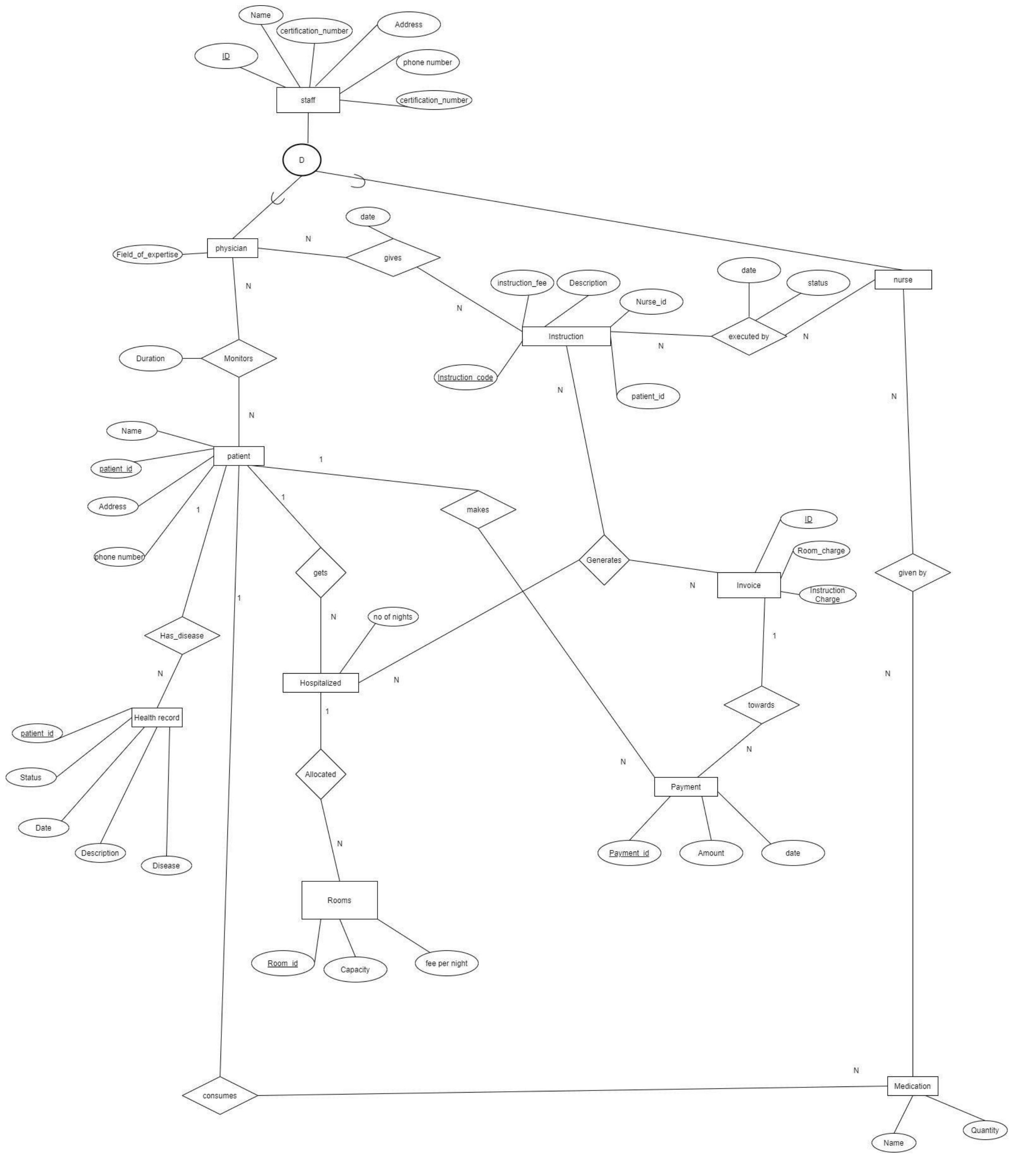
ITCS6160 – DATABASE SYSTEMS
HOMEWORK 5

ARUN KUMAR MEDI
ADITHYA KOLLA

SPOORTHI Y

Part-1:

EER Diagram



Changes to EER diagram:

1. We have considered Health record as weak entity and added total participation in relation with Patient.

Assumptions:

- Staff consists of physicians and nurses
- When a patient is hospitalized multiple rooms can be allocated to the patient based on the condition of the patient.
- Based on the No of nights and room type in the hospitalization billing will be done and invoices will be generated.
- Invoice will be generated based on the instructions.
- Room charge and instruction charge are included in invoice
- There can be multiple payments for an invoice
- Patient makes payment towards invoice

Relations in Database

Physician

Physician (Physician_ID,physician_name, Certification_number, Address, Phone_number,Field_Of_expertise)

Primary key { Physician_ID }

Foreign key

Nurse

Nurse(Nurse_ID,nurse_name, Certification_number, Address, Phone_number)

Primary key {Nurse_ID}

Foreign key

Physician_order_instructions

Physician_order_instructions(Instruction_id ,Physician_ID, instruction_code,Patient_ID, given_date)

Primary key{Instruction_id }

ForiegnKey{Physician_ID references Physician(Physician_ID), instruction_code references instruction(instruction_code), Patient_ID references patient(Patient_ID)}

Instruction

Instruction (Instruction_code,instruction_fee,Description)

Primary key (Instruction_code)

Nurse_Execution

Nurse Execution (execution_id,Instruction_Id, Nurse_ID,Date, status)

Primary key: { execution_id }

Foreign Key: { Instruction_Id references Physician_order_instructions(Instruction_id), Nurse_ID references Nurse (Nurse_ID)}

Physician_Monitors

Physician_monitors(monitor_id, Physician_Id, Patient_Id, startdate, enddate)

Primary key: { monitor_id}

Foreign key: {Physician_Id references Physician (Physician_ID), Patient_Id references Patient (Patient_Id)}

Patient

Patient (Patient_Id, patient_Name, Address, Phone_number)

Primary key: { Patient_Id }

Foreign Key:

Health_Record

Health_Record (HealthRecord_Id, Patient_Id, Disease, date, status, description)

Primary key: { HealthRecord_Id,Patient_Id }

Foreign key: { Patient_Id references Patient (patient_Id)}

Medication

Medication (Medication_id,Patient_Id, Nurse_Id, Medicine_name,Quantity)

Primary key: { Medication_id}

Foreign key: (Patient_Id references Patient (Patient_Id), Nurse_Id references Nurse (nurse_Id)}

Room

Room(Room_id,capacity,fee_per_night)

Primarykey{ Room_id}

Hospitalized

Hospitalized(Hospitalized_id,Patient_id,Room_id,no_of_nights)

Primary key{Hospitalized_id}

Foreign key{ Patient_id references Patient(patient_id), Room_id references Room(Room_id)}

Invoice

Invoice (Invoice_id, Hospitalized_id ,patient_id,room_charge,instruction_charge)

Primarykey: {Invoice_id}

Foreign key: { Hospitalized_id references Hospitalization(Hospitalized_Id), Patient_id references Patient(patient_id)}

Payment

Payment(Payment_id,Patient_id,Invoice_id,Amount,date)

Primary Key{Payment_id}

Foreign Key{ Patient_id references Patient(patient_id), Invoice_id references Invoice(Invoice_id)}

Queries:

Query 1:

Description:

List all the physicians along with the count of patients they are monitoring

Query:

