PROJECT 1 PRESENTATION

Link to the Google Slides (for authors)

Note: the hidden slides represent the presentation outline provided by instructor (“guidelines”)

Project 1
ITIS 6120

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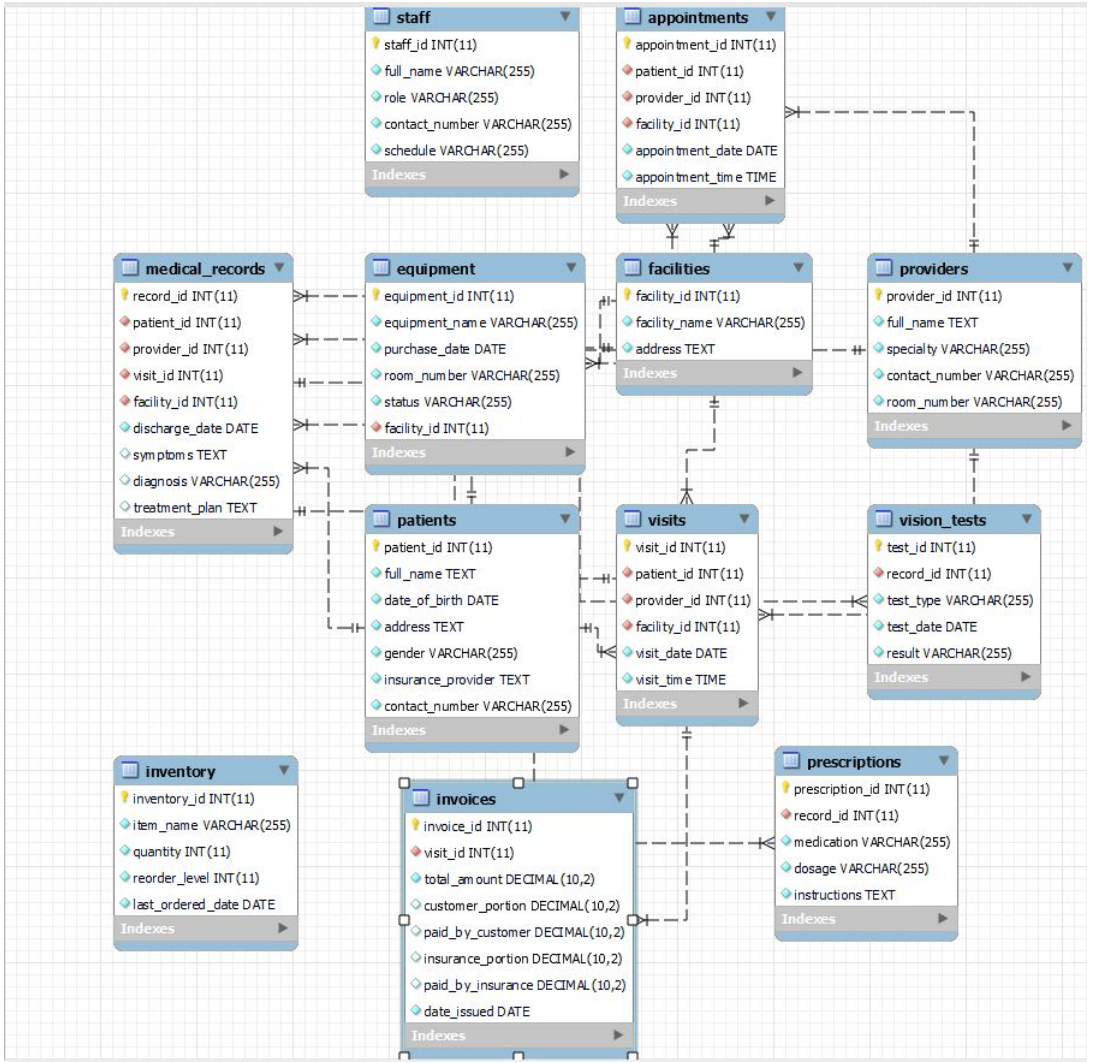
- What is your database about? Articulate the database

