**Hospital Administrator’s Database Design Document**

**Version 1.0 Revision 12**

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**Version History**

|  |  |
| --- | --- |
| Version | Description |
| 1.0 rev 10 | Released draft of ERD and EERD with regards to requirements. |
| 1.0 rev 11 | Summary of changes:   1. Added screen capture of RS diagram. 2. Edited entities w/ nested attributes, ERD, and EERD for consistence |
| 1.0 rev 12 | Summary of changes:   1. Created data dictionary from the RS diagram to ensure consistency 2. Fixed typos in DBDD and formatting |

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**Purpose**

The purpose of this Database Design (DBDD) is to keep track of everything that happens in the hospital from patients, nurses, doctors, wards, and medical treatments. Hospitals require an efficient logistical system that will ensure patients’ health and treatment is at the highest standard, therefore it requires an organized record keeping in a database.

**Narrative**

A hospital is developing a database to manage nurse assignments, the hospitals wards with corresponding beds, patient information and care, doctor duties of admitting and treating patients, items and treatments performed, if necessary.

Each nurse is uniquely identified by a Nurse ID and their name, address, phone number, alternate phone number, email address, and medical specialties are recorded. A nurse may supervise one or more other nurses, but no nurse is supervised by more than one nurse. Some nurses may not have supervisory responsibilities.

Each hospital ward is identified by a Ward ID and includes a descriptive name, physical location, and phone number. Each ward has at least one assigned nurse, and nurses can be assigned to multiple wards, with assignments tracked by date and hours worked per ward. Each ward has a designated charge nurse, responsible for medical records, and a nurse can only be a charge nurse for one ward.

Each bed is identified by a Bed ID and has a size (small, large, extra-large) and type (electric or manual). The default is large and manual. Beds are assigned to specific hospital wards. Patients are assigned to beds upon admission, with only one patient per bed at a time. Bed availability is not constant.

Patient data includes a Patient ID, name, gender, date of birth, address, phone number, alternate phone number, and email address. The system records the patient's admission date, admitting doctor (Doctor ID), discharge date, and discharging doctor.

Each doctor is identified by a Doctor’s ID and their name, address, phone number, alternate phone number, email address, and medical specialties are recorded. Doctors may admit and/or treat patients.

Treatments are identified by a Treatment ID and include a name, description, and charge. The system tracks the date and time of each treatment administration, the treating doctor (Doctor ID), and the results. A patient may receive multiple treatments from one or more doctors, or no treatments. Some treatments may be inactive (or not yet administered).

Items used by patients during their stay are tracked by Item ID, name, and charge. The system records which items are charged to which patients, including the date and quantity. All patients incur charges for consumable items. Item usage frequency varies.

Nurse-patient interactions are recorded as events, each with a unique Event ID and a type (wellness check, medication, food service, assistance, treatment administration, or other). The system records the date and time of the event, the nurse (Nurse ID), and the patient (Patient ID). Patients typically interact with multiple nurses during their stay, and nurses may interact with the same patient multiple times.

**Requirements (Actors and Roles**

Nurses: Nurse’s work in a ward and some nurses are in charge.

Wards: Ward that is located within the hospital is assigned by a nurse and has patient’s beds.

Beds: Beds are in each ward and are used by one patient at a time.

Patients: Patients arrive at a hospital to be treated for a medical condition.

Doctors: Doctors admit and treat patients.

Item: Items that are used by the patient.

Treatment: Treatments are the type of treatments that the hospital doctors provide.

**Entities**

* Nurse
* Ward
* Bed
* Patient
* Doctor
* Item
* Treatment

**Entities w/ Nested Attributes**

* Nurse
  + NurseID
  + Name (first, last)
  + Address (street, city, state, zip)
  + Phone
  + AltPhone
  + Email
  + {Certifications}
* Ward
  + WardID
  + WardName
  + Location
  + Phone
* Bed
  + BedID
  + Size
  + Type
  + WardID
* Patient
  + PatientID
  + Name (first, last)
  + Gender
  + DateOfBirth [age]
  + Address (street, city, state, zip)
  + Phone
  + AltPhone
  + Email
  + BedNo
* Doctor
  + DoctorID
  + Name (first, last)
  + Address (street, city, state, zip)
  + Phone
  + AltPhone
  + Email
  + {Specialty}
* Item
  + ItemID
  + ItemName
  + Charge
* Treatment
  + TreatmentID
  + TreatmentName
  + Descrip
  + Charge

**Business Rules**

Nurse: Charge nurses are assigned one or more nurses. A nurse can only be supervised by one charge nurse, some nurses are unsupervised.

