
# ADDIS ABABA INSTITUTE OF TECHNOLOGY

## School of Electrical and Computer Engineering

## Computer stream

# E-R DIAGRAM FOR HOSPITAL MANAGEMENT SYSTEM


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For our HMS project, we list the entity sets and their attributes below, with primary keys underlined:

- doctor: with attributes (dr_id, doc_name, address,  dept_name, salary, DOB, age, gender, phone, language, email).
- patient: with attributes (patient_id, pat_name, gender, dob, age, address, phone, disease).
- reception: with attributes (card_id, patient_id,  recept_id, dept_name, triage_id).
- triage: with attributes (triage_id, dept_name. doc_name, pat_name, card_id).
- nurse: with attributes (nurse_id, nurse_name, dept_name, dob, age, address, salary, phone, email).
- medical_test: with attributes (pat_name, lab_number, test_result, doc_name).
- department: with attributes (dept name, budget, building).
- appointment: with attributes (pat_name, doc_name, date, time).
- room: with attributes (room_number, building).
- billing: with attributes (pat_id, pat_name, bill_number, reason, card_id).
- admin: with attributes (admin_id, admin_name, gender, email, address, phone).

The relationship sets in our design are listed below:

- treat: relating doctor and nurse with patient.
- schedule: relating doctor, patient and appointment
- register: relating patient with reception.
- direct_to: relating reception  with triage.
- manage: relating admin  with doctor and nurse.
- test: relating  nurse with medical_test.
- admit: relating room with inpatient.
- pay: relating billing with patient.
- check: relating doctor with medical test.
- assign: relating triage with doctor.

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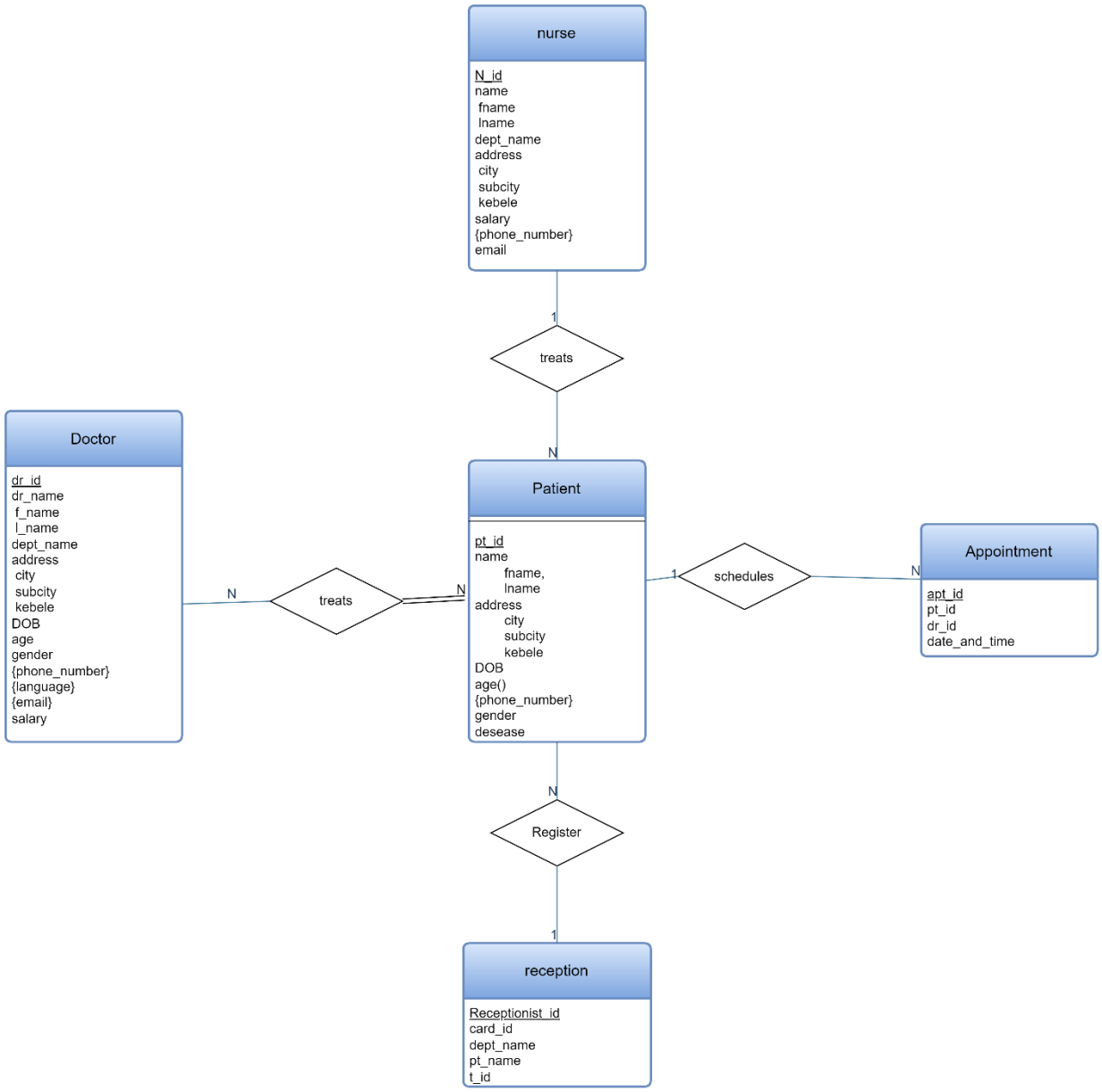
The relationship between a doctor and a patient in a hospital management system is typically represented as a many-to-many relationship. This is because a patient can have appointments with many doctors, and a doctor can have many patients.
To be more specific, a patient may visit a doctor for a medical consultation, examination, or treatment. The doctor would then provide a diagnosis and prescribe medication or treatment if necessary.
Therefore, we include a relationship between the Doctor entity and the Patient entity in our ER diagram as a "treats" relationship, to show that they work together to provide care for patients.

