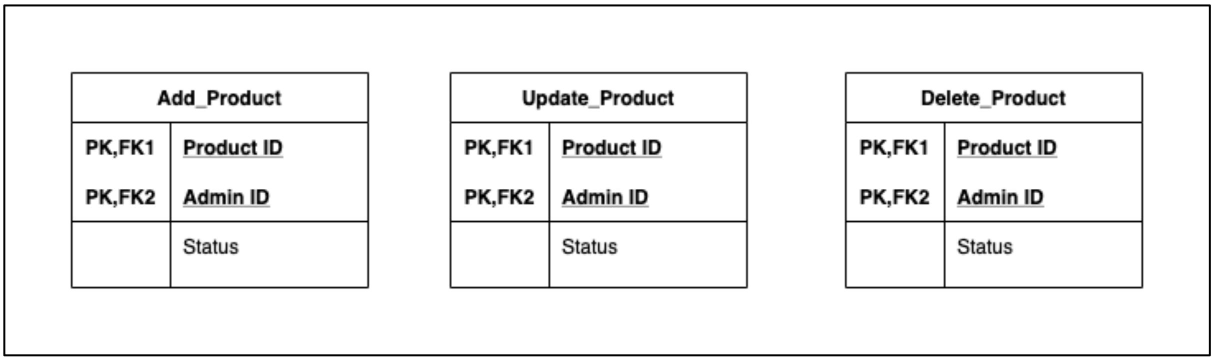
Admin	
PK	Admin ID
	Password

Figure 6 Converting Strong Entities into table from Image 1

Step – 2)
Convert all the weak entities into tables
In Step 2 we convert all the weak entities into a table in my case I don’t have any weak entities from my entity relation diagram (Image 1)

Step – 3)
Convert all the 1:1 relations into tables
In Step 3 we would be converting all the 1:1 relations into table in my case I don’t have any 1:1 relations from my entity relation diagram (Image 1)

Step – 4)
Convert all the 1:N relations into tables



Add_Product	
PK,FK1	Product ID
PK,FK2	Admin ID
	Status

Update_Product	
PK,FK1	Product ID
PK,FK2	Admin ID
	Status

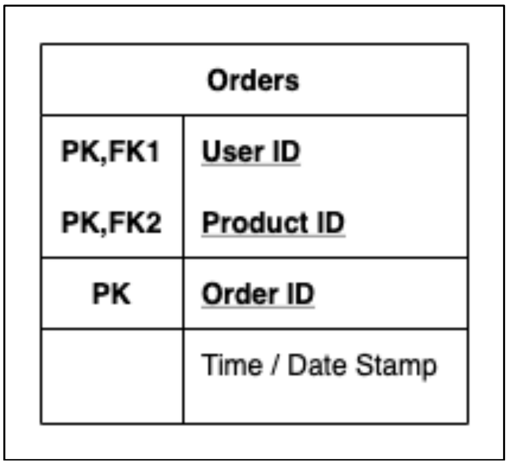
Delete_Product	
PK,FK1	Product ID
PK,FK2	Admin ID
	Status

Figure 7 Converting 1:N Relation into table from Image 1

In Step 4 we would be converting all the 1:N relations into table which basically means that adding foreign keys if your relation supports. In my case one admin can add a product or update a product or delete product .

Step – 5)

Convert all the M:N relations into tables



Orders	
PK,FK1 PK,FK2	User ID Product ID
PK	Order ID
	Time / Date Stamp

Figure 8 Converting M:N Relations into table from image 1

In Step 5 we would be converting all the M:N relations into table which has a separate table and have both the primary keys from the entities and also a attributes (if it has a attributes) in my case "M" number of customers can order "N" number of products.

Note: Here M is not equal to N

Step – 6)

Convert all the Multivalued attributes into tables

In Step 6 we should convert all the multivalued attributes into a separate table my case I don't have any Multivalued attributes from my entity relation diagram (Image 1)

Step – 7)

Convert all the N-Ary relationships into tables

In Step 7 we should convert all the N-Ary relationships into a table my case I don't have any N-Ary relationships from my entity relation diagram (Image 1)