Ward: Each ward has no more than one charge nurse, and one nurse assigned.

Bed: Beds are in each specific ward and used by one patient at a time, when available.

Patient: When admitted, patient is assigned an available bed. Patient’s Information is recorded.

Doctor: Doctors can admit patients and treat patients, or both.

Item: Items charged for patient use.

Treatment: Treatments are tracked by name, description, cost, time, and doctor. Patients can receive no treatments or multiple treatments, by one or more doctors.

**ERD**

**A screenshot of a computer

AI-generated content may be incorrect.**

**EERD**

**A computer screen shot of a diagram

AI-generated content may be incorrect.**

**RS**

**A computer screen shot of a diagram

AI-generated content may be incorrect.**

**Data Dictionary**

**Table:** Certification

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Description** | **Data Type** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **Allow Nulls** | **Index** |
| CertID | **PK** for certifications. | int |  | Y |  |  |  |  |  | Y |
| Certification | Nurse’s certification | nvarchar | 50 |  |  |  |  |  |  | Y |

**Table:** NurseCert

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Description** | **Data Type** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **Allow Nulls** | **Index** |
| NurseID | **CPK; FK** track certifications, reference Cert table | nvarchar | 50 |  |  |  |  |  |  | Y |
| CertID | **CPK; FK** track nurses, reference Cert table | int |  |  |  |  |  |  |  | Y |

**Table:** Nurse

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Description** | **Data Type** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **Allow Nulls** | **Index** |
| NurseID | **PK**; Unique sequential nurse ID number | int |  | Y |  |  |  |  |  | Y |
| FirstName | First name of the nurse | nvarchar | 20 |  |  |  |  |  |  |  |
| LastName | Last name of the nurse | nvarchar | 20 |  |  |  |  |  |  |  |
| Street | Street of the nurse | nvarchar | 30 |  |  |  |  |  |  |  |
| City | City of the nurse | nvarchar | 30 |  |  |  |  |  |  |  |
| State | State of the nurse | char | 2 |  |  |  |  | LIKE ‘[A-Z] [A-Z]’ |  |  |
| Zip | Zip code of the nurse | nvarchar | 5 |  |  |  |  | LIKE ‘[0-9] [0-9] [0-9] [0-9]’ |  |  |
| Phone | Phone number of the nurse | nvarchar | 14 |  |  |  | Phone Rule |  |  |  |
| AltPhone | Alternative phone number of nurse | nvarchar | 14 |  |  |  | Phone Rule |  |  |  |
| Email | Email address of the nurse | nvarchar | 20 |  |  |  |  |  |  |  |
| ChargeNurseNo | Recursive **FK**; Synonym for NurseID; One nurse supervises another nurse | int |  |  |  |  |  |  | Y |  |

**Table:** Care

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Description** | **Data Type** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **Allow Nulls** | **Index** |
| CareID | **PK**; Unique sequential care ID number | int |  | Y |  |  |  |  |  | Y |
| Event | Event type of the care | nvarchar |  |  |  |  |  |  |  |  |
| Date | Date of the care | date |  |  |  |  |  |  |  |  |
| PatientID | **FK** to the Patient table | int |  |  |  |  |  |  |  |  |
| NurseID | **FK** to the Nurse table | int |  |  |  |  |  |  |  |  |

**Table:** NurseAssignment

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Description** | **Data Type** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **Allow Nulls** | **Index** |
| AssignmentID | **PK**; Unique sequential nurse ID number | int |  | Y |  |  |  |  |  | Y |
| Hours | Number of hours the nurse works on assignment | decimal | (4,2) |  |  |  |  |  |  |  |
| Date | Date of the nurse assignment | date |  |  |  |  |  |  |  |  |
| NurseID | **FK** to Nurse table | int |  |  |  |  |  |  |  |  |
| WardID | **FK** to Ward table | int |  |  |  |  |  |  |  |  |

