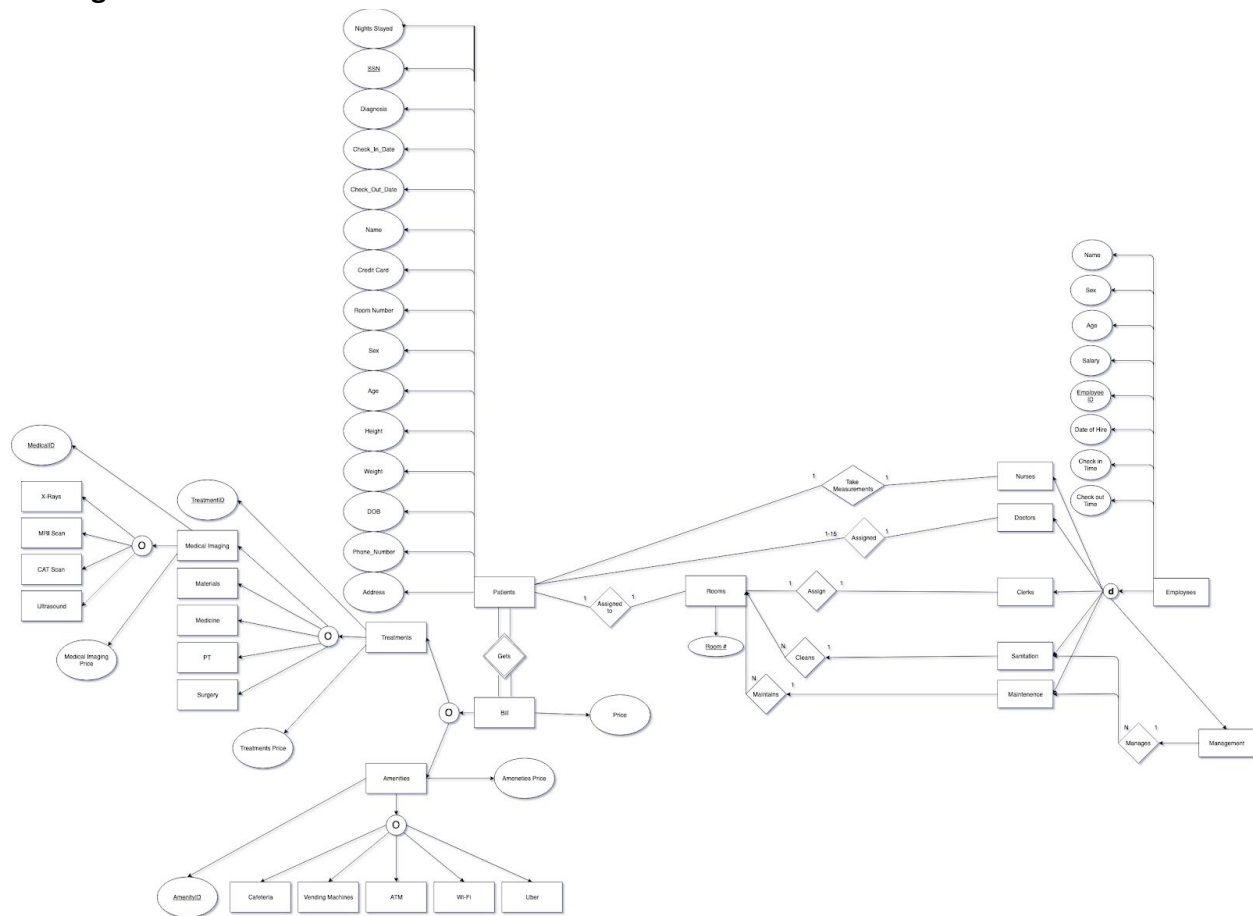**ER Diagram**

ER Dictionary
- Classes

  o   Class: Amenities
  Description: Different types of Amenities accessible to the patients
  Superclass: Bill
  Attributes: Amenities Price Integer, AmenityID integer
  Attribute Description: Price of Amenities, ID used to charge the patient with the amenity
  they got.

