Sandesh Shrestha

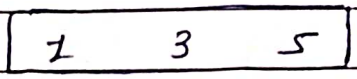
Assignment 8

Date .....

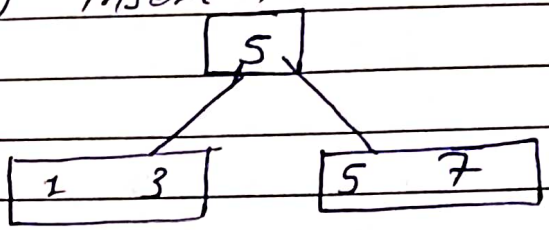
3) Show steps for inserting keys 1, 3, 5, 2, 9, 2, 4, 6, 8, 10 into B+ tree with n=4.

Soln:

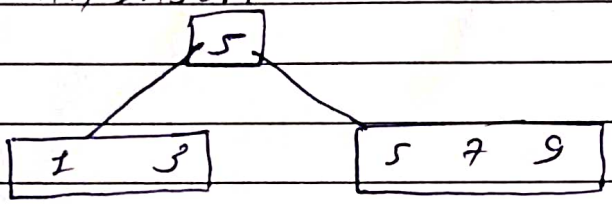
i) insert 1, 3, 5



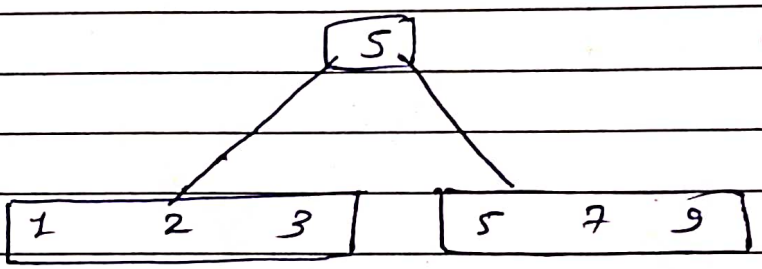
ii) insert 7



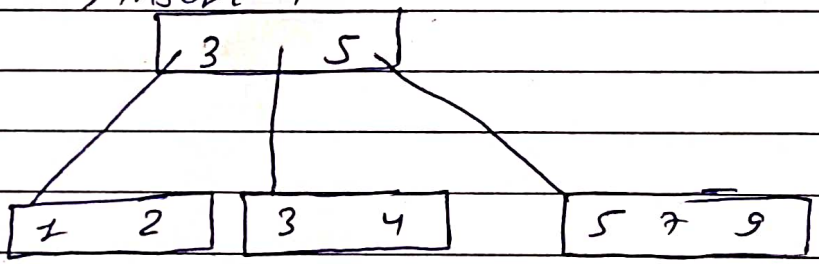
iii) Insert 9



iv) insert 2

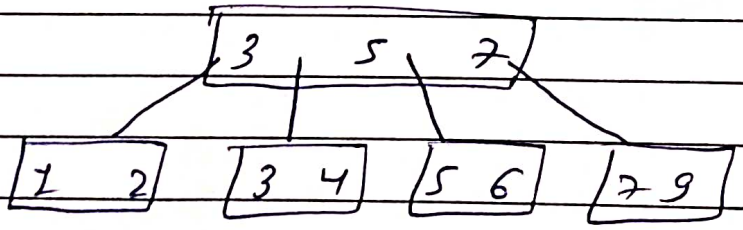


v) insert 4

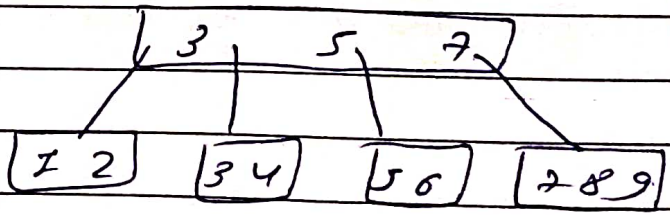


vi)

