SECD2523-DATABASE

20242025 – SEMESTER 1

PHASE 3

Conceptual Design

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1. **ERD Design**

The conceptual Entity-Relationship Diagram is designed to model the hospital management system by capturing entities, attributes, relationships, and their cardinalities. The design adheres to the system requirements outlined in Phase 2.

Explanation of Relationships

a. **Staff - Subclasses (Doctor, Nurse)**:

Constraint: Optional, Disjoint (OR)

Explanation: Every Staff member can be a Doctor, a Nurse, etc. (Optional) A Staff member cannot be both Doctor and Nurse(OR).

b. **Patient - Appointment**:

Relationship Name: Has

Multiplicity: 0..1 (Patient) to 1..* (Appointment)

Explanation: A Patient can have multiple Appointments or none, but each Appointment must be linked to one Patient.

c. **Doctor - Appointment**:

Relationship Name: Schedules

Multiplicity: 0..1 (Doctor) to 1..* (Appointment)

Explanation: A Doctor can schedule multiple Appointments or none, but each Appointment is managed by one Doctor.

d. **Patient - Treatment**:

Relationship Name: Receives

Multiplicity: 1..1 (Patient) to 1..* (Treatment)

Explanation: A Patient can undergo one or multiple Treatments, but each Treatment is associated with one Patient.

e. **Doctor - Treatment**:

Relationship Name: Provides

Multiplicity: 1..1 (Doctor) to 1..* (Treatment)

Explanation: A Doctor can administer one or multiple Treatments, but each Treatment is conducted by one Doctor.

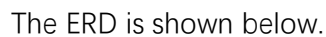f. **Patient - Bill**:

Relationship Name: Pays

Multiplicity: 1..1 (Patient) to 1..* (Bill)

Explanation: Each Patient can generate one or multiple Bills, but each bill belongs to one patient.

g. **Patient - LabTest**:

Relationship Name: Undergoes

Multiplicity: 0..1 (Patient) to 1..* (LabTest)

Explanation: A Patient can undergo multiple LabTests or none, but each LabTest must be associated with one Patient.

h. **LabTest - Department**:

Relationship Name: ConductedIn

Multiplicity: 1..* (LabTest) to 0..1 (Department)

Explanation: Each LabTest is performed in one Department, but a Department may conduct many or may not conduct LabTests.

i. **Patient - Visitor**:

Relationship Name: VisitedBy

Multiplicity: 0..1 (Patient) to 1..* (Visitor)

Explanation: A Patient can have multiple Visitors or none, but each Visitor is associated with one Patient.

j. **Treatment - Medication**:

Relationship Name: Prescribes

Multiplicity: 0..* (Treatment) to 1..* (Medication)

Explanation: A Treatment may require multiple Medications or none, and each Medication can be prescribed for multiple Treatments.

k. **Staff - Department**:

Relationship Name: AssignedTo

Multiplicity: 1..* (Staff) to 1..1 (Department)

Explanation: A Staff must be assigned to one Department, but a department can have one or multiple Staffs.

The ERD is shown below.

Data Dictionary

Overview

The Data Dictionary provides a detailed description of the entities, attributes, primary keys (PK), foreign keys (FK), and their roles in the database schema for the hospital management system.

Entities and Attributes:

Patient:

   a. PatientID (PK): Unique identifier for each patient.
   b. Name: Full name of the patient.
   c. DOB: Date of birth of the patient.
   d. ContactNumber:Phone number of patient
   e. EmailAddress:Patient's email

Visitor:

   a. VisitorID(PK):Unique identifier for each visitor
   b. PatientID(FK):Unique identifier for each patient
   c. Relationship:Visitor-patient relationship

Appointment:

   a. AppointmentID (PK): Unique identifier for each appointment.
   b. PatientID (FK): Links to PatientID in the Patient entity.
   c. DoctorID (FK): Links to DoctorID in the Doctor entity.
   d. Date Time: Date of the appointment.
   e. Status:The specific location of the reservation

Doctor:

   a. DoctorID (PK): Unique identifier for each doctor.
   b. Name: Full name of the doctor.
   c. Specialization: Area of expertise of the doctor.

