DELHI TECHNOLOGICAL UNIVERSITY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CO 202: DATABASE MANAGEMENT SYSTEMS

PRACTICAL FILE

Submitted To:

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2K19/CO/244

A4 Batch Group 1

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EXPERIMENT 5

CASE STUDY: RAILWAY MANAGEMENT SYSTEM.

PROBLEM STATEMENT:

- Railway Reservation System will maintain the information about Reservation like Passenger name, Id etc.
- Railway Reservation System will maintain the information about passenger like Personal details and Official detail.
- System will maintain the information about train like Train no., Train name.
- Railway Reservation System will maintain the information about the seat availability like Source station, Destination station, Date, Train no., Class, Arrival time.
- Railway Reservation System will maintain the information about the Account like, Date, PNR and Amount.
- Railway Reservation System will maintain the information about the Train for cancellation like PNR, No. of seat, Date.

ASSUMPTIONS:

- One Passenger can reserve N seats in one train.
- One Passenger can pay the Ticket Rate by only one account.
- One Passenger can cancel the N seats at one time. Passenger details can be Personal or Official.

ER DIAGRAM DESCRIPTION:

- **Identification of Entities:**
    1. PASSENGER (Personal Id, Name, Age, Sex, Phone No, Address, Office Name, Office Address, Office Phone)
    2. TRAIN (Train No., Train Name, Duration, First Station, Last Station)
    3. RESERVATION (Reservation No., Passenger Id, Passenger Name, Train Number, Number of Seats, Reservation Date)
    4. PASS_ACCOUNT (PNR, Account Holder Name, Date of Booking, Amount)
    5. CANCELLATION (Cancellation No., PNR, Train No., Train Name, Class, Number of Seats, Reservation Date)

6. SEAT AVAILABILITY (Train No., Total Seats, Reservation Date, Class, Quota, Available Seats)
7. TICKET (Train No., Ticket Price)

- **Identification of Relationships:**
    1. RESERVATION: PASSENGER (N:1)
    2. RESERVATION: TRAIN (N:M)
    3. TRAIN: SEAT AVAILABILITY (N:M)
    4. TRAIN: PASS_ACCOUNT (N:1)

CONCLUSION:

This experiment helped us to analyse the problem of the case study and make certain assumptions that will be helpful in studying the problem. It also helped us identify the key entities and their respective attributes which can be used to create relations. It helps us to construct ER diagrams.

EXPERIMENT 6

AIM: Creating Entity-Relationship Diagram, Entity Tables and Relationship Tables

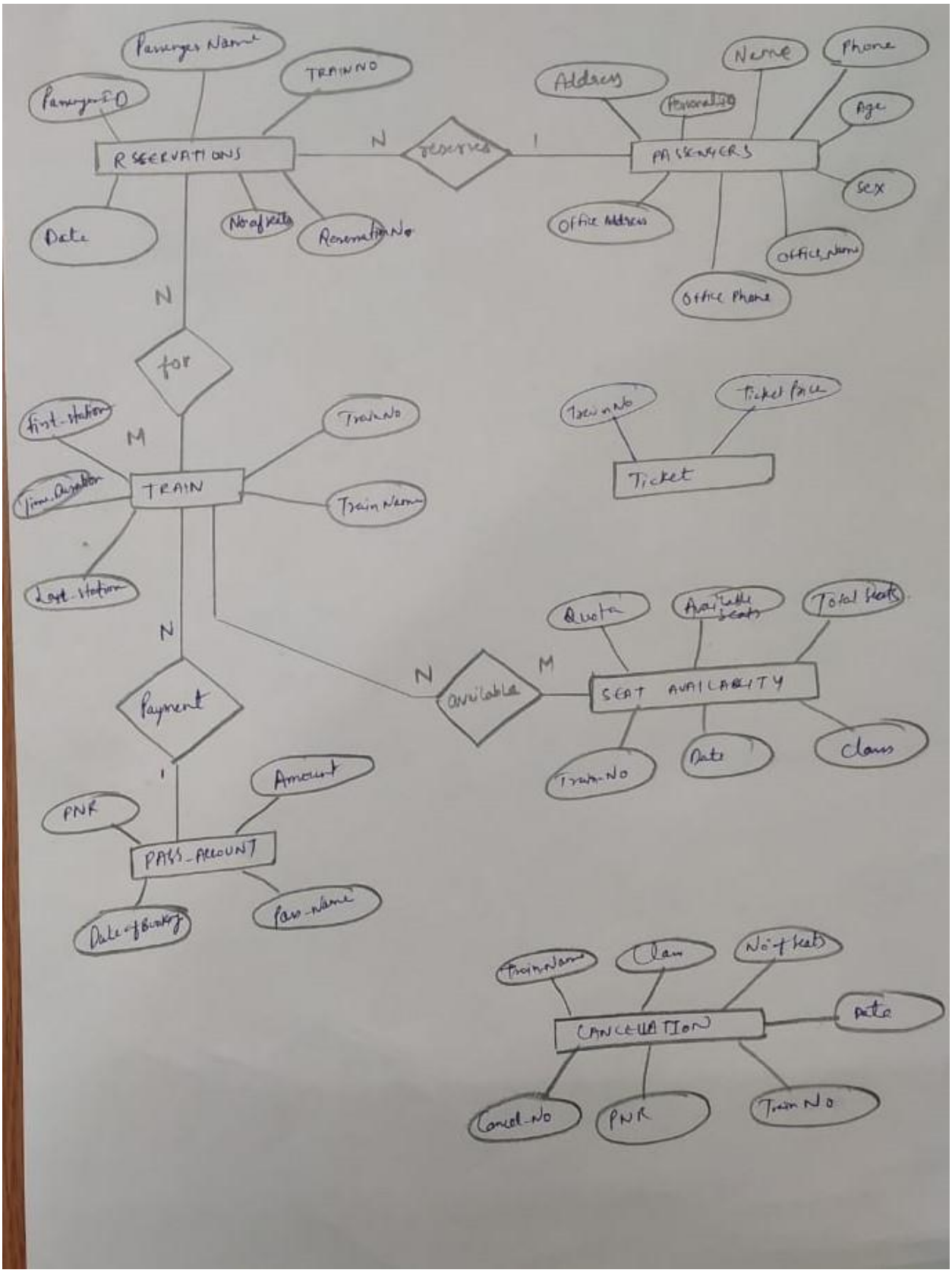
THEORY

Entity Relationship Diagrams are used to define the relationships between various entities. The Entities and Relationships had been identified in Experiment 5. As observed, there are seven key entities and four major relationships. They are listed below.

- **Identification of Entities:**
    1. PASSENGER (Personal Id, Name, Age, Sex, Phone No, Address, Office Name, Office Address, Office Phone)
    2. TRAIN (Train No., Train Name, Duration, First Station, Last Station)
    3. RESERVATION (Reservation No., Passenger Id, Passenger Name, Train Number, Number of Seats, Reservation Date)
    4. PASS_ACCOUNT (PNR, Account Holder Name, Date of Booking, Amount)
    5. CANCELLATION (Cancellation No., PNR, Train No., Train Name, Class, Number of Seats, Reservation Date)
    6. SEAT AVAILABILITY (Train No., Total Seats, Reservation Date, Class, Quota, Available Seats)
    7. TICKET (Train No., Ticket Price)

- **Identification of Relationships:**
    1. RESERVATION: PASSENGER (N:1)
    2. RESERVATION: TRAIN (N:M)
    3. TRAIN: SEAT AVAILABILITY (N:M)
    4. TRAIN: PASS_ACCOUNT (N:1)

The relevant Entity Relationship Diagram has been shown below.