Relational Schema

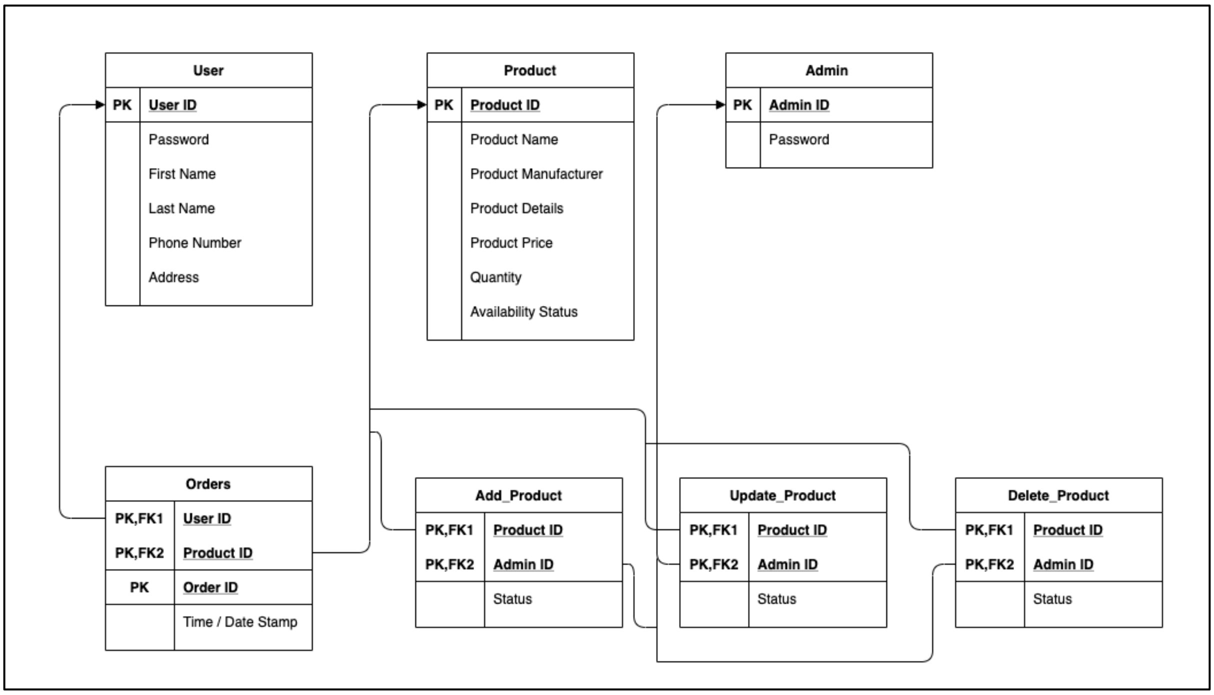


Figure 9 Complete Relational Schema to ER Diagram(Image 1)

B2.2)

User Table

1. User ID: PRIMARY KEY AUTO_INCREMENT <Type> INT

2. Password: NOT NULL <Type> VARCHAR

3. First Name: NOT NULL <Type> VARCHAR

4. Last Name: <Type> VARCHAR

5. Phone Number: NOT NULL UNIQUE <Type> LONG INT

6. Address: <Type> VARCHAR

Admin Table

1. Admin ID: PRIMARY KEY <Type> INT

2. Password: NOT NULL <Type> VARCHAR

Products Table

1. Product ID: PRIMARY KEY AUTO_INCREMENT <Type> INT

2. Product Name: NOT NULL <Type> VARCHAR

3. Manufacturer: NOT NULL <Type> VARCHAR

4. Availability Status: NOT NULL <Type> BOOLEAN

5. Quantity: NOT NULL <Type> INT

6. Description: NOT NULL <Type> VARCHAR

7. Product Price: NOT NULL <Type> DOUBLE

Orders Table

1. User ID: PRIMARY KEY & FOREIGN KEY <Type> INT

2. Product ID: PRIMARY KEY & FOREIGN KEY <Type> INT

3. Order ID: PRIMARY KEY AUTO_INCREMENT <Type> INT

4. Date Stamp: NOT NULL <Type> DATE STAMP

Add_Product Table

1. **Product ID:** PRIMARY KEY & FOREIGN KEY <Type> INT

2. Admin ID: PRIMARY KEY & FOREIGN KEY <Type> INT

3. Status: NOT NULL <TYPE> BOOLEAN

Update_Product Table

1. **Product ID:** PRIMARY KEY & FOREIGN KEY <Type> INT

2. Admin ID: PRIMARY KEY & FOREIGN KEY <Type> INT

3. Status: NOT NULL <TYPE> BOOLEAN

Delete_Product Table

1. **Product ID:** PRIMARY KEY & FOREIGN KEY <Type> INT

2. Admin ID: PRIMARY KEY & FOREIGN KEY <Type> INT

3. Status: NOT NULL <TYPE> BOOLEAN

B2.3)