Ophthalmology Database

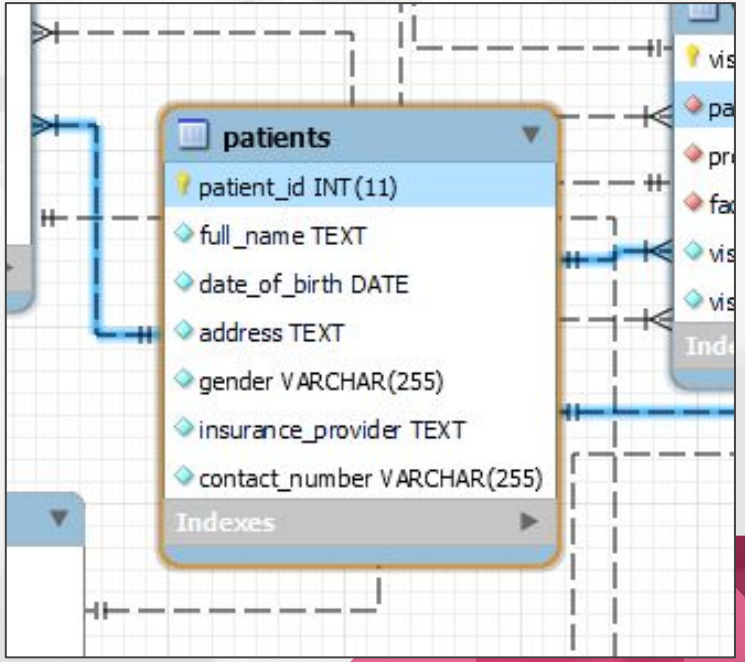
Our database is designed to support the operations and administration of a hypothetical ophthalmology practice