**Table:** Ward

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Description** | **Data Type** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **Allow Nulls** | **Index** |
| WardID | **PK**; Unique ward ID number | int |  | Y |  |  |  |  |  | Y |
| Location | Location of the ward | nvarchar | 20 |  |  |  |  |  |  |  |
| Phone | Phone number of the ward | nvarchar | 14 |  |  |  | Phone Rule |  |  |  |
| ChargeNurse | **FK** to Nurse table; Synonym for NurseID; One nurse charge of a ward | int |  |  |  |  |  |  |  |  |

**Table:** Bed

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Description** | **Data Type** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **Allow Nulls** | **Index** |
| BedID | **PK**; Unique bed ID number | int |  | Y |  |  |  |  |  | Y |
| Size | Size of the bed | char | 2 |  |  | ‘L’ |  | LIKE ‘S’ OR ‘M’ or ‘L’ OR ‘XL’ |  |  |
| Type | Type of bed | char | 1 |  |  | ‘M’ |  | LIKE ‘E’ or ‘M’ |  |  |
| Availability | Availability of the bed | char | 1 |  |  | ‘O’ |  | LIKE ‘O’ OR ‘A’ |  |  |
| WardID | **FK** to Ward table | int |  |  |  |  |  |  |  |  |

**Table:** Patient

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Description** | **Data Type** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **Allow Nulls** | **Index** |
| PatientD | **PK**; Unique sequential patient ID number | int |  | Y |  |  |  |  |  | Y |
| FirstName | First name of the patient | nvarchar | 20 |  |  |  |  |  |  |  |
| LastName | Last name of the patient | nvarchar | 20 |  |  |  |  |  |  |  |
| Gender | Gender of the patient | char | 2 |  |  |  |  | LIKE ‘M’ OR ‘F’ OR ‘NA’ |  |  |
| DOB | Date of birth of the patient | date |  |  |  |  |  |  |  |  |
| [Age] | Calculated age of the patient | computed |  |  |  |  |  |  |  |  |
| Street | Street of the patient | nvarchar | 30 |  |  |  |  |  |  |  |
| City | City of the patient | nvarchar | 30 |  |  |  |  |  |  |  |
| State | State of the patient | char | 2 |  |  |  |  | LIKE ‘[A-Z] [A-Z]’ |  |  |
| Zip | Zip code of the patient | char | 5 |  |  |  |  | LIKE ‘[0-9] [0-9] [0-9] [0-9]’ |  |  |
| Phone | Phone number of the patient | nvarchar | 14 |  |  |  | Phone Rule |  | Y |  |
| AltPhone | Alternative phone number of the patient | nvarchar | 14 |  |  |  | Phone Rule |  |  |  |
| Email | Email address of the patient | nvarchar | 20 |  |  |  |  |  |  |  |
| BedNo | **FK** to Bed table | int |  |  |  |  |  |  |  | Y |

**Table:** ItemCharge

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Description** | **Data Type** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **Allow Nulls** | **Index** |
| ChargeID | **PK**; Unique sequential charge ID number | int |  | Y |  |  |  |  |  | Y |
| Date | Date of item charge | date |  |  |  |  |  |  |  |  |
| Quantity | Quantity of items | int |  |  |  |  |  |  |  |  |
| PatientNo | **FK** to Patient table | int |  |  |  |  |  |  |  |  |
| ItemNo | **FK** to Item table | Int |  |  |  |  |  |  |  |  |

**Table:** Item

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Description** | **Data Type** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **Allow Nulls** | **Index** |
| ItemID | **PK**; Unique item ID number | int |  | Y |  |  |  |  |  | Y |
| ItemName | Description of the item name | nvarchar | 30 |  | Y |  |  |  |  |  |
| Charge | Cost of Item in money | Money |  |  |  |  |  |  |  |  |

