**Hospital Administrator’s Database Design Document**

# **DDL Exercise: Build Tables with Constraints**

**Version 2.0**

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**1.Data Dictionary**

**1. Nurse**

| **Attribute** | **Data Type** | **Description** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **Allow Nulls** | **Index** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NurseID | INT | **Primary Key,** unique identifier for each nurse |  | Y |  |  |  |  |  | Y |
| FirstName | VARCHAR(50) | Nurse's first name | 50 |  |  |  |  |  |  |  |
| LastName | VARCHAR(50) | Nurse's last name | 50 |  |  |  |  |  |  |  |
| Address | VARCHAR(255) | Nurse's address | 255 |  |  |  |  |  |  |  |
| Phone | VARCHAR(15) | Nurse's primary phone number | 15 |  |  |  |  |  |  |  |
| AlternatePhone | VARCHAR(15) | Nurse's alternate phone number | 15 |  |  |  |  |  |  |  |
| Email | VARCHAR(100) | Nurse's email address | 100 |  |  |  |  |  |  |  |
| Specialty | VARCHAR(100) | Medical specialties the nurse is certified in | 100 |  |  |  |  |  |  |  |
| SupervisorID | INT | **Foreign Key** referencing Nurse(NurseID) (supervisor) |  |  |  |  |  |  | Y |  |

**2. Ward**

| **Attribute** | **Data Type** | **Description** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **Allow nulls** | **Index** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| WardID | INT | **Primary Key**, unique identifier for each ward |  | Y |  |  |  |  |  | Y |
| WardNumber | VARCHAR(10) | Designated number of the ward | 10 |  |  |  |  |  |  |  |
| WardName | VARCHAR(100) | Descriptive name of the ward | 100 |  |  |  |  |  |  |  |
| Location | VARCHAR(255) | Physical location of the ward | 255 |  |  |  |  |  |  |  |
| PhoneNumber | VARCHAR(15) | Phone number for the ward | 15 |  |  |  |  |  |  |  |
| ChargeNurseID | INT | **Foreign Key** referencing Nurse(NurseID) (charge nurse) |  |  |  |  |  |  |  |  |

**3. Bed**

| **Attribute** | **Data Type** | **Description** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **AllowNulls** | **Index** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| BedID | INT | **Primary Key,** unique identifier for each bed |  | Y |  |  |  |  |  | Y |
| WardID | INT | **Foreign Key** referencing Ward(WardID) |  |  |  |  |  |  |  |  |
| Size | CHAR(2) | Size of the bed (S, L, XL) | 2 |  |  | L |  | [Size] = (‘S’) OR [Size] = (‘L’) OR [Size] = (‘XL’) |  |  |
| Type | CHAR(1) | Type of bed (E for electric, M for manual) | 1 |  |  | M |  | [Type] = (‘E’) OR [Type] = (‘M’) |  |  |
| Availability | CHAR(1) | Availability status (O for occupied, A for available) | 1 |  |  |  |  |  |  |  |

**4. Patient**

| **Attribute** | **Data Type** | **Description** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **AllowNulls** | **Index** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PatientID | INT | **Primary Key,** unique identifier for each patient |  | Y |  |  |  |  |  | Y |
| FirstName | VARCHAR(50) | Patient's first name | 50 |  |  |  |  |  |  |  |
| LastName | VARCHAR(50) | Patient's last name | 50 |  |  |  |  |  |  |  |
| Gender | CHAR(1) | Patient's gender | 1 |  |  |  |  | [Gender] = (‘M’) OR [Gender] = (‘F’) |  |  |
| DOB | DATE | Patient's date of birth |  |  |  |  |  |  |  |  |
| Address | VARCHAR(255) | Patient's address | 255 |  |  |  |  |  |  |  |
| Phone | VARCHAR(15) | Patient's primary phone number | 15 |  |  |  |  |  |  |  |
| AlternatePhone | VARCHAR(15) | Patient's alternate phone number | 15 |  |  |  |  |  |  |  |
| Email | VARCHAR(100) | Patient's email address | 100 |  |  |  |  |  |  |  |
| Age | INT | Calculated age of the patient |  |  |  |  |  |  | Y |  |
| AdmitDate | DATE | Date of admission |  |  |  |  |  |  |  |  |
| AdmitDoctorID | INT | **Foreign Key** referencing Doctor(DoctorID) |  |  |  |  |  |  |  |  |
| DischargeDate | DATE | Date of discharge |  |  |  |  |  |  |  |  |
| DischargeDoctorID | INT | **Foreign Key** referencing Doctor(DoctorID) |  |  |  |  |  |  |  |  |