Passenger Name
TRAIN NO
Passenger ID
RESERVATIONS
N
reserves
1
Address
Name
Phone
Passenger ID
Age
PASSENGERS
Sex
Date
No of seats
Reservation No
Office Address
Office Name
Office Phone
N
for
first_station
M
Train No
TRAIN
Train Name
Last_station
Train No
Ticket Price
Ticket
N
Payment
1
N
Available
M
Quota
Available seats
Total Seats
SEAT AVAILABILITY
Train No
Date
class
PNR
Amount
PASS_ACCOUNT
Date of Booking
Pass_name
Train Name
Class
No of seats
CANCELLATION
Date
Cancel_No
PNR
Train No

CONCLUSION:

This experiment helped us simplify the case study and identify the number of table that need to be made, the attribute that they should contain as well as visualize the relationships between them.

EXPERIMENT 7

AIM: Implementing DDL and DML commands.

THEORY

DDL Commands:

DDL stands for Database Definition Language. These types of SQL commands are used to define the database schema. It is used to create or modify database objects and deals with the description of the database schema. The most commonly used DDL commands are:

1. **CREATE TABLE:** This command is used to create a new relation in the database.

   Syntax: CREATE TABLE table_name

   (Attribute1, Datatype,

   Attribute2, Datatype…)

2. **ALTER TABLE:** This command is used to add, delete or manipulate attributes in a relation.

   Syntax: ALTER TABLE table_name

   ADD Attibute_Name datatype;

3. **DROP TABLE:** This command is used to remove or delete a relation from a database

   Syntax: DROP TABLE table_name;

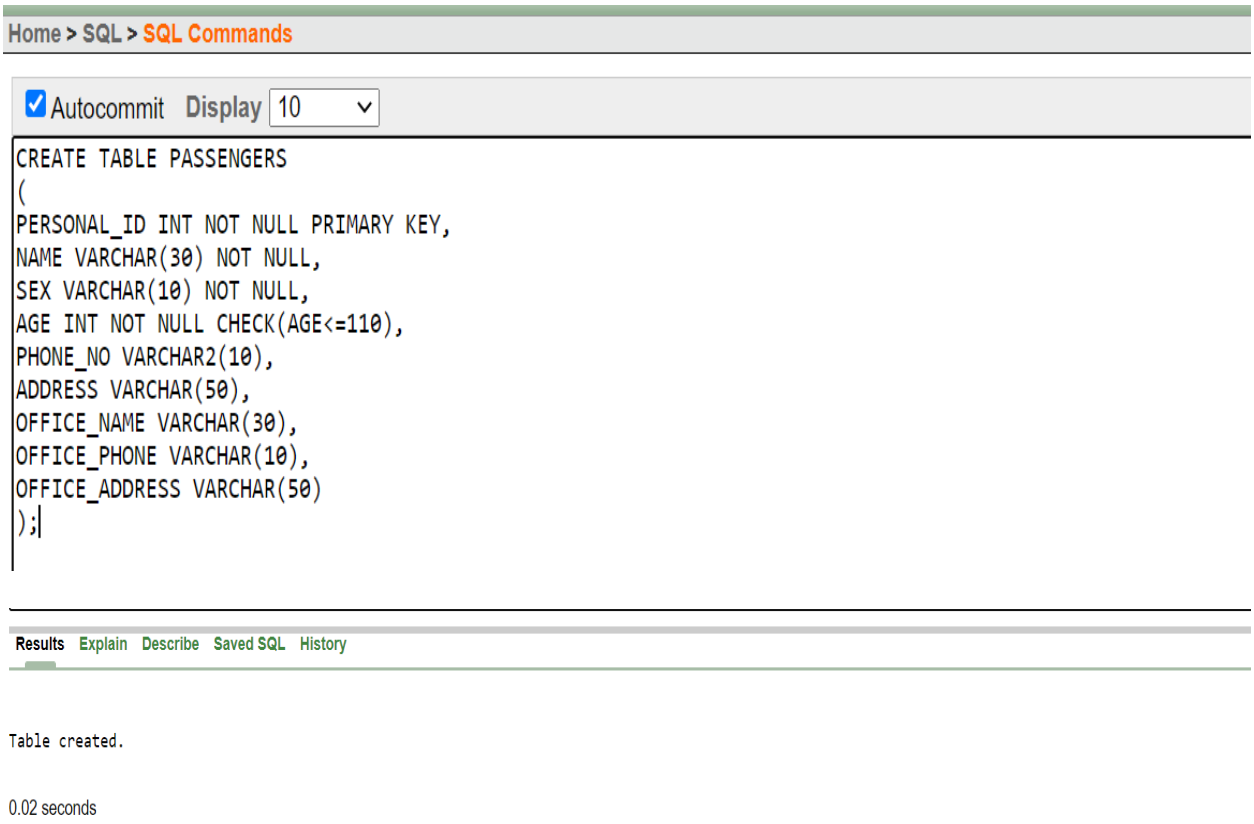
4. **TRUNCATE:** This command is used to erase complete data from an existing relation **Syntax:** TRUNCATE TABLE table_name;

Implementing DDL Commands:

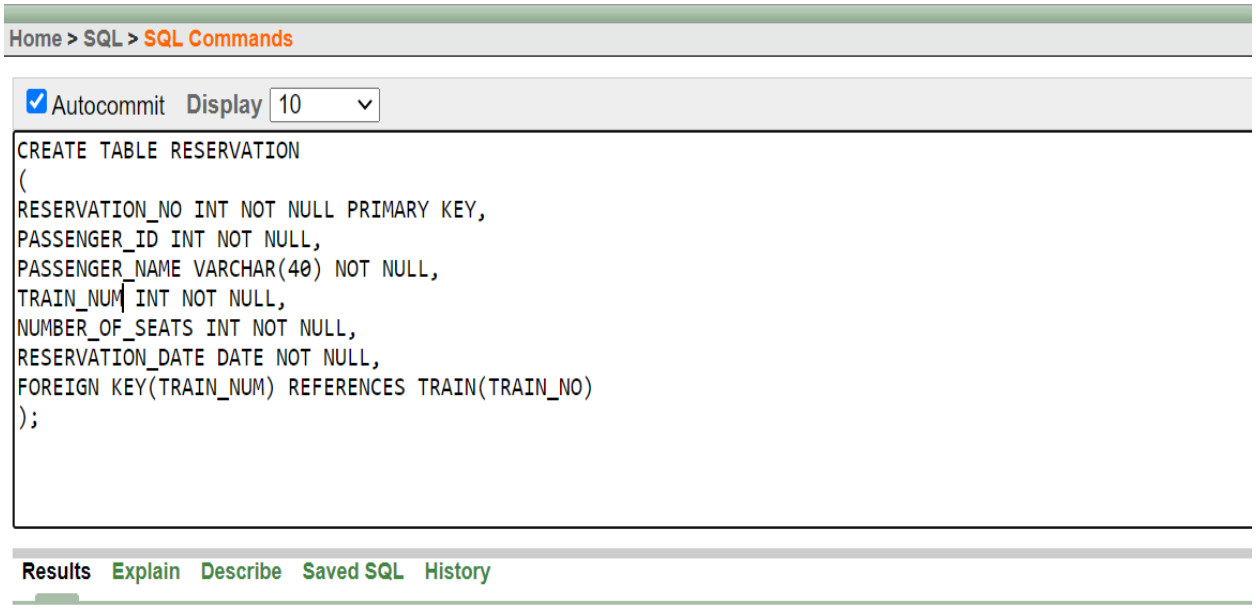
We will be implementing the CREATE and ALTER Table commands for this case study. The results are shown below.