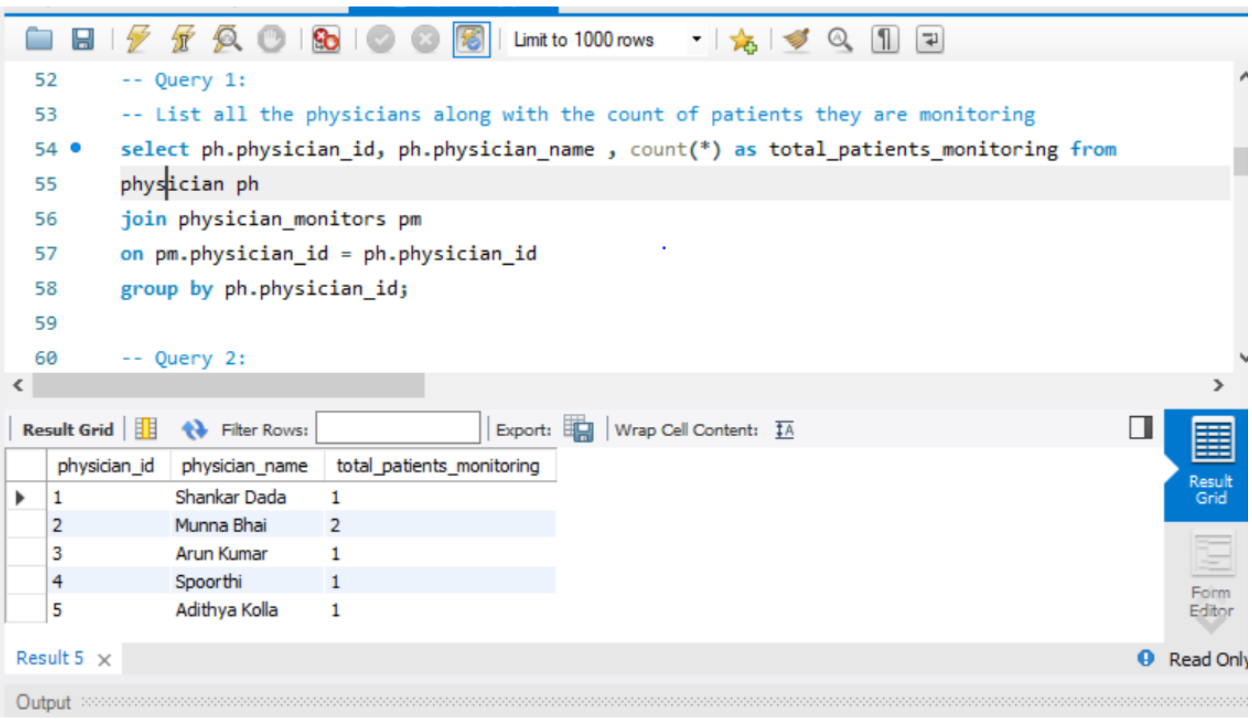
select ph.physician_id, ph.physician_name , count(*) as total_patients_monitoring from

physician ph

join physician_monitors pm

on pm.physician_id = ph.physician_id

group by ph.physician_id;



```
-- Query 1:
-- List all the physicians along with the count of patients they are monitoring
select ph.physician_id, ph.physician_name , count(*) as total_patients_monitoring from
physician ph
join physician_monitors pm
on pm.physician_id = ph.physician_id
group by ph.physician_id;

-- Query 2:
```

physician_id	physician_name	total_patients_monitoring
1	Shankar Dada	1
2	Munna Bhai	2
3	Arun Kumar	1
4	Spoorthi	1
5	Adithya Kolla	1

Query 2:

Description:

Total count of instructions assigned to each nurse

Query:

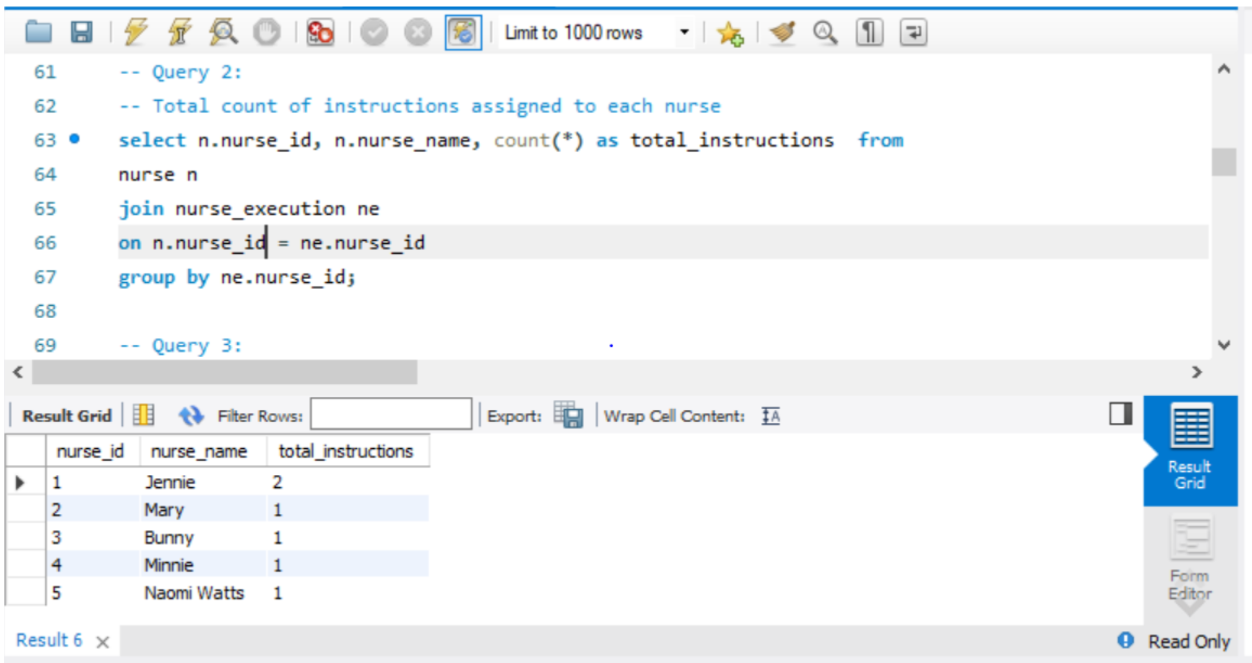
select n.nurse_id, n.nurse_name, count(*) as total_instructions from

nurse n

join nurse_execution ne

on n.nurse_id = ne.nurse_id

group by ne.nurse_id;



```
-- Query 2:
-- Total count of instructions assigned to each nurse
select n.nurse_id, n.nurse_name, count(*) as total_instructions  from
nurse n
join nurse_execution ne
on n.nurse_id = ne.nurse_id
group by ne.nurse_id;

-- Query 3:
```

nurse_id	nurse_name	total_instructions
1	Jennie	2
2	Mary	1
3	Bunny	1
4	Minnie	1
5	Naomi Watts	1

Query 3:

Description:

Display the number of medicines they gave to the patients

Query:

Display the number of medicines they gave to the patients

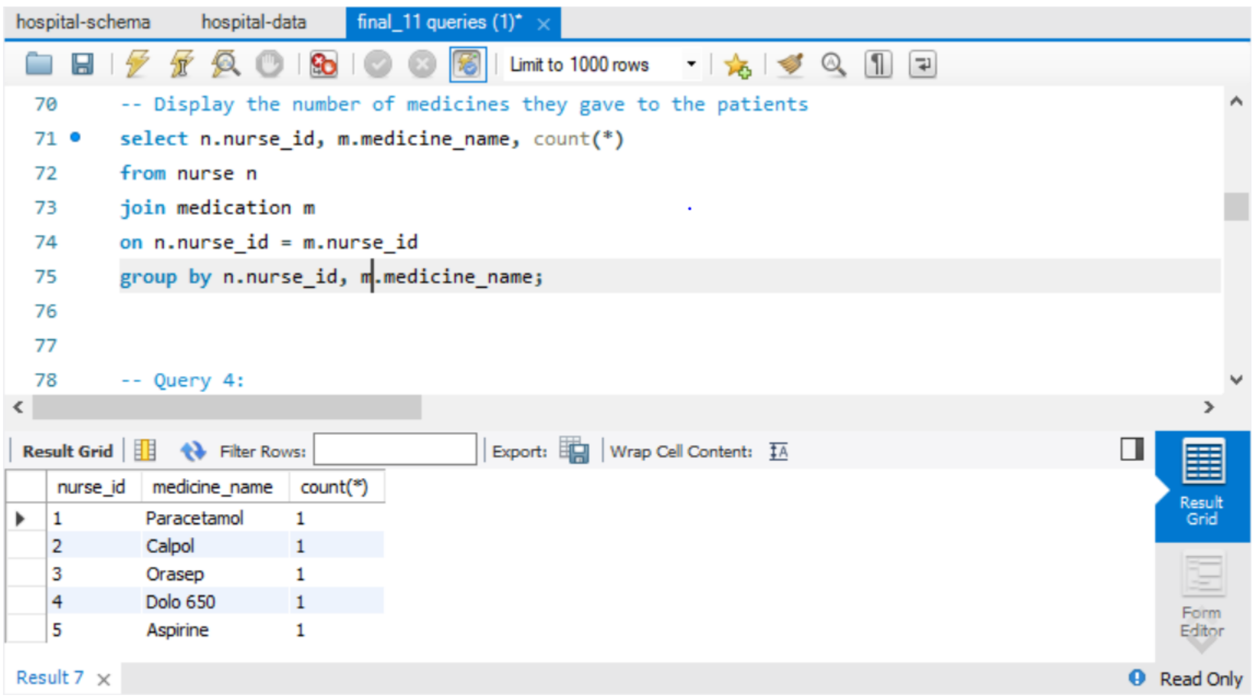
select n.nurse_id, m.medicine_name, count(*)

from nurse n

join medication m

on n.nurse_id = m.nurse_id

group by n.nurse_id, m.medicine_name;



```
-- Display the number of medicines they gave to the patients
select n.nurse_id, m.medicine_name, count(*)
from nurse n
join medication m
on n.nurse_id = m.nurse_id
group by n.nurse_id, m.medicine_name;


-- Query 4:
```

nurse_id	medicine_name	count(*)
1	Paracetamol	1
2	Calpol	1
3	Orasep	1
4	Dolo 650	1
5	Aspirine	1