  o   Class: ATM
  Description: Money vending service for patients and employees
  Superclass: Amenities
  Attributes: N/A
  Attribute Description: N/A

  o   Class: Cafeteria
  Description: Place for employees and patients to buy food
  Superclass: Amenities

Attributes: N/A
Attribute Description: N/A

o   Class: CAT Scan
Description: A type of scanning that allows to see inside the body. More detailed than x-rays.
Superclass: Medical Imaging
Attributes: N/A
Attribute Description: N/A

o   Class: Clerks
Description: Responsible for assigning rooms to patients
Superclass: Employees
Attributes: N/A
Attribute Description: N/A

o   Class: Doctors
Description: Responsible for treating patients
Superclass: Employees
Attributes: N/A
Attribute Description: N/A

o   Class: Doctors
Description: Responsible for treating patients
Superclass: Employees
Attributes: N/A
Attribute Description: N/A

o   Class: Maintenance
Description: Make sure medical equipment is maintained
Superclass: Employees
Attributes: N/A
Attribute Description: N/A

o   Class: Management
Description: Manage other employees
Superclass: Employees
Attributes: N/A
Attribute Description: N/A

o   Class: Materials
Description: List of all materials that is used to treat the patients.
Superclass: Treatments
Attributes: N/A

Attribute Description: N/A

 o Class: Medical Imaging
Description: Technique and process of creating visual representation of the interior body
Superclass: Treatments
Attributes: MedicalID integer, Medical Imaging Price, integer
Attribute Description: MedicalID , used to find the type of medical imaging the patient received. Medical Imaging Price, used to find the price of medical imaging received by patient.

 o Class: Medicine
Description: Medicine that is given to the patients.
Superclass: Treatments
Attributes: N/A
Attribute Description: N/A

 o   Class: MRI Scan
Description: Used to diagnose patient using imaging technologies
Superclass: Medical Imaging
Attributes: N/A
Attribute Description: N/A

 o   Class: Nurses
Description: Record the height and weight of the patients
Superclass: Employees
Attributes: N/A
Attribute Description: N/A

 o Class: PT
Description: Physical Therapy given to the patients.
Superclass: Treatments
Attributes: N/A
Attribute Description: N/A

 o   Class: Sanitation
Description: Cleaning and sanitizing hospital environments
Superclass: Employees
Attributes: N/A
Attribute Description: N/A

 o Class: Surgery
Description: Surgery conducted on patients
Superclass: Treatments
Attributes: N/A

Attribute Description: N/A

    o   Class: Treatments
Description: Different types of treatments used to bill patient
Superclass: Bill
Attributes: TreatmentID Integer Primary Key, Treatments Price Integer
Attribute Description: TreatmentID , used to find the treatment the patient received.
        Treatments Price, used to find the price of the treatments the patient received.

    o   Class: Uber
Description: Drop-off service for patients
Superclass: Amenities
Attributes: N/A
Attribute Description: N/A

    o   Class: UltraSound
Description: Used to diagnose patient using imaging technologies
Superclass: Medical Imaging
Attributes: N/A
Attribute Description: N/A

    o   Class: Vending Machines
Description: Dispenses food for patients and employees
Superclass: Amenities
Attributes: N/A
Attribute Description: N/A

    o   Class: Wi-Fi
Description: Internet service for patients and employees
Superclass: Amenities
Attributes: N/A
Attribute Description: N/A

    o   Class: X-Rays
Description: Used to diagnose patient using imaging technologies
Superclass: Medical Imaging
Attributes: N/A
Attribute Description: N/A

- Entities

    o   Entity: Bill
Description: A monetary charge assigned to a patient by the hospital

Primary Key: N/A

Attributes: Amenities, Varchar[], Treatments, Varchar [], Price, Integer.

Attribute Description: Amenities is a list of possible amenities that can go on the bill. Price is the monetary amount for the services patient received. Treatments is list of possible treatments that can go on the bill.

