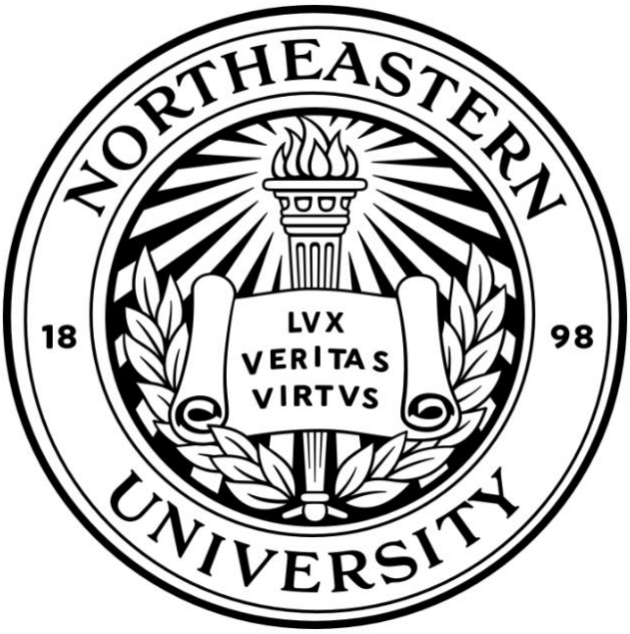
Dental Management System



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Revision History

Version	Changes Made	Date	Changed By
1.0	Formatted the document and added introduction.	11/09/19	Shivendra Shahi
1.1	Added Audiences and Business Rules	11/10/19	Prathamesh Verlekar
1.2	Added Main Subject Areas	11/10/19	Prathamesh Verlekar
1.3	Made few changes in Subject Areas	11/11/19	Shivendra Shahi
2.0	Added entities and attributes	11/11/19	Yash Pandya
2.1	Added Abbreviation and Definition	11/11/19	Yash Pandya
3.0	Added High Level Diagram	11/12/19	Dhaval Pandya
3.1	Added other cluster diagram and data model	11/13/19	Dhaval Pandya
3.2	Made changes in attributes tables	11/13/19	Shivendra Shahi
3.3	Added few more entities and attributes	11/14/19	Prathamesh Verlekar
4.1	Added new business rules	11/14/19	Yash Pandya
4.2	Made final changes in the data model	11/14/19	Dhaval Pandya
5.1	Made changes to dentist cluster	11/27/19	Prathamesh Verlekar
5.2	Made changes to treatment cluster	11/28/19	Dhaval Pandya
5.3	Made changes to inventory cluster	11/28/19	Shivendra Shahi
5.4	Made changes to Patient cluster	11/29/19	Yash Pandya
6.1	Added description to master tables	11/30/19	Shivendra Shahi
6.2	Added description to transaction tables	11/30/19	Yash Pandya
7.1	Made changes to all the tables and finalized it	12/1/19	Prathamesh Verlekar
7.2	Changed High level diagram as per requirements	12/2/19	Dhaval Pandya

1.0 Introduction:

Dental Management System is a database management system for monitoring and handling the appointments and other related activities in a Dental Office. The design of the model will be done using TOAD Data Modeler and implementation will be done using Microsoft SQL Server. The system will also store the details regarding the invoices generated, insurances used by the patient, patient treatment history and other high-level operations.

Dental Office is an organization that is responsible for providing a health medication and treatment for all types of dental patients. The traditional method means the customers need to fill in their details in the registration form manually and the information will only be kept in files. After the registration, the files will be placed in the rack and this will cause problems like taking a long time to retrieve the information, make mistakes while writing or misplacing the files.

Dental Management System is specially designed to let the staff have high-efficiency management tools, computerized and systematic patient records, and detail of treatment records. This system also provides an appointment feature, which allows staff to view the appointment that already made by the dentist/patient. Receptionist/Dentist can track all future appointments. The patient treatment module consists of the information about the tooth examination and record and list of treatment that has done. Apart from that, dental treatment and disease modules provide information about the cause of tooth extraction and tooth filling.

The proposed system will save the effort and the time of patients from waiting to make the appointment as well as reduce the work of system administrators to access information for the report and easier to manage the appointment. The system administrator needs to maintain the records of patients. Patients should be able to know the availability of a date.