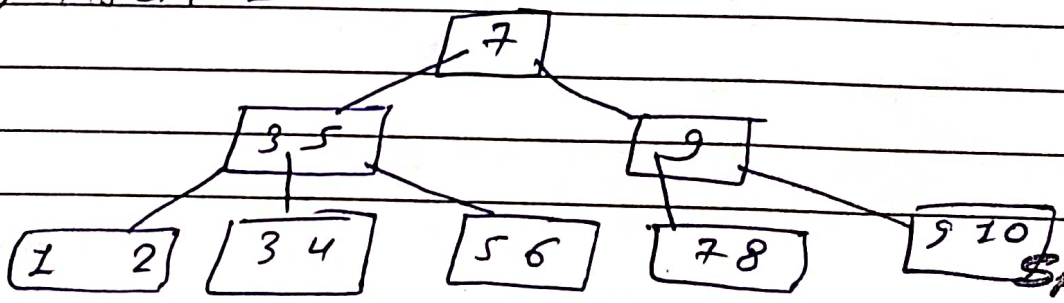
vi) insert 6



vii) insert 8



viii) insert 10



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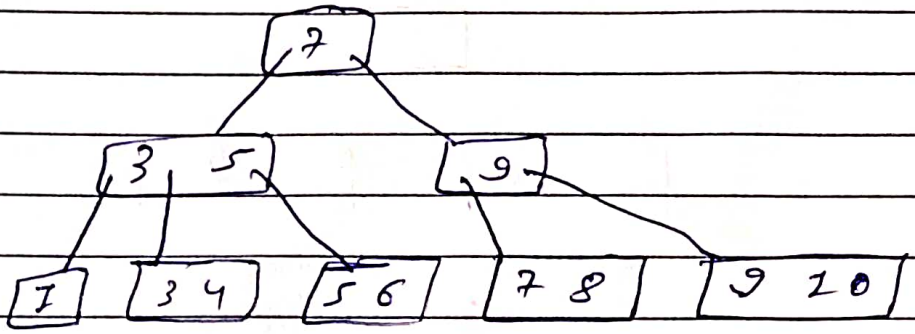
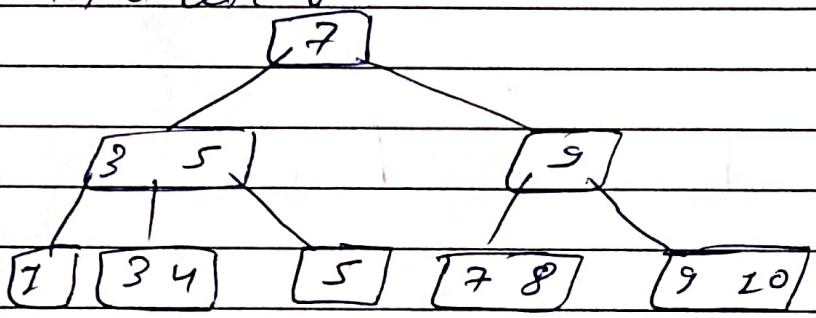
Date .....

Q 4) delete 2, 6, 10.

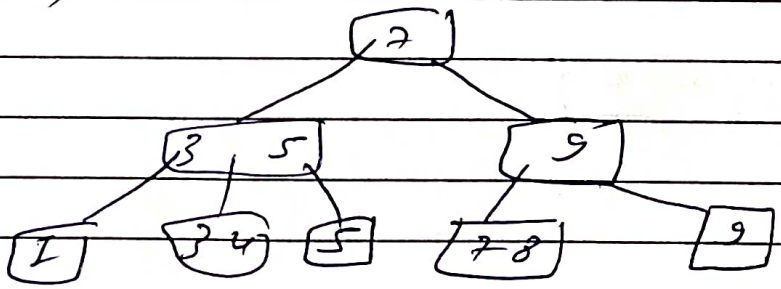
i) delete 2



ii) delete 6



iii) delete 10



Q 5) The keys 12, 18, 13, 2, 3, 23, 5, 15 are inserted into initially empty hash table of length 10 using open addressing with $h(k) = k \bmod 10$ and linear probing. What is resultant hash table?

Date .....