- o Entity: Employees

Description: A human who is employed by the hospital

Primary Key: Employee ID

Attributes: Name, Varchar, Sex, Varchar, Age, Integer, Salary, Integer, Employee_ID, Integer, Date_of_Hire, Varchar, Check_In_Time, Float, Check_Out_Time, Float.

Attribute Description: Name is the name of the independent employee. Sex is the sex of the employee, coded M=male, F=female. Age is the age of the employee as an integer. Salary is the salary of the employee, as an integer. Employee_ID is a unique integer assigned to the employee at hire time. Date_of_Hire is a varchar, encoded as MM/DD/YYYY. Check_In_Time is a floating point number representing when the employee clocked in for the day. Check_Out_Time is a floating point number representing when the employee clocked out for the day.

- o Entity: Patients

Description: A human who is under the care of the hospital

Primary Key: SSN

Attributes: SSN, Varchar, Diagnosis, Varchar, CheckIn_Date, Varchar, CheckOut_Date, Varchar, Name, Varchar, Credit_Card, Integer, Room_Number, Integer, Sex, Varchar, Age, Integer, Height, Float, Weight, Float, DOB, Varchar, Phone_Number, Integer, Address, Varchar, Nights Stayed, Integer

Attribute Description: SSN is the social security number of the patient, and is the unique identifier for the patient. Diagnosis is the diagnosis given to the patient by the doctor, expressed as a varchar. CheckIn_Date is the date the patient checked in, coded as MM/DD/YYYY. CheckOut_Date is the date the patient checked out, coded as MM/DD/YYYY. Name is the name of the patient. Credit_Card is the patient's credit card number as an integer. Room_Number is the number of the room the patient is staying in, as an integer. Sex is the sex of the patient, coded as M=male and F=female. Age is the age of the patient, expressed as an integer. Height is the height of the patient as a floating point number. Weight is the weight of the patient as a floating point number. DOB is the date of birth of the patient, coded as MM/DD/YYYY. Phone_Number is the integer phone number of the patient. Address is the address of the patient as a varchar, Nights stayed determined to get the number of nights the patient stayed.

- o Entity: Rooms

Description: Represents a room within the hospital

Primary Key: Room #
Attributes: Room #, Integer
Attribute Description: Room # is an integer representing the room number in the hospital.

- Relationships

  o   Relationship: Assign
  Entities: Clerks and Rooms
  Cardinality: 1:1
  Description: A relationship between the clerks and rooms

  o   Relationship: Assigned
  Entities: Doctors and Patients
  Cardinality: 1:15
  Description: A relationship between the doctors and patients

  o   Relationship: Assigned to
  Entities: Rooms and Patients
  Cardinality: 1:1
  Description: A relationship between the rooms and patients

  o   Relationship: Cleans
  Entities: Sanitation and Rooms
  Cardinality: 1:N
  Description: A relationship between the Sanitation staff and Rooms

  o   Relationship: Maintains
  Entities: Maintenance and Rooms
  Cardinality: 1:N
  Description: A relationship between the Maintenance staff and Rooms

  o   Relationship: Manages
  Entities: Management and Maintenance
  Cardinality: 1:N
  Description: A relationship between the Management staff and Maintenance staff

  o   Relationship: Manages
  Entities: Management and Sanitation
  Cardinality: 1:N
  Description: A relationship between the Management staff and Sanitation staff