Query 4:

Description:

Display patient name and maximum no of nights hospitalized

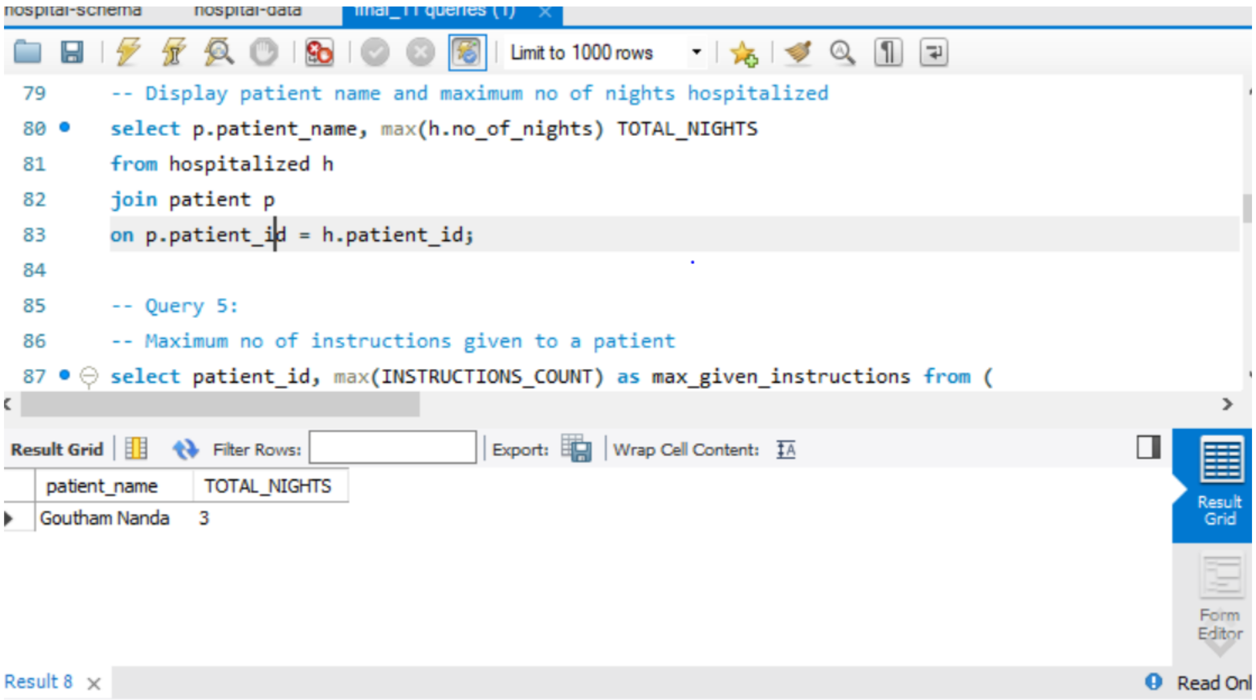
Query:

select p.patient_name, max(h.no_of_nights) TOTAL_NIGHTS

from hospitalized h

join patient p

on p.patient_id = h.patient_id;



```
-- Display patient name and maximum no of nights hospitalized
select p.patient_name, max(h.no_of_nights) TOTAL_NIGHTS
from hospitalized h
join patient p
on p.patient_id = h.patient_id;

-- Query 5:
-- Maximum no of instructions given to a patient
select patient_id, max(INSTRUCTIONS_COUNT) as max_given_instructions from (
```

patient_name	TOTAL_NIGHTS
Goutham Nanda	3

Query 5:

Description:

Maximum no of instructions given to a patient

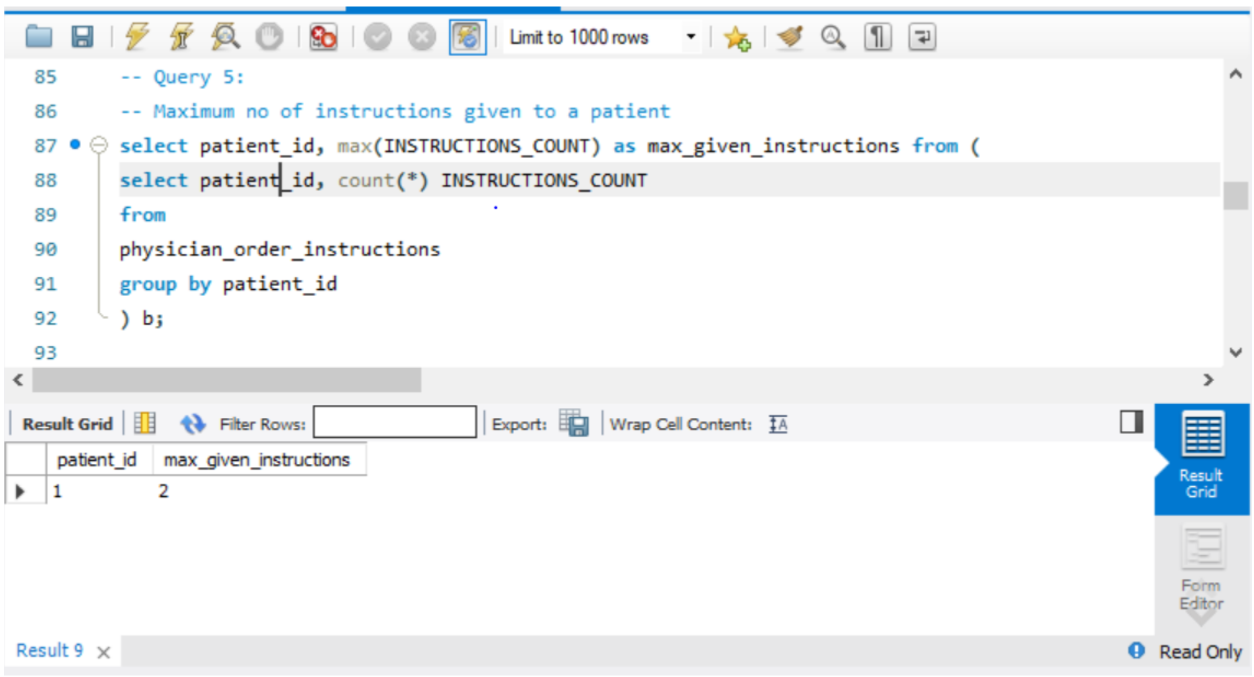
Query:

select patient_id, max(INSTRUCTIONS_COUNT) as max_given_instructions from (

select patient_id, count(*) INSTRUCTIONS_COUNT

from

physician_order_instructions group by patient_id) b;



```
-- Query 5:
-- Maximum no of instructions given to a patient
select patient_id, max(INSTRUCTIONS_COUNT) as max_given_instructions from (
select patient_id, count(*) INSTRUCTIONS_COUNT
from
physician_order_instructions
group by patient_id
) b;
```

patient_id	max_given_instructions
1	2

Query 6

Description:

Display all the instructions assigned to nurses which are in progress

Query:

select ne.nurse_id,n.nurse_name,ne.instruction_id,ne.status

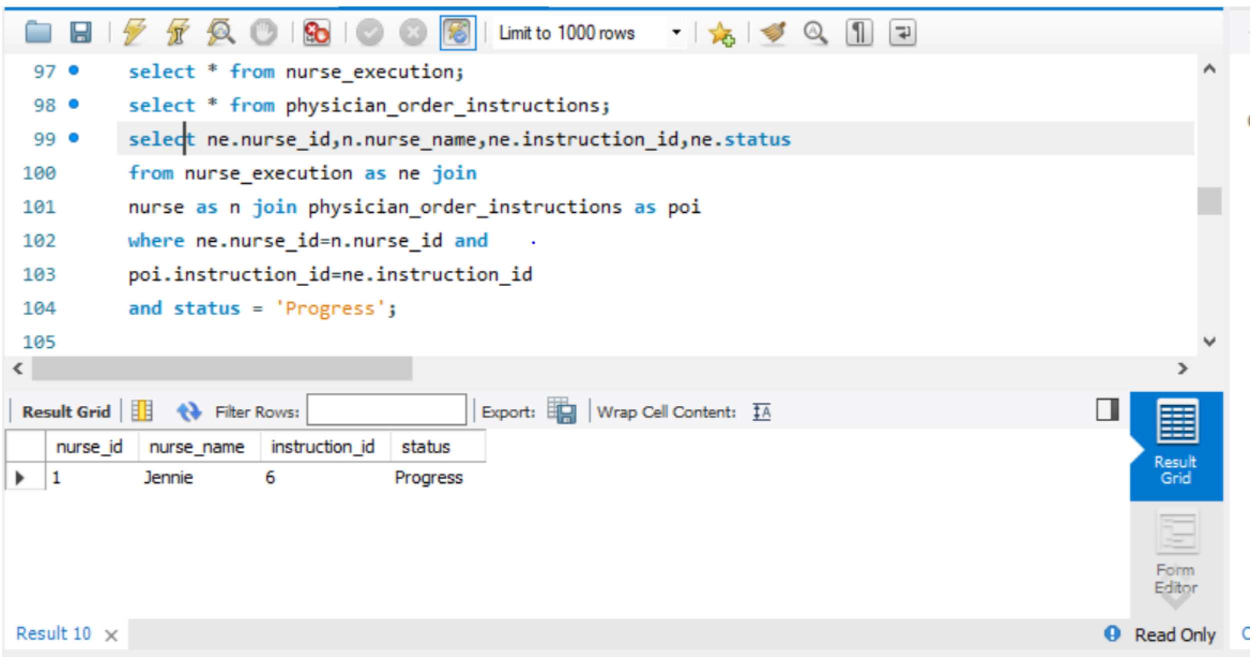
from nurse_execution as ne join

nurse as n join physician_order_instructions as poi

where ne.nurse_id=n.nurse_id and

poi.instruction_id=ne.instruction_id

and status = 'Progress';



```
select * from nurse_execution;
select * from physician_order_instructions;
select ne.nurse_id,n.nurse_name,ne.instruction_id,ne.status
from nurse_execution as ne join
nurse as n join physician_order_instructions as poi
where ne.nurse_id=n.nurse_id and
poi.instruction_id=ne.instruction_id
and status = 'Progress';
```

nurse_id	nurse_name	instruction_id	status
1	Jennie	6	Progress

Query 7

Description:

List all the count of instructions executed by a nurse

Query:

select q.nurse_id,q.nurse_name,

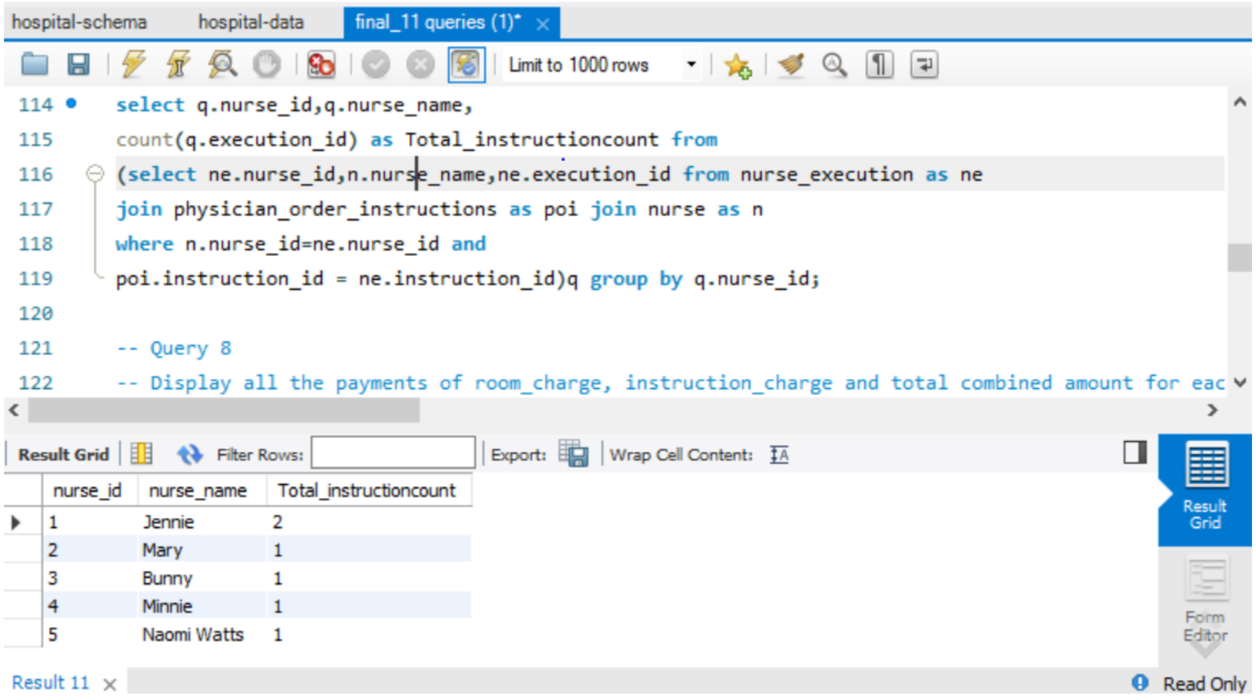
count(q.execution_id) as Total_instructioncount from

(select ne.nurse_id,n.nurse_name,ne.execution_id from nurse_execution as ne

join physician_order_instructions as poi join nurse as n

where n.nurse_id=ne.nurse_id and

poi.instruction_id = ne.instruction_id)q group by q.nurse_id;



```
select q.nurse_id,q.nurse_name,
count(q.execution_id) as Total_instructioncount from
(select ne.nurse_id,n.nurse_name,ne.execution_id from nurse_execution as ne
join physician_order_instructions as poi join nurse as n
where n.nurse_id=ne.nurse_id and
poi.instruction_id = ne.instruction_id)q group by q.nurse_id;

-- Query 8
-- Display all the payments of room_charge, instruction_charge and total combined amount for eac
```

nurse_id	nurse_name	Total_instructioncount
1	Jennie	2
2	Mary	1
3	Bunny	1
4	Minnie	1
5	Naomi Watts	1

Query 8

Description

Display all the payments of room_charge, instruction_charge and total combined amount for each patient

Query:

select q.patient_id,sum(q.room_charge) as roomcharge,

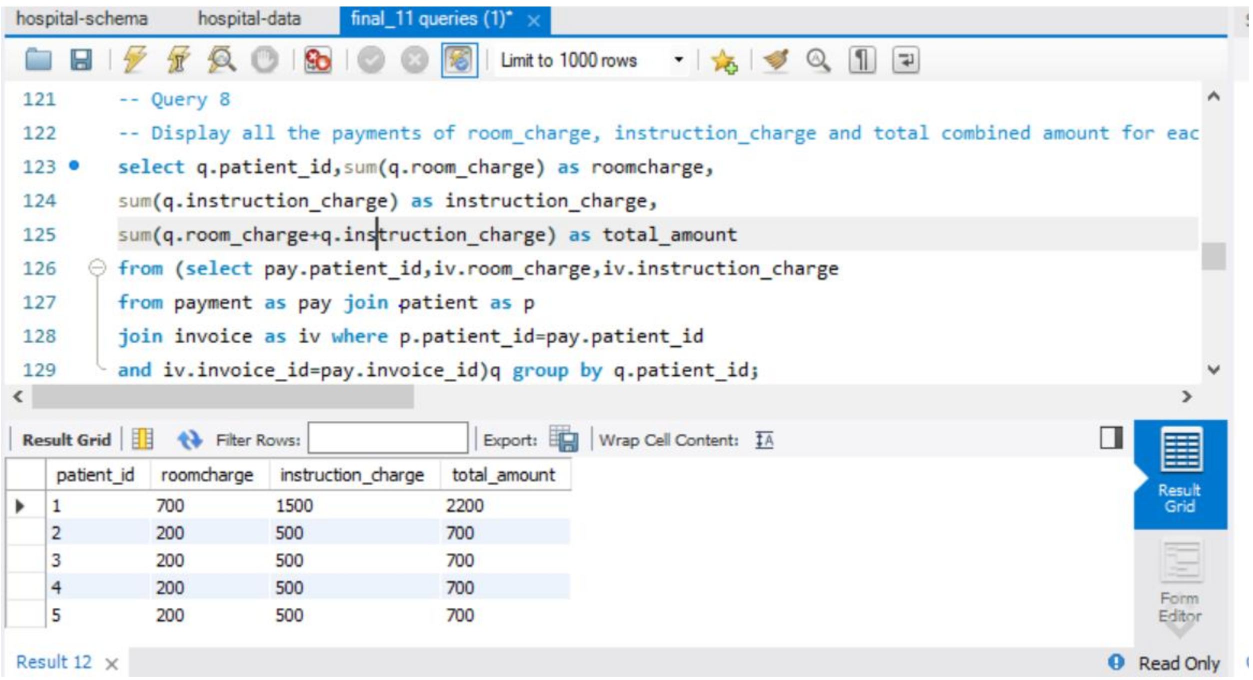
sum(q.instruction_charge) as instruction_charge,

sum(q.room_charge+q.instruction_charge) as total_amount

from (select pay.patient_id,iv.room_charge,iv.instruction_charge from payment as pay join patient as p

join invoice as iv where p.patient_id=pay.patient_id

and iv.invoice_id=pay.invoice_id)q group by q.patient_id;



```
-- Query 8
-- Display all the payments of room_charge, instruction_charge and total combined amount for eac
select q.patient_id,sum(q.room_charge) as roomcharge,
sum(q.instruction_charge) as instruction_charge,
sum(q.room_charge+q.instruction_charge) as total_amount
from (select pay.patient_id,iv.room_charge,iv.instruction_charge
from payment as pay join patient as p
join invoice as iv where p.patient_id=pay.patient_id
and iv.invoice_id=pay.invoice_id)q group by q.patient_id;
```

patient_id	roomcharge	instruction_charge	total_amount
1	700	1500	2200
2	200	500	700
3	200	500	700
4	200	500	700
5	200	500	700

