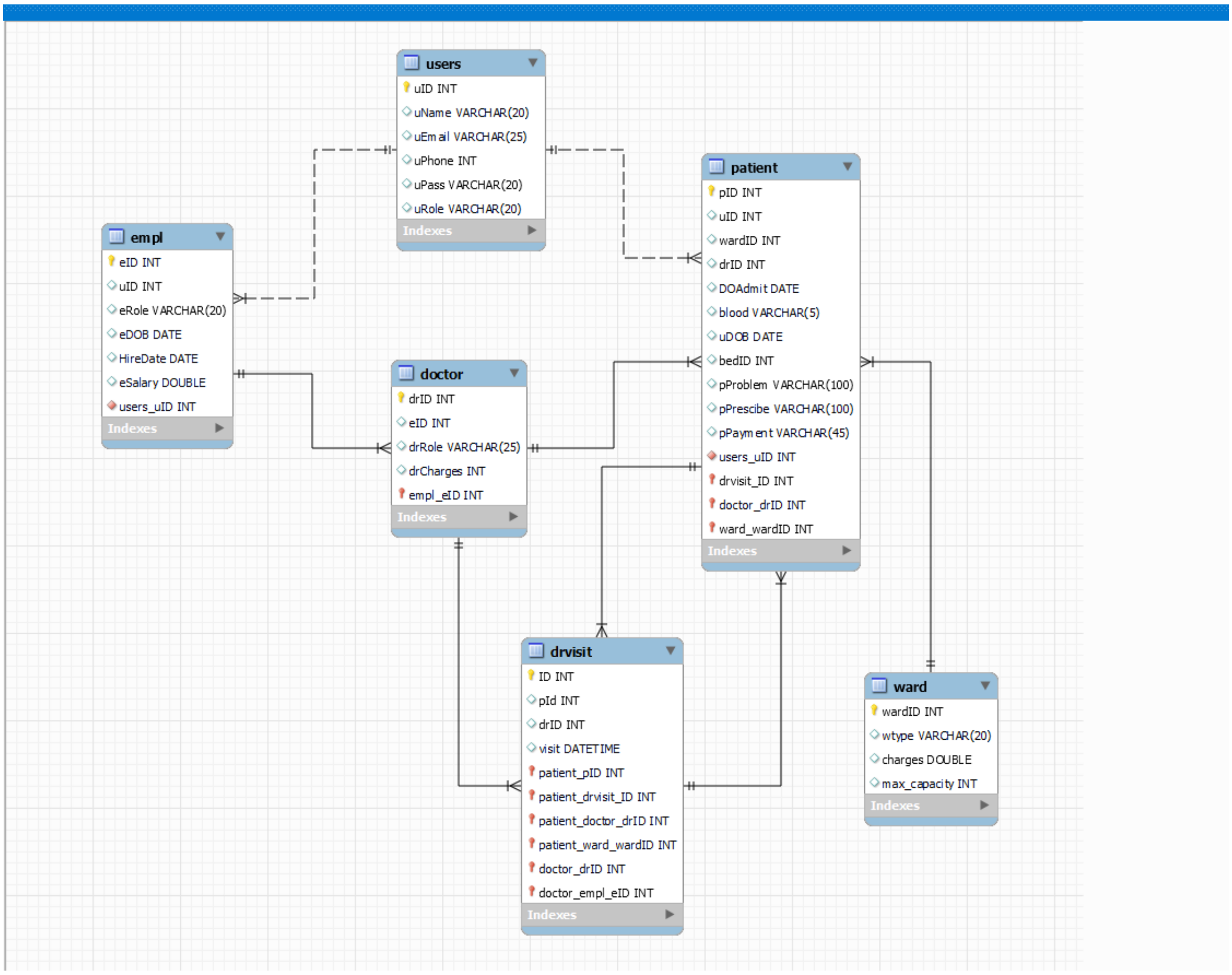