**5. Doctor**

| **Attribute** | **Data Type** | **Description** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **AllowNulls** | **Index** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DoctorID | INT | **Primary Key,** unique identifier for each doctor |  | Y |  |  |  |  |  | Y |
| FirstName | VARCHAR(50) | Doctor's first name | 50 |  |  |  |  |  |  |  |
| LastName | VARCHAR(50) | Doctor's last name | 50 |  |  |  |  |  |  |  |
| Address | VARCHAR(255) | Doctor's address | 255 |  |  |  |  |  |  |  |
| Phone | VARCHAR(15) | Doctor's primary phone number | 15 |  |  |  |  |  |  |  |
| AlternatePhone | VARCHAR(15) | Doctor's alternate phone number | 15 |  |  |  |  |  |  |  |
| Email | VARCHAR(100) | Doctor's email address | 100 |  |  |  |  |  |  |  |
| Specialty | VARCHAR(100) | Medical specialties the doctor is certified in | 100 |  |  |  |  |  |  |  |

**6. Treatment**

| **Attribute** | **Data Type** | **Description** | **Size** | **identity** | **Unique** | **Default** | **Rule** | **Check** | **AllowNulls** | **Index** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TreatmentID | INT | **Primary Key**, unique identifier for each treatment |  | Y |  |  |  |  |  | Y |
| Name | VARCHAR(100) | Name of the treatment | 100 |  |  |  |  |  |  |  |
| Description | TEXT | Description of the treatment |  |  |  |  |  |  |  |  |
| Charge | DECIMAL(10, 2) | Charge for the treatment | 10,2 |  |  |  |  |  |  |  |
| AdministeredDate | DATE | Date the treatment was administered |  |  |  |  |  |  |  |  |
| AdministeredTime | TIME | Time the treatment was administered |  |  |  |  |  |  |  |  |
| Results | TEXT | Results of the treatment |  |  |  |  |  |  |  |  |
| PatientID | INT | **Foreign Key** referencing Patient(PatientID) |  |  |  |  |  |  |  |  |
| DoctorID | INT | **Foreign Key** referencing Doctor(DoctorID) |  |  |  |  |  |  |  |  |

**7. Charge Item**

| **Attribute** | **Data Type** | **Description** | **Size** | **Identiy** | **Unique** | **Default** | **Rule** | **Check** | **AllowNulls** | **Index** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ChargeItemID | INT | **Primary Key,** unique identifier for each charge item |  | **Y** |  |  |  |  |  | **Y** |
| ItemName | VARCHAR(100) | Name of the item charged | 100 |  |  |  |  |  |  |  |
| Charge | DECIMAL(10, 2) | Charge for the item | (10,2) |  |  |  |  |  |  |  |
| PatientID | INT | **Foreign Key** referencing Patient(PatientID) |  |  |  |  |  |  |  |  |
| Date | DATE | Date of the charge |  |  |  |  |  |  |  |  |
| Quantity | INT | Quantity of items charged |  |  |  |  |  |  |  |  |

**8. Nurse Patient Interaction**

| **Attribute** | **Data Type** | **Description** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **AllowNulls** | **Index** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| InteractionID | INT | **Primary Key**, unique identifier for each interaction |  | Y |  |  |  |  |  | Y |
| NurseID | INT | **Foreign Key** referencing Nurse(NurseID) |  |  |  |  |  |  |  |  |
| PatientID | INT | **Foreign Key** referencing Patient(PatientID) |  |  |  |  |  |  |  |  |
| InteractionType | VARCHAR(50) | Type of interaction (e.g., Wellness Check) | 50 |  |  |  |  |  |  |  |
| Date | DATE | Date of the interaction |  |  |  |  |  |  |  |  |
| Time | TIME | Time of the interaction |  |  |  |  |  |  |  |  |