Query 9

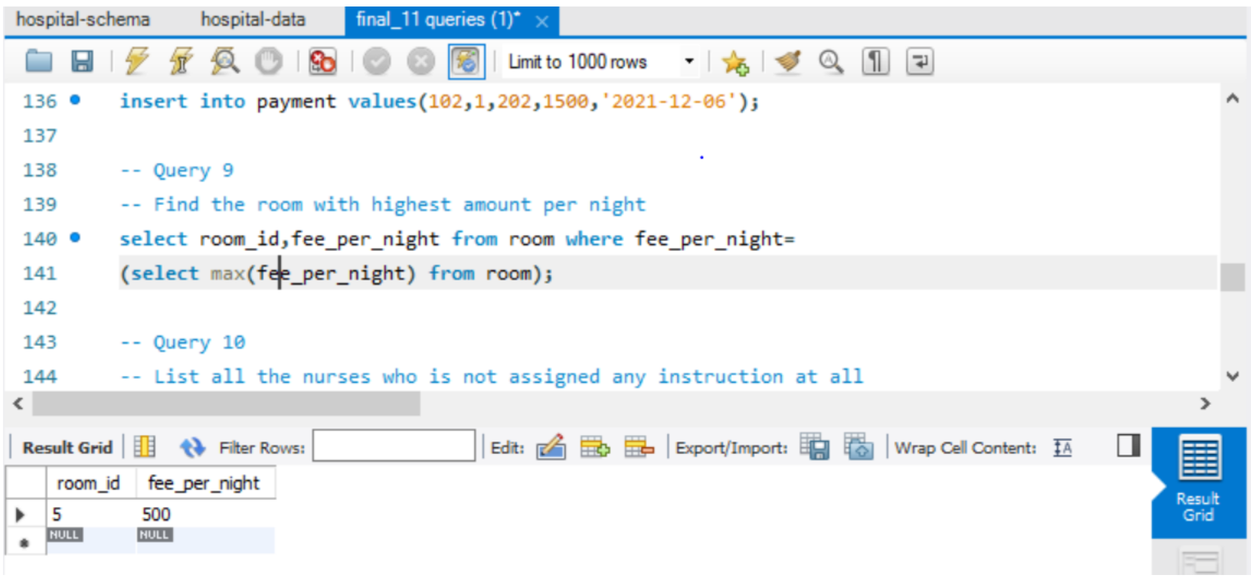
Description:

Find the room with highest amount per night

Query:

select room_id,fee_per_night from room where fee_per_night=

(select max(fee_per_night) from room);



```
insert into payment values(102,1,202,1500,'2021-12-06');

-- Query 9
-- Find the room with highest amount per night
select room_id,fee_per_night from room where fee_per_night=
(select max(fee_per_night) from room);

-- Query 10
-- List all the nurses who is not assigned any instruction at all
```

room_id	fee_per_night
5	500
NULL	NULL

Query 10

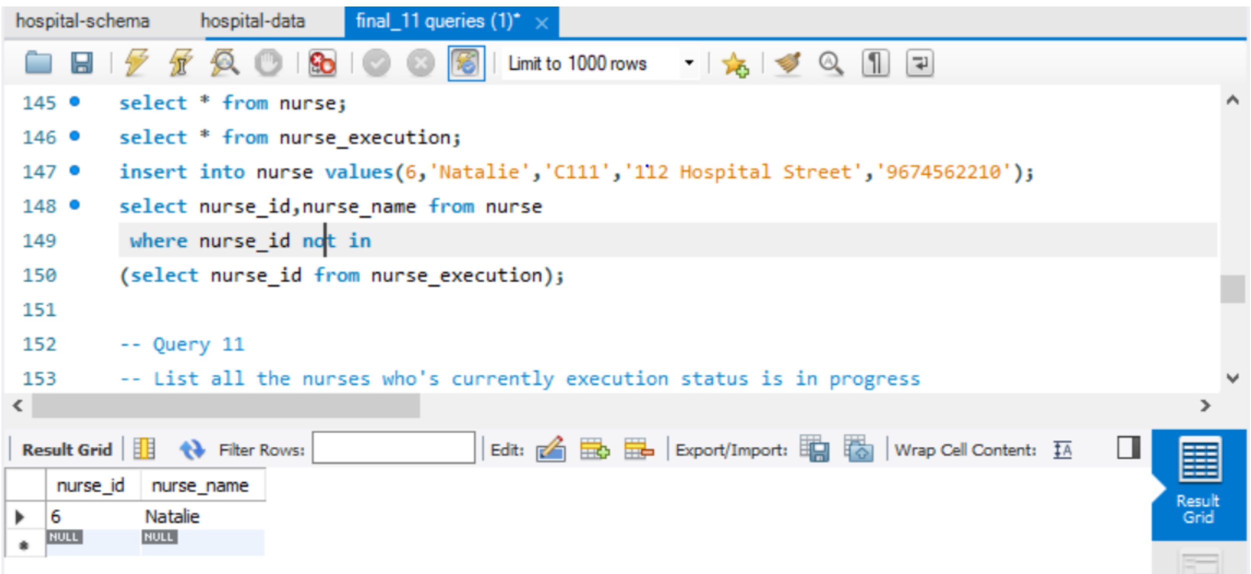
List all the nurses who is not assigned any instruction at all

Query:

select nurse_id,nurse_name from nurse

where nurse_id not in

(select nurse_id from nurse_execution);



```
select * from nurse;
select * from nurse_execution;
insert into nurse values(6,'Natalie','C111','112 Hospital Street','9674562210');
select nurse_id,nurse_name from nurse
 where nurse_id not in
(select nurse_id from nurse_execution);

-- Query 11
-- List all the nurses who's currently execution status is in progress
```

nurse_id	nurse_name
6	Natalie
NULL	NULL

Query 11

Description:

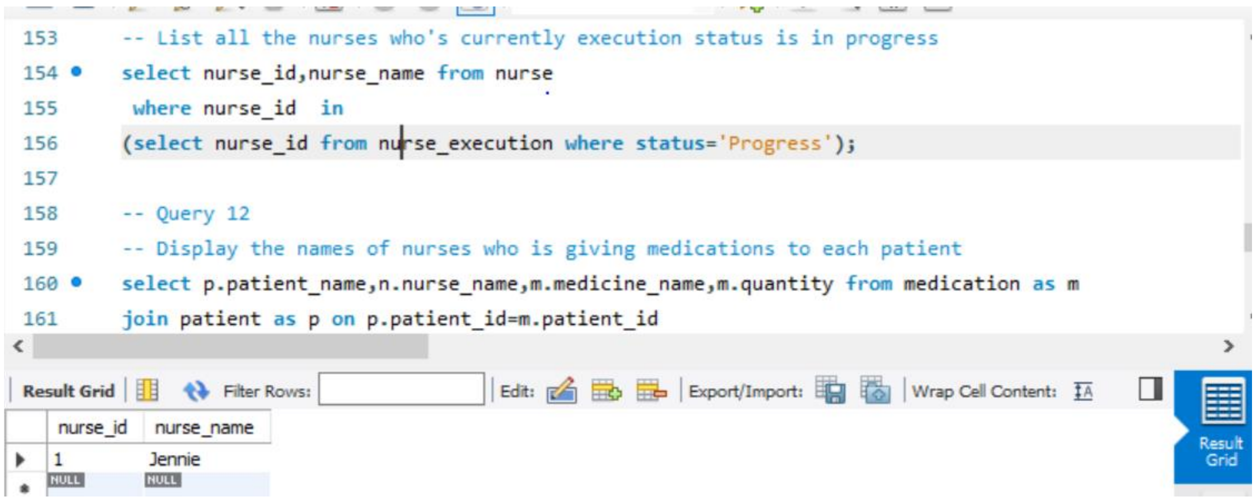
List all the nurses who's currently execution status is in progress