MySQL Implementation for Question B2.2

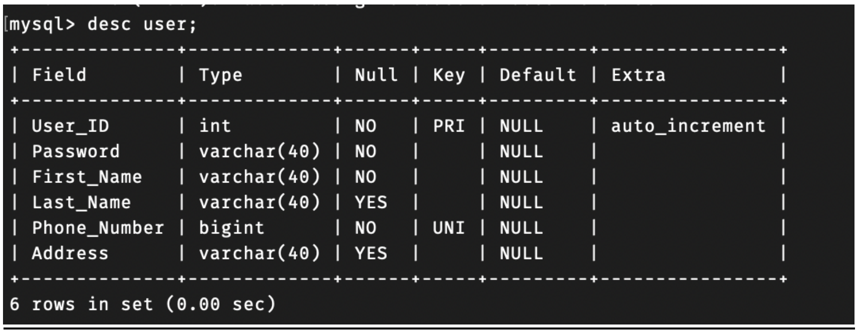
1. User Table

MySQL Query

```
create table user (
User_ID int auto_increment,
Password varchar (40) not null,
First_Name varchar (40) not null,
Last_Name varchar (40),
Phone_Number bigint unique not null,
Address varchar (40),
primary key (User_ID));
```

Result

Describe Table



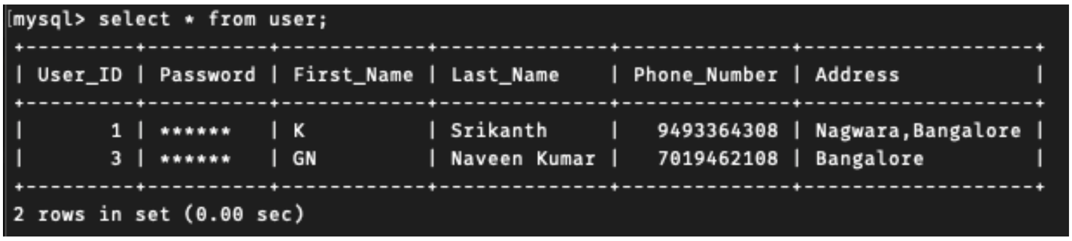
```
mysql> desc user;
+--------------+-------------+------+-----+---------+----------------+
| Field        | Type        | Null | Key | Default | Extra          |
+--------------+-------------+------+-----+---------+----------------+
| User_ID      | int         | NO   | PRI | NULL    | auto_increment |
| Password     | varchar(40) | NO   |     | NULL    |                |
| First_Name   | varchar(40) | NO   |     | NULL    |                |
| Last_Name    | varchar(40) | YES  |     | NULL    |                |
| Phone_Number | bigint      | NO   | UNI | NULL    |                |
| Address      | varchar(40) | YES  |     | NULL    |                |
+--------------+-------------+------+-----+---------+----------------+
6 rows in set (0.00 sec)
```

Figure 10 MySQL Metadata for user table.

Data in the table

MySQL Query

```
insert into user(Password,FIRST_Name,Last_Name,Phone_Number,Address) values
("******","K","Srikanth",9493364308,"Nagwara,Bangalore");
insert into user(Password,FIRST_Name,Last_Name,Phone_Number,Address) values
("******","GN","Naveen Kumar",7019462108,"Bangalore");
```



```
mysql> select * from user;
+---------+----------+------------+--------------+--------------+-------------------+
| User_ID | Password | First_Name | Last_Name    | Phone_Number | Address           |
+---------+----------+------------+--------------+--------------+-------------------+
|       1 | ******   | K          | Srikanth     |   9493364308 | Nagwara,Bangalore |
|       3 | ******   | GN         | Naveen Kumar |   7019462108 | Bangalore         |
+---------+----------+------------+--------------+--------------+-------------------+
2 rows in set (0.00 sec)
```

Figure 11 MySQL data from user table

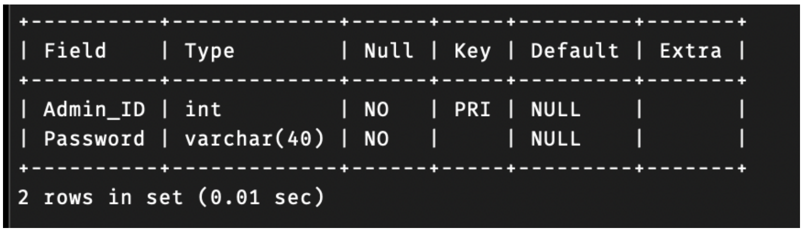
2. Admin Table

MySQL Query

```
create table admin(
Admin_ID int,
Password varchar (40) not null,
primary key (Admin_ID));
```