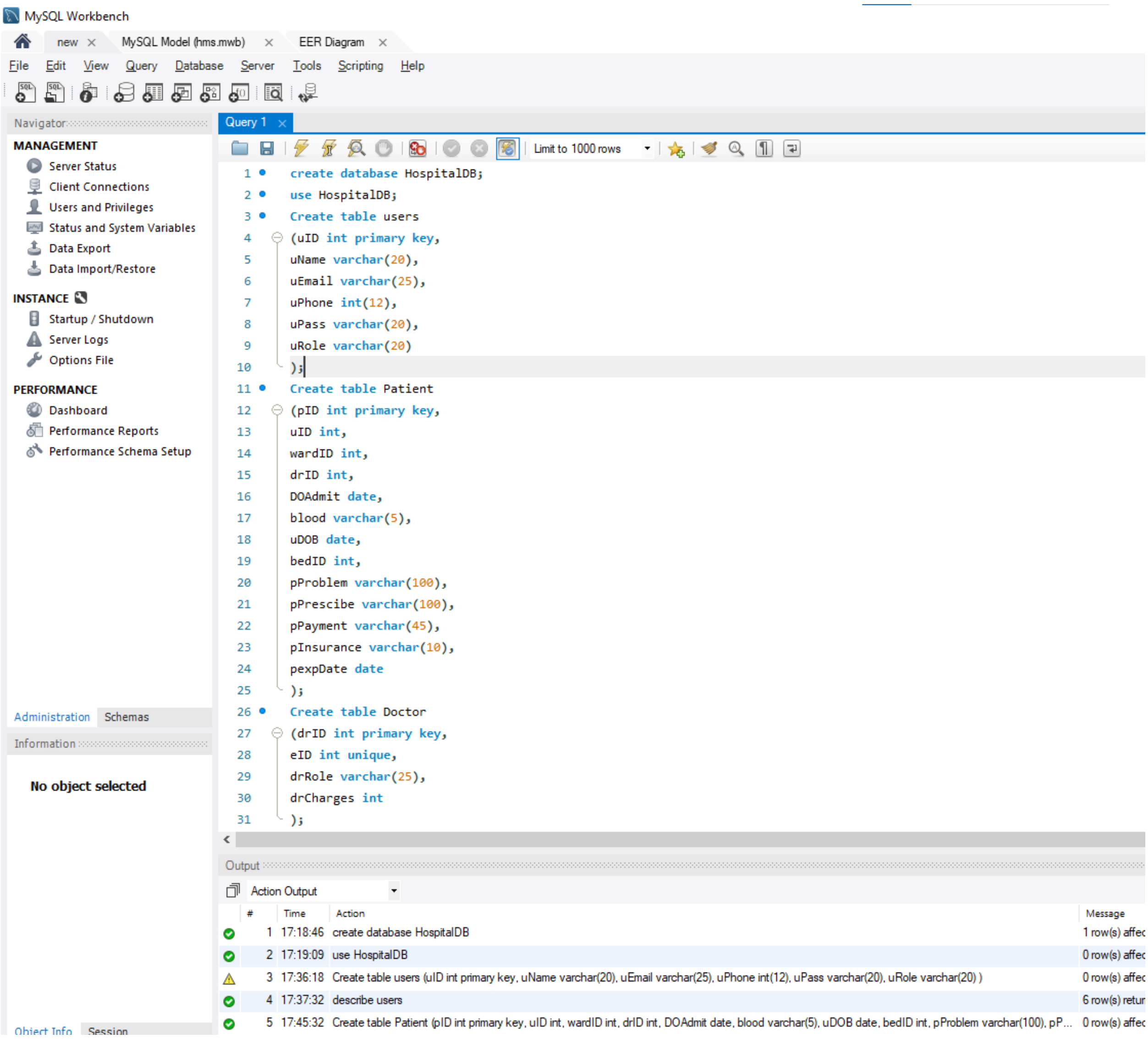
Q1. Hospital Management System Schema