$h(k) = k \bmod 10$

index	0	1	2	3	4	5	6	7	8	9
value	—	—	12	13	2	3	23	5	18	15
probe	—	—	0	0	2	2	3	2	0	4

12 %. 10 = 2,
18 %. 10 = 8
13 %. 10 = 3
2 %. 10 = 2 x, 3 x, 4 ✓
3 %. 10 = 3 x, 4 x, 5 ✓
23 %. 10 = 3 x, 4 x, 5 x, 6 ✓
5 %. 10 = 5 x, 6 x, 7 ✓
15 %. 10 = 5 x, 6 x, 7 x, 8 x, 9 ✓

Q6) soln,

$h(k) = k \bmod (10)$ → m

quadratic probing: $h'(k,i) = (h(k) + i^2) \bmod m$

index	values	probes
0	19	1
1	—	—
2	—	—
3	29	2
4	59	5
5	49	4
6	69	7
7	—	—
8	39	3
9	9	0

9 %. 10 = 9

$h'(9,0) = (h(9) + 0^2) \%. 10$
$= 9$ ✓

$h'(19,0) = (h(19) + 0^2) \%. 10$ ×
$= 9$ x

$h'(19,1) = (h(19) + 1^2) \%. 10$
$= 10 \%. 10$
$= 0$ ✓

$h'(29,0) = (h(29) + 0^2) \%. 10$
$= 9$ x

$h'(29,1) = (h(29) + 1^2) \%. 10$
$= 0$ x

$h'(29,2) = (9 + 4) \%. 10$
$= 3$ ✓

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Date .....

$h'(39,0) = x$	$h'(49,0) = x$
$h'(39,1) = x$	$h'(49,4) = (9+10) \% 10$
$h'(39,2) = x$	$= 5$
$h'(39,3) = (9+9) \% 10$	$h'(59,5) = (9+25) \% 10$
$= 18 \% 10 = 8$	$= 4$

$h'(69,6) = (9+36) \% 10$
$= 5 x$
$h'(69,7) = (9+49) \% 10$
$= 58 \% 10$
$= 6$

97) soln;

double hashing

$h(k,i) = (h_1(k) + i h_2(k)) \bmod m$

$h_1(k) = k \bmod 11 \rightarrow m$

$h_2(k) = k \bmod 7 + 1$

index	values	probes
0	—	—
1	34	0
2	—	—
3	14	0
4	37	0
5	16	0
6	17	0
7	25	1
8	—	—
9	26	1
10	—	—

$14: (h_1(14) + 0(h_2(14))) \bmod 11$
$= (3 + 0) \bmod 11 = 3$

$h(17,0) = (h_1(17) + 0\, h_2(17)) \% 11$
$= (6 + 0) \% 11$
$= 6.$

$h(25,0) = (3+0) \% 11$
$= 3 x$

$h(25,1) = (3 + 1 \times 4) \% 11$
$= (7) \% 11$
$= 7 \checkmark$

$h(37,0) = (4+0) \% 11$
$= 4 \checkmark$

$h(34,0) = (1+0) \% 11$
$= 1$

$h(16,0) = (5+0) \% 11$
~ 5

Spiral

Date .....