Result

Describe Table



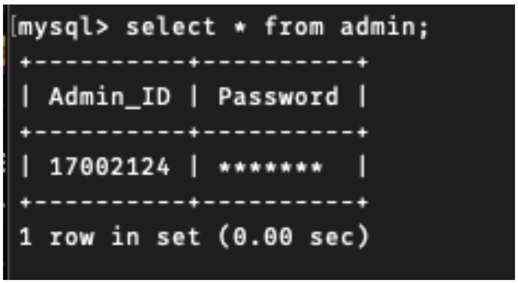
```
+----------+-------------+------+-----+---------+-------+
| Field    | Type        | Null | Key | Default | Extra |
+----------+-------------+------+-----+---------+-------+
| Admin_ID | int         | NO   | PRI | NULL    |       |
| Password | varchar(40) | NO   |     | NULL    |       |
+----------+-------------+------+-----+---------+-------+
2 rows in set (0.01 sec)
```

Figure 12 MySQL Metadata for Admin table.

Data in the table

MySQL Query

```
insert into admin values ("17002124","*******");
```



```
mysql> select * from admin;
+----------+----------+
| Admin_ID | Password |
+----------+----------+
| 17002124 | *******  |
+----------+----------+
1 row in set (0.00 sec)
```

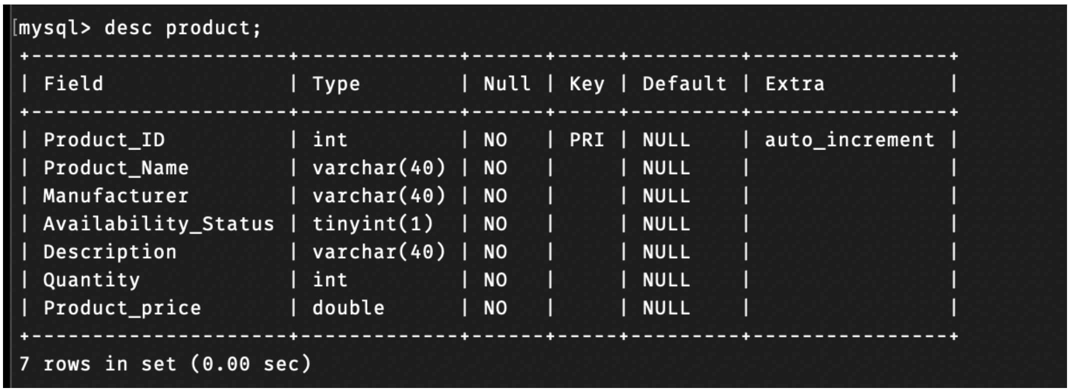
Figure 13 MySQL data from Admin table

3. Products Table

MySQL Query

```
create table product21 (
        Product_ID int auto_increment,
        Product_Name varchar (40) not null,
        Manufacturer varchar (40) not null,
        Availability_Status Bool not null,
        _Description varchar (40) not null,
        Quantity int not null,
        Product_price Double not null,
        primary key (Product_ID));
```

Describe Table



```
mysql> desc product;
+---------------------+-------------+------+-----+---------+----------------+
| Field               | Type        | Null | Key | Default | Extra          |
+---------------------+-------------+------+-----+---------+----------------+
| Product_ID          | int         | NO   | PRI | NULL    | auto_increment |
| Product_Name        | varchar(40) | NO   |     | NULL    |                |
| Manufacturer        | varchar(40) | NO   |     | NULL    |                |
| Availability_Status | tinyint(1)  | NO   |     | NULL    |                |
| Description         | varchar(40) | NO   |     | NULL    |                |
| Quantity            | int         | NO   |     | NULL    |                |
| Product_price       | double      | NO   |     | NULL    |                |
+---------------------+-------------+------+-----+---------+----------------+
7 rows in set (0.00 sec)
```

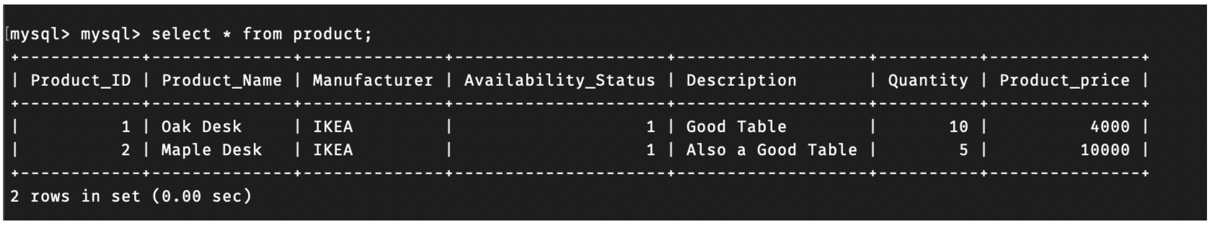
Figure 14 MySQL Metadata for Product table.