implement the schema so that you are able to perform at least the following operations.

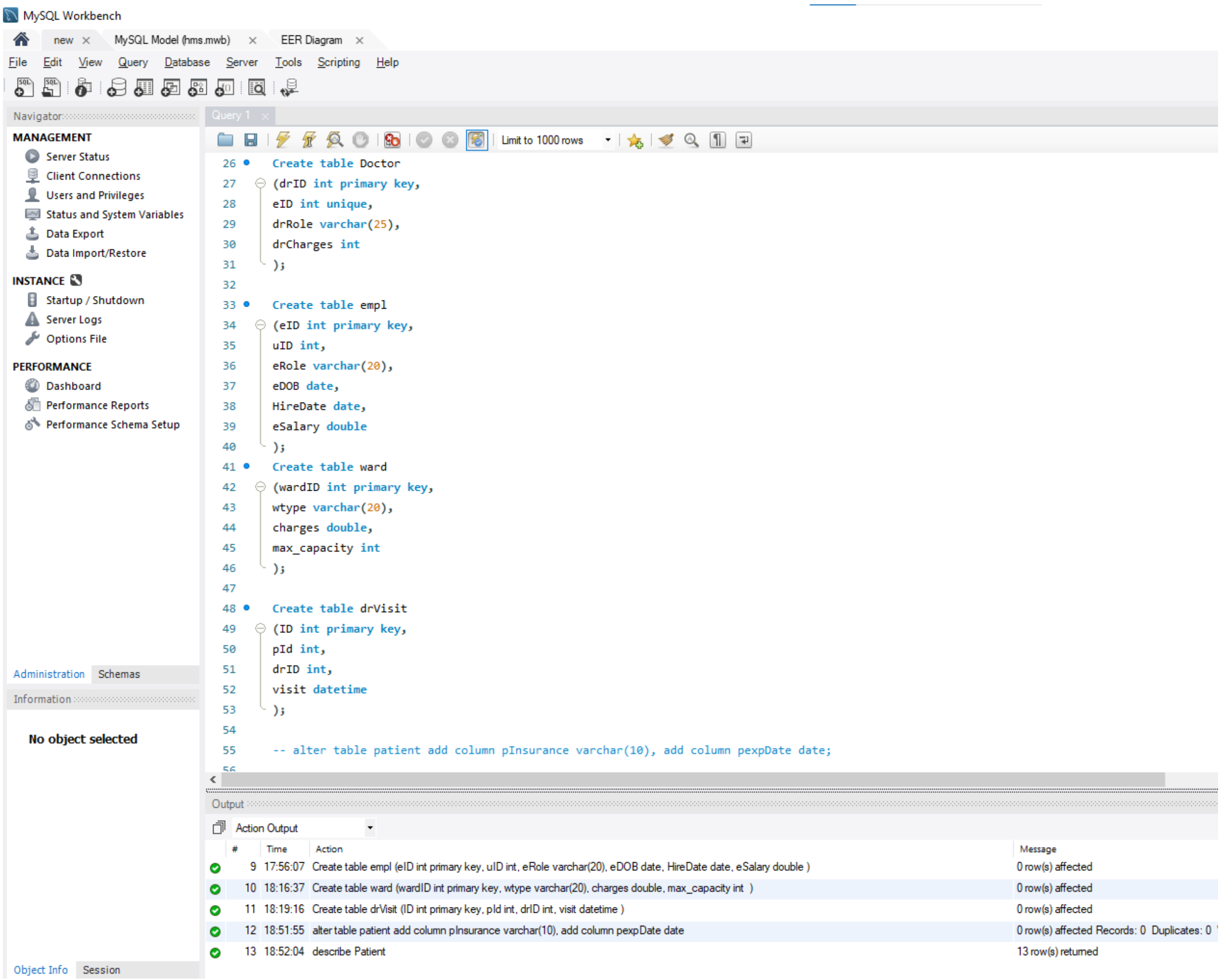
HMS should be capable to recognize already registered patients and user roles.





```sql
create database HospitalDB;
use HospitalDB;
Create table users
(uID int primary key,
uName varchar(20),
uEmail varchar(25),
uPhone int(12),
uPass varchar(20),
uRole varchar(20)
);
Create table Patient
(pID int primary key,
uID int,
wardID int,
drID int,
DOAdmit date,
blood varchar(5),
uDOB date,
bedID int,
pProblem varchar(100),
pPrescibe varchar(100),
pPayment varchar(45),
pInsurance varchar(10),
pexpDate date
);
Create table Doctor
(drID int primary key,
eID int unique,
drRole varchar(25),
drCharges int
);
```