Entity Relationship Diagrams



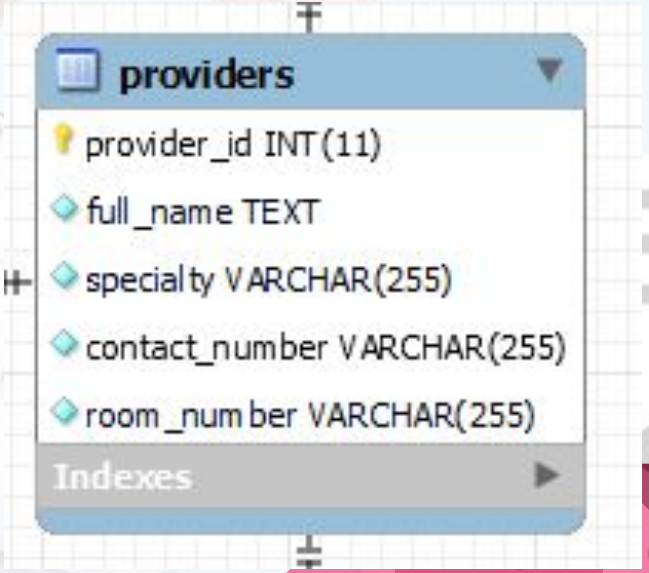
Patients

Insert ER and UML diagram



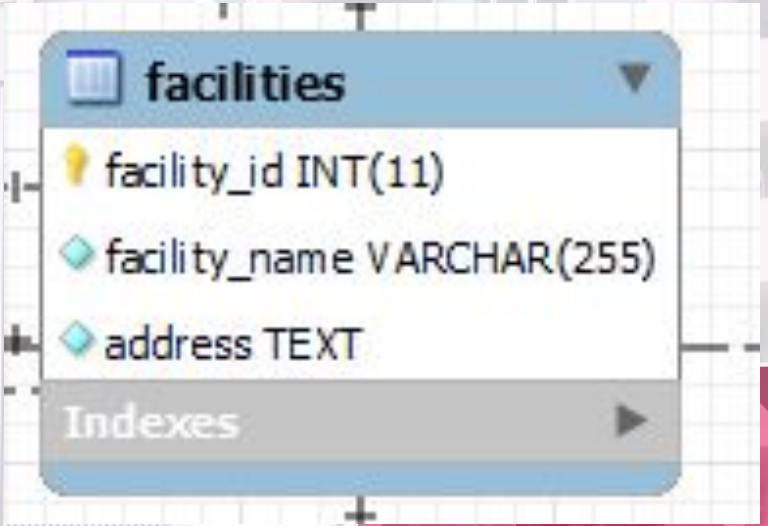
Providers

Insert ER and UML diagram



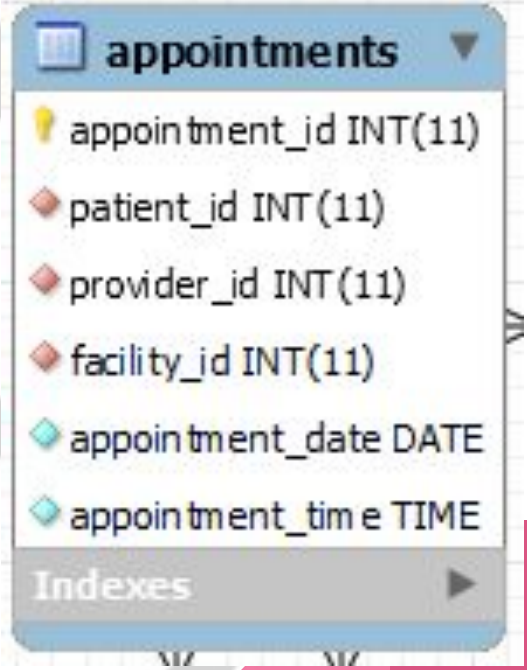
Facilities

Insert ER and UML diagram



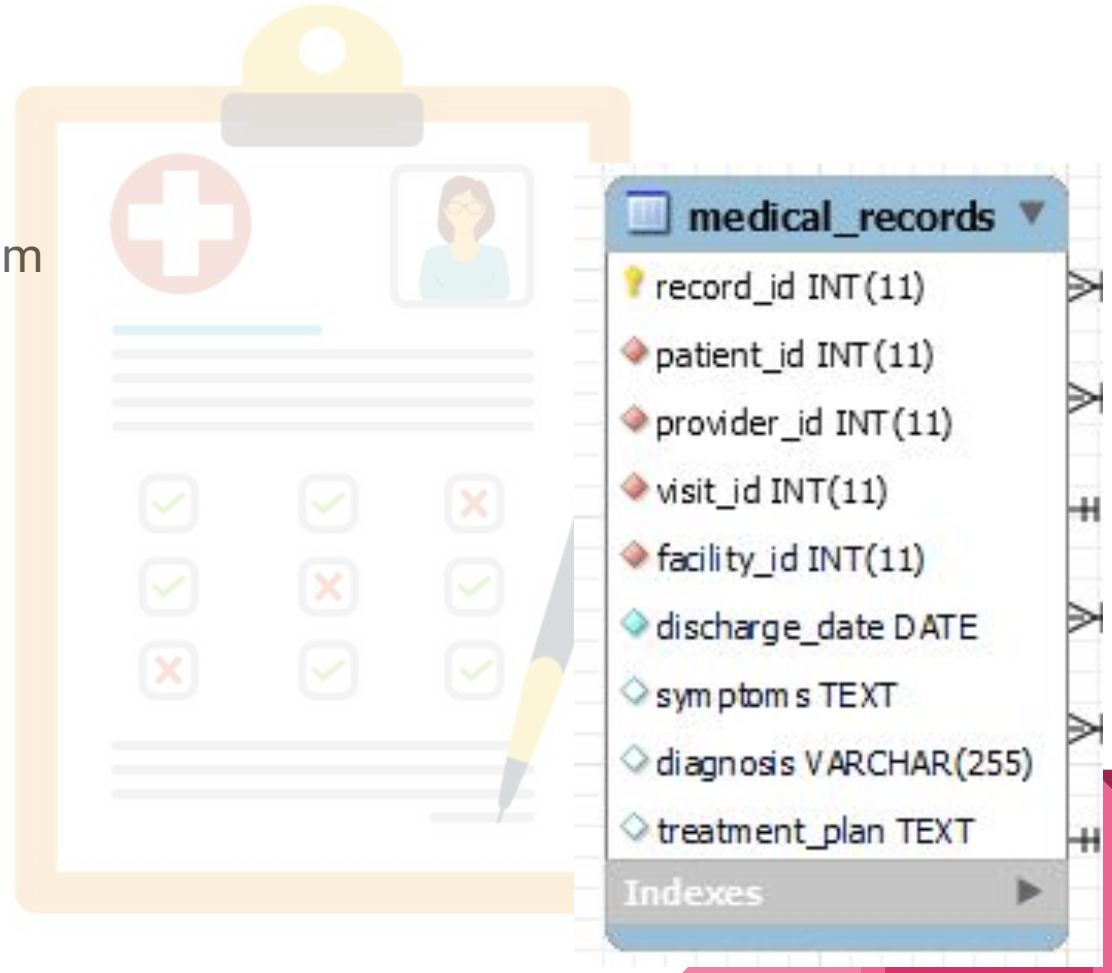
Appointments

Insert ER and UML diagram



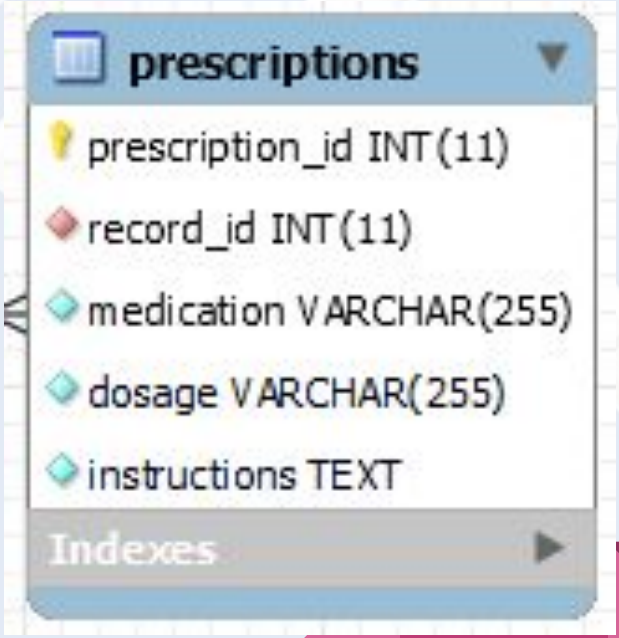
Medical Records

Insert ER and UML diagram



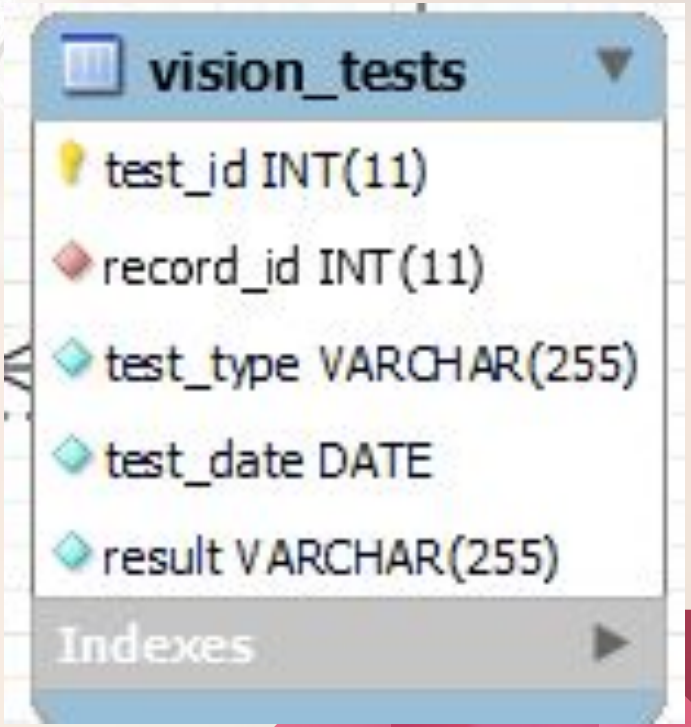
Prescriptions

Insert ER and UML diagram

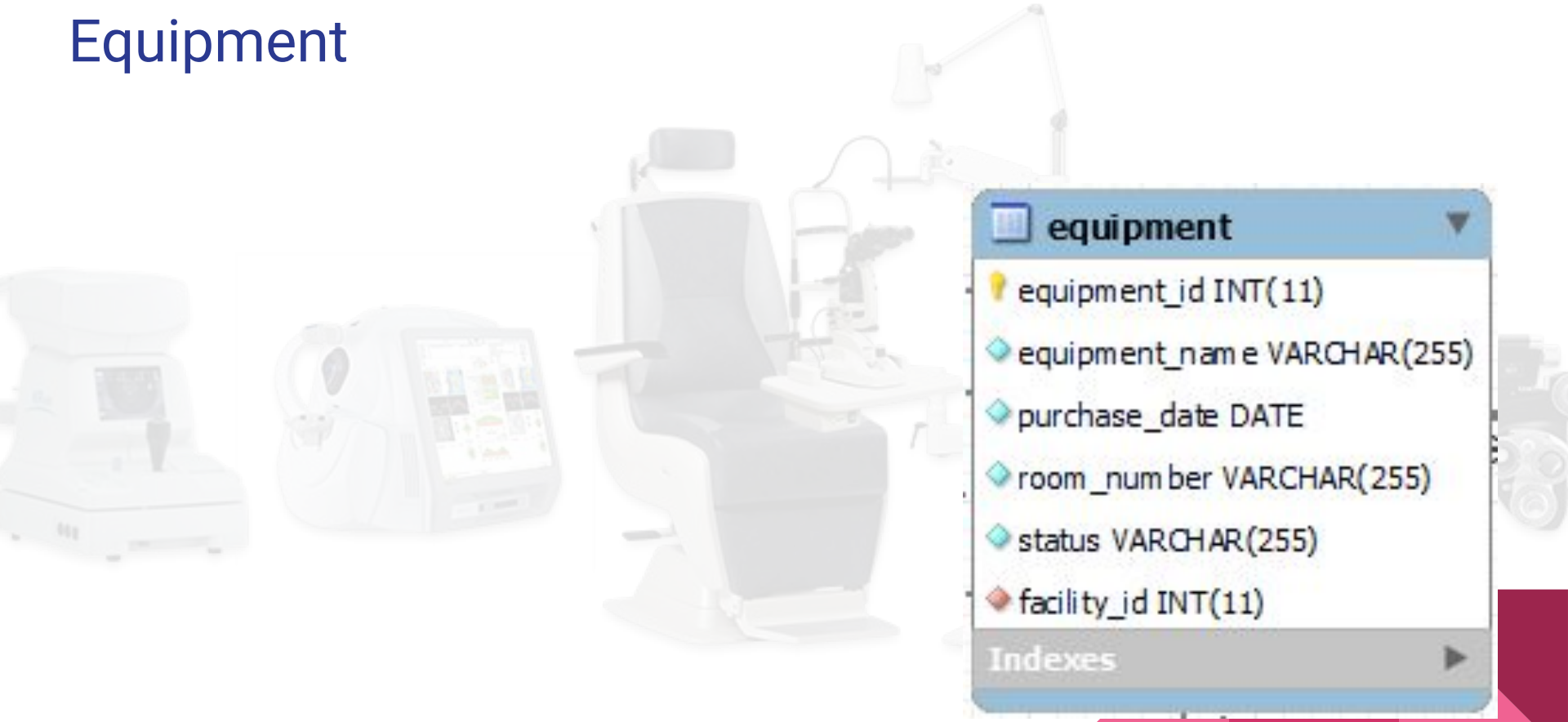


Vision Tests

Insert ER and UML diagram



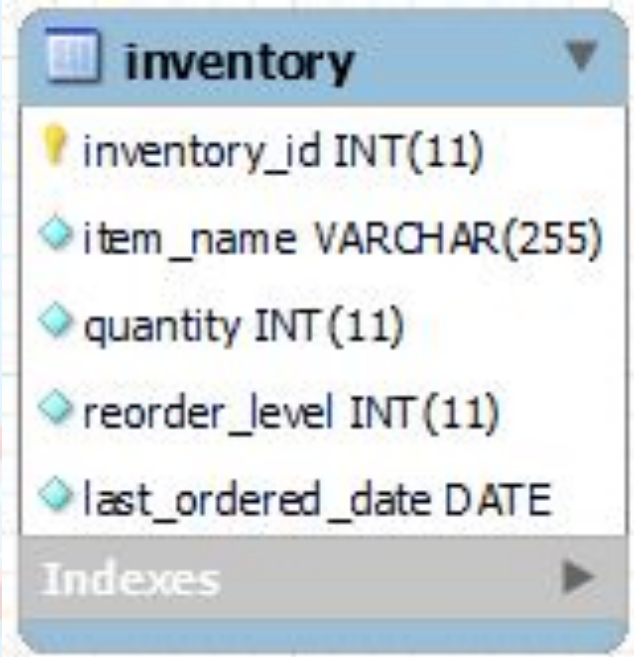
Equipment



equipment
equipment_id INT(11)
equipment_name VARCHAR(255)