The relationship between nurse and patient in a hospital management system can be represented as a one-to-many relationship, where one nurse may take care of many patients, but each patient is typically assigned to only one nurse at a time.
We include a "treats" relationship between the Nurse entity and the Patient entity in our ER diagram to show that each nurse takes care of one or more patients, and each patient is assigned to one nurse at a time.
The relationship between a patient and an appointment in a hospital management system can be represented as a one-to-many relationship, where one patient can have many appointments, but each appointment is associated with only one patient at a time. To be more specific, a patient may schedule an appointment with a doctor or medical staff for a consultation, examination, or treatment.
Therefore, we include a relationship between the Patient entity and the Appointment entity in our ER diagram as a "schedules" relationship, to show that the patient has one or more appointments associated with them.

The relationship between a patient and a receptionist is represented as a one-to-many relationship, where one receptionist can serve many patients, but each patient is assigned to only one receptionist at a time.
The receptionist is typically the first point of contact for patients when they arrive at the hospital. The receptionist may be responsible for verifying the patient's personal information, scheduling appointments, and directing the patient to the appropriate medical staff or department.
Therefore, we include a relationship between the Receptionist entity and the Patient entity in our ER diagram as a "register" relationship, to show that the receptionist is responsible for assisting and registering the patient during their hospital visit.



