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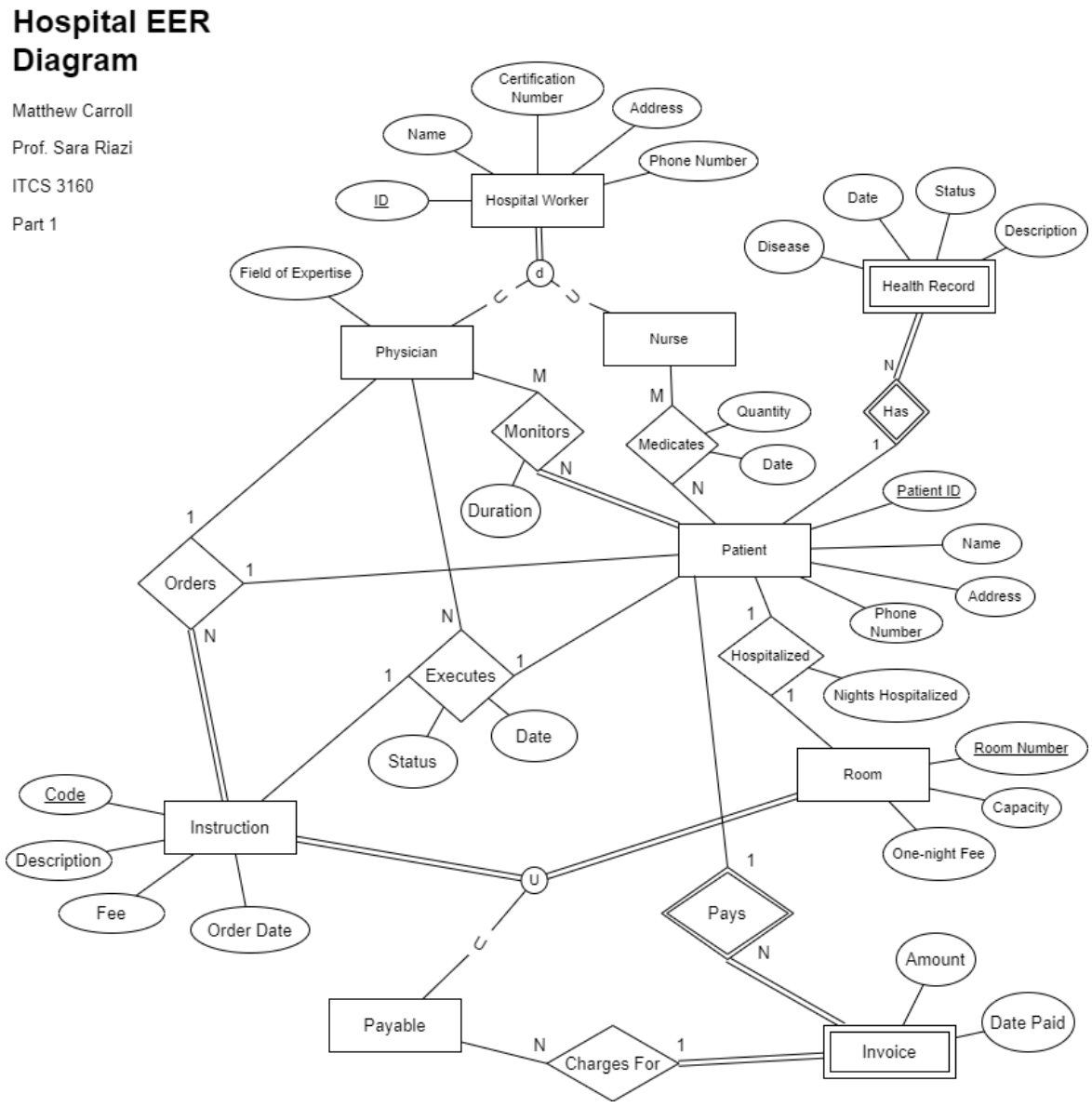
Conceptual Design for Hospital Database

Original (E)ER Design:



Modifications:

- Medication will be a new entity having an id and name, with the Medicates relationship being made into a three-way relationship between Nurse(M), Patient(N), and Medication(Z)
- Invoice will get a key and become a strong entity in order for it to be referenced uniquely, in the case that a patient needs to pay multiple invoices
- Payables will have a surrogate payable_id, and so will the payable table reference the payable_id as well as the patient_id so that the invoice can know who needs to pay for what

Relational Mapping Concept

Entity Tables:

** Since hospital workers have to be either physicians or nurses, the hospital entity is not a relation in the database **

// physicians and nurses

Physician(physician_id, full_name, certification_number, address, phone_number, field_of_expertise)

Primary key: {physician_id}

Foreign key: {None}

Nurse(nurse_id, full_name, certification_number, address, phone_number)

Primary key: {nurse_id}

Foreign key: {None}

// patients, health records, and their medications

Patient(patient_id, full_name, address, phone_number)

Primary key: {patient_id}

Foreign key: {None}

Health_Record(patient_id, disease, record_date, record_status, descr)

Primary key: {patient_id}

Foreign key: {patient_id references patient(patient_id)}

Medication(medication_id, medication_name)

Primary key: {medication_id}

Foreign key: {None}

// payable items like instructions and rooms as well as invoices

Instruction(instruction_code, descr, fee, order_date)

Primary key: {instruction_code}

Foreign key: {None}

Room(room_number, capacity, fee)

Primary key: {room_number}

Foreign key: {None}

Invoice(invoice_id, patient_id, total)

Primary key: {invoice_id}

Foreign key: {patient_id references patient(patient_id)}

Relationship Tables:
** These tables are used to represent relations, and thus all have foreign keys **
** Some 1 - N relationships are not represented by their own relation table, and instead, the attributes for the N side of the relationship are added to the corresponding table (e.g. Has_Record is represented by a patient_id in the Health_Record table) **

// monitors, medicates, and hospitalized relationships
Monitors(physician_id, patient_id, duration)
Primary key: {physician_id, patient_id}
Foreign key: {physician_id references physician(physician_id), patient_id references patient(patient_id)}
Medicates(nurse_id, patient_id, medication_id, quantity, med_date)
Primary key: {nurse_id, patient_id, medication_id}
Foreign key: {nurse_id references nurse(nurse_id), patient_id references patient(patient_id), medication_id references medication(medication_id)}
Hospitalized(patient_id, room_number, num_nights)
Primary key: {patient_id, room_number}
Foreign key: {patient_id references patient(patient_id), room_number references room(room_number)}

// orders and executes three-way relationships
Orders(instruction_code, physician_id, patient_id)
Primary key: {instruction_code}
Foreign key: {instruction_code references instruction(instruction_code), physician_id references physician(physician_id), patient_id references patient(patient_id)}
Executes(instruction_code, nurse_id, patient_id)
Primary key: {instruction_code, nurse_id}
Foreign key: {instruction_code references instruction(instruction_code), nurse_id references nurse(nurse_id), patient_id references patient(patient_id)}

// payment relationship that records a payment made at a time for an invoice
Payment(invoice_id, payment_id, patient_id, amount, date_paid)
Primary key: {invoice_id, payment_id}
Foreign key: {invoice_id references invoice(invoice_id), patient_id references patient(patient_id)}