CREATE:

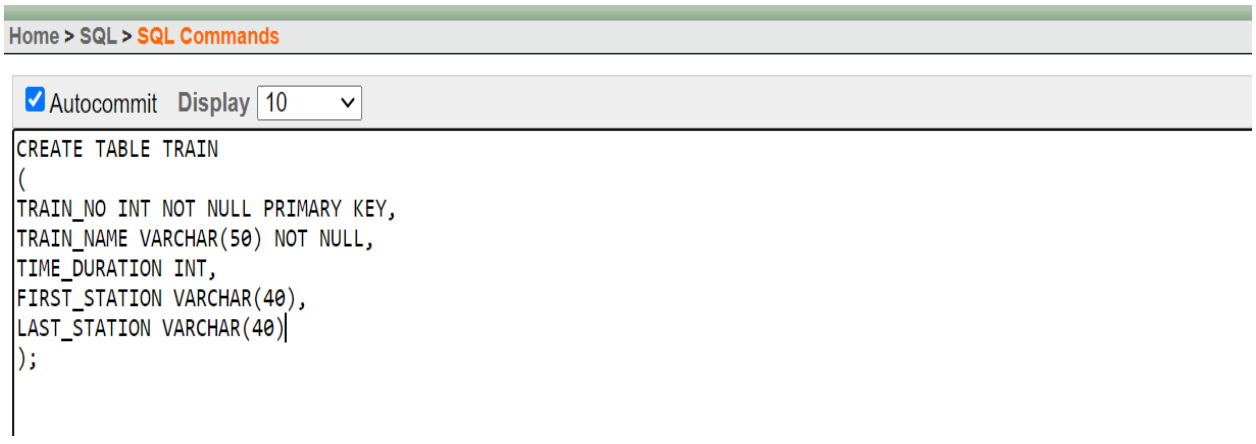
1. PASSENGERS TABLE:



2. RESERVATION TABLE:



3. TRAIN TABLE:



Results Explain Describe Saved SQL History

```
Table created.
```

0.00 seconds

4. TICKET TABLE:

Autocommit Display 10

```
CREATE TABLE TICKET
(
TRAIN_NUMBER INT NOT NULL,
TICKET_PRICE INT NOT NULL,
FOREIGN KEY(TRAIN_NUMBER) REFERENCES TRAIN(TRAIN_NO)
);
```

Results Explain Describe Saved SQL History

```
Table created.
```

0.00 seconds

5. PASS_ACCOUNT TABLE:

Home > SQL > SQL Commands

Autocommit Display 10

```
CREATE TABLE PASS_ACCOUNT
(
PNR INT NOT NULL PRIMARY KEY,
PASS_NAME VARCHAR(50) NOT NULL,
DATE_OF_BOOKING VARCHAR(10) NOT NULL,
AMOUNT INT NOT NULL
);
```

Results Explain Describe Saved SQL History

```
Table created.
```

0.02 seconds

6. CANCELLATION TABLE:

Home > SQL > SQL Commands

Autocommit Display 10

```
CREATE TABLE CANCELLATION
(
PNR_NUM INT NOT NULL,
TRAIN_NUM INT NOT NULL,
TRAIN_NAME VARCHAR(50) NOT NULL,
CLASS VARCHAR(15) NOT NULL,
CANCEL_NO INT NOT NULL PRIMARY KEY,
NUMBER_OF_SEATS  INT NOT NULL,
RES_DATE DATE NOT NULL,
FOREIGN KEY(PNR_NUM) REFERENCES PASS_ACCOUNT(PNR),
FOREIGN KEY(TRAIN_NUM) REFERENCES TRAIN(TRAIN_NO)
);
```

Results Explain Describe Saved SQL History

```
Table created.
```

0.01 seconds

7. SEAT_AVAILABILITY TABLE:

Home > SQL > SQL Commands

Autocommit Display 10

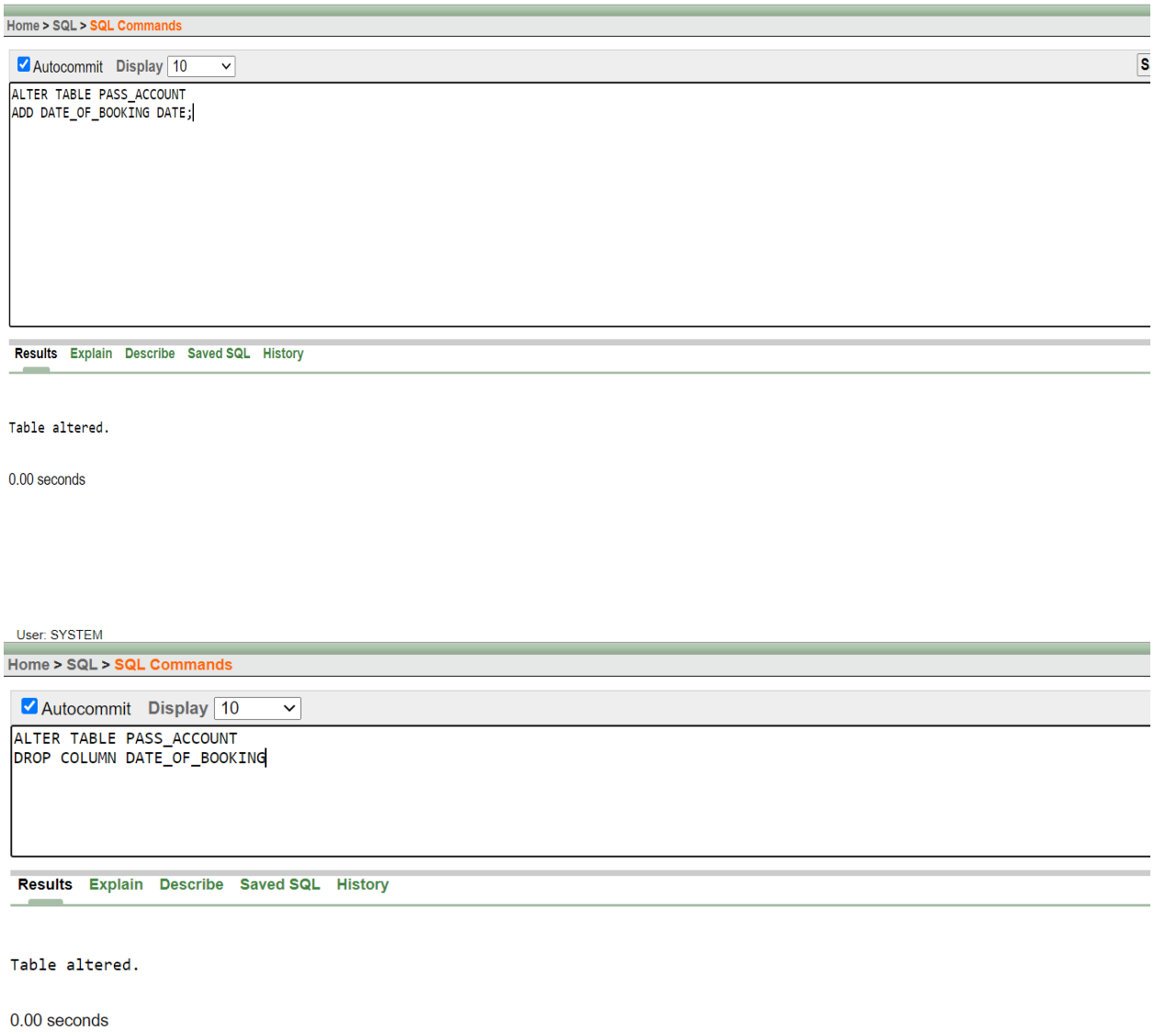
```
CREATE TABLE SEAT_AVAILABILITY
(
TR_NUM INT NOT NULL,
DATE_RES DATE NOT NULL,
CLASS VARCHAR(20) NOT NULL,
QUOTA VARCHAR(20) NOT NULL,
TOTAL_SEATS INT NOT NULL,
SEATS_AVAIL INT NOT NULL,
FOREIGN KEY(TR_NUM) REFERENCES TRAIN(TRAIN_NO)
)
```