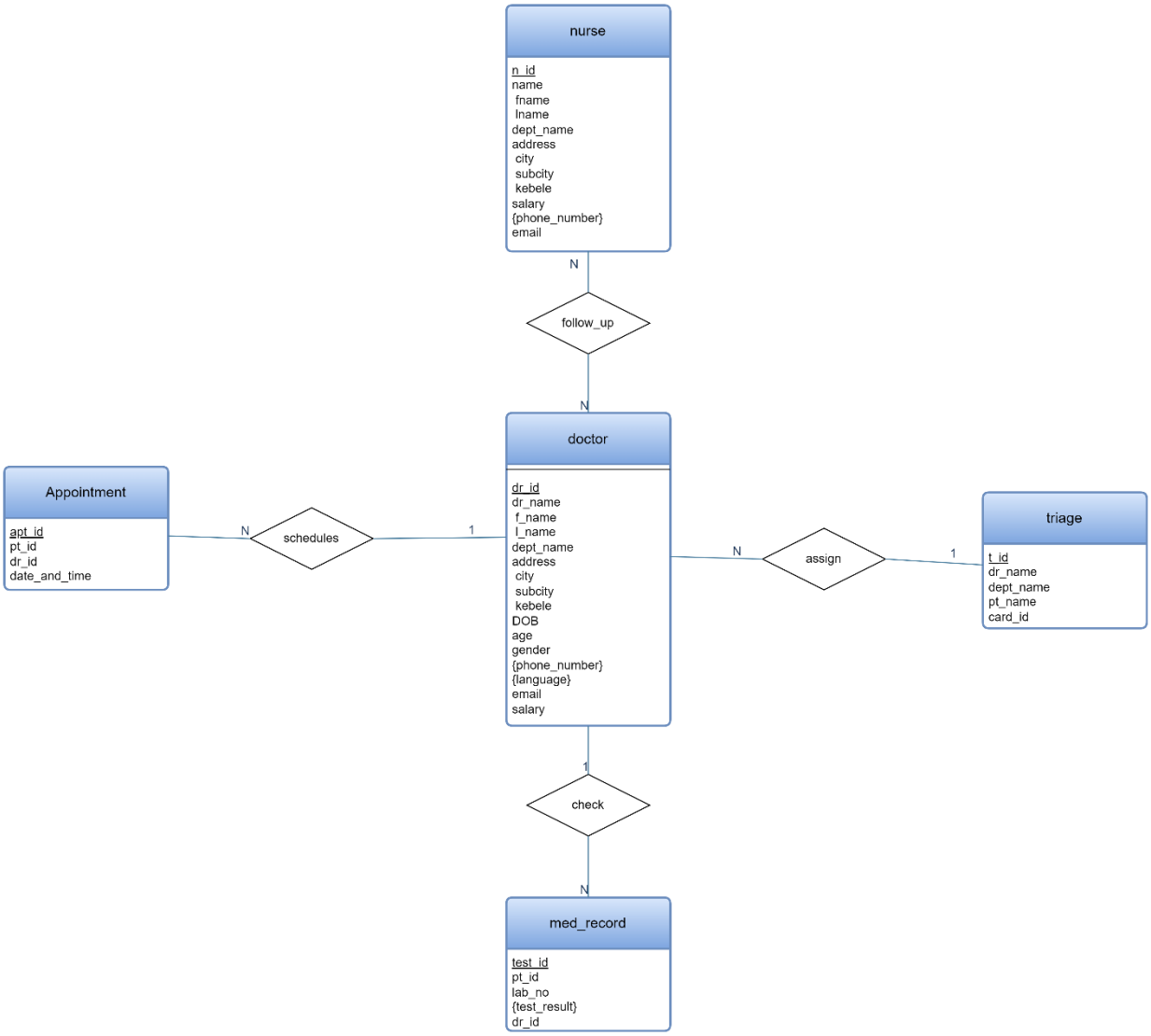

The relationship between a doctor and a nurse is represented as a many-to-many relationship, since a doctor can work with many nurses, and a nurse can work with many doctors
A doctor may prescribe treatments for a patient, which would then be administered by a nurse. In this case, the doctor and nurse would need to collaborate to ensure that the treatment is administered correctly, and that the patient receives the appropriate care.
Therefore, we include a relationship between the Doctor entity and the Nurse entity in our ER diagram, as a "follow_up" relationship, to show that they work together to provide care for patients.