purchase_date DATE
room_number VARCHAR(255)
status VARCHAR(255)
facility_id INT(11)
Indexes

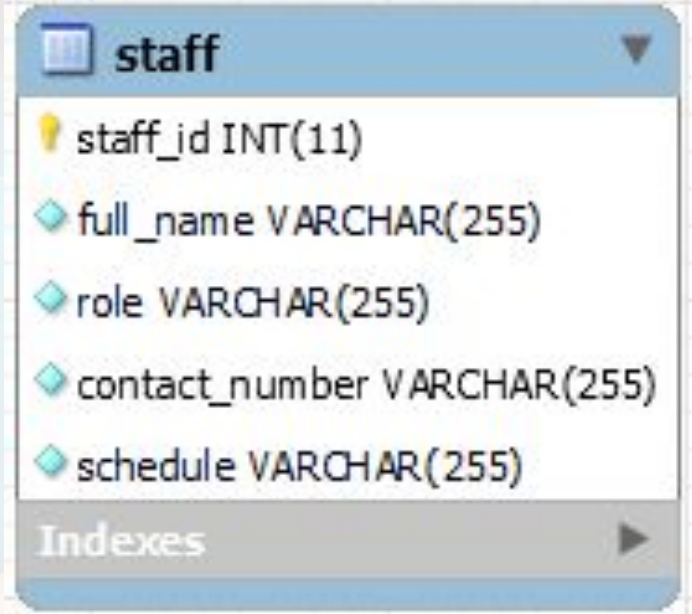
Inventory

Insert ER and UML diagram



Staff

Insert ER and UML diagram



Prove tables are in BCNF form

All tables are in BCNF

Boyce-Codd Normal Form (BCNF) requires that each table has a primary key (or a composite primary key in the case of linked tables), and all attributes are fully functionally dependent on their respective primary key.

There are no partial dependencies or transitive dependencies that would violate the rules of BCNF.

All tables are in BCNF.

- What information can be obtained?

Supporting queries

A sample of the many queries that would be needed to support operations.