2.0 Audiences

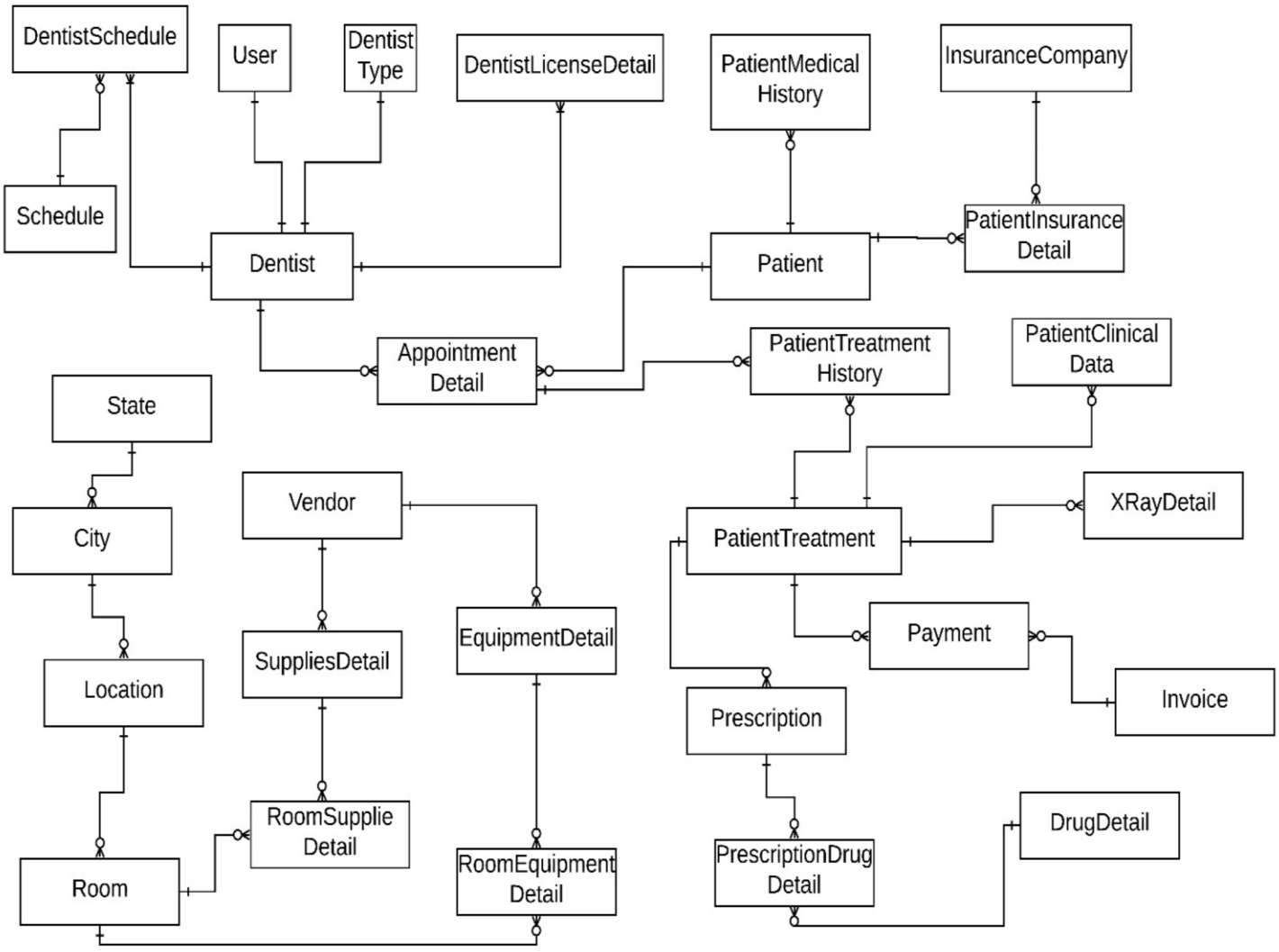
Admin

- The role of the admin will be to enter and manage the system. He will be responsible for updating the data like if appointment is cancelled then change the status to cancel, if it is done then change the status to complete or done.
- All the database activities will e managed by the admin. Admin will be allowed to create new roles if required. He can increase or decrease the security of a table.
- Admin will play a main role in managing the system from data entry to data deletion and updating the data as per the requirement.

Dentist

- Apartment from admin, dentist will also be allowed to access the system.
- He/ She can check their appointments scheduled for a given date.
- He/ She can access the patient history and medical details with the help of the system. This will help the dentist to know more about the patient history before starting the treatment. He will get the details of the necessary precaution which needs to be taken before starting the treatment
- Dentist can also give prescription through the system directly to the patient without an appointment.
- He/ She will be informed about the license expiry, so that the Dentist can renew or make a new license.

3.0 High Level Diagram



4.0 Main Subject Areas

Patient

- The Patient entity cluster will store all the information related to the patient identity like Patient ID, Patient Name, Address, Phone Number, E-Mail ID along with insurance details and medical history. This entity cluster will help in capturing all the information related to patient. Patient entity cluster will have a relationship with the dentist entity cluster with the help of appointment.

Provider

- The Provider entity cluster will store all the information about the dentist who will be operating on a patient. It will have information about the License a provider is having, years of experience, Provider ID, Provider name, etc. It will also store the insurance details and the appointment details. It will have a relationship with the appointment entity cluster as well as treatment entity cluster.

Visit

- This will have the details regarding the treatment which has been given to the patient during the current visit. It will also have details regarding any treatment taken from previous visits. Details regarding prescription given will also be stored in this entity cluster. Invoice will be generated based on the treatment given to the patient.

Inventory

- Inventory management will track the detail of all the supplies and equipment. It will track the cost and availability of all the Equipment and supplies. It will also record the contract details with a vendor such as a purchase contract or maintenance contract. Apart from this, the user can easily track the detail of any equipment such as where it is located, is it functioning properly or not, etc.