The relationship between a doctor and an appointment in a hospital management system can be represented as a many-to-one relationship, where many appointments can be associated with one doctor.
A doctor may have many appointments scheduled with patients for consultations, examinations, or treatments. The doctor would need to be available at the time of the appointment to provide care and medical advice to the patient.
Therefore, we could include a relationship between the Doctor entity and the Appointment entity in our ER diagram as “schedules" relationship, to show that the doctor performs medical procedures or attends appointments associated with patients.

The relationship between a doctor and triage in a hospital management system can be represented as a many-to-one relationship, where many patients may be triaged by one or more doctors.
When a patient arrives at the hospital, they typically undergo a triage process to assess their condition and prioritize their treatment. A doctor may be involved in the triage process by evaluating the patient's symptoms and deciding on the appropriate course of action.
Therefore, we include a relationship between the Doctor entity and the Triage entity in our ER diagram, such as an "assign" relationship, to show that the doctor is assigned to the patient during the triage process.

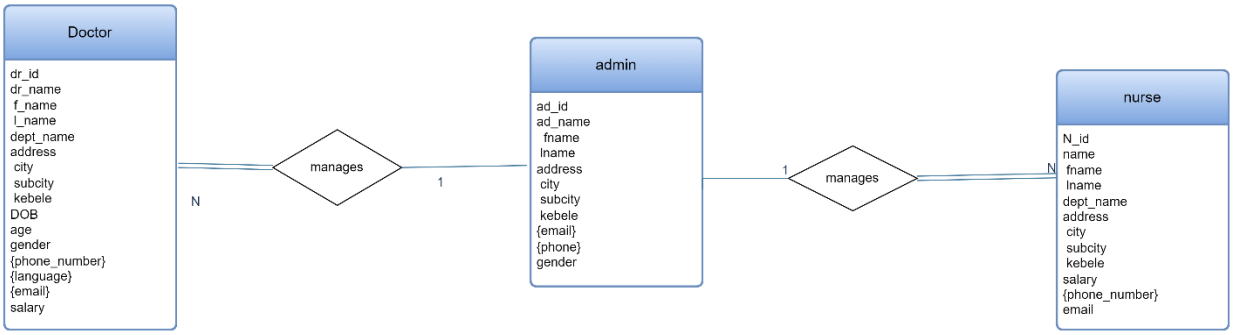
The relationship between doctor and medical lab report in a hospital management system can be represented as a one-to-many relationship, where one doctor can check many medical lab reports, but each medical lab report is typically checked by only one doctor.

In a hospital setting, doctors may order medical lab tests to help diagnose or monitor a patient's condition. We include a "checks" relationship between the Doctor entity and the Medical Lab Report entity in our ER diagram to show that each doctor can order many medical lab reports, and each medical lab report is checked by only one doctor.



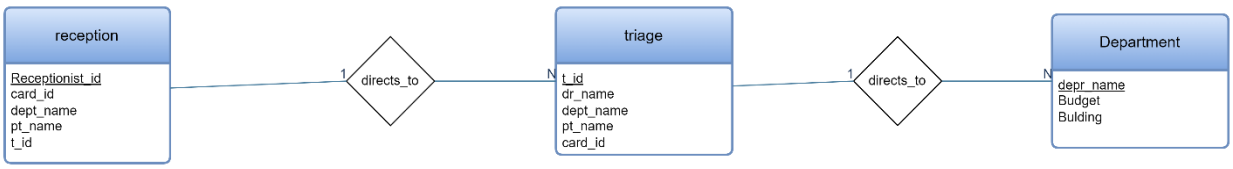

The relationship between admin and doctor is represented as a one-to-many relationship, where one admin may manage many doctors, but each doctor is managed by only one admin at a time.
Therefore, we include a relationship between the Admin entity and the Doctor entity in our ER diagram as "manages" relationship, to show that an admin manages or supervises one or more doctors

The relationship between admin and nurse is represented as a one-to-many relationship, where one admin may manage many nurses, but each nurse is managed by only one admin at a time.
Therefore, we include a relationship between the Admin entity and the Nurse entity in our ER diagram as a "manages" relationship, to show that an admin manages one or more nurses.