Data in the table

MySQL Query

```
insert into
product(Product_Name,Manufacturer,Availability_Status,Description,Quantity,Product_price)
VALUES ("Oak Desk","IKEA",true,"Good Table",10,4000.00);

insert into
product(Product_Name,Manufacturer,Availability_Status,Description,Quantity,Product_price)
VALUES ("Maple Desk","IKEA",true,"Also a Good Table",5,10000.00);
```



```
mysql> mysql> select * from product;
+------------+--------------+--------------+---------------------+-------------------+----------+---------------+
| Product_ID | Product_Name | Manufacturer | Availability_Status | Description       | Quantity | Product_price |
+------------+--------------+--------------+---------------------+-------------------+----------+---------------+
|          1 | Oak Desk     | IKEA         |                   1 | Good Table        |       10 |          4000 |
|          2 | Maple Desk   | IKEA         |                   1 | Also a Good Table |        5 |         10000 |
+------------+--------------+--------------+---------------------+-------------------+----------+---------------+
2 rows in set (0.00 sec)
```

Figure 15 MySQL data from Product table

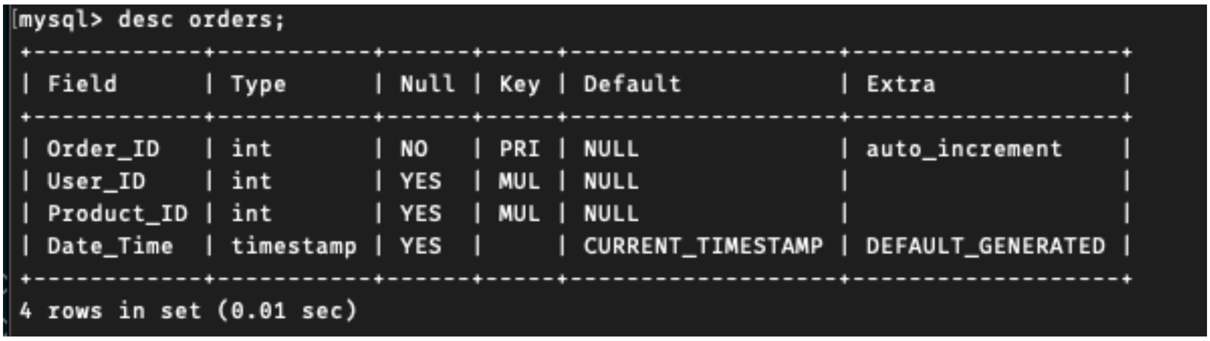
Note: Here Availability_Status is a Boolean data type If it is **1 then it is true (Available)** or if it is **0 then it is false (Out of stock),**

4. Orders Table

MySQL Query

```
create table orders (
        Order_ID int auto_increment,
        User_ID int,
        Product_ID int,
        Date_Time TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
        FOREIGN KEY (User_ID) REFERENCES user (User_ID),
        FOREIGN KEY (Product_ID) REFERENCES product (Product_ID),
        primary key (Order_ID));
```

Describe Table



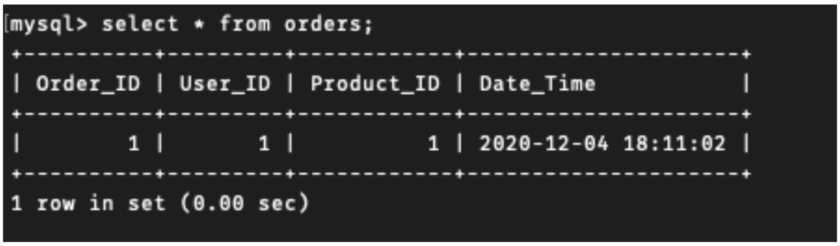
```
[mysql> desc orders;
+------------+-----------+------+-----+-------------------+-------------------+
| Field      | Type      | Null | Key | Default           | Extra             |
+------------+-----------+------+-----+-------------------+-------------------+
| Order_ID   | int       | NO   | PRI | NULL              | auto_increment    |
| User_ID    | int       | YES  | MUL | NULL              |                   |
| Product_ID | int       | YES  | MUL | NULL              |                   |
| Date_Time  | timestamp | YES  |     | CURRENT_TIMESTAMP | DEFAULT_GENERATED |
+------------+-----------+------+-----+-------------------+-------------------+
4 rows in set (0.01 sec)
```

Figure 16 MySQL Metadata for Order table.