Treatment:

   a) TreatmentID (PK): Unique identifier for each treatment.
   b) PatientID (FK): Links to PatientID in the Patient entity.
   c) DoctorID (FK): Links to DoctorID in the Doctor entity
   d) Details: Description of the treatment provided
   e) DOB: Date of birth of the patient

Bill:

a. BillID (PK): Unique identifier for each bill.
b. PatientID (FK): Links to PatientID in the Patient entity.
c. Amount: Total amount charged.
d. PaymentStatus:Pay specific location

LabTest:

a. LabTestID (PK): Unique identifier for each lab test.
b. PatientID (FK): Links to PatientID in the Patient entity.
c. TestName:Name of test
d. DateConducted:date for lab test
e. LabID:Unique identifier for each lab

Department:

a. DepartmentID (PK): Unique identifier for each department.
b. Name: Name of the department.
c. Location:Department location

Medication:

a. MedicationID (PK): Unique identifier for each medication.
b. Name: Name of the medication.
c. Details: Description of the medication.

Staff:

a. StaffID (PK): Unique identifier for each staff.
b. DepartmentID (FK): Links to DepartmentID in the Department entity.
c. FullName: Full name of the staff.
d. ContactNumber：Phone number of staff

Entity	Attribute	Key (PK/FK)	Description	Data Type
Patient	PatientID	PK	Unique identifier for each patient	INTEGER
	Name		Full name of the patient	VARCHAR(100)
	DOB		Date of birth of the patient	DATE
	Gender		Gender of the patient	CHAR(1)
	ContactNumber		Phone number of the patient	VARCHAR(15)
	EmailAddress		Patient's email address	VARCHAR(100)
Visitor	VisitorID	PK	Unique identifier for each visitor	INTEGER
	PatientID	FK	Foreign key referencing PatientID	INTEGER
	Relationship		Relationship of the visitor to the patient	VARCHAR(50)
Appointment	AppointmentID	PK	Unique identifier for each appointment	INTEGER
	PatientID	FK	Foreign key referencing PatientID	INTEGER
	DoctorID	FK	Foreign key referencing DoctorID	INTEGER

Entity	Attribute	Key (PK/FK)	Description	Data Type
	DateTime		Date and time of the appointment	TIMESTAMP
	Status		Status of the appointment	VARCHAR(20)
Doctor	DoctorID	PK	Unique identifier for each doctor	INTEGER
	Name		Full name of the doctor	VARCHAR(100)
	Specialization		Area of expertise	VARCHAR(100)
Treatment	TreatmentID	PK	Unique identifier for each treatment	INTEGER
	PatientID	FK	Foreign key referencing PatientID	INTEGER
	DoctorID	FK	Foreign key referencing DoctorID	INTEGER
	Details		Description of the treatment provided	TEXT
Bill	BillID	PK	Unique identifier for each bill	INTEGER
	PatientID	FK	Foreign key referencing PatientID	INTEGER
	Amount		Total amount charged	DECIMAL(10,2)
	PaymentStatus		Payment status (e.g., Paid, Pending)	VARCHAR(20)

Entity	Attribute	Key (PK/FK)	Description	Data Type
LabTest	LabTestID	PK	Unique identifier for each lab test	INTEGER
	PatientID	FK	Foreign key referencing PatientID	INTEGER
	DepartmentID	FK	Foreign key referencing DepartmentID	INTEGER
	TestName		Name of the lab test	VARCHAR(100)
	DateConducted		Date of the lab test	DATE
Department	DepartmentID	PK	Unique identifier for each department	INTEGER
	Name		Name of the department	VARCHAR(100)
	Location		Department location	VARCHAR(100)
Medication	MedicationID	PK	Unique identifier for each medication	INTEGER
	Name		Name of the medication	VARCHAR(100)
	Details		Description of the medication	TEXT
Staff	StaffID	PK	Unique identifier for each staff	INTEGER

Entity	Attribute	Key (PK/FK)	Description	Data Type
	DepartmentID	FK	Foreign key referencing DepartmentID	INTEGER
	FullName		Full name of the staff	VARCHAR(100)
	ContactNumber		Phone number of the staff	VARCHAR(15)
Nurse	NurseID	PK	Unique identifier for each nurse	INTEGER
	DepartmentID	FK	Foreign key referencing DepartmentID	INTEGER
	Name		Full name of the nurse	VARCHAR(100)