The relationship between reception and triage is represented as a one-to-many relationship, where one receptionist can assign many patients to the triage process, but each patient can be assigned to only one triage process at a time.
Therefore, we include a relationship between the Reception entity and the Triage entity in our ER diagram as a “directs to" relationship, to show that the receptionist assigns or directs patients to the triage process.

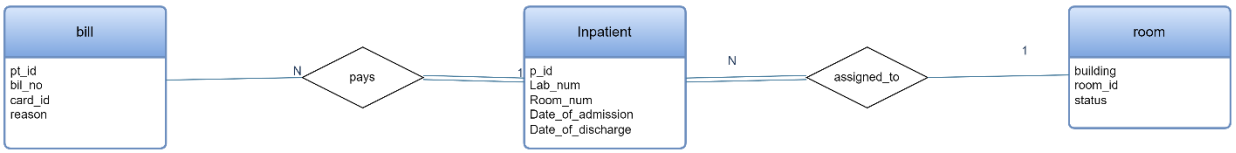
The relationship between department and triage is represented as a many-to-one relationship, where many patients may be triaged by one or more departments.
After a patient undergoes the triage process, they may be assigned to a specific department within the hospital based on their medical condition and treatment needs.
Therefore, we include a relationship between the Department entity and the Triage entity in our ER diagram, as a "directs to" relationship, to show that the department is directed patient who have undergone the triage process.



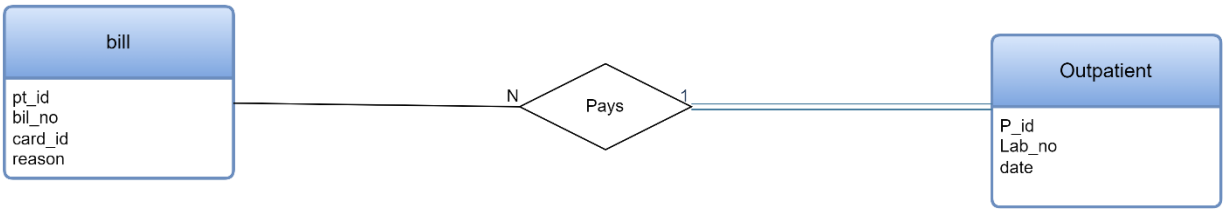

The relationship between inpatient and bill is represented by one-to-many relationship, where one inpatient may have many bills, but each bill is typically associated with only one inpatient. we include a "pays" relationship between the Inpatient entity and the Bill entity in your ER diagram to show that each inpatient may have many bills, and each bill is associated with only one inpatient.

The relationship between Inpatient and Room entities is represented as a many-to-one relationship. This is because multiple inpatients can be assigned to the same room, but each inpatient is typically assigned to only one room during their hospital stay.

To represent the relationship between Inpatient and Room entities in the ER diagram we add a "assigned_to" relationship from the Inpatient entity to the Room entity. This indicates that each Inpatient entity can be assigned to only one Room entity at a time.