$h(26,0) = (4+0) \% 11$
$= 4$ ✗

$h(26,1) = (4+1\times5) \% 11$
$= 9 \% 11$
$= 9$

Qsn 2) soln,

content of index = < key, block pointer >
= 6 + 10 = 16 bytes

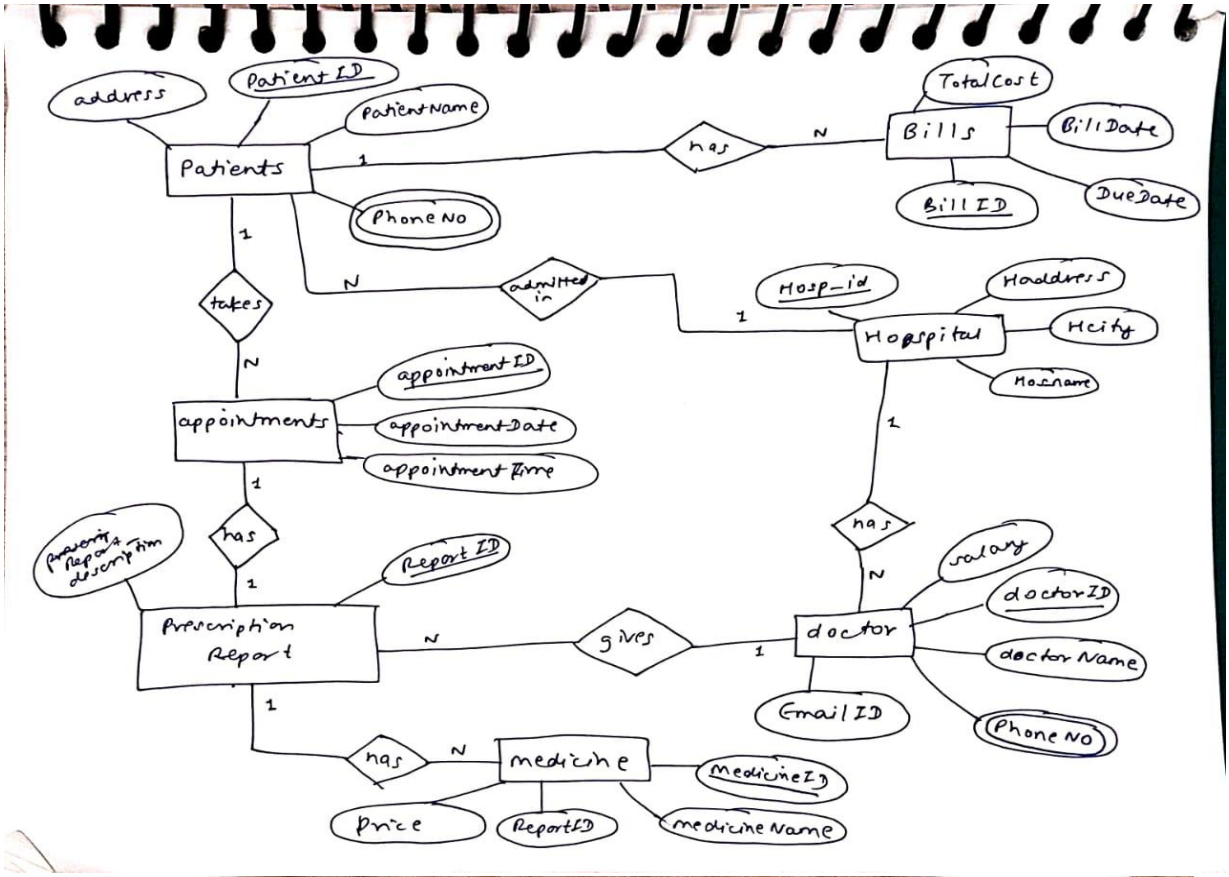
In first level, there will be entry for each record. So,
Total size of first level index = 16384 × 16 bytes

no. of blocks in first level = total size / block size
$= \frac{16384 \times 16}{1024}$
$= 256$ ✓

In second level, there will be entry for each block in first level. So, Total entries = 256 and total size of second level index = no of entries × size of 1 entry
= 256 × 16

∴ no. of blocks in second level index = $\frac{256 \times 16}{1024}$
$= 4$ ✓

Assignment 8 Question no 1. 2k21/CO/417 Sandesh Shrestha



Relational table

Patients Table

Patient-ID	Patient Name	Phone no.	address	Hosp-id (FK)

Doctor Table

Doctor ID	Doctor Name	Phone No	Email ID	Hosp-id (FK)

Prescription Report Table

Report ID	Report Desc	Doctor ID	salary

Medicine Table

Medicine ID	Medicine Name	Price	Report ID (FK)

Appointments Table

Appointment ID	Appointment Date	Appointment Time

Patient ID (FK)	Report ID (FK)