	#	Time	Action	Message
✓	1	17:18:46	create database HospitalDB	1 row(s) affec
✓	2	17:19:09	use HospitalDB	0 row(s) affec
⚠	3	17:36:18	Create table users (uID int primary key, uName varchar(20), uEmail varchar(25), uPhone int(12), uPass varchar(20), uRole varchar(20))	0 row(s) affec
✓	4	17:37:32	describe users	6 row(s) retur
✓	5	17:45:32	Create table Patient (pID int primary key, uID int, wardID int, drID int, DOAdmit date, blood varchar(5), uDOB date, bedID int, pProblem varchar(100), pP...	0 row(s) affec



```
Create table Doctor
(drID int primary key,
eID int unique,
drRole varchar(25),
drCharges int
);

Create table empl
(eID int primary key,
uID int,
eRole varchar(20),
eDOB date,
HireDate date,
eSalary double
);
Create table ward
(wardID int primary key,
wtype varchar(20),
charges double,
max_capacity int
);

Create table drVisit
(ID int primary key,
pId int,
drID int,
visit datetime
);

-- alter table patient add column pInsurance varchar(10), add column pexpDate date;
```

#	Time	Action	Message
9	17:56:07	Create table empl (eID int primary key, uID int, eRole varchar(20), eDOB date, HireDate date, eSalary double)	0 row(s) affected
10	18:16:37	Create table ward (wardID int primary key, wtype varchar(20), charges double, max_capacity int)	0 row(s) affected
11	18:19:16	Create table drVisit (ID int primary key, pId int, drID int, visit datetime)	0 row(s) affected
12	18:51:55	alter table patient add column pInsurance varchar(10), add column pexpDate date	0 row(s) affected Records: 0 Duplicates: 0
13	18:52:04	describe Patient	13 row(s) returned

Code:

```
create database HospitalDB;
use HospitalDB;

Create table users
( uID int primary key,
uName varchar(20),
uEmail varchar(25),
uPhone int(12),
uPass varchar(20),
uRole varchar(20)
);

Create table Patient
( pID int primary key,
uID int,
wardID int,
drID int,
DOAdmit date,
blood varchar(5),
uDOB date,
bedID int,
pProblem varchar(100),
pPrescibe varchar(100),
pPayment varchar(45),
pInsurance varchar(10),
pexpDate date
);


Create table Doctor
(drID int primary key,
eID int unique,
drRole varchar(25),
drCharges int
);


Create table empl
(eID int primary key,
uID int,
eRole varchar(20),
eDOB date,
HireDate date,
eSalary double
);


Create table ward
(wardID int primary key,
wtype varchar(20),
charges double,
max_capacity int
);


Create table drVisit
(ID int primary key,
pId int,
drID int,
visit datetime
);
```

- Write necessary queries to register new user roles and personas

```
INSERT INTO users (uID, uName, uEmail, uPhone, uPass, uRole)
VALUES
   (1, 'Admin', 'admin@example.com', 1234567890, 'adminpass', 'Administrator'),
   (2, 'Doctor', 'doctor@example.com', 9876543210, 'doctorpass', 'Doctor'),
   (3, 'Nurse', 'nurse@example.com', 8765432109, 'nursepass', 'Nurse'),
   (4, 'ram', 'ram@example.com', 9876543210, 'rampass', 'Patient'),
   (5, 'Sita', 'sita@example.com', 8765432109, 'sitapass', 'Patient')
   ;

INSERT INTO empl (eID, uID, eRole, eDOB, HireDate, eSalary) VALUES
   (1, 6, 'Receptionist', '1999-05-15', '2023-01-01', 15000.00),
   (2, 2, 'Doctor', '1985-08-20', '2013-02-15', 140000.00),
   (3, 8, 'Doctor', '1982-03-10', '2015-03-20', 200000.00),
   (4, 7, 'Janitor', '1980-08-20', '2012-02-15', 300000.00),
   (5, 3, 'Nurse', '1997-03-10', '2022-03-20', 20000.00)
   ;

INSERT INTO Doctor (drID, eID, drRole, drCharges)
VALUES
   (1, 2, 'General Practitioner', 10000),
   (2, 3, 'Surgeon', 15000)
   ;
```

- Write necessary queries to add to the list of diagnosis of the patient tagged by date.