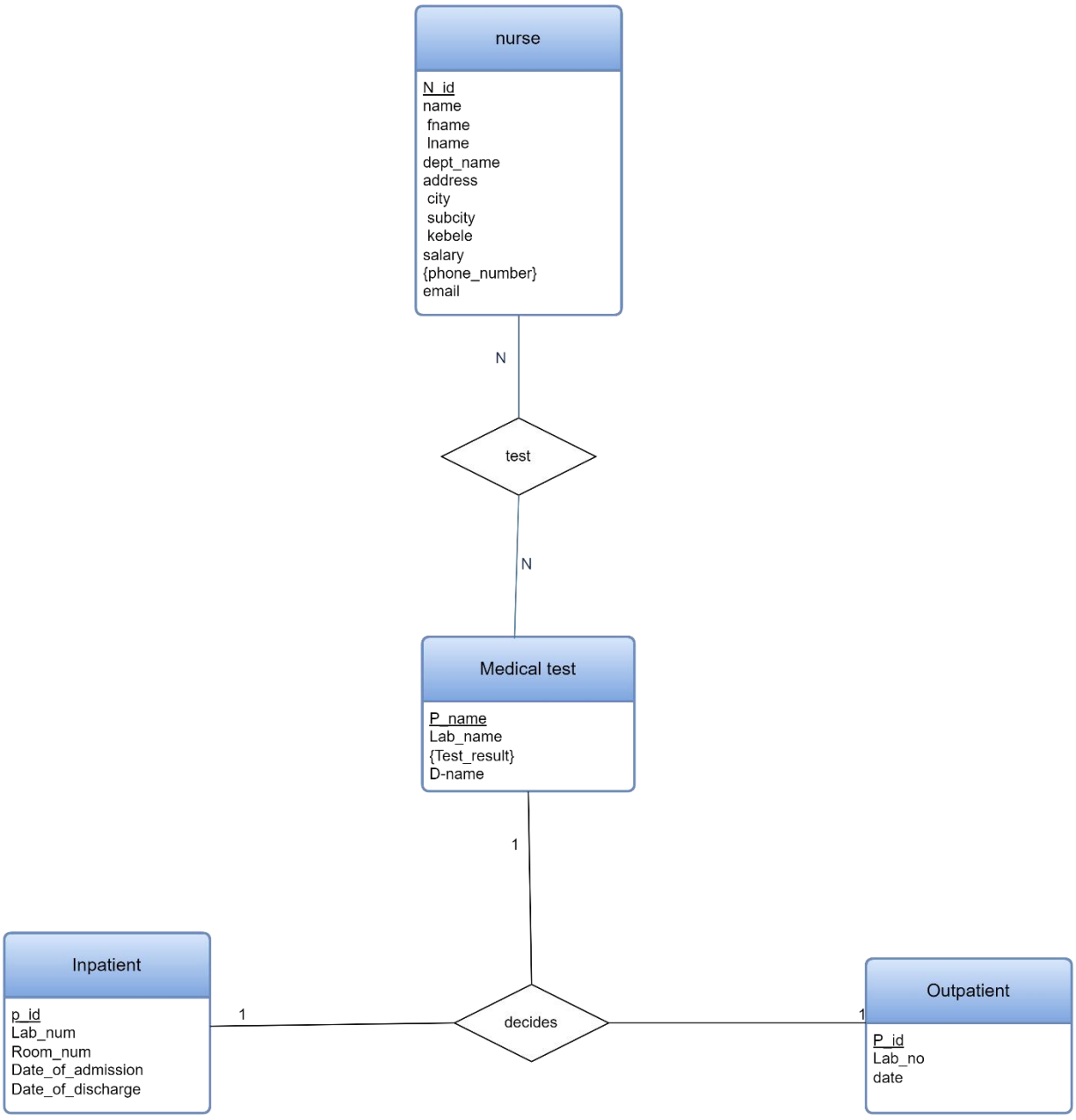

The relationship between outpatient and bill is represented by one-to-many relationship, where one outpatient may have many bills, but each bill is typically associated with only one inpatient.
we include a "pays" relationship between the Inpatient entity and the Bill entity in your ER diagram to show that each inpatient may have many bills, and each bill is associated with only one outpatient.




The relationship between Medical Lab Report and Patient entities is represented as a one-to-one relationship. This is because a Patient can only one Medical Lab Reports associated with their medical history.
To represent the relationship between Medical Lab Report and Patient entities in the ER diagram we add a "decides" relationship from the in Patient entity and outpatient to the Medical Lab Report entity.

The relationship between Nurse and Medical Test entities in a hospital management system can be represented as a many-to-many relationship. This is because a Nurses may assist with administering multiple medical tests to multiple patients.

To represent the relationship between Nurse and Medical Test entities in the ER diagram we add a "test" relationship from the Nurse entity to the Medical Test entity. This indicates that Nurse entity can administer multiple Medical Test entities.