Bills Table

Bill ID	Patient ID (FK)	Total Cost	Bill Date	Due Date

Hospital Table

Hosp-id	Haddress	Hcity	Hospname

```
CREATE TABLE Patients(
    PatientID NUMBER PRIMARY KEY,
    PatientName VARCHAR2(50) NOT NULL,
    Address VARCHAR2(50) NOT NULL,
    PhoneNo VARCHAR2(50) NOT NULL
);

CREATE TABLE Doctor(
    DoctorID NUMBER(10) PRIMARY KEY,
    DoctorName VARCHAR2(50) NOT NULL,
    PhoneNo VARCHAR2(50) UNIQUE,
    EmailID VARCHAR2(50) UNIQUE);

CREATE TABLE PrescriptionReport(
    ReportID NUMBER(10) PRIMARY KEY,
    ReportDescription VARCHAR2(255) DEFAULT 'General Checkup',
    DoctorID NUMBER(10),
    FOREIGN KEY(DoctorID) REFERENCES Doctor(DoctorID));

CREATE TABLE Medicine(
    MedicineID NUMBER(10) PRIMARY KEY,
    MedicineName VARCHAR2(255) NOT NULL,
    Price VARCHAR2(255) NOT NULL,
    ReportID NUMBER(10),
    FOREIGN KEY(ReportID) REFERENCES PrescriptionReport(ReportID)
);

CREATE TABLE Appointments(
    AppointmentID NUMBER(10) PRIMARY KEY,
```

```
    AppointmentDate DATE NOT NULL,
    AppointmentTime VARCHAR2(30) NOT NULL,
    PatientID NUMBER(10),
    ReportID NUMBER(10),
    FOREIGN KEY(PatientID) REFERENCES Patients(PatientID),
    FOREIGN KEY(ReportID) REFERENCES PrescriptionReport(ReportID));


CREATE TABLE Bills (
    BillID NUMBER(10) PRIMARY KEY,
    PatientID NUMBER(10) NOT NULL,
    TotalCost NUMBER(10, 2) NOT NULL,
    BillDate DATE NOT NULL,
    DueDate DATE,
    FOREIGN KEY (PatientID) REFERENCES Patients (PatientID)
);


INSERT ALL
INTO Patients(PatientID, PatientName, Address, PhoneNo) VALUES (1, 'Liam Johnson', '123 Main St, Anytown', '123-456-7890')
INTO Patients(PatientID, PatientName, Address, PhoneNo) VALUES (2, 'Ava Smith', '456 Oak Ave, Another Town', '555-555-1234')
INTO Patients(PatientID, PatientName, Address, PhoneNo) VALUES (3, 'Noah Davis', '789 Pine Rd, Big City', '111-222-3333')
INTO Patients(PatientID, PatientName, Address, PhoneNo) VALUES (4, 'Sophia Rodriguez', '321 Maple Dr, Smallville', '444-555-6666')
INTO Patients(PatientID, PatientName, Address, PhoneNo) VALUES (5, 'William Brown', '987 Cherry Ln, Metropolis', '777-888-9999')
INTO Patients(PatientID, PatientName, Address, PhoneNo) VALUES (6, 'Isabella Wilson', '654 Elm St, Gotham', '333-444-5555')
```

INTO Patients(PatientID, PatientName, Address, PhoneNo) VALUES (7, 'James Lee', '246 5th Ave, Springfield', '888-999-0000')

INTO Patients(PatientID, PatientName, Address, PhoneNo) VALUES (8, 'Olivia Perez', '135 Broadway, Capital City', '222-333-4444')

INTO Patients(PatientID, PatientName, Address, PhoneNo) VALUES (9, 'Oliver Martin', '864 High St, Atlantis', '111-222-3333')

INTO Patients(PatientID, PatientName, Address, PhoneNo) VALUES (10, 'Lalu Yadav', 'Bihar', '987-634-259')

INTO Patients(PatientID, PatientName, Address, PhoneNo) VALUES (11, 'Rahul Sharma', 'Delhi', '767-473-5890')

INTO Patients(PatientID, PatientName, Address, PhoneNo) VALUES (12, 'Aman Yadav', 'Delhi', '858-7848-789')

INTO Patients(PatientID, PatientName, Address, PhoneNo) VALUES (13, 'Sameer Saxena', 'Mumbai', '838-146-7671')

INTO Patients(PatientID, PatientName, Address, PhoneNo) VALUES (14, 'Akash Chopra', 'Goa', '734-932-1587')

INTO Patients(PatientID, PatientName, Address, PhoneNo) VALUES (15, 'Emma Thompson', '579 Low St, Neverland', '555-444-3333')

