ER Modelling Exercise – Hospital

Consider the following requirements for inpatients at a hospital: All patients admitted to the hospital are given a unique patient number. The patient's name, address, age, and sex are recorded. Private patients are allocated a private room, identified by the room number. Private rooms are of different types, e.g., standard, deluxe, palatial, etc. NHS patients are allocated a bed in a ward, beds being identified by the ward name and bed number. Wards are of different types, e.g., paediatric, cancer, etc, with a named sister in charge of each one. Each patient is allocated to a named consultant who supervises the medical care of the patient. The consultant decides on the treatments to be given to the patient. A treatment is any medical procedure performed on the patient. Each treatment is given a unique treatment number, and a description of the treatment and the date it is performed are recorded.

Design an E-R diagram for the above database. Derive a corresponding relational scheme from your E-R diagram. The E-R diagram must show attributes, keys, cardinalities, and constraints.

The relational scheme must be in third-normal form, with primary and foreign keys clearly indicated.

Entities and Attributes:

Patient:

PatientNumber (Primary Key)

Name

Address

Age

Sex

Type (Private or NHS)

Room (For private patients only):

RoomNumber (Primary Key)

Type (Standard, Deluxe, Palatial)

Ward (For NHS patients only):

WardName (Primary Key)

WardType (Paediatric, Cancer, etc.)

SisterInCharge

Bed (In each ward):

WardName (Foreign Key)

BedNumber (Primary Key in combination with WardName)

Consultant:

ConsultantID (Primary Key)

Name

Specialization

Treatment:

TreatmentNumber (Primary Key)

Description

Date

PatientNumber (Foreign Key)

ConsultantID (Foreign Key)

Relationships:

Patient is assigned to a consultant:

Cardinality: Each patient is assigned to one consultant, but each consultant can have multiple patients.

Type: 1-to-Many (One consultant, many patients)

Private Patient is allocated a Room:

Cardinality: A private patient is allocated to one room, and a room can be allocated to at most one patient at a time.

Type: 1-to-1 (One patient, one room)

NHS Patient is allocated a Bed:

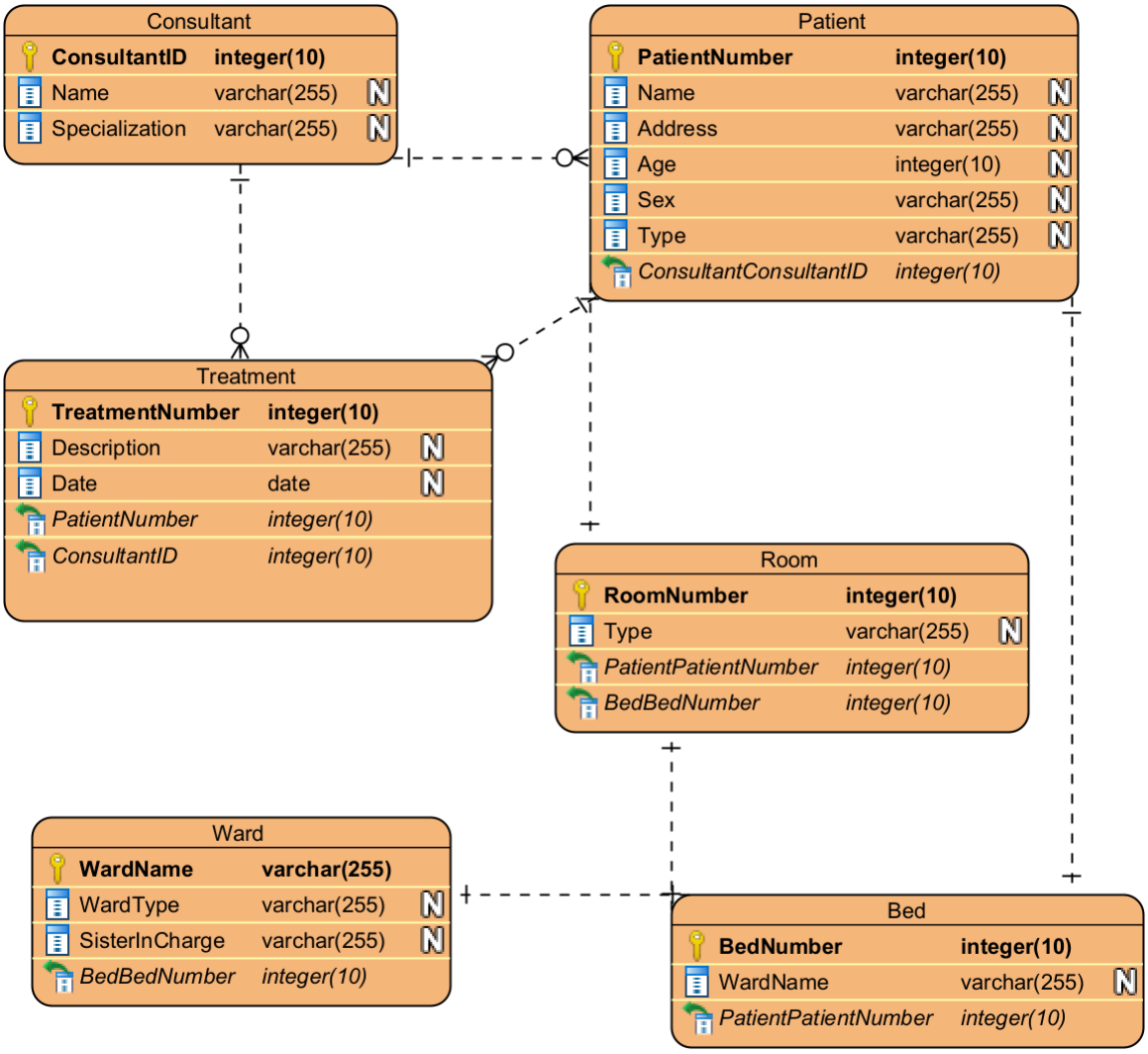
Cardinality: An NHS patient is assigned to one bed in a ward, and each bed can only be assigned to one patient at a time.

Type: 1-to-1 (One patient, one bed)

Each Treatment is given to a Patient and prescribed by a consultant:

Cardinality: A patient can receive many treatments, and each treatment is prescribed by a consultant.

Type: Many-to-1 for both Patient and Consultant (Many treatments for one patient and one consultant)


Consultant
ConsultantID integer(10)
Name varchar(255) N
Specialization varchar(255) N
Patient
PatientNumber integer(10)
Name varchar(255) N
Address varchar(255) N
Age integer(10) N
Sex varchar(255) N
Type varchar(255) N
ConsultantConsultantID integer(10)
Treatment
TreatmentNumber integer(10)
Description varchar(255) N
Date date N
PatientNumber integer(10)
ConsultantID integer(10)
Room
RoomNumber integer(10)
Type varchar(255) N
PatientPatientNumber integer(10)
BedBedNumber integer(10)
Ward
WardName varchar(255)
WardType varchar(255) N
SisterInCharge varchar(255) N
BedBedNumber integer(10)
Bed
BedNumber integer(10)
WardName varchar(255) N
PatientPatientNumber integer(10)