o   Relationship: Take Measurements
Entities: Nurses and Patients
Cardinality: 1:1
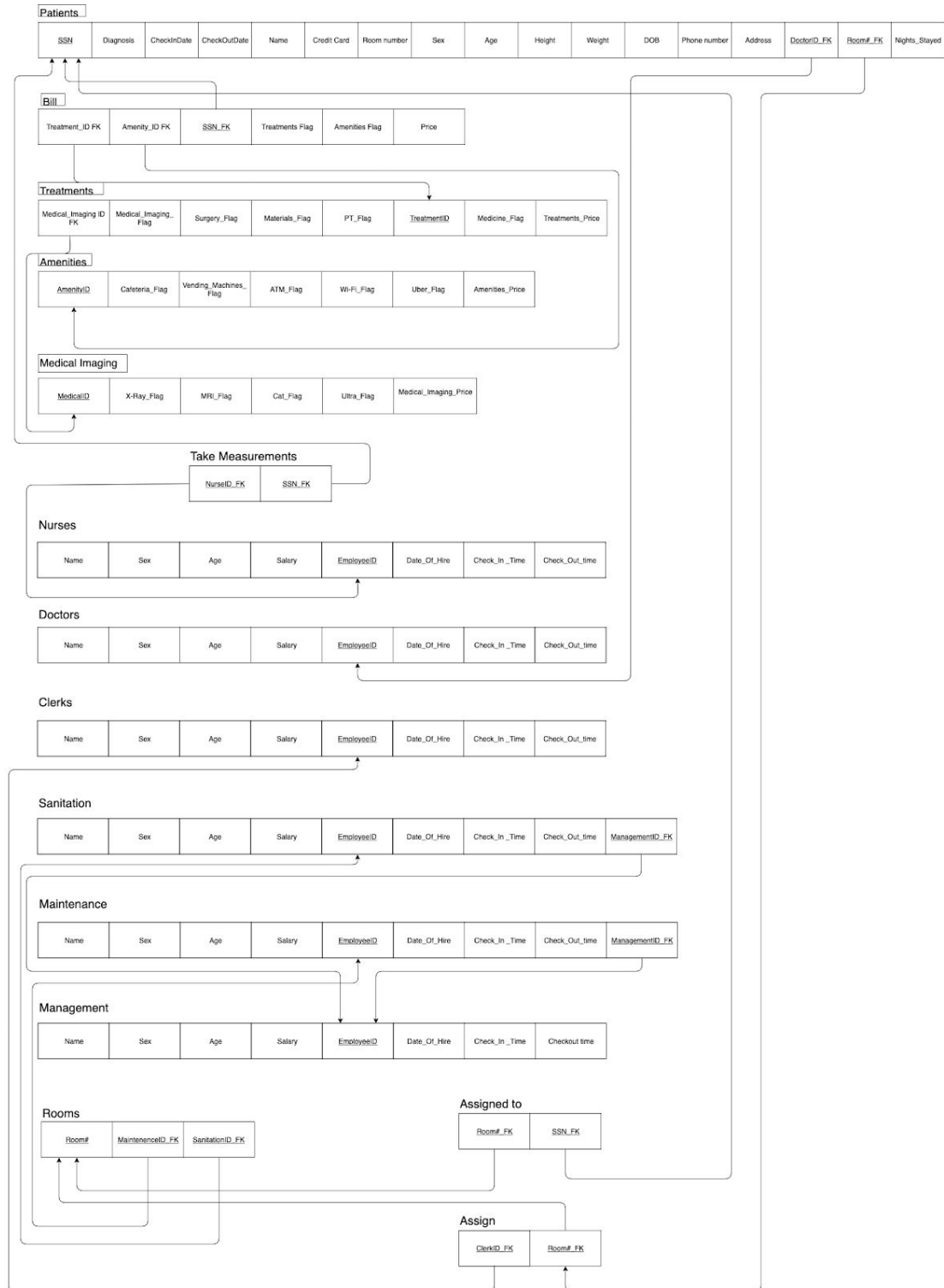Description: A relationship between the nurses and patients

o   Relationship: Gets
Entities: Patients and Bill
Cardinality: 1:1
Description: A relationship between the Patients and their Bill

Schema Diagram

Patients

SSN	Diagnosis	CheckInDate	CheckOutDate	Name	Credit Card	Room number	Sex	Age	Height	Weight	DOB	Phone number	Address	DoctorID_FK	Room#_FK	Nights_Stayed