SELECT 1 FROM dual;

INSERT ALL

INTO Doctor(DoctorID, DoctorName, PhoneNo, EmailID) VALUES(1, 'Dr. Jackson', '555-123-4567', 'jackson@hospital.com')

INTO Doctor(DoctorID, DoctorName, PhoneNo, EmailID) VALUES(2, 'Dr. Smith', '555-234-5678', 'smith@hospital.com')

INTO Doctor(DoctorID, DoctorName, PhoneNo, EmailID) VALUES(3, 'Dr. Patel', '555-345-6789', 'patel@hospital.com')

INTO Doctor(DoctorID, DoctorName, PhoneNo, EmailID) VALUES(4, 'Dr. Chen', '555-456-7890', 'chen@hospital.com')

INTO Doctor(DoctorID, DoctorName, PhoneNo, EmailID) VALUES(5, 'Dr. Kim', '555-567-8901', 'kim@hospital.com')

SELECT * FROM dual;

INSERT ALL

```
INTO PrescriptionReport(ReportID, ReportDescription, DoctorID) VALUES(1, 'Leg Injury', 1)

INTO PrescriptionReport(ReportID, ReportDescription, DoctorID) VALUES(2, 'Heart Attack', 4)

INTO PrescriptionReport(ReportID, ReportDescription, DoctorID) VALUES(3, 'Broken Teeth', 5)

INTO PrescriptionReport(ReportID, ReportDescription, DoctorID) VALUES(4, 'Typhoid', 2)

INTO PrescriptionReport(ReportID, ReportDescription, DoctorID) VALUES(5, 'Fever and Commoncold', 3)

INTO PrescriptionReport(ReportID, ReportDescription, DoctorID) VALUES(6, 'Hand Injury', 1)

SELECT * FROM dual;


INSERT ALL

INTO Medicine(MedicineID, MedicineName, Price, ReportID) VALUES(1, 'Aspirin', 'Rs.200', 1)

INTO Medicine(MedicineID, MedicineName, Price, ReportID) VALUES(2, 'Vasoter', 'Rs.250', 2)

INTO Medicine(MedicineID, MedicineName, Price, ReportID) VALUES(3, 'Avandia', 'Rs.300', 2)

INTO Medicine(MedicineID, MedicineName, Price, ReportID) VALUES(4, 'OraGel', 'Rs.179', 3)

INTO Medicine(MedicineID, MedicineName, Price, ReportID) VALUES(5, 'Ceftriaxone', 'Rs.200', 4)

INTO Medicine(MedicineID, MedicineName, Price, ReportID) VALUES(6, 'Vivotif', 'Rs.250', 4)

INTO Medicine(MedicineID, MedicineName, Price, ReportID) VALUES(7, 'Paracetamol', 'Rs.60', 5)

INTO Medicine(MedicineID, MedicineName, Price, ReportID) VALUES(8, 'Moov', 'Rs.70', 6)

SELECT * FROM dual;

INSERT ALL
```