**Table:** AdmitDischarge

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Description** | **Data Type** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **Allow Nulls** | **Index** |
| AdmitID | **PK**; Unique sequential admin ID number | int |  | Y |  |  |  |  |  | Y |
| AdmitDate | Date the patient is admitted | date |  |  |  |  |  |  |  |  |
| DischargeDate | Date the patient is discharged | date |  |  |  |  |  |  |  |  |
| PatientNo | **FK** to Patient table | int |  |  |  |  |  |  |  |  |
| AdmitDoc | **FK** to Doctor table; Synonym for DoctorID | int |  |  |  |  |  |  |  |  |
| DischargeDoc | **FK** to Doctor table; Synonym for DoctorID | int |  |  |  |  |  |  |  |  |

**Table:** Doctor

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Description** | **Data Type** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **Allow Nulls** | **Index** |
| DoctorID | **PK**; Unique sequential doctor ID number | int |  | Y |  |  |  |  |  | Y |
| FirstName | First name of the doctor | nvarchar | 20 |  |  |  |  |  |  |  |
| LastName | Last name of the doctor | nvarchar | 20 |  |  |  |  |  |  |  |
| Street | Street of the doctor | nvarchar | 30 |  |  |  |  |  |  |  |
| City | City of the doctor | nvarchar | 30 |  |  |  |  |  |  |  |
| State | State of the doctor | char | 2 |  |  |  |  | LIKE ‘[A-Z] [A-Z]’ |  |  |
| Zip | Zip code of the doctor | nvarchar | 5 |  |  |  |  | LIKE ‘[0-9] [0-9] [0-9] [0-9]’ |  |  |
| Phone | Phone number of the doctor | nvarchar | 14 |  |  |  | Phone Rule |  |  |  |
| AltPhone | Alternative phone number of the doctor | nvarchar | 14 |  |  |  | Phone Rule |  |  |  |
| Email | Email address of the doctor | nvarchar | 20 |  |  |  |  |  |  |  |

**Table:** DoctorSpecialty

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Description** | **Data Type** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **Allow Nulls** | **Index** |
| DoctorID | **PK**; Unique sequential employee ID number | int |  | Y |  |  |  |  |  | Y |
| SpecialtyID |  | nvarchar | 15 |  |  |  |  |  |  |  |

**Table:** Specialty

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Description** | **Data Type** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **Allow Nulls** | **Index** |
| SpecialityID | **PK**; Unique specialty ID number | int |  | Y |  |  |  |  |  | Y |
| Specialty | Doctor’s specialties | nvarchar | 50 |  |  |  |  |  |  |  |

**Table:** TreatmentAdministration

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Description** | **Data Type** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **Allow Nulls** | **Index** |
| PatientNo | **CPK; FK**; Unique patient ID number; reference Patient table | int |  | Y |  |  |  |  |  | Y |
| Date |  | date |  |  |  |  |  |  |  |  |
| Time |  | time |  |  |  |  |  |  |  |  |
| Results |  | nvarchar | 30 |  |  |  |  |  |  |  |
| DoctorID | **FK** to Doctor table | int |  |  |  |  |  |  |  |  |
| TreatmentID | **FK** to Treatment table | int |  |  |  |  |  |  |  |  |

**Table:** Treatment

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Description** | **Data Type** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **Allow Nulls** | **Index** |
| TreatmentID | **PK**; Unique treatment ID number | int |  | Y |  |  |  |  |  | Y |
| TreatmentName | Name of the treatment | nvarchar | 30 |  |  |  |  |  |  |  |
| Descrip | Description of the treatment | nvarchar | 30 |  |  |  |  |  |  |  |
| Charge | Charge of the treatment | nvarchar | 20 |  |  |  |  |  |  |  |

**Table:** NursePatient

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Description** | **Data Type** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **Allow Nulls** | **Index** |
| EventID | **PK**; Unique sequential patient event ID number | int |  | Y |  |  |  |  |  | Y |
| EventType | Type of the nurse patient event | type | 3 |  |  |  |  | LIKE ‘WC’ OR ‘MED’ OR ‘FS’ OR ‘AST’ OR ‘OTH’ |  |  |
| Date | Date of the nurse patient event | date |  |  |  |  |  |  |  |  |
| Time | Time of the nurse patient event | time |  |  |  |  |  |  |  |  |
| PatientID | **FK** to Patient table | int |  |  |  |  |  |  |  |  |
| NurseID | **FK** to Nurse table | int |  |  |  |  |  |  |  |  |