Bill

Treatment_ID FK	Amenity_ID FK	SSN_FK	Treatments Flag	Amenities Flag	Price

Treatments

Medical_Imaging ID FK	Medical_Imaging_Flag	Surgery_Flag	Materials_Flag	PT_Flag	TreatmentID	Medicine_Flag	Treatments_Price

Amenities

AmenityID	Cafeteria_Flag	Vending_Machines_Flag	ATM_Flag	Wi-Fi_Flag	Uber_Flag	Amenities_Price

Medical Imaging

MedicalID	X-Ray_Flag	MRI_Flag	Cat_Flag	Ultra_Flag	Medical_Imaging_Price

Take Measurements

NurseID_FK	SSN_FK

Nurses

Name	Sex	Age	Salary	EmployeeID	Date_Of_Hire	Check_In_Time	Check_Out_time

Doctors

Name	Sex	Age	Salary	EmployeeID	Date_Of_Hire	Check_In_Time	Check_Out_time

Clerks

Name	Sex	Age	Salary	EmployeeID	Date_Of_Hire	Check_In_Time	Check_Out_time

Sanitation

Name	Sex	Age	Salary	EmployeeID	Date_Of_Hire	Check_In_Time	Check_Out_time	ManagementID_FK

Maintenance

Name	Sex	Age	Salary	EmployeeID	Date_Of_Hire	Check_In_Time	Check_Out_time	ManagementID_FK

Management

Name	Sex	Age	Salary	EmployeeID	Date_Of_Hire	Check_In_Time	Checkout time

Rooms

Room#	MaintenenceID_FK	SanitationID_FK

Assigned to

Room#_FK	SSN_FK

Assign

ClerkID_FK	Room#_FK

Schema Dictionary

- Classes

    o   Class: Amenities
    Description: Different types of Amenities accessible to the patients
    Superclass: Bill
    Attributes: Amenities_Price, AmenityID
    Attribute Description: Amenities Price used to determine the price for each amenity
    (same price for each amenity), Unique ID used to determine amenity chosen for bill.

    o   Class: ATM_Flag
    Description: Money vending service for patients and employees
    Superclass: Amenities
    Attributes: N/A
    Attribute Description: N/A

    o   Class: Cafeteria_Flag
    Description: Place for employees and patients to buy food
    Superclass: Amenities
    Attributes: N/A
    Attribute Description: N/A

    o Class: CAT_Flag
    Description: A type of scanning that allows to see inside the body. More detailed than
    x-rays.
    Superclass: Medical Imaging
    Attributes: N/A
    Attribute Description: N/A

    o   Class: Clerks
    Description: Responsible for assigning rooms to patients
    Superclass: Employees
    Attributes: Name, Varchar, Sex, Varchar, Age, Integer, Salary, Integer, EmployeeID,
            Integer, Date_Of_Hire, Varchar, Check_In_Time, float, Check_Out_Time, float.
    Foreign Keys: ManagementID_FK
    Attribute Description: Name is the name of the employee, Sex is the gender of
            employee, Age, age of employee, Salary is the salary of employee, EmployeeID is
            the id of the employee, Check_In_Time and Check_Out_Time used to clock
            employees in

    o   Class: Doctors
    Description: Responsible for treating patients
    Superclass: Employees

Attributes: Name, Varchar, Sex, Varchar, Age, Integer, Salary, Integer, EmployeeID, Integer, Date_Of_Hire, Varchar, Check_In_Time, float, Check_Out_Time, float.

Attribute Description: Name is the name of the employee, Sex is the gender of employee, Age, age of employee, Salary is the salary of employee, EmployeeID is the id of the employee, Check_In_Time and Check_Out_Time used to clock employees in

- o   Class: Maintenance

Description: Make sure medical equipment is maintained

Superclass: Employees

Attributes: Name, Varchar, Sex, Varchar, Age, Integer, Salary, Integer, EmployeeID, Integer, Date_Of_Hire, Varchar, Check_In_Time, float, Check_Out_Time, float.