The data in these queries is fictitious.

Supporting Query 1

Spec A: Should allow users to enter patient demographic information (including address and insurance)

INSERT INTO patients (full_name, date_of_birth, address, gender, insurance_provider, contact_number)

VALUES ('Alice Johnson', '1990-05-15', '123 Main St, Springfield', 'female', 'HealthPlus Insurances', '555-0201');

Supporting Query 2

Spec B: Should allow users to enter provider information (including specialty)

```
INSERT INTO providers (full_name, specialty, contact_number, room_number)
VALUES ('Dr. Sarah Lee', 'Oncology', '555-0301', '201');
```

Supporting Query 3 and 4

Spec C: Should allow users to enter visit information (including time and facility)

3. Appointments:

INSERT INTO appointments (patient_id, provider_id, facility_id, appointment_date, appointment_time)

VALUES (1, 1, 1, '2024-03-01', '09:00:00');

4. Visits and medical record information:

INSERT INTO medical_records (patient_id, provider_id, visit_id, facility_id, discharge_date, symptoms, diagnosis, treatment_plan)

VALUES (1, 3, 2, 1, '2024-03-02', 'Cough and fever', 'Common Cold', 'Rest');

Note on Spec D:

Spec D: should allow users to enter clinical care information (including recording of signs and symptoms, discharge diagnosis and prescriptions, and orders and results of exams, tests, and procedures)

This spec is satisfied by Query 4.