Results Explain Describe Saved SQL History

```
Table created.
```

0.00 seconds

ALTER TABLE COMMANDS:



DML Commands:

DML stands for Data Manipulation Language. DML commands are used for insertion, deletion and modification of data in a database. The most commonly used DML commands are:

1. INSERT: This command is used to insert new records into a relation.

Syntax: INSERT INTO *table_name*
VALUES (*value1, value2, value3 ,...*);

2. UPDATE: This command is used to update existing records in a relation.

Syntax: UPDATE *table_name*
SET *column1 = value1*, *column2 = value2*, ...
WHERE *condition*;

3. DELETE: This command is used to delete desired records from a relation.

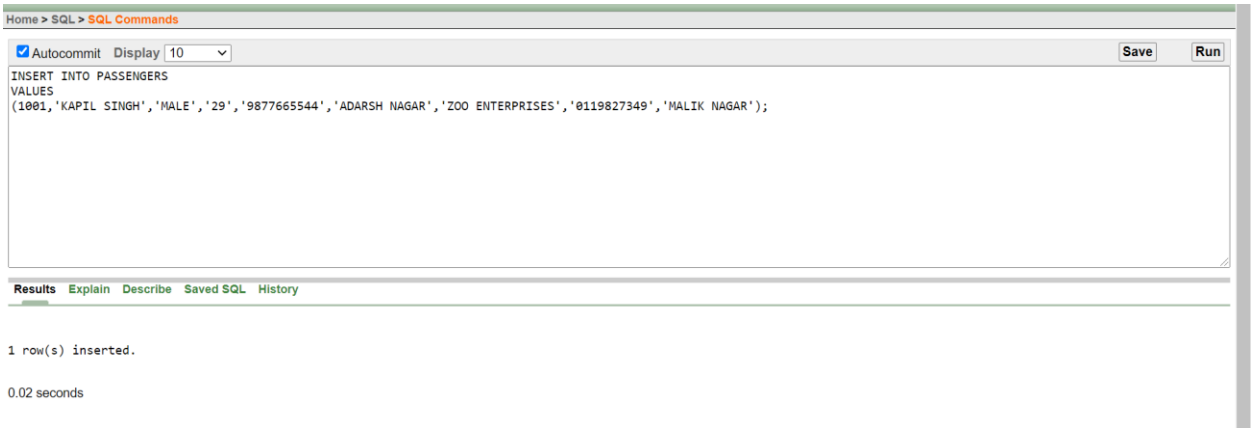
Syntax: DELETE FROM *table_name* WHERE *condition*;

4. SELECT: This command is used to retrieve data from a database.

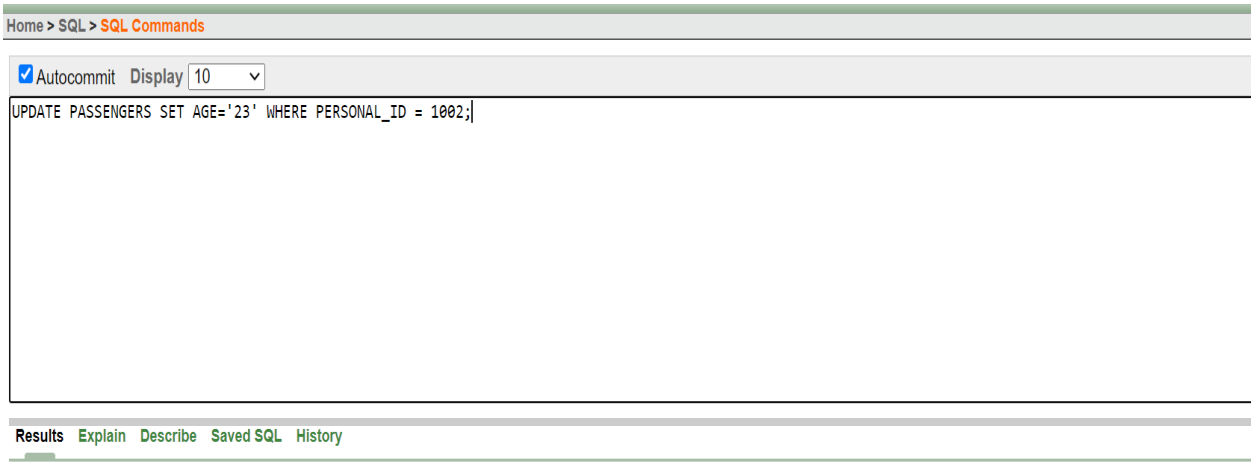
Syntax: SELECT *column1*, *column2*, ... FROM *table_name*;

Implementing DML Commands:

1. **INSERT:**



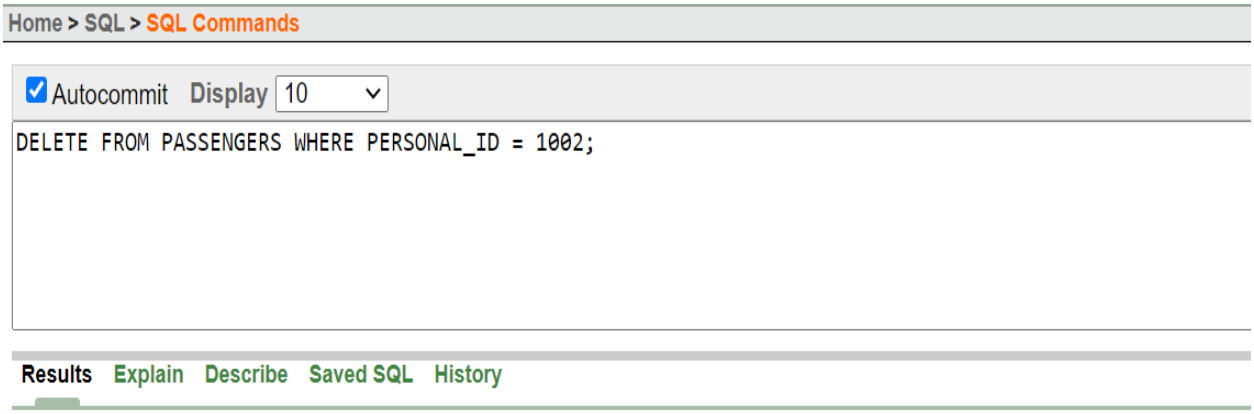
2. UPDATE:



1 row(s) updated.