Query:

select nurse_id,nurse_name from nurse

 where nurse_id in

(select nurse_id from nurse_execution where status='Progress');



```
-- List all the nurses who's currently execution status is in progress
select nurse_id,nurse_name from nurse
 where nurse_id  in
(select nurse_id from nurse_execution where status='Progress');

-- Query 12
-- Display the names of nurses who is giving medications to each patient
select p.patient_name,n.nurse_name,m.medicine_name,m.quantity from medication as m
join patient as p on p.patient_id=m.patient_id
```

nurse_id	nurse_name
1	Jennie
NULL	NULL

Query 12

Description:

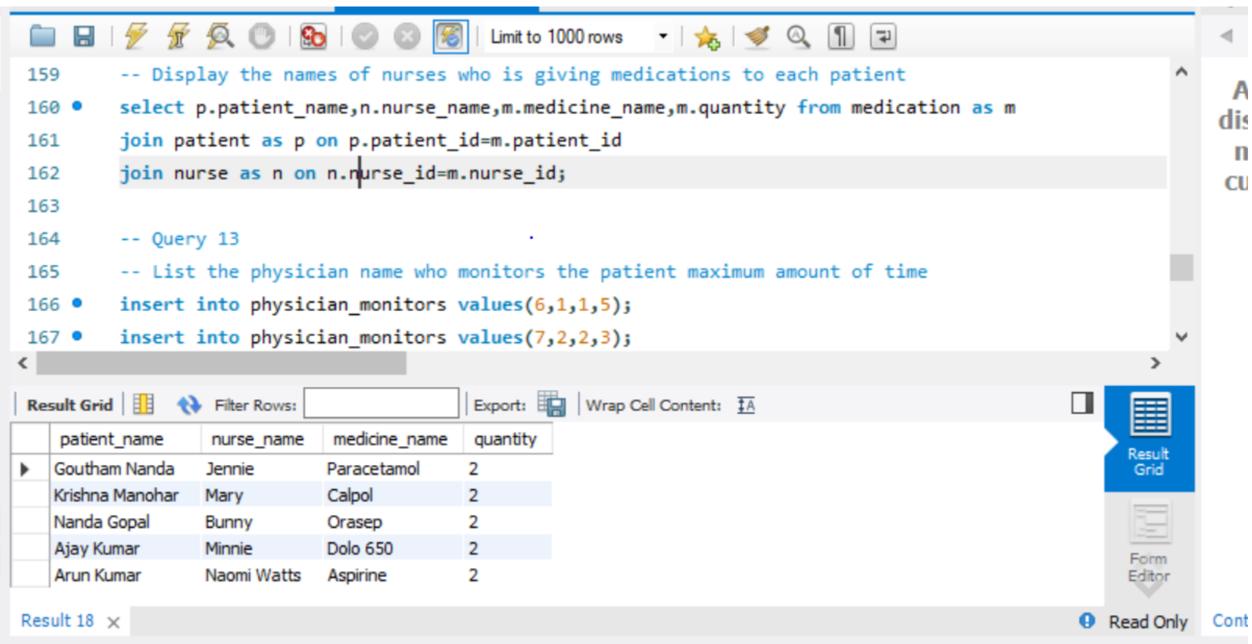
Display the names of nurses who is giving medications to each patient

Query:

select p.patient_name,n.nurse_name,m.medicine_name,m.quantity from medication as m

join patient as p on p.patient_id=m.patient_id

join nurse as n on n.nurse_id=m.nurse_id;



```
-- Display the names of nurses who is giving medications to each patient
select p.patient_name,n.nurse_name,m.medicine_name,m.quantity from medication as m
join patient as p on p.patient_id=m.patient_id
join nurse as n on n.nurse_id=m.nurse_id;

-- Query 13
-- List the physician name who monitors the patient maximum amount of time
insert into physician_monitors values(6,1,1,5);
insert into physician_monitors values(7,2,2,3);
```

patient_name	nurse_name	medicine_name	quantity
Goutham Nanda	Jennie	Paracetamol	2
Krishna Manohar	Mary	Calpol	2
Nanda Gopal	Bunny	Orasep	2
Ajay Kumar	Minnie	Dolo 650	2
Arun Kumar	Naomi Watts	Aspirine	2

Query 13

Description:

List the physician name who monitors the patient maximum amount of time

Query:

select p.physician_name,pa.patient_name,max(ph.duration) as 'duration(hrs)'

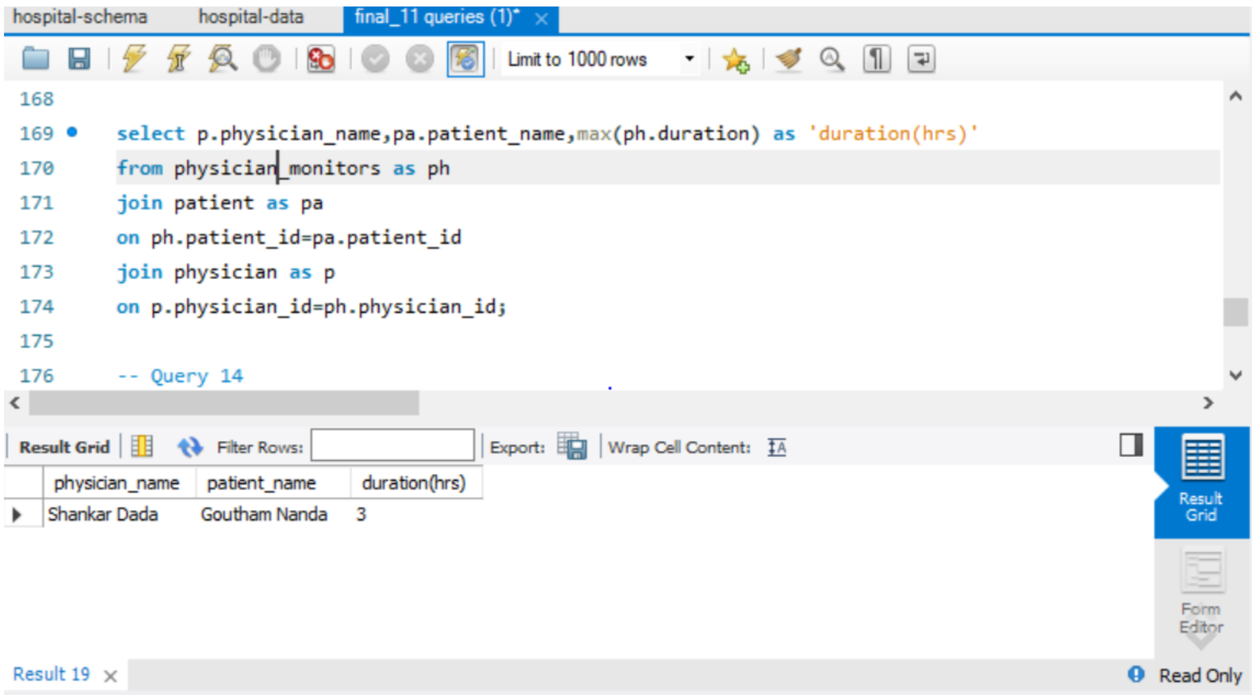
from physician_monitors as ph

join patient as pa

on ph.patient_id=pa.patient_id

join physician as p

on p.physician_id=ph.physician_id;



```

select p.physician_name,pa.patient_name,max(ph.duration) as 'duration(hrs)'
from physician_monitors as ph
join patient as pa
on ph.patient_id=pa.patient_id
join physician as p
on p.physician_id=ph.physician_id;

-- Query 14
```

physician_name	patient_name	duration(hrs)
Shankar Dada	Goutham Nanda	3

Query 14

Description:

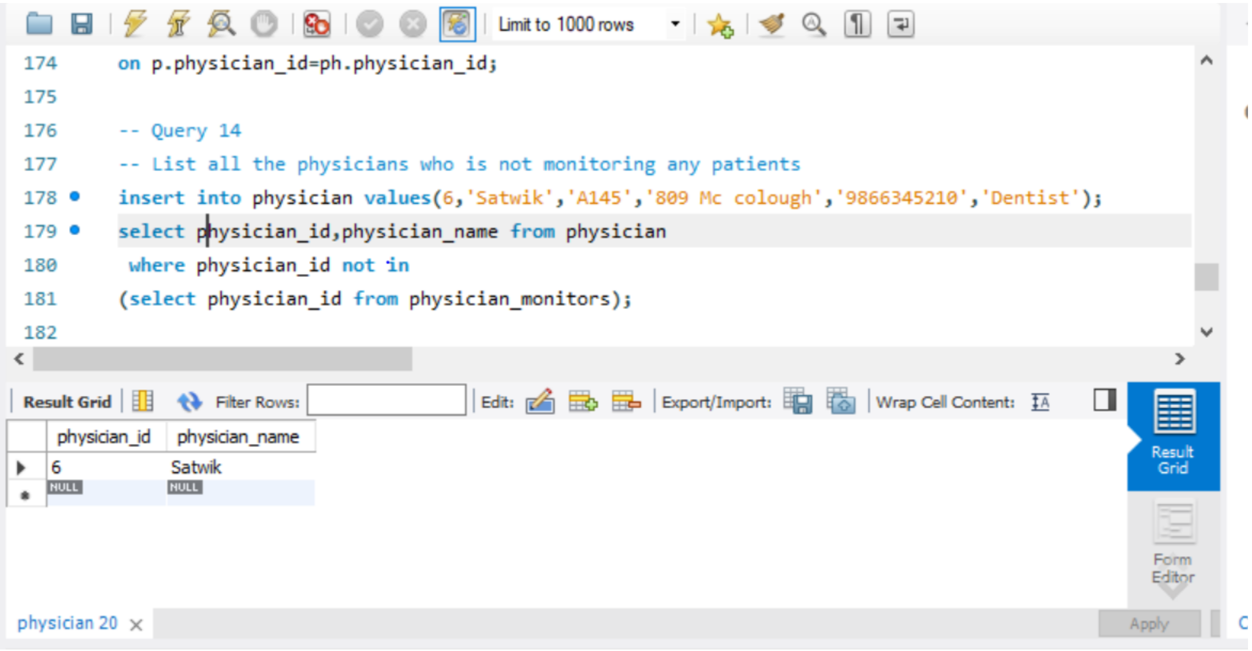
List all the physicians who is not monitoring any patients

Query:

select physician_id,physician_name from physician

where physician_id not in

(select physician_id from physician_monitors);



```
on p.physician_id=ph.physician_id;

-- Query 14
-- List all the physicians who is not monitoring any patients
insert into physician values(6,'Satwik','A145','809 Mc colough','9866345210','Dentist');
select physician_id,physician_name from physician
 where physician_id not in
(select physician_id from physician_monitors);

```

physician_id	physician_name
6	Satwik
NULL	NULL

Query 15

Description:

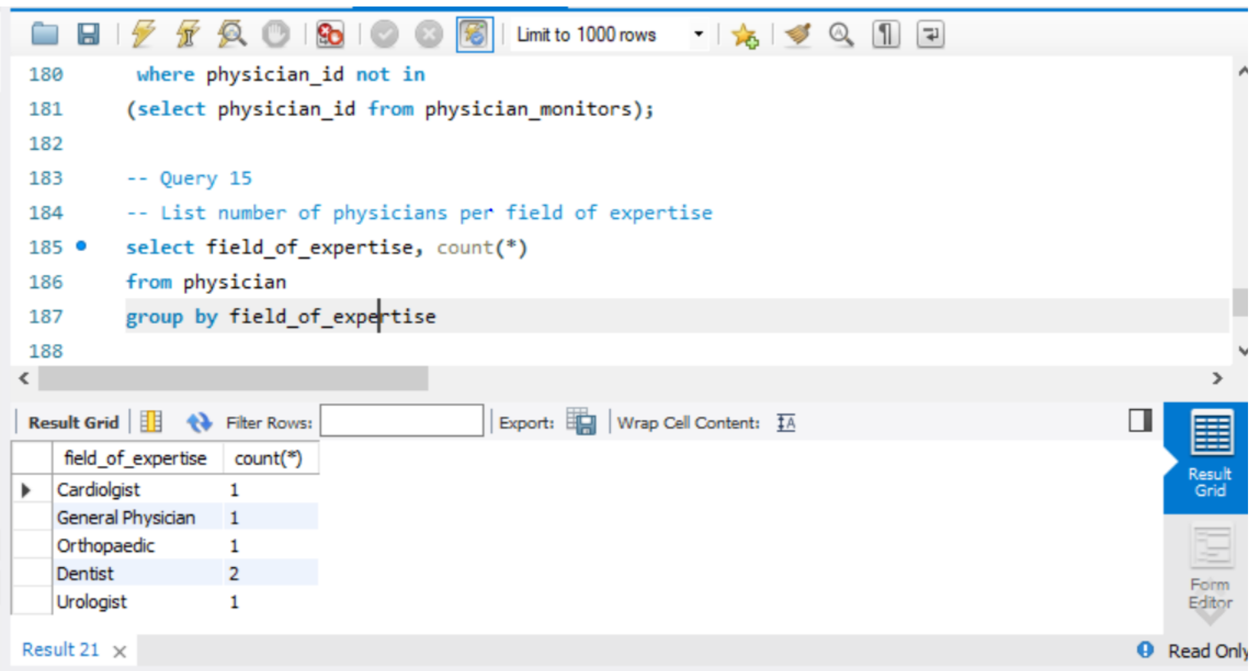
List number of physicians per field of expertise

Query:

select field_of_expertise, count(*)

from physician

group by field_of_expertise;



```
 where physician_id not in
(select physician_id from physician_monitors);

-- Query 15
-- List number of physicians per field of expertise
select field_of_expertise, count(*)
from physician
group by field_of_expertise

```

field_of_expertise	count(*)
Cardiolgist	1
General Physician	1
Orthopaedic	1
Dentist	2
Urologist	1

<u>VIEWS</u>

VIEW 1

Description:

To View the Patient name and physician who treated and status of patient

create view v_patient_physician

as

select p.patient_name, ph.physician_name, hr.status from patient p

join physician_order_instructions poi

on p.patient_id = poi.patient_id

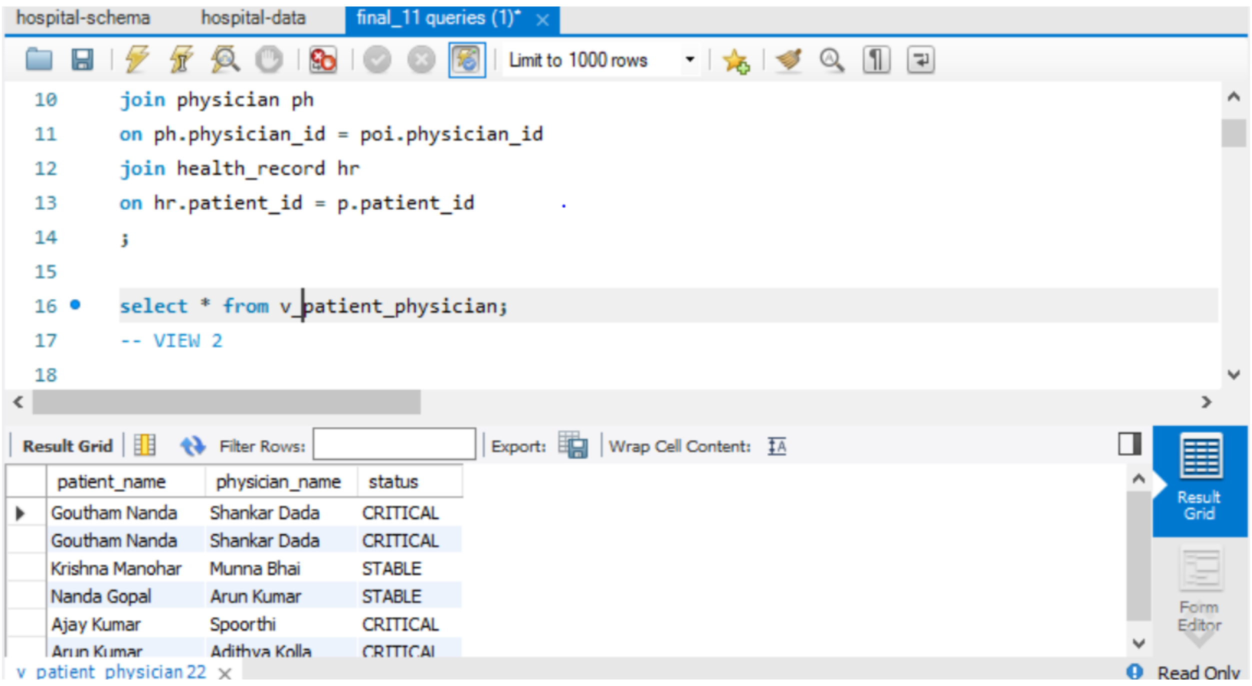
join physician ph

on ph.physician_id = poi.physician_id

join health_record hr

on hr.patient_id = p.patient_id

;



```
join physician ph
on ph.physician_id = poi.physician_id
join health_record hr
on hr.patient_id = p.patient_id
;

select * from v_patient_physician;
-- VIEW 2