Data in the table

MySQL Query

```
insert into orders(user_ID,Product_ID) values (1,1);
```



```
[mysql> select * from orders;
+----------+---------+------------+---------------------+
| Order_ID | User_ID | Product_ID | Date_Time           |
+----------+---------+------------+---------------------+
|        1 |       1 |          1 | 2020-12-04 18:11:02 |
+----------+---------+------------+---------------------+
1 row in set (0.00 sec)
```

Figure 17 MySQL data from Order table

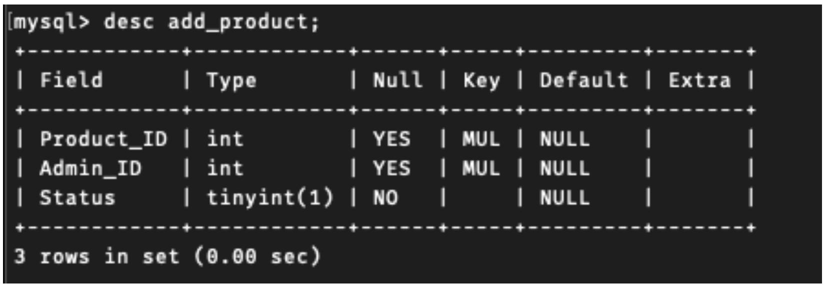
5. Add_Product Table

MySQL Query

```
create table add_product (
        Product_ID int,
        Admin_ID int,
        Status bool not null,
        FOREIGN KEY (Product_ID) REFERENCES product (Product_ID),
        FOREIGN KEY (Admin_ID) REFERENCES admin (Admin_ID));
```

Result

Describe Table



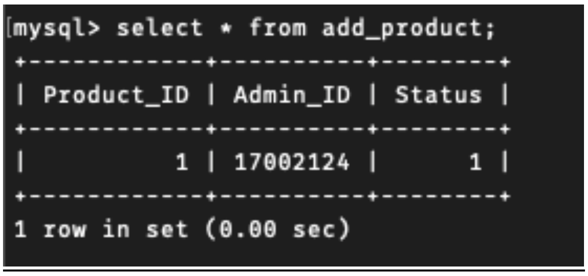
```
[mysql> desc add_product;
+------------+------------+------+-----+---------+-------+
| Field      | Type       | Null | Key | Default | Extra |
+------------+------------+------+-----+---------+-------+
| Product_ID | int        | YES  | MUL | NULL    |       |
| Admin_ID   | int        | YES  | MUL | NULL    |       |
| Status     | tinyint(1) | NO   |     | NULL    |       |
+------------+------------+------+-----+---------+-------+
3 rows in set (0.00 sec)
```

Figure 18 MySQL Metadata for add_product table.

Data in the table

MySQL Query

```
insert into add_product (Product_ID,Admin_ID,Status) values
(1,17002124,true);
```



```
[mysql> select * from add_product;
+------------+----------+--------+
| Product_ID | Admin_ID | Status |
+------------+----------+--------+
|          1 | 17002124 |      1 |
+------------+----------+--------+
1 row in set (0.00 sec)
```

Figure 19 MySQL data from add_product table

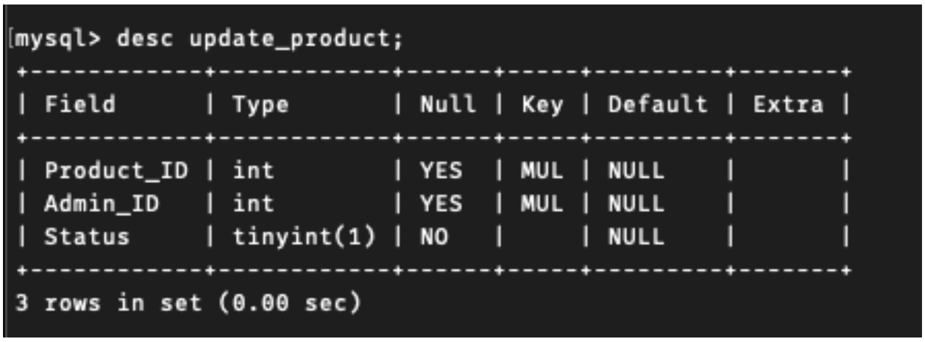
6. Update_Product Table

MySQL Query

```
create table update_product (
        Product_ID int,
        Admin_ID int,
        Status bool not null,
        FOREIGN KEY (Product_ID) REFERENCES product (Product_ID),
        FOREIGN KEY (Admin_ID) REFERENCES admin (Admin_ID));
```