0.00 seconds

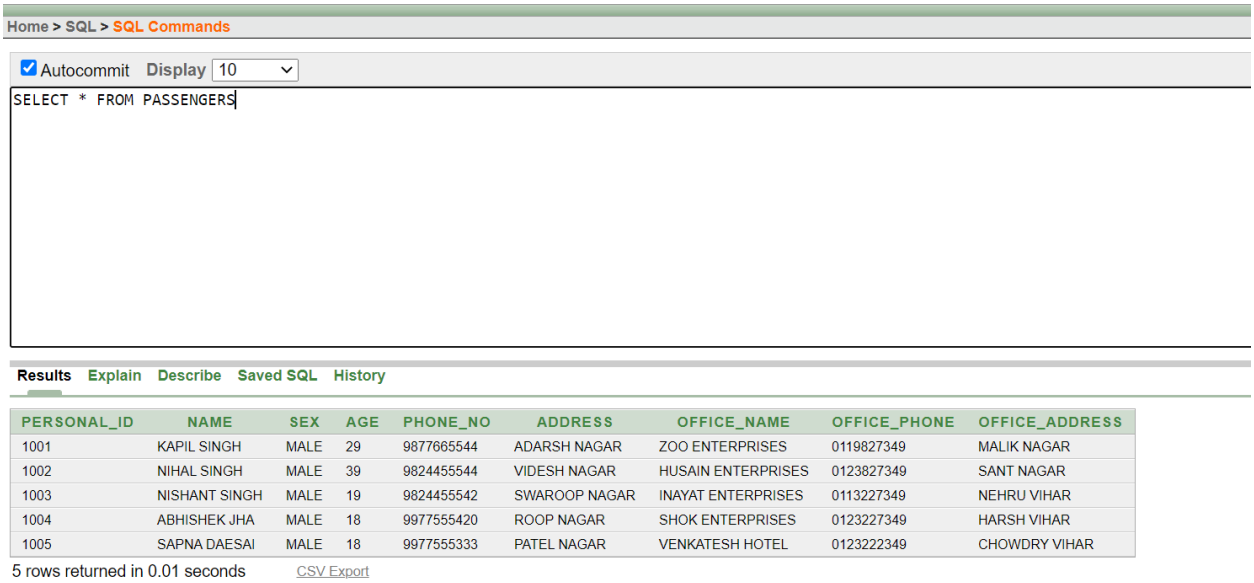
3. DELETE:



1 row(s) deleted.

0.00 seconds

4. SELECT:



PERSONAL_ID	NAME	SEX	AGE	PHONE_NO	ADDRESS	OFFICE_NAME	OFFICE_PHONE	OFFICE_ADDRESS
1001	KAPIL SINGH	MALE	29	9877665544	ADARSH NAGAR	ZOO ENTERPRISES	0119827349	MALIK NAGAR
1002	NIHAL SINGH	MALE	39	9824455544	VIDESH NAGAR	HUSAIN ENTERPRISES	0123827349	SANT NAGAR
1003	NISHANT SINGH	MALE	19	9824455542	SWAROOP NAGAR	INAYAT ENTERPRISES	0113227349	NEHRU VIHAR
1004	ABHISHEK JHA	MALE	18	9977555420	ROOP NAGAR	SHOK ENTERPRISES	0123227349	HARSH VIHAR
1005	SAPNA DAESAI	MALE	18	9977555333	PATEL NAGAR	VENKATESH HOTEL	0123222349	CHOWDRY VIHAR

5 rows returned in 0.01 seconds CSV Export

CONCLUSION:

At the end of this experiment, various common DDL and DML commands were successfully implemented.

EXPERIMENT 8

AIM: Performing Simple Queries.

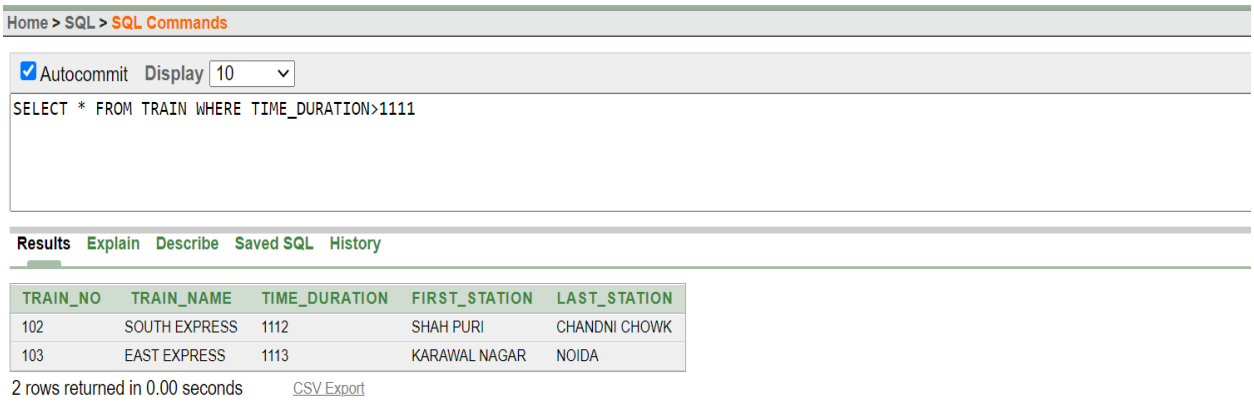
THEORY:

SQL Queries:

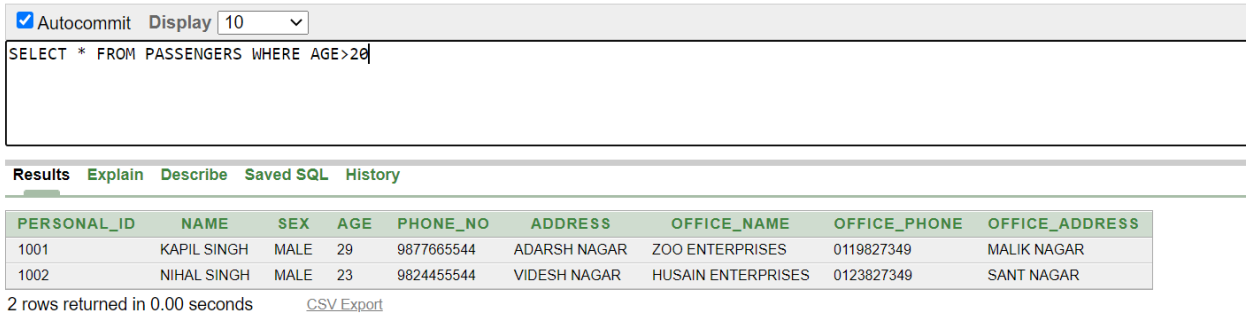
Queries are used in SQL to manipulate and retrieve data from a database as per requirements. This is achieved with the help of some constraints. In SQL, the SELECT command is used for efficient query processing. The data retrieved is presented in the form a result table and the results are called result-sets.

Performing Simple Queries:

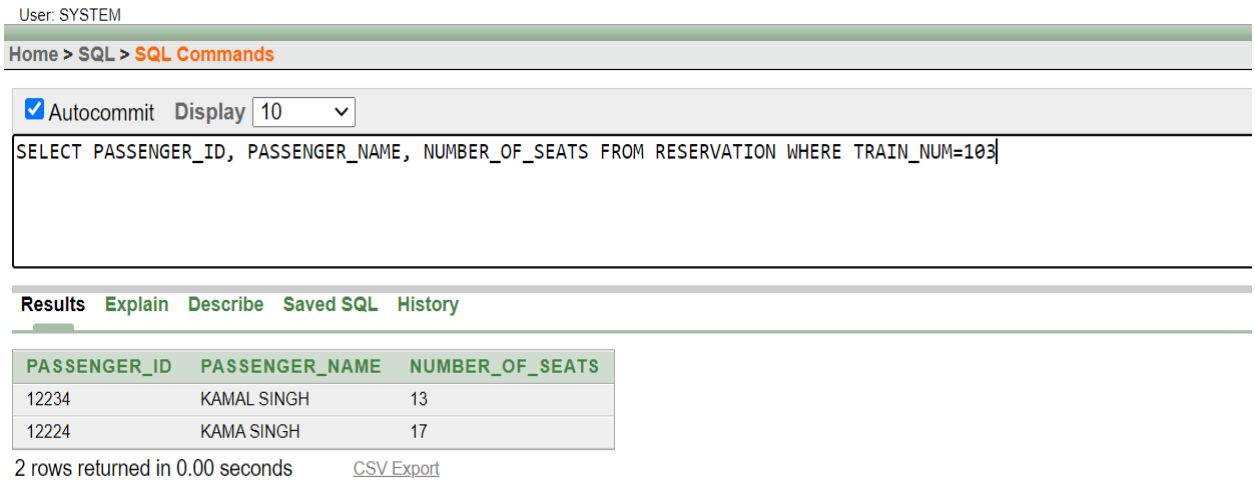
1. **Retrieve all records from train table where time duration is more than 1111 minutes.**