5.0 Business Rules

5.1 In Scope Items

ID	Business Rules	Area
IS01	The dentist will provide the treatment to one/many patients.	Dentist
IS02	Dentist will provide the medical prescription to the patient	Dentist
IS03	Dentist can treat a single patient at a time.	Dentist
IS04	The Dentist Entity will store basic Information of Dentist such as Name, Phone Number, Address etc.	Dentist
IS05	The Dentist can provide service to multiple location.	Dentist
IS06	Every Dentist must have a valid license.	Dentist
IS07	The Dentist can have one or multiple License according their specialization.	Dentist
IS08	The Detail of license will be stored in License Detail Entity such as License Number, status, Type etc.	Dentist
IS09	Confidential data such as SSN, Tax Payer Id, etc. should be stored in separate reference table with more security applied to the table.	Dentist
IS10	The Specialization Entity will store the information of the doctor and detail of his/her specialization such as Dentist can be general dentist, orthodontist, prosthodontist etc.	Dentist
IS11	Appointments booked by every patient will be recorded along with date, time and Dentist's details with whom the appointment is booked.	Dentist
IS12	The patient Entity will store the basic detail of patient such as Name, Phone Number, and Emergency Number.	Patient
IS13	Other Patient Details like missing teeth, facial growth problems, oral habit, spaced teeth etc. must be recorded in Patient’s health history.	Patient
IS14	A patient can have more than one insurance.	Patient
IS15	There cannot be multiple appointments at a single time for a patient.	Patient
IS16	The system will store the details of various dental disease details.	Patient
IS17	The system will store the detail of the treatment given by dentist to the patient.	Patient
IS18	Patient can pay the bill via different payment mode and can set the preferred payment mode.	Patient
IS19	The dentist can prescribe the drugs to the patient according to the disease.	Prescription
IS20	The patient can get prescriptions from multiple dentists.	Prescription
IS21	The Patient can change the payment mode and set the primary payment mode	Invoice
IS22	The system will save the demographic information of the patient such as Address.	Patient
IS23	A Patient can have one or more home addresses.	Patient
IS24	Patient will have Emergency Contact Details	Patient
IS25	Details regarding number of upper teeth and number of lower teeth of the patient must be recorded.	Patient
IS26	Patient history must contain previous medical history.	Patient
IS27	Multiple appointments can be made by a patient at multiple locations with different time	Appointment

IS28	There is appointment status which will maintain the status of appointment such as Done, Cancelled etc.	Appointment
IS29	An appointment must be associated with a specific location via a room	Appointment
IS30	A room can be booked more than one time for different appointments.	Location
IS31	Prescription provider name must be included in the prescription.	Prescription
IS32	Treatment must have a treatment ID that can be used for invoice and dentist.	Treatment
IS33	Details regarding which tooth has been treated during the treatment must be recorded.	Treatment
IS34	The Dentist can send the prescription to the patient without having any appointment.	Prescription
IS35	There is at least one invoice against the appointment	Invoice
IS36	The Dentist can work with multiple schedule at multiple location	Dentist
IS37	The Dentist can have one or more than one appointment in his/her working hours	Dentist
IS38	The System will track the all the Equipment Details such as vendor detail, Is the equipment portable etc.	Equipment
IS39	The Vendor Detail will save the all the information of Equipment / Supplies vendor	Vendor
IS40	The System will track the information of all the available supplies	Supplies
IS41	Supplies must contain supplier ID to track the shipment.	Supplies
IS42	The System will track the contract details with Multiple vendors of equipment and supplies	Equipment
IS43	We will track the details of the equipment such as where it is located currently	Equipment
IS44	Medical equipment can be bought from multiple vendors.	Vendor
IS45	Warranty details of equipment should be stored for repairing and replacement.	Equipment

5.2 Out of Scope Items

ID	**Business Rules**	**Area**
OS01	Feedback for dentist is not tracked.	Dentist
OS02	Salaries of dentist and staff are not tracked in the system	Dentist
OS03	Schedule of staff working in the office is not captured.	Other Staff
OS04	Other staff working in office but not participating in the dental care of the patient are not tracked.	Other Staff
OS05	Cost of the prescribed medicines are not tracked in the system.	Medicine
OS06	Utilities that are being used in the room are not tracked.	Location
OS07	Finances of Dentist office are not tracked.	Dentist
OS08	Medicines for other diseases apart from dental problems,	Medicine
OS09	No method for membership plans/discounts to the regular patients at this dental office.	Membership
OS10	Status of prescription is not required.	Prescription

6.0 Entities and Attributes

1.0 Master Tables

- **City Table**

This entity contains the details of the city in which the clinic is, this is a part of the address. It contains City name, city code and the state code where the city is.

Attribute_ID	DataType	Constraints	Definition with example
City_ID	Char (2)	Primary Key (PK), Not Null (NN)	A City code to differentiate Different Cities in a table. Example. 01,02
City_Name	Varchar (50)	Not Null (NN)	Name of the city. For example, Boston, New York.
State_Code	Char (2)	Foreign Key, Not Null (NN)	
Created_By	Integer	Not Null (NN)	The data created by example 1,2,3
Created_Time	DateTime	Not Null (NN)	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **State Table**

This entity contains the details of the state where the clinic is, this is a part of the address. It contains the state code and state name.

Attribute_ID	DataType	Constraints	Definition with example
State_Code	Char (2)	Primary Key (PK), (NN)	A State code to differentiate Different State in a table. Example. 01,02
State_Name	Varchar (50)	Not Null (NN)	Name of the State. For example, Texas, Massachusetts.
Created_By	Integer	Not Null (NN)	The data created by example 1,2,3
Created_Time	DateTime	Not Null	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **Insurance Company**

This entity will store the company details of the insurance so that if a patient is using more than one insurance, we can have a record of the amount of bill covered by a different insurance company and the treatments which are included in different insurance. Different companies will have different policies, terms, and conditions to use the insurance. This entity will record all these details.