Result

Describe Table



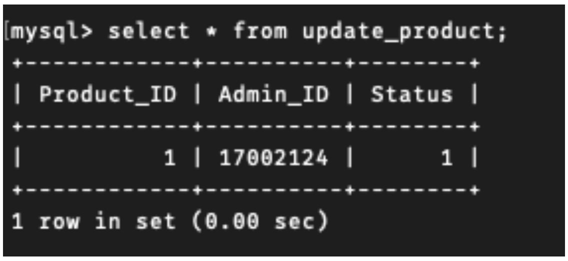
```
[mysql> desc update_product;
+------------+------------+------+-----+---------+-------+
| Field      | Type       | Null | Key | Default | Extra |
+------------+------------+------+-----+---------+-------+
| Product_ID | int        | YES  | MUL | NULL    |       |
| Admin_ID   | int        | YES  | MUL | NULL    |       |
| Status     | tinyint(1) | NO   |     | NULL    |       |
+------------+------------+------+-----+---------+-------+
3 rows in set (0.00 sec)
```

Figure 20 MySQL Metadata for update_product table.

Data in the table

MySQL Query

```
insert into update_product(Product_ID,Admin_ID,Status) values (1,17002124,true);
```



```
[mysql> select * from update_product;
+------------+----------+--------+
| Product_ID | Admin_ID | Status |
+------------+----------+--------+
|          1 | 17002124 |      1 |
+------------+----------+--------+
1 row in set (0.00 sec)
```

Figure 21 MySQL data from update_product table

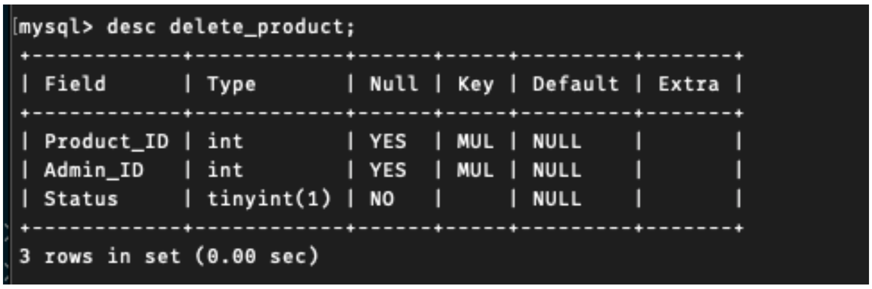
7. Delete_Product Table

MySQL Query

```
create table delete_product (
        Product_ID int,
        Admin_ID int,
        Status bool not null,
        FOREIGN KEY (Product_ID) REFERENCES product (Product_ID),
        FOREIGN KEY (Admin_ID) REFERENCES admin (Admin_ID));
```

Result

Describe Table



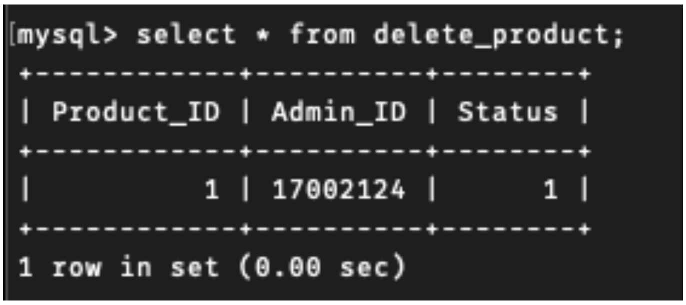
```
[mysql> desc delete_product;
+------------+------------+------+-----+---------+-------+
| Field      | Type       | Null | Key | Default | Extra |
+------------+------------+------+-----+---------+-------+
| Product_ID | int        | YES  | MUL | NULL    |       |
| Admin_ID   | int        | YES  | MUL | NULL    |       |
| Status     | tinyint(1) | NO   |     | NULL    |       |
+------------+------------+------+-----+---------+-------+
3 rows in set (0.00 sec)
```

Figure 22 MySQL Metadata for delete_product table.