Foreign Keys: ManagementID_FK

Attribute Description: Name is the name of the employee, Sex is the gender of employee, Age, age of employee, Salary is the salary of employee, EmployeeID is the id of the employee, Check_In_Time and Check_Out_Time used to clock employees in

- o   Class: Management

Description: Manage other employees

Superclass: Employees

Attributes: Name, Varchar, Sex, Varchar, Age, Integer, Salary, Integer, EmployeeID, Integer, Date_Of_Hire, Varchar, Check_In_Time, float, Check_Out_Time, float.

Attribute Description: Name is the name of the employee, Sex is the gender of employee, Age, age of employee, Salary is the salary of employee, EmployeeID is the id of the employee, Check_In_Time and Check_Out_Time used to clock employees in

- o Class: Materials_Flag

Description: List of all materials that is used to treat the patients.

Attributes: N/A

Attribute Description: N/A

- o Class: Medical Imaging_Flag

Description: Technique and process of creating visual representation of the interior body

Superclass: Treatments

Attributes: MedicalID int(10), X-Ray_Flag integer, MRI_Flag integer, Cat_Flag integer, Ultra_Flag integer, Medical_Imaging_Price integer

Attribute Description: MedicalD used to determine which medical imaging was used for bill, Flags are used for determining if imaging type is being used for Bill. Medical Imaging Price used to determine the price for all medical imaging types.

o Class: Medicine_Flag
Description: List of all medicine that is given to the patients.
Superclass: Treatments
Attributes: N/A
Attribute Description: N/A

o Class: MRI_Flag
Description: Used to diagnose patient using imaging technologies
Superclass: Medical Imaging
Attributes: N/A
Attribute Description: N/A

o Class: Nurses
Description: Record the height and weight of the patients
Superclass: Employees
Attributes: Name, Varchar, Sex, Varchar, Age, Integer, Salary, Integer, EmployeeID,
        Integer, Date_Of_Hire, Varchar, Check_In_Time, float, Check_Out_Time, float.
Attribute Description: Name is the name of the employee, Sex is the gender of
        employee, Age, age of employee, Salary is the salary of employee, EmployeeID is
        the id of the employee, Check_In_Time and Check_Out_Time used to clock
        employees in

o Class: PT_Flag
Description: Physical Therapy given to the patients.
Superclass: Treatments
Attributes: N/A
Attribute Description: N/A

o Class: Sanitation
Description: Cleaning and sanitizing hospital environments
Superclass: Employees
Attributes: Name, Varchar, Sex, Varchar, Age, Integer, Salary, Integer, EmployeeID,
        Integer, Date_Of_Hire, Varchar, Check_In_Time, float, Check_Out_Time, float.
Foreign Keys: MangementID_FK
Attribute Description: N/A

o Class: Surgery_Flag
Description: Surgery conducted on patients
Superclass: Treatments
Attributes: N/A
Attribute Description: N/A

o Class: Treatments

Description: Different types of treatments used to bill patient
Superclass: Bill
Foreign Keys: Medical_Imaging_ID FK int(10)
Attributes: <u>TreatmentID</u> int(10), Medical_Imaging_Flag, integer, Surgery_Flag integer, Materials_Flag integer, PT_Flag integer, Medicine_Flag Treatment_Price
Attribute Description: TreatmentID used to determine which treatment to be used for bill. Medical_Imaging_ID used to determine which imaging services were used for the bill. Flags used to determine specific treatment type. Treatment_Price used to
     determine the price for each patient for the treatment received.