**9. Nurse Assignment**

| **Attribute** | **Data Type** | **Description** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **AllowNulls** | **Index** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AssignmentID | INT | **Primary Key**, unique identifier for each assignment |  | Y |  |  |  |  |  | Y |
| NurseID | INT | **Foreign Key** referencing Nurse(NurseID) |  |  |  |  |  |  |  |  |
| WardID | INT | **Foreign Key** referencing Ward(WardID) |  |  |  |  |  |  |  |  |
| AssignmentDate | DATE | Date of assignment |  |  |  |  |  |  |  |  |
| HoursWorked | DECIMAL(5, 2) | Hours worked in the ward | (5,2) |  |  |  |  |  |  |  |

**10. Bed Assignment**

| **Attribute** | **Data Type** | **Description** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **AllowNulls** | **Index** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| BedAssignmentID | INT | **Primary Key**, unique identifier for each bed assignment |  | Y |  |  |  |  |  | Y |
| PatientID | INT | **Foreign Key** referencing Patient(PatientID) |  |  |  |  |  |  |  |  |
| BedID | INT | **Foreign Key** referencing Bed(BedID) |  |  |  |  |  |  |  |  |
| AssignmentDate | DATE | Date the bed was assigned |  |  |  |  |  |  |  |  |

**11. Patient Admission**

| **Attribute** | **Data Type** | **Description** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **AllowNulls** | **Index** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AdmissionID | INT | **Primary Key**, unique identifier for each admission |  | Y |  |  |  |  |  | Y |
| PatientID | INT | **Foreign Key** referencing Patient(PatientID) |  |  |  |  |  |  |  |  |
| AdmitDate | DATE | Date of admission |  |  |  |  |  |  |  |  |
| AdmitDoctorID | INT | **Foreign Key** referencing Doctor(DoctorID) |  |  |  |  |  |  |  |  |
| DischargeDate | DATE | Date of discharge |  |  |  |  |  |  |  |  |
| DischargeDoctorID | INT | **Foreign Key** referencing Doctor(DoctorID) |  |  |  |  |  |  |  |  |

**12. Treatment History**

| **Attribute** | **Data Type** | **Description** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **AllowNulls** | **Index** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TreatmentHistoryID | INT | **Primary Key,** unique identifier for each treatment record |  | Y |  |  |  |  |  | Y |
| PatientID | INT | **Foreign Key** referencing Patient(PatientID) |  |  |  |  |  |  |  |  |
| TreatmentID | INT | **Foreign Key** referencing Treatment(TreatmentID) |  |  |  |  |  |  |  |  |
| AdministeredDate | DATE | Date the treatment was administered |  |  |  |  |  |  |  |  |
| AdministeredTime | TIME | Time the treatment was administered |  |  |  |  |  |  |  |  |
| Results | TEXT | Results of the treatment |  |  |  |  |  |  |  |  |

**13. Item Charge History**

| **Attribute** | **Data Type** | **Description** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **AllowNulls** | **Index** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ItemChargeID | INT | **Primary Key,** unique identifier for each item charge record |  | Y |  |  |  |  |  | Y |
| ChargeItemID | INT | **Foreign Key** referencing ChargeItem(ChargeItemID) |  |  |  |  |  |  |  |  |
| PatientID | INT | **Foreign Key** referencing Patient(PatientID) |  |  |  |  |  |  |  |  |
| Date | DATE | Date the item was charged |  |  |  |  |  |  |  |  |
| Quantity | INT | Quantity of items charged |  |  |  |  |  |  |  |  |

**14. Ward Staffing History**

| **Attribute** | **Data Type** | **Description** | **Size** | **Identity** | **Unique** | **Default** | **Rule** | **Check** | **AllowNulls** | **Index** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| StaffingHistoryID | INT | **Primary Key,** unique identifier for each staffing record |  | Y |  |  |  |  |  | Y |
| WardID | INT | **Foreign Key** referencing Ward(WardID) |  |  |  |  |  |  |  |  |
| NurseID | INT | **Foreign Key** referencing Nurse(NurseID) |  |  |  |  |  |  |  |  |
| StartDate | DATE | Start date of the staffing |  |  |  |  |  |  |  |  |
| EndDate | DATE | End date of the staffing |  |  |  |  |  |  |  |  |

**2.Database Diagram (shows all tables and PK-FK connections).**

A computer screen shot of a computer

Description automatically generated

**3.All tables with checks, defaults, calc columns, PK-FK relationships**

A screenshot of a computer program

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**4.Screen Capture of Navigation Panel with Bed Table Expanded to Show CKs and DFs, and the Patient Table Expanded to show Calculated Age Column.**

