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Hospital Management System Database

Database Specification: Purpose, Business Problems Addressed, and Business Rules

Database Purpose: The purpose of this database is to maintain the data used to support an active hospital management system including creating, tracking, searching and reporting the data included in the database. The database includes data/ information about the patients – incoming and outgoing, their diagnosis, test results, room allocated, their appointment booking, payment information and insurance information. It also contains data on the doctor and medical staff in the hospital. Furthermore, it will also include data on the hospital inventory status. It will be used by administrative staff of the hospital to keep track of the doctor, medical staff and patient information

Business Problems Addressed:
- Allows admin staff to keep a track of daily activities to ensure efficiency in functioning of management system
- Helps doctor to view details about patients, medical staff assigned to them and the status of medical equipment required by them. Also maintains a transparency in the process of operation theatre/MRI room etc. booking thus reducing duplicate/dual room allocation issues
- Allows medical staff and doctors to correctly identify the patients allocated/scheduled for a surgery
- Provides records of billings and payments made by patients along with identifying source of payment – cash, cheque, insurance etc.
- Allows administrative staff to look upon staffing, inventory and room requirements thus ensuring/enabling smooth functioning

Business Rules
- Each patient must have one Patient ID
- Each patient will have an assigned Test ID value
- Each patient will have an Appointment ID value
- Each patient may have an insurance ID value
- Each in-patient will have a room assigned
- Each out-patient will have one appointment ID value
- Each patient will have one or more test values
- Each patient may have one diagnosis value
- Each doctor must have Doctor ID
- Each doctor will have one Type value
- Each doctor may have one or more medical staff assigned to him
- Each medical staff will have one Staff ID value
- Each medical staff will have a Type value
- Each medical staff will have one Doctor ID value

Design Requirements
- Use Crow's Foot Notation
- Specify the primary key fields in each table by specifying PK beside the fields
- Draw a line between the fields of each table to show the relationships between each table. This should be pointed directly to the fields in each table that are used to form the relationship
- Specify which table is on the many side of the relationship by placing a crow's feet symbol next to where the line ends.

Design Decisions

#	Entity Name	Why is Entity Included	How Entity is related to other Entities
1	Patient	This entity will store information regarding the patient who has been to the hospital. It will contain personal details about the patient such as Name, Age, Gender, Address, Contact name and email ID, emergency contact etc. The administrative staff can look up the details during discharge, surgery or mapping doctor and medical staff to the patient	The patient is one of the main entities in the database system. It is a human entity and is further broken down into Inpatient and Outpatient. Other details such as appointment details, test results, payment details and insurance details are also linked with patient entity
2	In Patient	This entity will store information regarding the patient admitted in the hospital. It will contain the ID of the patient and the room allocated to the patient	In patient is a sub part of the patient entity and is in direct connection with the room allocation entity as the patient admitted in the hospital will be allocated a room and both the entities together can be used to track the details of the patient
3	Outpatient	This entity will store information about the patient who has a consultation with doctor but is not admitted in the hospital. It is a sub part of the patient entity. The administrative staff can use this information to keep a track of the patients the hospital receives and store data for further visits/consultation	The Outpatient is again a human entity and will have association with appointment, doctor and medical staff. The details regarding his/her appointment will be linked with it.
4	Payment	This entity will contain information about the payment done by the patient – Inpatient and Outpatient. It will aid the administrative staff in determining the payment method and type and help patient if any discrepancy arises.	The payment entity will have a relation with the Patient and insurance entity and details about the payment status of an incoming or outgoing patient can be pulled up along with his/her insurance details
5	Appointment	This entity contains information about the appointment details of the Out-patient such as his/her appointment time, date and ID. This helps the hospital management to generate efficiency in the booking system	Appointment bookings will be directly related Out-patient. It will also be linked directly to the Doctor entity to determine the doctor-patient appointment details
6	Insurance	The details of a patient's insurance records (if any) will be stored in this entity. The administrative staff can determine and take further action if a patient has an insurance claim and verify and maintain details about the same	Insurance details will be directly linked to the Patient entity. The Insurance ID may contain the insurance number of an individual or have null values if he/she doesn't have an insurance. It will also be directly connected to the payment entity so as to maintain increased visibility and ensure efficient tracking