```

patient_name	physician_name	status
Goutham Nanda	Shankar Dada	CRITICAL
Goutham Nanda	Shankar Dada	CRITICAL
Krishna Manohar	Munna Bhai	STABLE
Nanda Gopal	Arun Kumar	STABLE
Ajay Kumar	Spoorthi	CRITICAL
Arun Kumar	Adithya Kolla	CRITICAL

VIEW 2

Description:

Create a view to list the patient names and the medicines they took

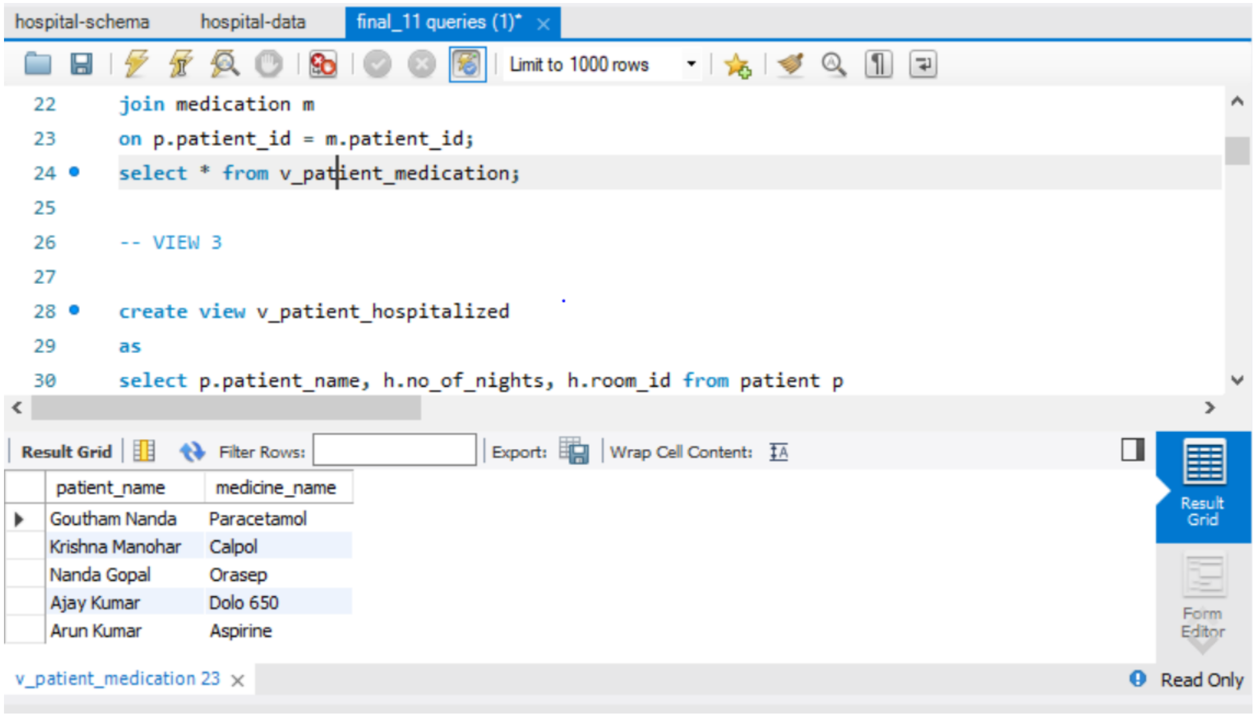
create view v_patient_medication

as

select p.patient_name, m.medicine_name from patient p

join medication m

on p.patient_id = m.patient_id;



```
join medication m
on p.patient_id = m.patient_id;
select * from v_patient_medication;

-- VIEW 3

create view v_patient_hospitalized
as
select p.patient_name, h.no_of_nights, h.room_id from patient p
```

patient_name	medicine_name
Goutham Nanda	Paracetamol
Krishna Manohar	Calpol
Nanda Gopal	Orasep
Ajay Kumar	Dolo 650
Arun Kumar	Aspirine

VIEW 3

Description:

Create a view to display the patient name, room id, no of nights that he was hospitalized

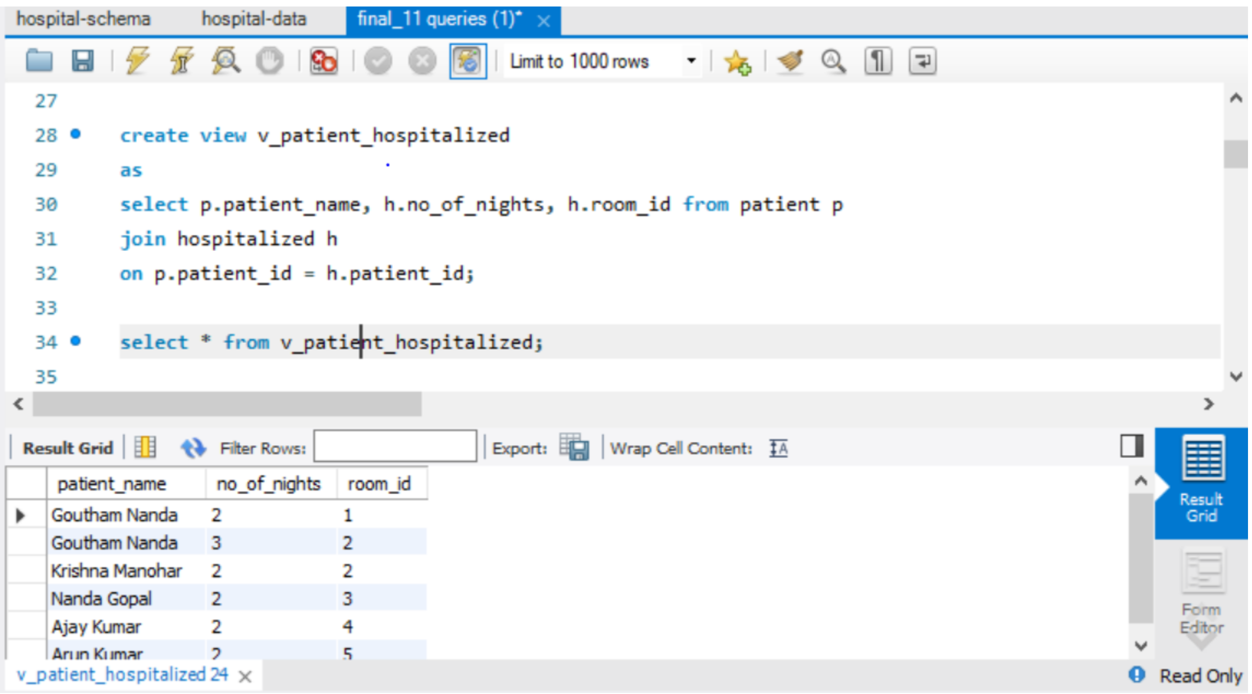
create view v_patient_hospitalized

as

select p.patient_name, h.no_of_nights, h.room_id from patient p

join hospitalized h

on p.patient_id = h.patient_id;



```
create view v_patient_hospitalized
as
select p.patient_name, h.no_of_nights, h.room_id from patient p
join hospitalized h
on p.patient_id = h.patient_id;

select * from v_patient_hospitalized;
```

patient_name	no_of_nights	room_id
Goutham Nanda	2	1
Goutham Nanda	3	2
Krishna Manohar	2	2
Nanda Gopal	2	3
Ajay Kumar	2	4
Arun Kumar	2	5

TRIGGERS

Trigger 1

Description: trigger to update invoice table whenever a patient record is updated in hospitalized table as per number of rooms.

```
CREATE TRIGGER tgr_invoice_hospitalized_update after
UPDATE
ON hospitalized FOR each row
UPDATE invoice
SET    room_charge =
      (
            SELECT fee_per_night
            FROM   room
            WHERE  room_id = new.room_id) * new.no_of_nights
WHERE  patient_id = new.patient_id;
```

Trigger 2

Description: trigger to insert a row in invoice table whenever a new patient record is added in hospitalized table as per number of rooms.

```
CREATE TRIGGER tgr_after_hospitalized_insert after
INSERT
ON hospitalized FOR each row
UPDATE invoice
SET    room_charge =
      (
            SELECT fee_per_night
            FROM   room
            WHERE  room_id = new.room_id) * new.no_of_nights
WHERE  patient_id = new.patient_id;
```

Trigger 3

Description: trigger to auto populate invoice table whenever a new record is inserted into patient table.

```
CREATE TRIGGER tgr_after_patient_insert after
INSERT
ON patient FOR each row
INSERT INTO invoice
        (
                patient_id,
                date
        )
        VALUES
        (
                new.patient_id,
                sysdate()
        );
```