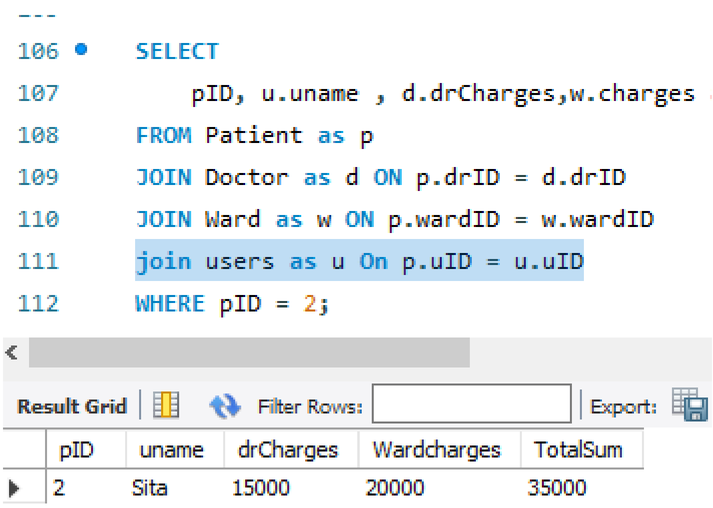
```
 INSERT INTO Patient (
   pID, uID, wardID, drID, DOAdmit, blood, uDOB, bedID, pProblem, pPrescibe, pPayment, pInsurance, pExpDate
) VALUES
      (3, 8, 1, 1, '2023-01-29', 'A+', '1997-01-01', 101, 'Fever and headache', 'Paracetamol and analgesics', 'Pending', 'Yes',
'2027-01-29'),
      (4, 9, 2, 2, '2024-01-30', 'B-', '1990-05-15', 102, 'Broken leg', 'Painkillers', 'Paid', 'No', NULL),
      (5, 5, 1, 1, '2024-01-29', 'O+', '1999-01-01', 101, 'Skin Problem ', 'Cream', 'Pending', 'Yes', '2025-01-29'),
      (6, 6, 2, 2, '2024-01-30', 'AB-', '2000-05-15', 102, 'Acne', 'Painkillers', 'Pending', 'No', NULL)
;
```

- Write necessary queries to fetch required details of a particular patient.

```
Select * from Patient where pID=2;
```

- Write necessary queries to prepare bill for the patient at the end of checkout.

```
SELECT
   pID, u.uname, d.drCharges, w.charges as Wardcharges, sum(d.drCharges + w.charges) as TotalSum
FROM Patient as p
JOIN Doctor as d ON p.drID = d.drID
JOIN Ward as w ON p.wardID = w.wardID
JOIN users as u On p.uID = u.uID
WHERE pID = 2;
```