Attribute_ID	DataType	Constraints	Definition with example
Insurance_ Company_ID	Integer	Primary Key (PK), Not Null (NN)	A State code to differentiate Different State in a table. Example. 01,02
State_Name	Varchar (50)	Not Null (NN)	Name of the State. For example, Texas, Massachusetts.
Created_By	Integer	Not Null (NN)	The data created by example 1,2,3
Created_Time	DateTime	Not Null (NN)	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **Tooth**

This entity contains the Tooth_Id which uniquely identifies every tooth. It also contains tooth description and an attribute called Tooth_File_Path which contains the image path of a tooth.

Attribute_ID	DataType	Constraints	Definition with example
Tooth_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different tooth. Example 1,2,3
Tooth_ Description	Varchar (200)	Not Null (NN)	Description about tooth. Example canine tooth
Tooth_File_ Path	Varchar (200)	Not Null (NN)	Tooth file path contains the image path of a tooth.
Created_By	Integer	Not Null	The data created by, example 1,2,3
Created_Time	DateTime	Not Null (NN)	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **Location**

This entity will have details regarding the different locations where the dental office is present, along with the room details and address of the dental office. It will be linked to the appointment entity in order to have these details in the appointment history.

Attribute_ID	DataType	Constraints	Definition with example
Location_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Location. Example 1,2,3
Location_ Name	Varchar (100)	Not Null (NN)	Name of a Location. Example Washington Street
Location_ Address	Varchar (200)	Not Null (NN)	Location address. Example 115 Northampton Street
State_Code	Integer	Foreign Key (FK), Not Null (NN)	
City_ID	Integer	Foreign Key (FK), Not Null (NN)	
Zip_Code	Integer	Not Null (NN)	Zip code of a location. Example, 02118
Created_By	Integer	Not Null (NN)	The data created by, example 1,2,3
Created_Time	DateTime	Not Null (NN)	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **Room**

This entity will have details regarding the different types of rooms and their names, along with the Room_Id. It will be linked to the appointment entity in order to have these details in the appointment history. Every Patient will be assigned a room to be treated during the visit.

Attribute_ID	DataType	Constraints	Definition with example
Room_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Room. Example 1,2,3
Room_Name	Varchar (50)	Null (N)	Name of a Room. Example Tulip
Location_ID	Integer	Foreign Key (FK), Not Null (NN)	
Room_Number	Integer	Not Null (NN)	Number of a room. Example 202
Floor	Small Integer	Not Null (NN)	Floor number. Example First, Second Floor
Created_By	Integer	Not Null (NN)	The data created by, example 1,2,3
Created_Time	DateTime	Not Null (NN)	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **Vendor**

This entity contains the detail about the various vendors who provides supplies and equipments. Vendor_Id is used to uniquely identify different vendors associated.

Attribute_ID	DataType	Constraints	Definition with example
Vendor_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Vendors. Example 1,2,3
Vendor_Name	Varchar (50)	Not Null (NN)	Name of the Vendor. For example, Afrojack.
Created_By	Integer	Not Null	The data created by example 1,2,3
Created_Time	DateTime	Not Null	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **Drug Details**

This entity contains the description about the all the Drugs that a Dentist would be prescribing to a Patient. It contains Drug name, Drug type and Drug Description. The Drug_Detail_Id will uniquely identify all the drugs.

Attribute_ID	DataType	Constraints	Definition with example
Drug_detail_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Drug Details. Example 1,2,3
Drug_Name	Varchar (50)	Not Null (NN)	Name of the Drug. For example, Paracetamol.
Drug_type	Varchar (10)	Not Null (NN)	Type of Drug. Example High Dose
Drug_ Description	Varchar (200)	Not Null (NN)	Description about Drugs. Example Paracetamol is for cold and cough.
Created_By	Integer	Not Null (NN)	The data created by example 1,2,3
Created_Time	DateTime	Not Null (NN)	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

2.0 Transaction tables

- **Dentist**

The Dentist Entity will store the details about all the dentists working in the dental office who will be operating on a patient. This will have details like Dentist's name, SSN, Phone number and years of experience he has. It will have Dentist_Id as primary key for uniquely identifying different dentists.

Attribute_ID	DataType	Constraints	Definition with example
Dentist_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Dentist. Example 1,2,3
First_Name	Varchar (50)	Not Null (NN)	First Name of the Dentist. For example, Jack.
Middle_Name	Varchar (50)	Null (N)	Middle Name of the dentist. For example, J.
Last_Name	Varchar (50)	Not Null (NN)	Last Name of the dentist. For Example, Ryan.
Dentist_SSN	Varchar (10)	Not Null (NN)	SSN number of a dentist. Example, 1QAW23S34
Dentist_ Gender	Varchar (5)	Not Null (NN)	Gender of a dentist. Example, Male
Dentist_Phone	Varchar (10)	Not Null (NN)	Phone number of dentists. Example, 8578005124
Dentist_Type _ID	Integer	Foreign Key (FK), Not Null (NN)	
User_ID	Integer	Foreign Key (FK), Not Null	
Dentist_Work _Experience	Integer	Not Null (NN)	Work experience of a Dentist. Example 2
Created_By	Integer	Not Null (NN)	The data created by example 1,2,3
Created_Time	DateTime	Not Null (NN)	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **Dentist Type**

This entity will describe about the type of dentist. For example, there are different types of Dentistry practices like Periodontology, Orthodontics, Prosthodontics, Endodontics etc. This entity will provide details about the type of Dentist.