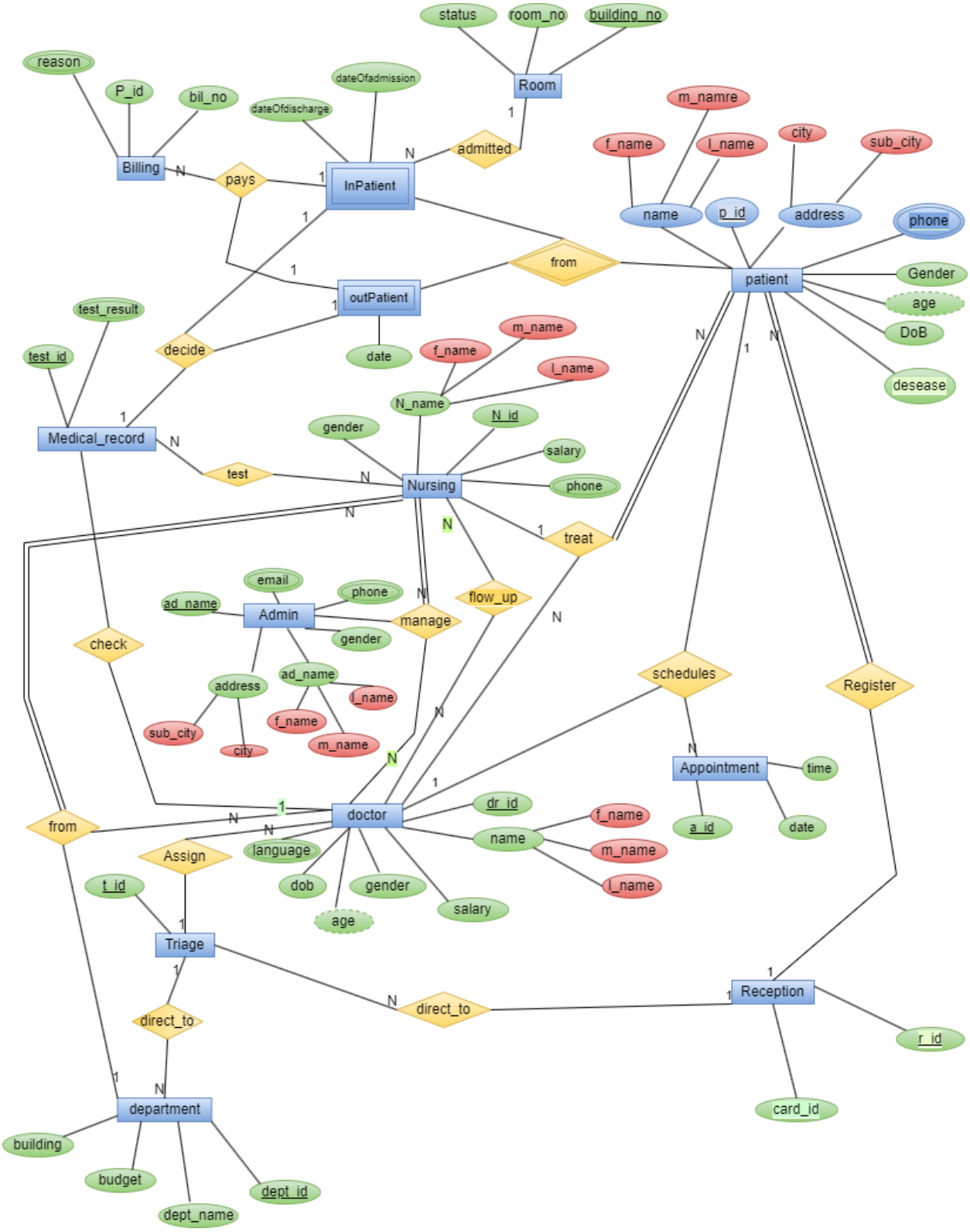



**Figure:** E-R diagram for a hospital management system