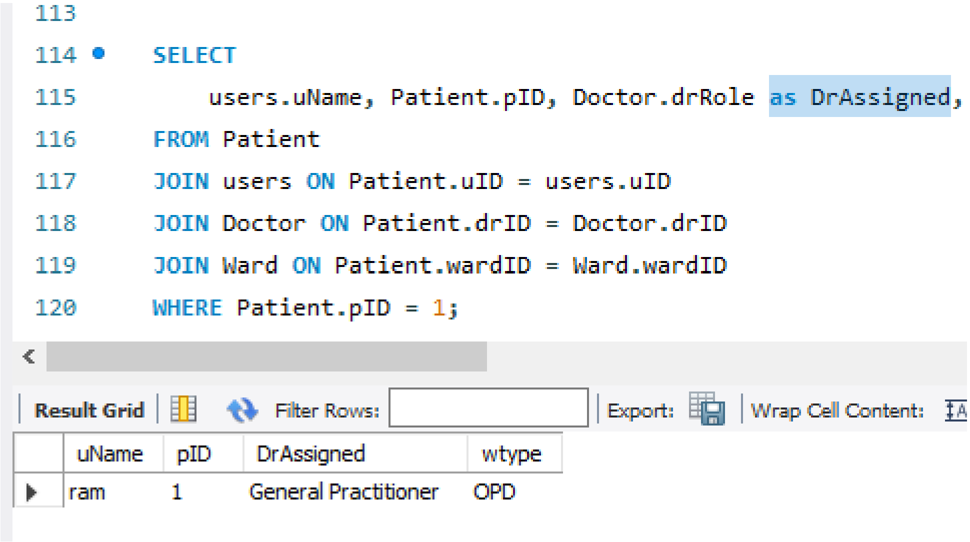
```
SELECT
    pID, u.uname , d.drCharges,w.charges
FROM Patient as p
JOIN Doctor as d ON p.drID = d.drID
JOIN Ward as w ON p.wardID = w.wardID
join users as u On p.uID = u.uID
WHERE pID = 2;
```

pID	uname	drCharges	Wardcharges	TotalSum
2	Sita	15000	20000	35000

- Write necessary queries to fetch and show data from various related tables (Joins)

For Payment Join Query

```
SELECT
   users.uName, Patient.pID, Doctor.drRole as DrAssigned, Ward.wtype
FROM Patient
JOIN users ON Patient.uID = users.uID
JOIN Doctor ON Patient.drID = Doctor.drID
JOIN Ward ON Patient.wardID = Ward.wardID
WHERE Patient.pID = 1;
```



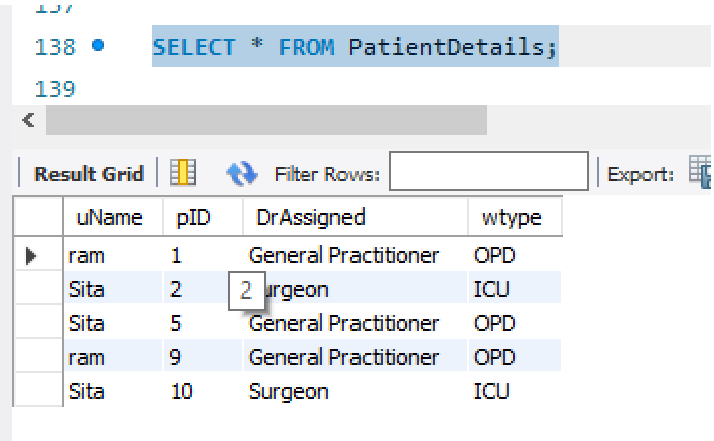
```
SELECT
    users.uName, Patient.pID, Doctor.drRole as DrAssigned,
FROM Patient
JOIN users ON Patient.uID = users.uID
JOIN Doctor ON Patient.drID = Doctor.drID
JOIN Ward ON Patient.wardID = Ward.wardID
WHERE Patient.pID = 1;
```

uName	pID	DrAssigned	wtype
ram	1	General Practitioner	OPD

- Optimize repeated read operations using views/materialized views.

-- Create a view for frequently accessed information

```
CREATE VIEW PatientDetails AS
SELECT
   users.uName, Patient.pID, Doctor.drRole as DrAssigned, Ward.wtype
FROM Patient
JOIN users ON Patient.uID = users.uID
JOIN Doctor ON Patient.drID = Doctor.drID
JOIN Ward ON Patient.wardID = Ward.wardID;
```



```
SELECT * FROM PatientDetails;
```