Attribute_ID	DataType	Constraints	Definition with example
Dentist_type_ ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Dentist Type. Example 1,2,3
Name	Varchar (50)	Not Null (NN)	Name of Dentist Type. Example Ortho surgeon
Description	Varchar (200)	Not Null (NN)	Description About Dentist Type. Example, Ortho surgeon is for maintaining the care for teeth.
Created_By	Integer	Not Null	The data created by, example 1,2,3
Created_Time	DateTime	Not Null	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **Dentist License Details**

This entity will contain the information about the License details of all the Dentists along with details like License Expiry date.

Attribute_ID	DataType	Constraints	Definition with example
Dentist_License Detail_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Dentist. Example 1,2,3
Dentist_ID	Integer	Foreign Key (FK)Not Null (NN)	
LicenseNumber	Integer	Foreign Key (FK), Not Null (NN)	
License_Expire _Date	DateTime	Null (N)	License Expire Date. Example, 12/10/2019
Created_By	Integer	Not Null (NN)	The data created by, example 1,2,3
Created_Time	DateTime	Not Null (NN)	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **Schedule**

This will contain the details about the Schedule such as Start time and End time. The different Schedule_Id will differentiate between different schedule.

Attribute_ID	DataType	Constraints	Definition with example
Schedule_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Schedule. Example 1,2,3
Start_Time	DateTime	Not Null (NN)	Schedule Starting Time. Example 12/10/201912:10:00
End_Time	DateTime	Not Null (NN)	Schedule ending time. Example, 12/23/2019 13:00:09
Created_By	Integer	Not Null (NN)	The data created by, example 1,2,3
Created_Time	DateTime	Not Null (NN)	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **Dentist schedule Table**

This entity will contain detail about different schedule that a Dentist would have.

Attribute_ID	DataType	Constraints	Definition with example
Dentist_Schedule _ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Dentist schedule. Example 1,2,3
Dentist_ID	Integer	Foreign Key (FK)Not Null (NN)	
Schedule_ID	Integer	Foreign Key (FK)Not Null (NN)	
Day	Varchar (10)	Not Null (NN)	This will give the particular day for dentist schedule.
Created_By	Integer	Not Null (NN)	The data created by, example 1,2,3
Created_Time	DateTime	Not Null (NN)	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **Patient**

The Patient entity will store all the information related to the patient identity like Patient Id, Patient Name, Age, Address, Phone Number, E-Mail ID and Emergency contact details. It will have Patient_Id to uniquely identify every patient visiting the dental office. Patient entity cluster will have a relationship with the Dentist cluster with the help of appointment.

Attribute_ID	DataType	Constraints	Definition with example
Patient_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Patient. Example 1,2,3
First_Name	Varchar (50)	Not Null (NN)	First Name of the Patient. For example, Jack.
Middle_Name	Varchar (50)	Null (N)	Middle Name of the Patient. For example, J.
Last_Name	Varchar (50)	Not Null (NN)	Last Name of the Patient. For Example, Ryan.
Date_Of_Birth	Integer	Not Null (NN)	Date of Birth of a patient. Example, 12/10/2019
Patient_ Address	Varchar (5)	Not Null (NN)	Address of a patient. For Example, 115 Northampton Street.
State_Code	Integer	Foreign Key (FK), Not Null (NN)	
City_Code	Integer	Foreign Key (FK), Not Null (NN)	
Zip_Code	Integer	Not Null (NN)	Zip code of patient. Example, 02118
Patient_ Emergency_ Contact_ Number	Varchar (10)	Not Null (NN)	Emergency contact number of a patient. Example, 8578444512
Patient_ Emergency _Contact_ Name	Varchar (50)	Not Null (NN)	Emergency contact name of a patient. Example, Yash
Patient_Age	Integer	Not Null (NN)	Calculated Field through Date of Birth. Example, 23
Created_By	Integer	Not Null (NN)	The data created by example 1,2,3
Created_Time	DateTime	Not Null (NN)	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **Patient Medical History**

This entity will have a patient history as if the patient is allergic to things such as latex, anesthetic, etc. It will also have the smoking history of the patient and will have details about any previous medication or treatment which the patient has taken from the same dentist or from any others. These details will help the dentist to take precautions during the treatment.

Attribute_ID	DataType	Constraints	Definition with example
Patient_ Medical_History _ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Patient medical history. Example 1,2,3
Patient_ID	Integer	Foreign Key (FK)Not Null (NN)	
Patient_ Allregry_Details	Varchar (250)	Not Null (NN)	Allergy Details of a patient. Example itching in skin.
Other_Diseases	Varchar (250)	Not Null (NN)	Other diseases that patient has. Example cough cold
Patient_Medical _Report_File _Path	Varchar (200)	Not Null (NN)	Location where medical report of a patient is kept.
Created_By	Integer	Not Null (NN)	The data created by, example 1,2,3
Created_Time	DateTime	Not Null (NN)	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **Patient Insurance Details**

  This entity will store insurance details like type of insurance, amount or percentage of the bill it covers, which all treatments are included, etc. A single patient can use more than one insurance for his treatment so all those insurances should be linked with the patient while billing.