7	Inventory	This entity will collect all the information about the medical equipment required by the medical staff and also the current status of the same such as – In stock, out of stock, order placed, delivery completed etc.	This entity will be connected to the medical staff and doctors so that they can request or track a certain medical equipment that is needed for a surgery or any medical condition
8	Doctor	This entity will store information on the Doctor's Type, Gender, Contact details. The administrative can look up the patients and hospital staff assigned to a doctor.	The doctor is one of the main entities in the database system. It is a human entity and has direct associations with appointment and medical staff. The appointments with a particular doctor can be pulled up.
9	Medical Staff	This entity will store information on the Medical Staff's Type, Gender, Contact details. The hospital management can look up the doctor a medical staff is assigned to and his/her experience level.	Medical Staff is one of the 3 human entities in the database system. It has direct associations with the doctor entity and the stock management entity so as to track the inventory status.
10	Patient Rooms	This entity will store information on the room an admitted in-patient is occupying. Each room has an occupancy limit field and attributes such as type taking values of Premium, Economy and Luxury.	Patient Rooms have a direct association with In-patients. There can be searches made on the available rooms by looking for null values in this entity for patientID.
11	Test Results	This will store detailed information about the tests done by all patients such as their name, address, phone numbers, email ID, blood type, haemoglobin levels, RBC and WBC count and cholesterol levels. This will help the hospital form a diagnosis.	Test Results are related to all Patients and directly related to Diagnosis. This is a mandatory field for all patients. Searches can be performed to look for results with lower than threshold values to indicate abnormalities.
12	Diagnosis	This will store information on the diagnosis of all patients done so far. It will have patientID, Type (which will take values for diseases) and a result attribute which takes negative, positive and null values.	Diagnosis is directly related to Test Results and indirectly related to patients. All patients will have a diagnosis, it may be null for patients who are yet to be diagnosed or could not be diagnosed with any ailment. Searches on this can help the hospital group patients with similar diagnosis.
13	Stock Management	This entity contains the details from the Inventory entity about the equipment and the staff that has raised a request for the equipment or possesses that equipment	It acts as a bridge between the Inventory entity and Medical staff entity to ensure proper tracking of the equipment by medical staff
14	Operating Suites	The operating suites give information on all available Operation Theatres, Consulting Rooms and Emergency rooms. Each suite will have an ID, one of the above types and a field which will indicate if it is currently booked or not.	This field was pulled up as a separate entity keeping in mind the specific business use case of a hospital which needs information of all available operating suites at any given time in order to cater to emergencies. It is directly related to patient rooms.

Entity Relationship Diagram

Insurance
- PK InsuranceID
- InsuranceType
- Company
- Cover

Payment
- PK paymentID
- FK InsuranceID
- PaymentType
- PaymentMethod
- PaymentStatus

TestResult
- PK TestID
- FK PatientID
- BloodType
- Haemoglobin
- WBC
- RBC
- Cholestrol
- FK DiagnosisID

Diagnosis
- PK DiagnosisID
- DiagnosisType
- Result

Inventory
- PK EquipmentID
- InventoryStatus
- EquipmentName

Stock Management
- PK StockManagementID
- FK EquipmentID
- FK StaffID

Patient
- PK PatientID
- name
- Date of Birth
- Age
- gender
- address
- City
- State
- Country
- Zipcode
- EmergencyContact
- FK appointmentID
- FK InsuraceID

Medical Staff
- PK StaffID
- Name
- Date of Birth
- Age
- Gender
- Address
- City
- State
- Country
- Zip Code
- FK DoctorID

In-Patient
- PK PatientID
- FK Room_No
- Date_adm
- Date_dis

SuperClass^^

Out-Patient
- PK PatientID
- Date

Appointment
- PK AppointmentID
- FK PatientID
- FK DoctorID
- Timefrom
- Timeto
- Date

Doctor
- PK DoctorID
- Name
- Date of Birth
- Age
- Gender
- Address
- City
- State
- ZipCode
- Country
- Specialization

PatientRoom
- PK RoomID
- RoomType
- PatientRoomStatus

OperationSuite
- PK OperationSuiteID
- Type
- Status
- FK RoomID