Supporting Query 5

SPEC E: Other pertinent information depending on scenarios, for example, clinics will need to manage appointments and exam rooms, emergency department will need to manage information about beds. All clinics will also need to manage supplies and billing.

SUPPORTING QUERY 5: Record a prescription

INSERT INTO prescriptions (record_id, medication, dosage, instructions)

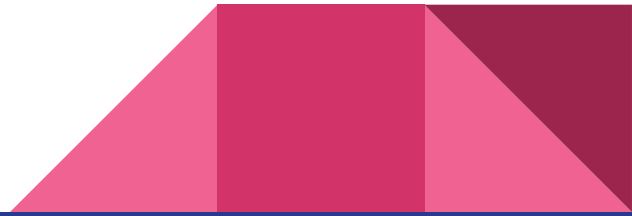
VALUES (1, 'Tylenol', '500mg', 'Take with food once a day');

Supporting Query 6

SUPPORTING QUERY 6: Record results of a vision test

INSERT INTO vision_tests (record_id, test_type, test_date, result)

VALUES (1, 'Visual Acuity', '2024-03-02', '20/20');



Supporting Query 7

SUPPORTING QUERY 7: Record an invoice

INSERT INTO invoices (visit_id, total_amount, customer_portion, paid_by_customer, insurance_portion, paid_by_insurance, date_issued)

VALUES (1, 100.00, 50.00, 50.00, 50.00, 50.00, '2024-03-02');

Supporting Query 8

SUPPORTING QUERY 8: Update quantity of inventory item

```
UPDATE inventory

SET quantity = 10

WHERE inventory_id = 1;
```

Supporting Query 9

SPEC F: Your database should support editing of existing records to correct data entry mistakes or legitimate changes of information (e.g. change of address or insurance).

SUPPORTING QUERY 9: Update patient demographic information

```
UPDATE patients

SET address = '456 Elm St, Springfield'

WHERE patient_id = 2;
```

Supporting Query 10

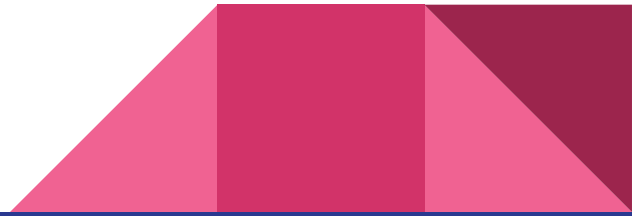
SPEC G: searching of patient records based on name, ID, and possibly other information such as visit dates.

SUPPORTING QUERY 10: Search for patients based on name

```
SELECT *

FROM patients

WHERE full_name = 'John Doe';
```



Supporting Query 11

SUPPORTING QUERY 11: Search for patients based on ID

```
SELECT *

FROM patients

WHERE patient_id = 2;
```

Supporting Query 12

SUPPORTING QUERY 12: search for records based on visit date:

```
SELECT *

FROM patients

JOIN medical_records ON patients.patient_id = medical_records.patient_id

JOIN visits ON medical_records.visit_id = visits.visit_id

WHERE visits.visit_date = '2024-03-25';
```

Supporting Query 13

SPEC H: Your database should support reporting functions such as listing of all patients who satisfy certain selection criteria, such as those who have been given certain diagnosis, or who visited on certain days, or who have been seen by certain doctor, or combinations of these such as, the diagnoses of patients who visited the clinic twice within the shortest time interval.