Attribute_ID	DataType	Constraints	Definition with example
Patient_ Insurance_ Details_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Patient Insurance details. Example 1,2,3
Patient_ID	Integer	Foreign Key (FK)Not Null (NN)	
Insurance_ Number	Integer	Not Null (NN)	Patient health Insurance number. Example 642318
Insurance_ Cover_Amount	Money	Not Null (NN)	Patient insurance cover amount. Example $23456
Insurance_ Company_ID	Integer	Foreign Key (FK), Not Null (NN)	
Created_By	Integer	Not Null (NN)	The data created by, example 1,2,3
Created_Time	DateTime	Not Null (NN)	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **Equipment Details**

This will give information about all the equipment that are used for the dental treatment of the Patient like X-ray machines, dental chairs, etc. It will be linked to a room or a location.

Attribute_ID	DataType	Constraints	Definition with example
Equipment_ Detail_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Equipment Details. Example 1,2,3
Equipment_ Name	Varchar (100)	Not Null (NN)	Name of the equipment. Example Forceps
Equipment_ Type	Varchar (10)	Not Null (NN)	Type of Equipment Used. Example ting
Is_Portable	Boolean	Not Null (NN)	Can Equipment be moved from place to place? Example Yes
Vendor_ID	Integer	Foreign Key (FK), Not Null (NN)	
Contract_End Date	DateTime	Not Null (NN)	Date at which contract ends. Example 12/10/2019
Equipement_ Total_Quantity	Integer	Not Null (NN)	Total Quantity of Equipment. Example 20
Equipment_ Description	Varchar (200)	Not Null (NN)	Description of equipment. Example It is used for treatment.
Created_By	Integer	Not Null (NN)	The data created by, example 1,2,3
Created_Time	DateTime	Not Null (NN)	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **Room Equipment Details**

This entity will have details about the equipment that would be used in the respective room. This will contain equipment detail id, room id and equipment quantity.

Attribute_ID	DataType	Constraints	Definition with example
Room_ Equipment _Details_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Room equipment details. Example 1,2,3
Room_ID	Integer	Foreign Key (FK)Not Null (NN)	
Equipment_ Detail_ID	Integer	Foreign Key (FK)Not Null (NN)	
Quantity	Integer	Not Null	Number of equipment used. Example 24
Created_By	Integer	Not Null	The data created by, example 1,2,3
Created_Time	DateTime	Not Null	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null	The data modified time example 12/11/2019 13:10:00

- **Supplies Details**

This will have details of all the types of supplies which are being used during the treatment and which are going to be charged to the Patient. It will also store the details of the quantity of medicine and other supplies which are used or need to be refilled.

Attribute_ID	DataType	Constraints	Definition with example
Supplies _Details_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Supplies details. Example 1,2,3
Supplies_Name	Varchar (50)	Not Null (NN)	Name of the supplies.
Supplies_ Description	Varchar (200)	Not Null (NN)	Description about supplies.
TotalQuantity	Integer	Not Null (NN)	Number of Supplies used. Example 24
Vendor_ID	Integer	Foreign Key (FK), Not Null (NN)	
Created_By	Integer	Not Null	The data created by, example 1,2,3
Created_Time	DateTime	Not Null	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null	The data modified time example 12/11/2019 13:10:00

- **Room Supplies Details**

This entity will contain the detail about the supplies and quantity of supplies that would be used in a room.

Attribute_ID	DataType	Constraints	Definition with example
Room_ Supplies Details_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Room Supplies details. Example 1,2,3
Room_ID	Integer	Foreign Key (FK)Not Null (NN)	
Equipment_ Detail_ID	Integer	Foreign Key (FK)Not Null (NN)	
Quantity	Integer	Not Null	Number of Quantity used. Example 24
Created_By	Integer	Not Null	The data created by, example 1,2,3
Created_Time	DateTime	Not Null	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null	The data modified time example 12/11/2019 13:10:00

- **Appointment Detail**

This entity will store all the details related to the appointments made by every patient with the dentist. It will have details regarding the Patient as well as the Dentist assigned to treat the patient.

Attribute_ID	DataType	Constraints	Definition with example
AppointmentDetail _ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different appointment. Example 1,2,3
Dentist_ID	Integer	Foreign Key (FK), Not Null (NN)	
Patient_ID	Integer	Foreign Key (FK), Not Null (NN)	
Room_ID	Integer	Foreign Key (FK), Not Null (NN)	
Start_Time	Date Time	Not Null (NN)	Appointment Start time. Example 12/10/2019 12:20:00
End_Time	Date Time	Not Null	Appointment End time. Example 12/11/2019 13:25:00
Created_By	Integer	Not Null	The data created by, example 1,2,3
Created_Time	DateTime	Not Null	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null	The data modified time example 12/11/2019 13:10:00

- **Patient Treatment**

This will have the details regarding the treatment which has been given to the patient during the current visit. It will also have details regarding any treatment taken from the catalog to reduce the billing time.

Attribute_ID	DataType	Constraints	Definition with example
Patient_ Treatment_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Patient Treatment. Example 1,2,3
Appointment _Details_ID	Integer	Foreign Key (FK), Not Null (NN)	
Treatment_ Comment	Varchar (500)	Not Null (NN)	Comment about treatment.
Created_By	Integer	Not Null (NN)	The data created by, example 1,2,3
Created_Time	DateTime	Not Null (NN)	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **X-ray Details**

This entity will contain the details about the X-ray of tooth of each patient if needed. It will store the treatment Id, Patient Id and Tooth Id along with X-ray file path where X-rays are kept.