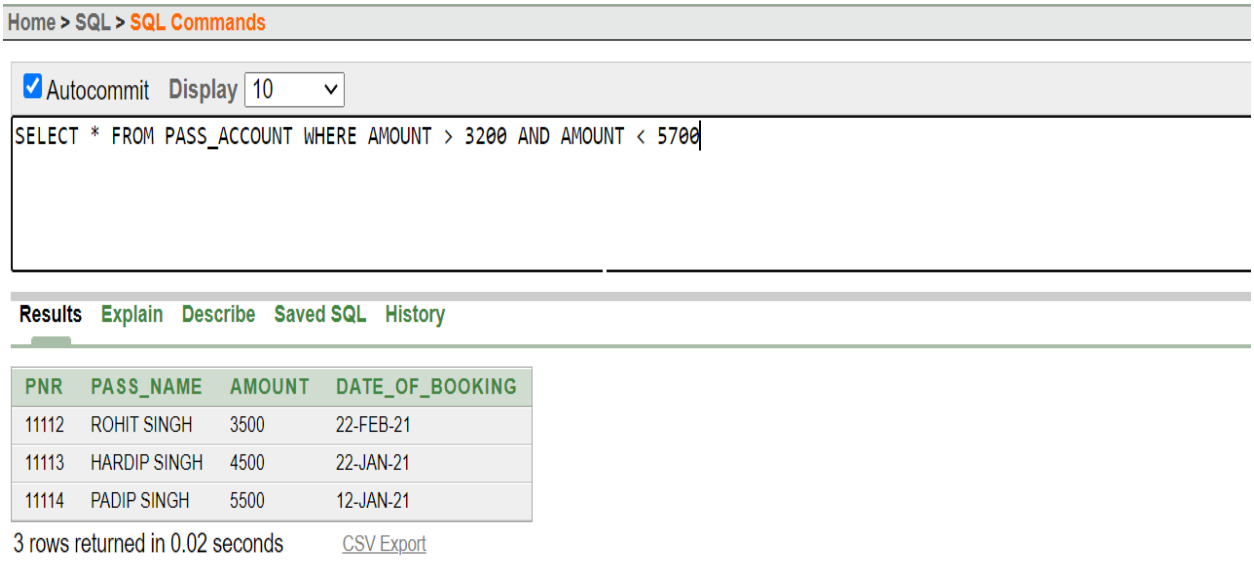
2. **Retrieve all records from passengers table whose age is greater than 20**



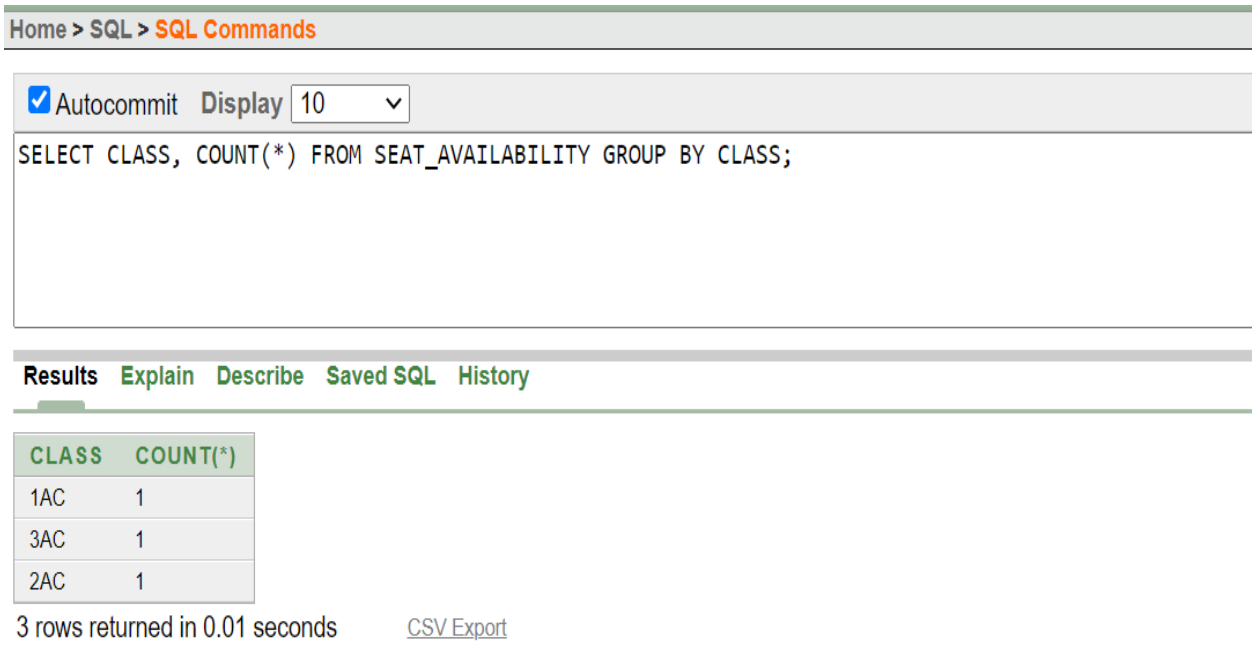
3. **Display the Passenger Id, Passenger Name and Number of Seats from Reservations Table where TrainNum=103**



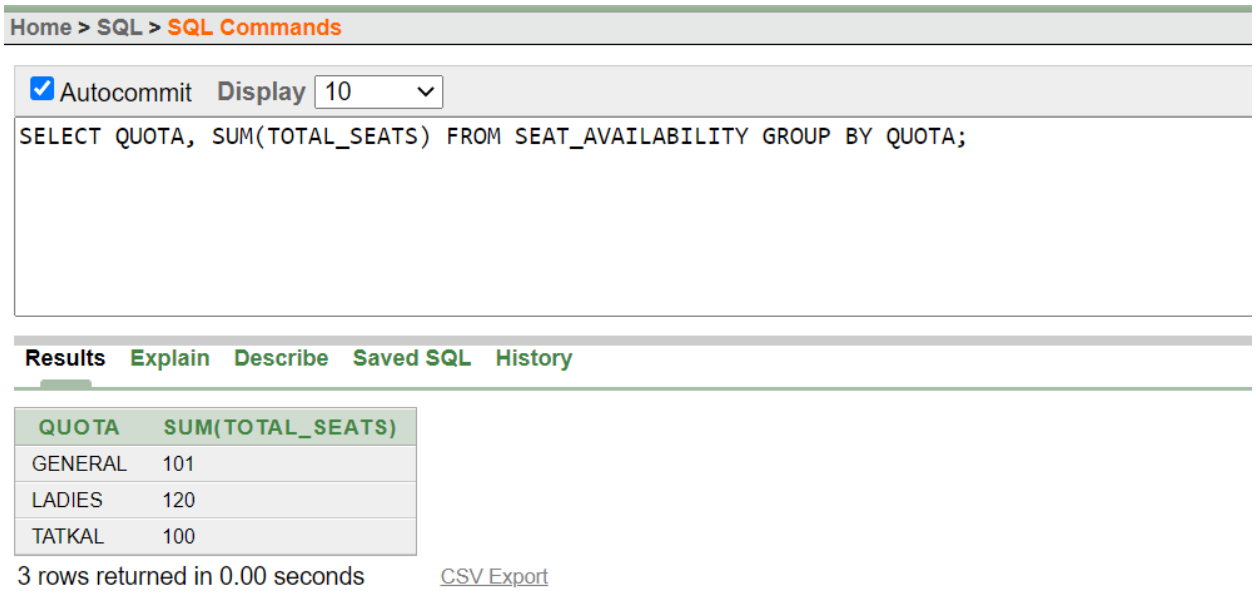
4. **Display those records from Account Table where Amount is between 3200 and 5700**