A screenshot of a computer program

Description automatically generatedA screenshot of a computer

Description automatically generated

**MDF and LDF (database name shall be Hospital\_YourFirstInitialLastInitial)**

Attached Separately

**Queries :**

-- 1. Create Doctor Table (Referenced by Patient and Bed)

CREATE TABLE [dbo].[Doctor] (

DoctorID INT IDENTITY(1,1) PRIMARY KEY,

FirstName NVARCHAR(50) NOT NULL,

LastName NVARCHAR(50) NOT NULL,

Specialization NVARCHAR(100)

);

-- 2. Create Treatment Table (Referenced by Patient)

CREATE TABLE [dbo].[Treatment] (

TreatmentType NVARCHAR(50) PRIMARY KEY,

Description NVARCHAR(255)

);

-- 3. Create Ward Table (Referenced by Nurse and Bed)

CREATE TABLE [dbo].[Ward] (

WardID INT IDENTITY(1,1) PRIMARY KEY,

WardName NVARCHAR(50),

FloorNo INT CHECK (FloorNo BETWEEN 1 AND 10) -- CK: Floor must be between 1 and 10

);

-- 4. Create Nurse Table (Referenced by Bed)

CREATE TABLE [dbo].[Nurse] (

NurseID INT IDENTITY(1,1) PRIMARY KEY,

FirstName NVARCHAR(50) NOT NULL,

LastName NVARCHAR(50) NOT NULL,

WardID INT, -- FK to Ward

CONSTRAINT FK\_Nurse\_Ward FOREIGN KEY (WardID) REFERENCES [dbo].[Ward](WardID)

);

-- 5. Create Bed Table (Foreign keys to Doctor, Nurse, Ward)

CREATE TABLE [dbo].[Bed] (

BedID INT IDENTITY(1,1) PRIMARY KEY,

DoctorID INT, -- FK to Doctor

NurseID INT, -- FK to Nurse

Availability CHAR(1) DEFAULT 'Y' CHECK (Availability IN ('Y', 'N')), -- DF: Default to 'Y', CK: Only 'Y' or 'N'

Type NVARCHAR(20) CHECK (Type IN ('General', 'ICU', 'Private')), -- CK: Allowed bed types

Size NVARCHAR(10) CHECK (Size IN ('Small', 'Medium', 'Large')), -- CK: Bed size options

WardID INT, -- FK to Ward

CONSTRAINT FK\_Bed\_Doctor FOREIGN KEY (DoctorID) REFERENCES [dbo].[Doctor](DoctorID),

CONSTRAINT FK\_Bed\_Nurse FOREIGN KEY (NurseID) REFERENCES [dbo].[Nurse](NurseID),

CONSTRAINT FK\_Bed\_Ward FOREIGN KEY (WardID) REFERENCES [dbo].[Ward](WardID)

);

-- 6. Create Patient Table (Foreign keys to Doctor and Treatment)

CREATE TABLE [dbo].[Patient] (

PatientID INT IDENTITY(1,1) PRIMARY KEY,

FirstName NVARCHAR(50) NOT NULL,

LastName NVARCHAR(50) NOT NULL,

Gender CHAR(1) CHECK (Gender IN ('M', 'F')), -- CK: Gender can only be 'M' or 'F'

DoctorID INT, -- FK to Doctor

AdmitDate DATE DEFAULT GETDATE(), -- DF: Default Admit Date to current date

DOB DATE NOT NULL, -- Date of Birth

Age AS FLOOR(DATEDIFF(DAY, DOB, GETDATE()) / 365.25), -- Calculated Age

TreatmentType NVARCHAR(50), -- FK to Treatment

CONSTRAINT FK\_Patient\_Doctor FOREIGN KEY (DoctorID) REFERENCES [dbo].[Doctor](DoctorID),

CONSTRAINT FK\_Patient\_Treatment FOREIGN KEY (TreatmentType) REFERENCES [dbo].[Treatment](TreatmentType)

);

-- 7. Create Billing Table (Referenced by Patient)

CREATE TABLE [dbo].[Billing] (

BillID INT IDENTITY(1,1) PRIMARY KEY,

PatientID INT, -- FK to Patient

Amount DECIMAL(10,2) NOT NULL,

BillingDate DATE DEFAULT GETDATE(),

CONSTRAINT FK\_Billing\_Patient FOREIGN KEY (PatientID) REFERENCES [dbo].[Patient](PatientID)

);