Attribute_ID	DataType	Constraints	Definition with example
X-ray _Details_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different X-ray. Example 1,2,3
Patient_ Treatment_ID	Integer	Foreign Key (FK), Not Null (NN)	
Tooth_ID	Integer	Foreign Key (FK), Not Null (NN)	
X-ray_File _path	Varchar (200)	Not Null (NN)	Path where X-rays are kept.
Created_By	Integer	Not Null	The data created by, example 1,2,3
Created_Time	DateTime	Not Null	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null	The data modified time example 12/11/2019 13:10:00

- **Patient Treatment History**

  This entity will have details about the Patient's treatment history. It will contain the Patient_Treatment_History_Id which will uniquely identify the different patient history. It will also contain Patient treatment Id and Appointment details along with treatment comments.

Attribute_ID	DataType	Constraints	Definition with example
Patient_ Treatment_ History_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Patient Treatment history. Example 1,2,3
Patient_ Treatment_ID	Integer	Foreign Key (FK), Not Null (NN)	
Appointment _Details_ID	Integer	Foreign Key (FK), Not Null (NN)	
Treatment_ Comment	Varchar (200)	Not Null (NN)	Comment about treatment.
Created_By	Integer	Not Null	The data created by, example 1,2,3
Created_Time	DateTime	Not Null	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null	The data modified time example 12/11/2019 13:10:00

- **Prescription**

  This entity will have the details of prescription which is given by the dentist or any staff to the Patient after the visit. It can include a list of medicines the Patient will have to take before the next visit along with the procedures.

Attribute_ID	DataType	Constraints	Definition with example
Prescription_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Prescritpion. Example 1,2,3
Patient_ Treatment_ID	Integer	Foreign Key (FK), Not Null (NN)	
Dentist Comment	Varchar (200)	Not Null (NN)	Dentist prescription comments.
Created_By	Integer	Not Null	The data created by, example 1,2,3
Created_Time	DateTime	Not Null	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null	The data modified time example 12/11/2019 13:10:00

- **Prescription Drug Details**

  This entity will contain all the different drug details with associated prescription id, drug id and the drug quantity provided by the doctor for treatment.

Attribute_ID	DataType	Constraints	Definition with example
Prescription _Drug_ Details_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Drug Details. Example 1,2,3
Prescription_ID	Integer	Foreign Key (FK), Not Null (NN)	
Drug_ID	Integer	Foreign Key (FK), Not Null (NN)	
Drug_Quntity	Integer	Not Null (NN)	Drug quantity provided by doctor for treatment. Example 3
Created_By	Integer	Not Null (NN)	The data created by, example 1,2,3
Created_Time	DateTime	Not Null (NN)	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **Patient Clinical Data**

This entity contains clinical data about possible problems or area of problem a patient could have, for which he came to clinic.

Attribute_ID	DataType	Constraints	Definition with example
PatientClinical Data_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different clinical data details. Example 1,2,3
PatientTreatment _ID	Integer	Foreign Key (FK), Not Null (NN)	
Total_Tooth	Integer	Not Null (NN)	It contains the number of tooth patient has at present, example 32, 28, 30
Drug_Quntity	Integer	Not Null (NN)	Drug quantity provided by doctor for treatment. Example 3
Plaque	Bit		Select if the abnormality present.
Strains	Varchar (50)		Describe about the Strains if present.
Abrasions	Bit		Select if the abnormality present.
Contact_Points	Bit		Select if the abnormality present.
Overhangs	Bit		Select if the abnormality present.
GingivalTissues	Varchar (50)		Describe about the Gingival Tissue.
Color	Varchar (50)		Describe about the Strains if present.
Recession	Bit		Select if the abnormality present.
Pockets	Bit		Select if the abnormality present.
Palate	Varchar (50)		Describe about the Palate.
Frenum	Bit		Select if the abnormality present.
Tongue	Bit		Select if the abnormality present.
Ridge	Bit		Select if the abnormality present.
Exudate	Bit		Select if the abnormality present.
AreaOfFood Retension	Bit		Select if the abnormality present.
Created_By	Integer	Not Null (NN)	The data created by, example 1,2,3
Created_Time	DateTime	Not Null (NN)	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **Payment**

This entity details about Treatment fees, mode of payment, Invoice ID, Treatment ID and the person who makes the payment.

Attribute_ID	DataType	Constraints	Definition with example
Payment_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Invoice. Example 1,2,3
TreatmentFees	Money	Not Null (NN)	Description about payment.
PaymentMode	Varchar (10)	Not Null (NN)	Description about mode of payment, Example: card, cash, insurance
PaymentBy	Varchar (20)	Not Null (NN)	Description about who made the payment. Example Sudhir
Invoice_ID	Integer	Primary Foreign Key (PFK), Not Null (NN)	
PatientTreatment_ID	Integer	Primary Foreign Key (PFK), Not Null (NN)	
Created_By	Integer	Not Null (NN)	The data created by, example 1,2,3
Created_Time	DateTime	Not Null (NN)	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null (NN)	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

- **Invoice**

This entity will have details of the invoice or bill which will be given to the patient or insurance company by the dentist. This will also help track the amount paid in the previous visits along with the due amount or balance which is remaining to be paid.