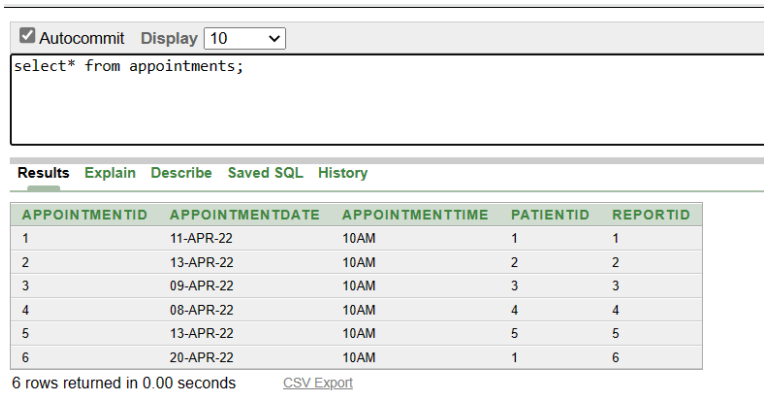
```
INTO Appointments(AppointmentID, AppointmentDate, AppointmentTime, PatientID, ReportID)

VALUES(1, TO_DATE('2022-04-11', 'YYYY-MM-DD'), '10AM', 1, 1)

INTO Appointments(AppointmentID, AppointmentDate, AppointmentTime, PatientID, ReportID)

VALUES(2, TO_DATE('2022-04-13', 'YYYY-MM-DD'), '10AM', 2, 2)

INTO Appointments(AppointmentID, AppointmentDate, AppointmentTime, PatientID, ReportID)

VALUES(3, TO_DATE('2022-04-09', 'YYYY-MM-DD'), '10AM', 3, 3)

INTO Appointments(AppointmentID, AppointmentDate, AppointmentTime, PatientID, ReportID)

VALUES(4, TO_DATE('2022-04-08', 'YYYY-MM-DD'), '10AM', 4, 4)

INTO Appointments(AppointmentID, AppointmentDate, AppointmentTime, PatientID, ReportID)

VALUES(5, TO_DATE('2022-04-13', 'YYYY-MM-DD'), '10AM', 5, 5)

INTO Appointments(AppointmentID, AppointmentDate, AppointmentTime, PatientID, ReportID)

VALUES(6, TO_DATE('2022-04-20', 'YYYY-MM-DD'), '10AM', 1, 6)

SELECT 1 FROM dual;


INSERT ALL

INTO Bills (BillID, PatientID, TotalCost, BillDate, DueDate) VALUES (1, 2, 100.00, TO_DATE('2023-03-01', 'YYYY-MM-DD'), TO_DATE('2023-03-31', 'YYYY-MM-DD'))

INTO Bills (BillID, PatientID, TotalCost, BillDate, DueDate) VALUES (2, 3, 250.00, TO_DATE('2023-03-01', 'YYYY-MM-DD'), TO_DATE('2023-03-31', 'YYYY-MM-DD'))

INTO Bills (BillID, PatientID, TotalCost, BillDate, DueDate) VALUES (3, 4, 75.50, TO_DATE('2023-03-01', 'YYYY-MM-DD'), TO_DATE('2023-03-31', 'YYYY-MM-DD'))

INTO Bills (BillID, PatientID, TotalCost, BillDate, DueDate) VALUES (4, 5, 500.00, TO_DATE('2023-03-01', 'YYYY-MM-DD'), TO_DATE('2023-03-31', 'YYYY-MM-DD'))
```

INTO Bills (BillID, PatientID, TotalCost, BillDate, DueDate) VALUES (5, 1, 1000.00, TO_DATE('2023-03-01', 'YYYY-MM-DD'), TO_DATE('2023-03-31', 'YYYY-MM-DD'))

INTO Bills (BillID, PatientID, TotalCost, BillDate, DueDate) VALUES (6, 6, 200.00, TO_DATE('2023-03-01', 'YYYY-MM-DD'), TO_DATE('2023-03-31', 'YYYY-MM-DD'))

SELECT * FROM dual;

Some sample Select commands in oracle:



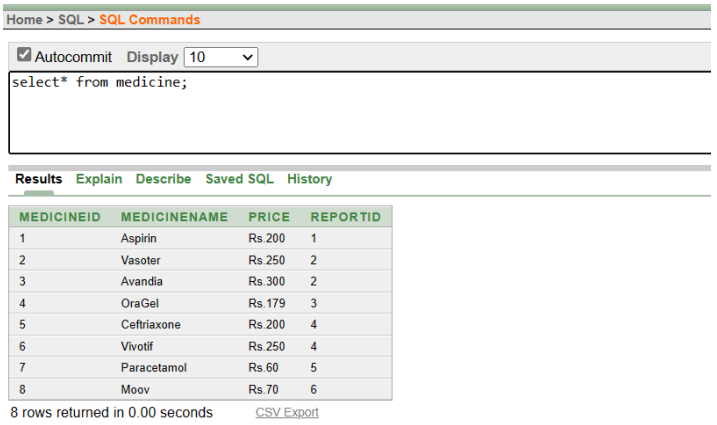
Autocommit Display 10

```
select* from appointments;
```