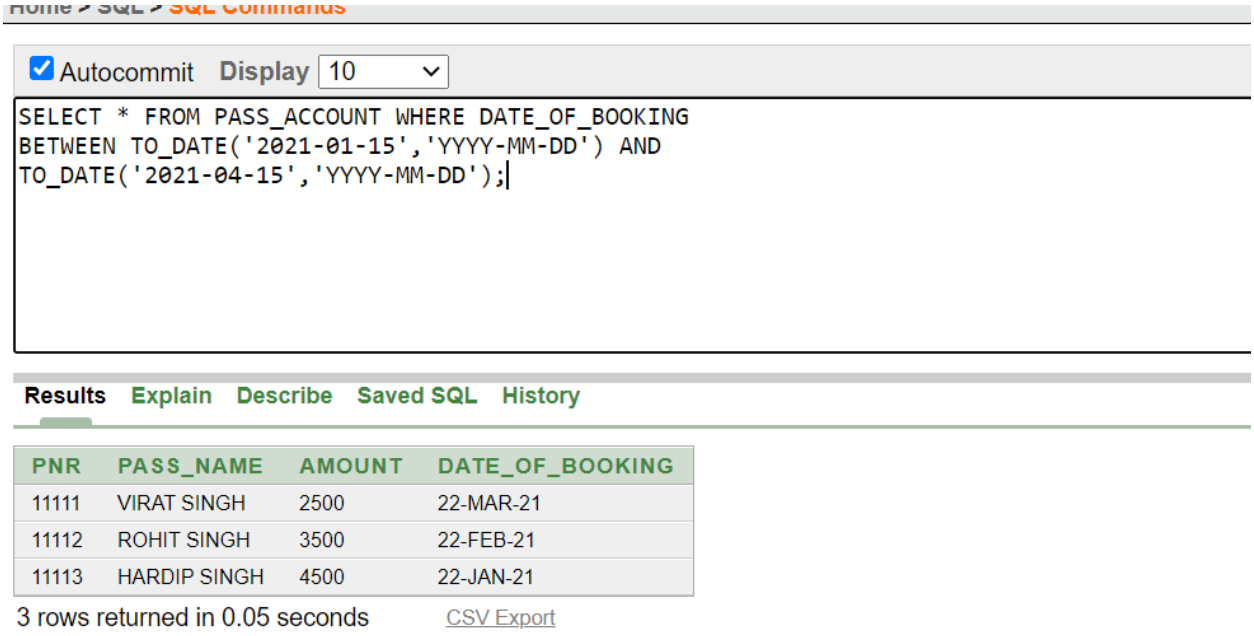
5. **Find out the number of trains in operation on the basis of their class**



6. **Calculate the total number of seats in trains based on quota**



7. **Retrieve information of all bookings from Account table made between 2021-01-15 and 2021-04-15.**



CONCLUSION:

As observed in the experiment, we understood how to perform simple queries on a database. The significance of the SELECT command and the GROUP BY command was understood. Also, we understood how to use basic aggregate functions like COUNT, SUM AND AVERAGE in SQL.

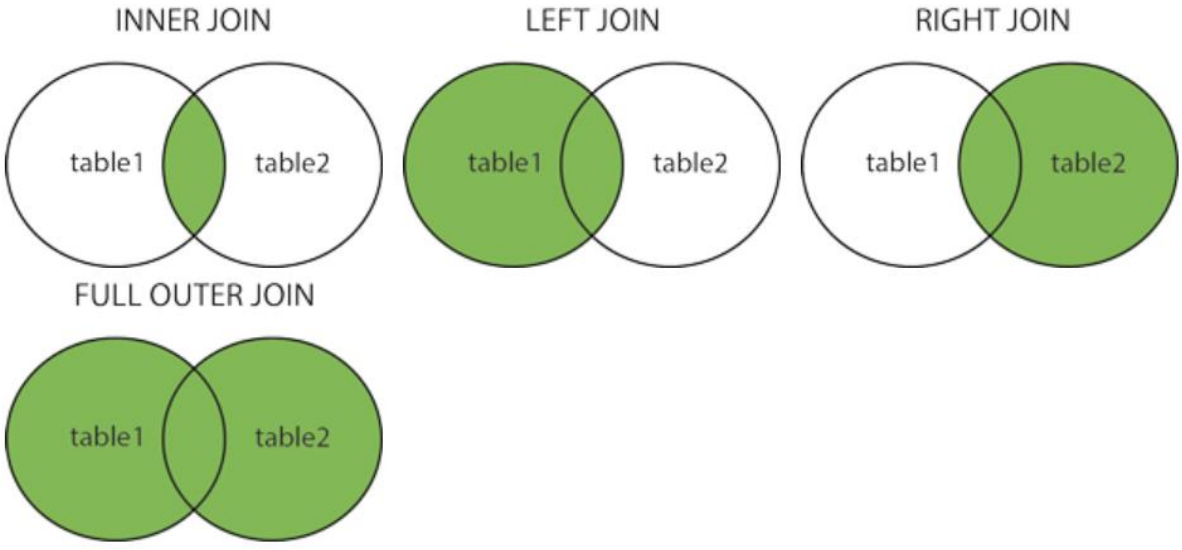
EXPERIMENT 9

AIM: Implementation of Simple Joins

THEORY

A Join is clause in SQL that is used to combine records from two or more tables based on a related attribute between them. There are five major joins in SQL. They are listed below.

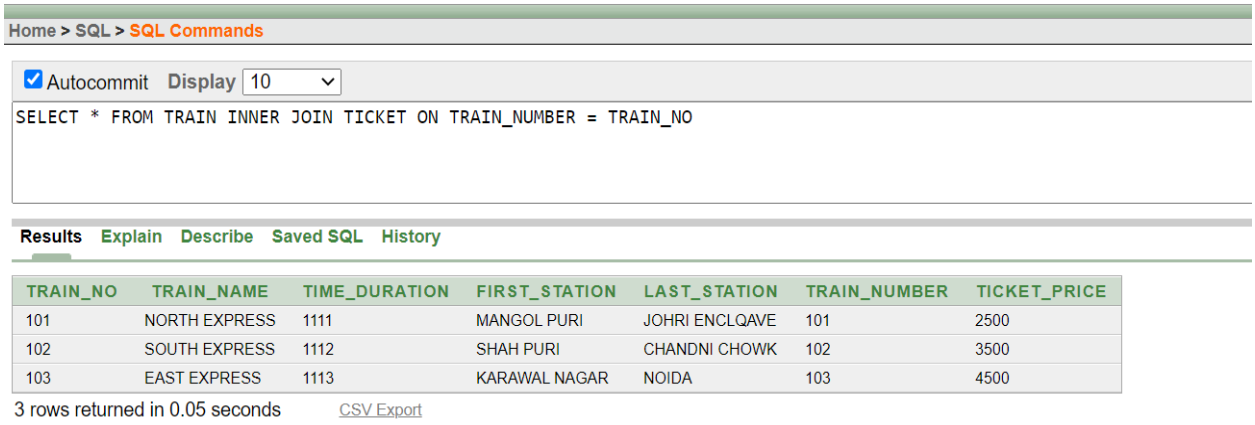
- **INNER JOIN:** This join is used to retrieve records that have matching values in both relations.
- **LEFT OUTER JOIN:** This join returns all records from the left relation and matching records from the right relation.
- **RIGHT OUTER JOIN:** This join returns all records from the right relation and matching records from the left relation.
- **FULL OUTER JOIN:** This join returns all the records along with their matches in left and right relation wherever they exist.
- **CROSS JOIN:** This join returns the Cartesian product of rows from the relations in the join.