- o   Class: Uber_Flag
Description: Drop-off service for patients
Superclass: Amenities
Attributes: N/A
Attribute Description: N/A

- o   Class: Ultra_Flag
Description: Used to diagnose patient using imaging technologies
Superclass: Medical Imaging
Attributes: N/A
Attribute Description: N/A

- o   Class: Vending_Machines_Flag
Description: Dispenses food for patients and employees
Superclass: Amenities
Attributes: N/A
Attribute Description: N/A

- o   Class: Wi-Fi_Flag
Description: Internet service for patients and employees
Superclass: Amenities
Attributes: N/A
Attribute Description: N/A

- o   Class: X-Rays_Flag
Description: Used to diagnose patient using imaging technologies
Superclass: Medical Imaging
Attributes: N/A
Attribute Description: N/A

- ● Entities

- o   Entity: Bill
Description: A monetary charge assigned to a patient by the hospital

Primary Key: N/A
Foreign Key: <u>SSN_FK</u>
Attributes: Treatement_ID FK int (10), Amentiy_ID FK int (10), SSN_FK int,
      Treatments_Flag integer, Amenities_Flag integer, Price Integer.
Attribute Description: Treatement_ID FK used for determining treatments used for bill.,
      Amentiy_ID FK used for determining amenity used for bill. Price is the total
      monetary amount charged for patient. Flags used for determining if treatments,
      amenities, or nights stayed were used for bill.

- o Entity: Employees

Description: A human who is employed by the hospital
Primary Key: Employee ID
Attributes: Name, Varchar, Sex, Varchar, Age, Integer, Salary, Integer,
Employee_ID, Integer, Date_of_Hire, Varchar, Check_In_Time, Float, Check_Out_Time,
      Float.
Attribute Description: Name is the name of the independent employee. Sex is the sex of
      the employee, coded M=male, F=female. Age is the age of the employee as an
      integer. Salary is the salary of the employee, as an integer. Employee_ID is a
      unique integer assigned to the employee at hire time. Date_of_Hire is a varchar,
      encoded as MM/DD/YYYY. Check_In_Time is a floating point number
      representing when the employee clocked in for the day. Check_Out_Time is a
      floating point number representing when the employee clocked out for the day.

- o Entity: Patients

Description: A human who is under the care of the hospital
Primary Key: SSN
Foreign Keys: <u>DoctorID_FK</u>, <u>Room#_FK</u>
Attributes: SSN, Varchar, Diagnosis, Varchar, CheckIn_Date, Varchar, CheckOut_Date,
      Varchar, Name, Varchar, Credit_Card, Integer, Room_Number, Integer, Sex,
      Varchar, Age, Integer, Height, Float, Weight, Float, DOB, Varchar,
      Phone_Number, Integer, Address, Varchar, Nights_Stayed, Integer.
Attribute Description: SSN is the social security number of the patient, and is the unique
      identifier for the patient. Diagnosis is the diagnosis given to the patient by the
      doctor, expressed as a varchar. CheckIn_Date is the date the patient checked in,
      coded as MM/DD/YYYY. CheckOut_Date is the date the patient checked out,
      coded as MM/DD/YYYY. Name is the name of the patient. Credit_Card is the
      patient's credit card number as an integer. Room_Number is the number of the
      room the patient is staying in, as an integer. Sex is the sex of the patient, coded
      as M=male and F=female. Age is the age of the patient, expressed as an integer.
      Height is the height of the patient as a floating point number. Weight is the
      weight of the patient as a floating point number. DOB is the date of birth of the
      patient, coded as MM/DD/YYYY. Phone_Number is the integer phone number of
      the patient. Address is the address of the patient as a varchar. Nights_Stayed
      used to find the number of nights patient stayed.

o   Entity: Rooms
Description: Represents a room within the hospital
Primary Key: Room#
Foreign Key: MaintenenceID_FK, SanitationID_FK
Attributes: Room #, Integer
Attribute Description: Room # is an integer representing the room number in the
   hospital.

● Relationships

o   Relationship: Assign
Entities: Clerks and Rooms
Cardinality: 1:1
Foreign Key: ClerkID_FK, Room#_FK
Description: A relationship between the clerks and rooms

o   Relationship: Assigned to
Entities: Rooms and Patients
Cardinality: 1:1
Foreign Key: Room#_FK, SSN_FK
Description: A relationship between the rooms and patients

o   Relationship: Take Measurements
Entities: Nurses and Patients
Cardinality: 1:1
Foreign Keys: NurseID_FK, SSN_FK
Description: A relationship between the nurses and patients