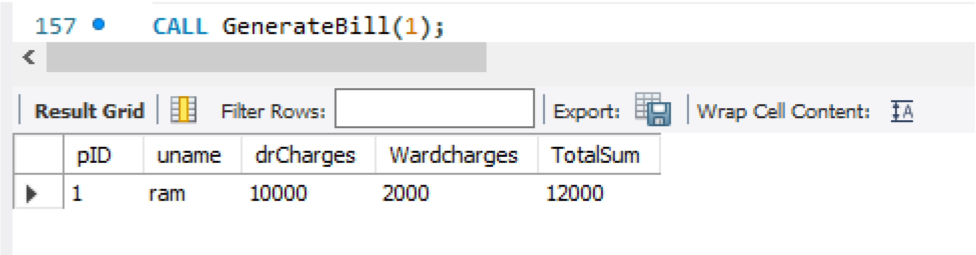
uName	pID	DrAssigned	wtype
ram	1	General Practitioner	OPD
Sita	2	Surgeon	ICU
Sita	5	General Practitioner	OPD
ram	9	General Practitioner	OPD
Sita	10	Surgeon	ICU

- Optimize read operations using indexing wherever required. (Create index on at least 1 table)

```
CREATE INDEX idx_patient_id ON Patient(pID);
```

- Try optimizing bill generation using stored procedures.

```
DELIMITER //
CREATE PROCEDURE GenerateBill ( IN patientID INT)
BEGIN
   SELECT
   pID, u.uname , d.drCharges,w.charges as Wardcharges, sum(d.drCharges+w.charges) as TotalSum
            FROM Patient as p
            JOIN Doctor as d ON p.drID = d.drID
            JOIN Ward as w ON p.wardID = w.wardID
            join users as u On p.uID = u.uID
   WHERE pID = patientID
    GROUP BY pID, u.uname;
END //
DELIMITER ;
```

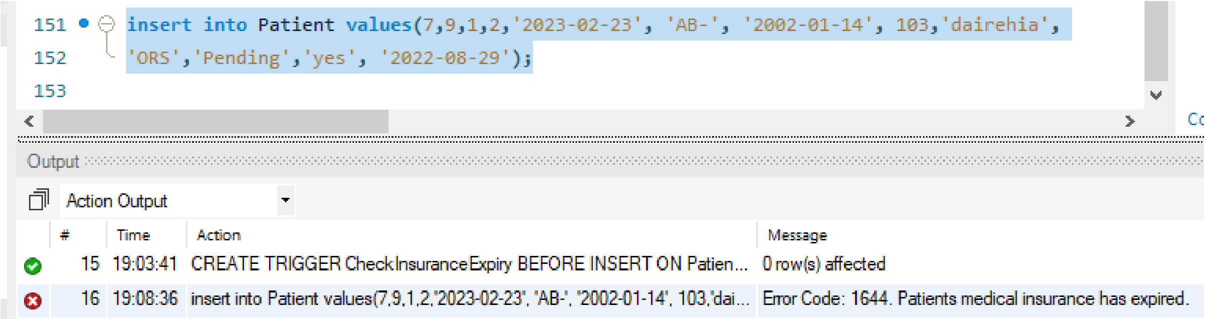


```
CALL GenerateBill(1);
```

pID	uname	drCharges	Wardcharges	TotalSum
1	ram	10000	2000	12000

- Add necessary triggers to indicate when patients medical insurance limit has expired.

```
DELIMITER //
CREATE TRIGGER CheckInsuranceExpiry
BEFORE INSERT ON Patient
FOR EACH ROW
BEGIN
  IF NEW.pExpDate < CURDATE() THEN
    SIGNAL SQLSTATE '45000'
    SET MESSAGE_TEXT = 'Patients medical insurance has expired.';
  END IF;
END //
DELIMITER ;
```



```
insert into Patient values(7,9,1,2,'2023-02-23', 'AB-', '2002-01-14', 103,'dairehia',
'ORS','Pending','yes', '2022-08-29');
```

```
   #   Time      Action                                                               Message
✓  15  19:03:41  CREATE TRIGGER CheckInsuranceExpiry BEFORE INSERT ON Patien...       0 row(s) affected
✗  16  19:08:36  insert into Patient values(7,9,1,2,'2023-02-23', 'AB-', '2002-01-14', 103,'dai...  Error Code: 1644. Patients medical insurance has expired.
```