Data in the table

MySQL Query

```
insert into delete_product(Product_ID,Admin_ID,Status) values (1,17002124,true);
```



```
mysql> select * from delete_product;
+------------+----------+--------+
| Product_ID | Admin_ID | Status |
+------------+----------+--------+
|          1 | 17002124 |      1 |
+------------+----------+--------+
1 row in set (0.00 sec)
```

Figure 23 MySQL data from delete_product table

B2.4)

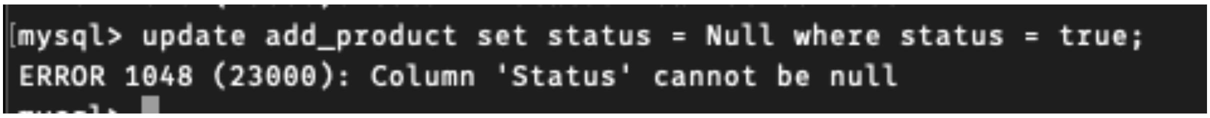
Schema Violating Constraints

1. Not Null Constraint

MySQL Query

```
update add_product set status = Null where status = true;
```

Output



```
mysql> update add_product set status = Null where status = true;
ERROR 1048 (23000): Column 'Status' cannot be null
```

Figure 24 MySQL Constraint Error for Not Null

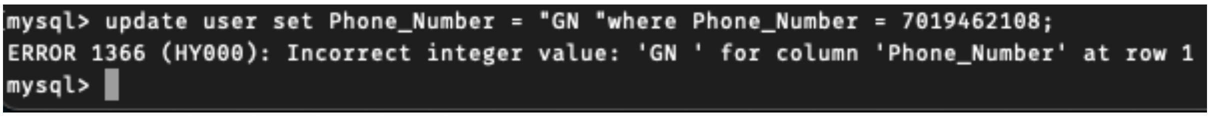
The violation we see is that status is a not null Boolean value when you try to update it cannot be null it violates not null constraint.

2. Domain Constraint

MySQL Query

```
update user set Phone_Number = "GN "where Phone_Number = 7019462108;
```

Output



```
mysql> update user set Phone_Number = "GN "where Phone_Number = 7019462108;
ERROR 1366 (HY000): Incorrect integer value: 'GN ' for column 'Phone_Number' at row 1
mysql>
```

Figure 25 MySQL Constraint Error for domain constraint

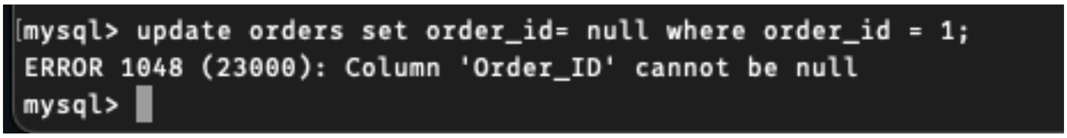
The violation we see is that phone number is a integer value and it cannot accept a string or a character array it violates domain constraint

3. Primary Key

MySQL Query

```
update orders set order_id= null where order_id = 1;
```

Output



```
[mysql> update orders set order_id= null where order_id = 1;
ERROR 1048 (23000): Column 'Order_ID' cannot be null
mysql>
```

Figure 26 MySQL Constraint Error for Entity integrity constraint

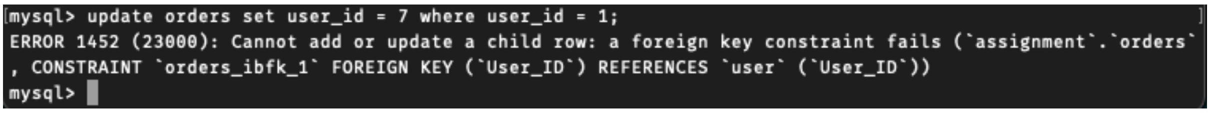
The violation we see is that primary key cannot be null when you try update it violates Entity integrity constraint.

4. Foreign Key

MySQL Query

```
update orders set user_id = 7 where user_id = 1;
```

Output



```
[mysql> update orders set user_id = 7 where user_id = 1;
ERROR 1452 (23000): Cannot add or update a child row: a foreign key constraint fails (`assignment`.`orders`
, CONSTRAINT `orders_ibfk_1` FOREIGN KEY (`User_ID`) REFERENCES `user` (`User_ID`))
mysql>
```

Figure 27 MySQL Constraint Error for referral integrity constraint

The violation we see is that if the foreign key doesn’t exist from user table it cannot map to that attribute and it violates Referential Integrity Constraint.