SUPPORTING QUERY 13: List all patients who have been given a certain diagnosis

```
SELECT *

FROM patients

JOIN medical_records ON patients.patient_id = medical_records.patient_id

WHERE medical_records.diagnosis = 'Myopia';
```

Supporting Query 14

SUPPORTING QUERY 14: List all patients who visited on certain days

```
SELECT *

FROM patients

JOIN medical_records ON patients.patient_id =
medical_records.patient_id

JOIN visits on medical_records.visit_id = visits.visit_id

WHERE visits.visit_date = '2024-03-25';
```

Supporting Query 15

SUPPORTING QUERY 15: List all patients who have been seen by a certain doctor

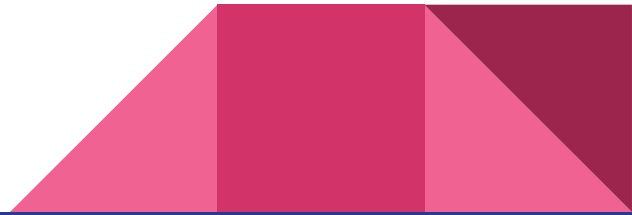
```
SELECT *

FROM patients

JOIN medical_records ON patients.patient_id = medical_records.patient_id

JOIN providers ON medical_records.provider_id = providers.provider_id

WHERE providers.full_name = 'Dr. Iris Clearview';
```



Supporting Query 16

SUPPORTING QUERY 16: List all patients who have visited the clinic twice within the shortest time interval

PLACEHOLDER

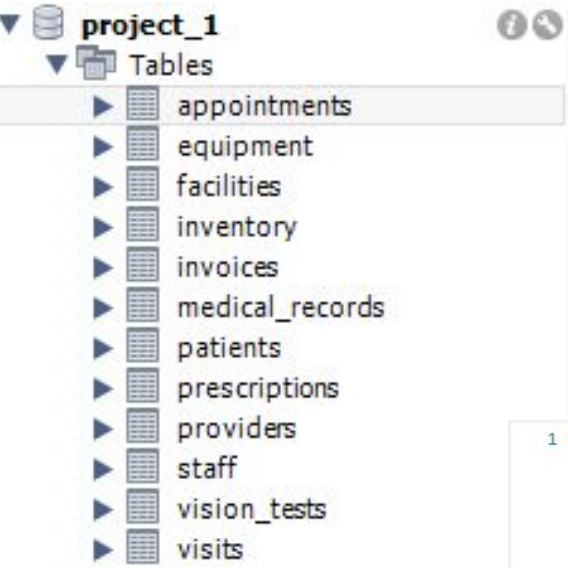
- Explain UML data model (can be incorporated with the explaining the database)

UML Models and ER Diagrams included previously

- Explain ER diagram (no need to spend too much time on this part)

Included in previous slides

Show database and test data in SQL (it’s okay to not spend too much on this part)



Information

Table: medical_records

Columns:

record_id	int(11) AI PK
patient_id	int(11)
provider_id	int(11)
visit_id	int(11)
facility_id	int(11)
discharge_date	date
symptoms	text
diagnosis	varchar(255)
treatment_plan	text

```
1 •  SELECT * FROM project_1.medical_records;
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

record_id	patient_id	provider_id	visit_id	facility_id	discharge_date	symptoms	diagnosis	treatment_plan
1	1	1	1	1	2024-03-25	Blurry vision	Myopia	Prescribed corrective lenses.
2	2	2	2	2	2024-03-26	Eye irritation	Dry Eye Syndrome	Prescribed eye drops.
3	3	3	3	3	2024-03-27	Difficulty reading	Hyperopia	Prescribed reading glasses.
4	4	4	4	4	2024-03-28	Headaches and eye strain	Astigmatism	lenses recommended.
5	5	5	5	5	2024-03-29	Red eyes	Conjunctivitis	Antibiotic eye drops prescribed.
6	6	6	6	6	2024-03-30	Sudden vision loss	Retinal detachment	Urgent surgical intervention recommended.
7	7	7	7	7	2024-03-31	Cloudy vision	Cataract	Cataract surgery suggested.
8	8	8	8	8	2024-04-01	Floaters in vision	Vitreous detachment	Monitoring and possible laser treatment.
9	9	9	9	9	2024-04-02	Glare and halos around lights	Cataracts	Cataract surgery.
10	10	10	10	10	2024-04-03	Eye pain and nausea	Acute angle-closure glaucoma	Immediate medical treatment required.
11	1	3	2	1	2024-03-02	Cough and fever	Common Cold	Rest
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Astigmatism

Supporting functionalities

Included in previous slides