Results Explain Describe Saved SQL History

APPOINTMENTID	APPOINTMENTDATE	APPOINTMENTTIME	PATIENTID	REPORTID
1	11-APR-22	10AM	1	1
2	13-APR-22	10AM	2	2
3	09-APR-22	10AM	3	3
4	08-APR-22	10AM	4	4
5	13-APR-22	10AM	5	5
6	20-APR-22	10AM	1	6

6 rows returned in 0.00 seconds CSV Export



Home > SQL > SQL Commands

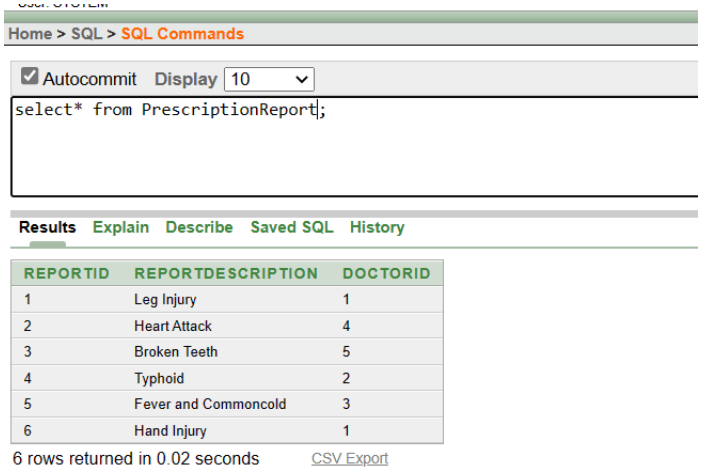
Autocommit Display 10

```
select* from medicine;
```

Results Explain Describe Saved SQL History

MEDICINEID	MEDICINENAME	PRICE	REPORTID
1	Aspirin	Rs.200	1
2	Vasoter	Rs.250	2
3	Avandia	Rs.300	2
4	OraGel	Rs.179	3
5	Ceftriaxone	Rs.200	4
6	Vivotif	Rs.250	4
7	Paracetamol	Rs.60	5
8	Moov	Rs.70	6

8 rows returned in 0.00 seconds CSV Export



Home > SQL > SQL Commands

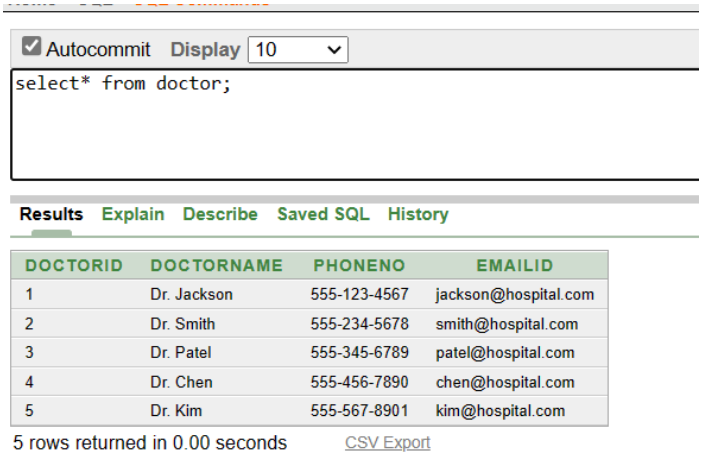
Autocommit Display 10

```
select* from PrescriptionReport;
```

Results Explain Describe Saved SQL History

REPORTID	REPORTDESCRIPTION	DOCTORID
1	Leg Injury	1
2	Heart Attack	4
3	Broken Teeth	5
4	Typhoid	2
5	Fever and Commoncold	3
6	Hand Injury	1

6 rows returned in 0.02 seconds CSV Export



Autocommit Display 10

```
select* from doctor;
```

Results Explain Describe Saved SQL History

DOCTORID	DOCTORNAME	PHONENO	EMAILID
1	Dr. Jackson	555-123-4567	jackson@hospital.com
2	Dr. Smith	555-234-5678	smith@hospital.com
3	Dr. Patel	555-345-6789	patel@hospital.com
4	Dr. Chen	555-456-7890	chen@hospital.com
5	Dr. Kim	555-567-8901	kim@hospital.com

5 rows returned in 0.00 seconds CSV Export