Implementation of joins:

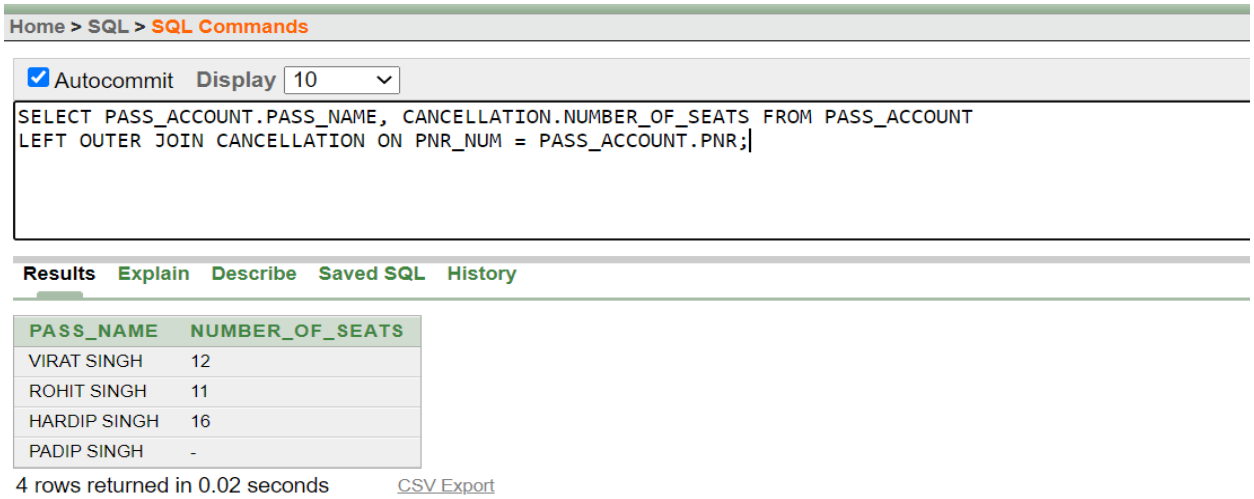
- Inner Join

  Syntax: SELECT columns FROM table1 INNER JOIN table2 ON table1.clumn=table2.column WHERE Condition



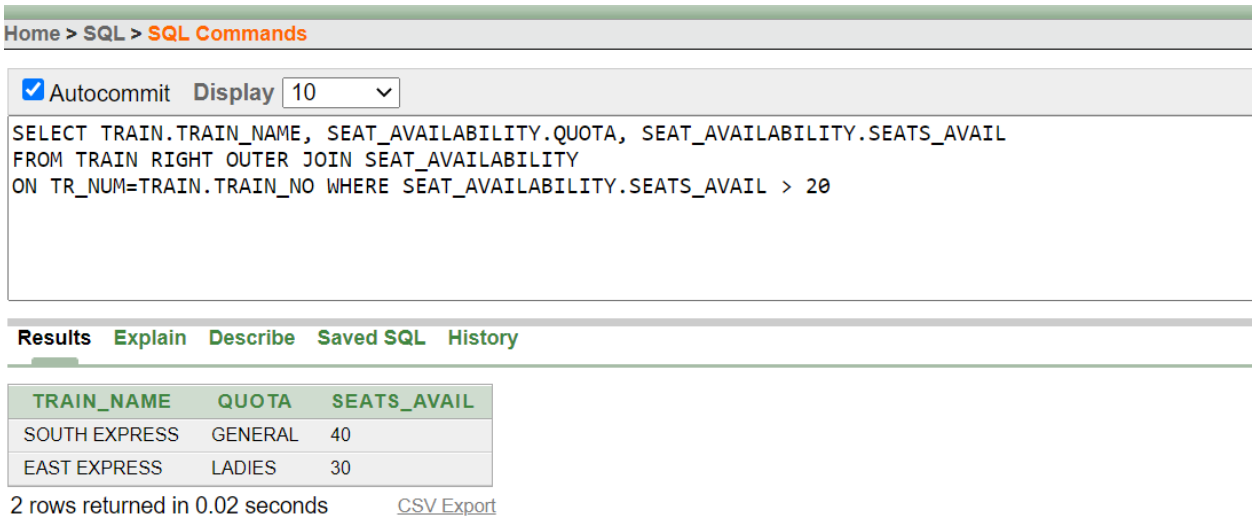
- Left Outer Join

  Syntax: SELECT columns FROM table1 LEFT OUTER JOIN table2 ON table1.clumn=table2.column WHERE Condition



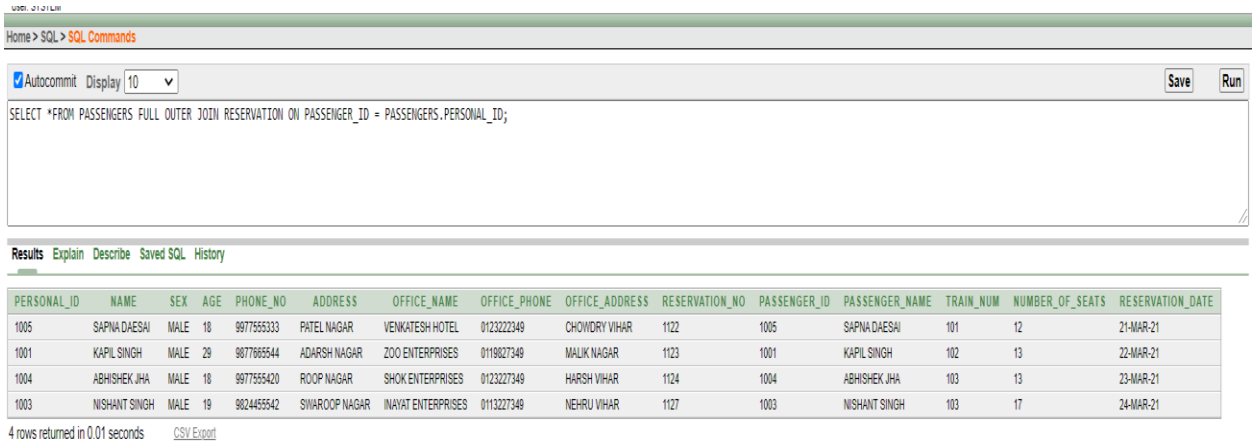
- **Right Outer Join**

Syntax: SELECT columns FROM table1 RIGHT OUTER JOIN table2 ON table1.clumn=table2.column WHERE Condition



- **Full Outer Join**

Syntax: SELECT columns FROM table1 FULL OUTER JOIN table2 ON table1.clumn=table2.column



Conclusion: We understood how to perform various types of joins in a database and how they work.