Attribute_ID	DataType	Constraints	Definition with example
Invoice_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Invoice. Example 1,2,3
TreatmentFees	Money	Not Null (NN)	Description about payment.
OtherCharges	Money	Not Null (NN)	Description about other charges which are included in the Invoice, Example: taxes
Final_Amount	Money	Not Null	Final amount in Invoice. Example $243
Created_By	Integer	Not Null	The data created by, example 1,2,3
Created_Time	DateTime	Not Null	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null (NN)	The data modified time example 12/11/2019 13:10:00

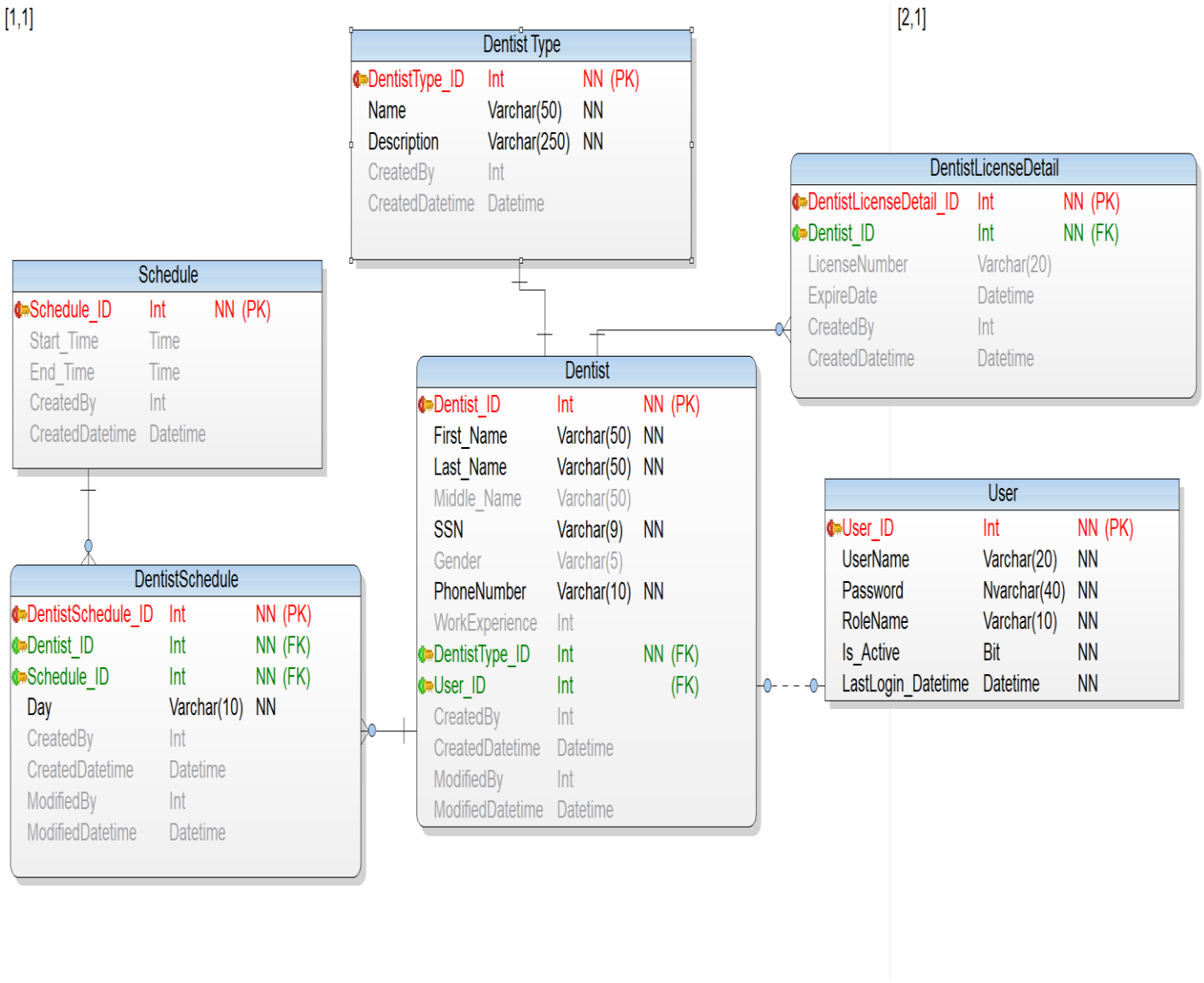
- **User**

It will store user id, user name, password and last login detail regarding each person that has been created in the database.

Attribute_ID	DataType	Constraints	Definition with example
User_ID	Integer	Primary Key (PK), Not Null (NN)	A unique Id to differentiate between different Users. Example 1,2,3
User_Name	Varchar (100)	Not Null (NN)	User name to login into system.
Password	Varchar (50)	Not Null (NN)	Password to enter into system.
Role_Name	Varchar (50)	Not Null (NN)	Name of the role which is used to get into system. Example Dentist, Patient
Is_Active	Boolean	Not Null	To check is the user is still active. Example Yes
Last_Login_ Date_Time	DateTime	Not Null (NN)	Date and Time of previous login of a user.
Created_By	Integer	Not Null	The data created by, example 1,2,3
Created_Time	DateTime	Not Null	The data created time example 12/10/2019 12:00:00
Modified_By	Integer	Not Null	The data modified by example 4,5,6
Modified_Time	DateTime	Not Null	The data modified time example 12/11/2019 13:10:00

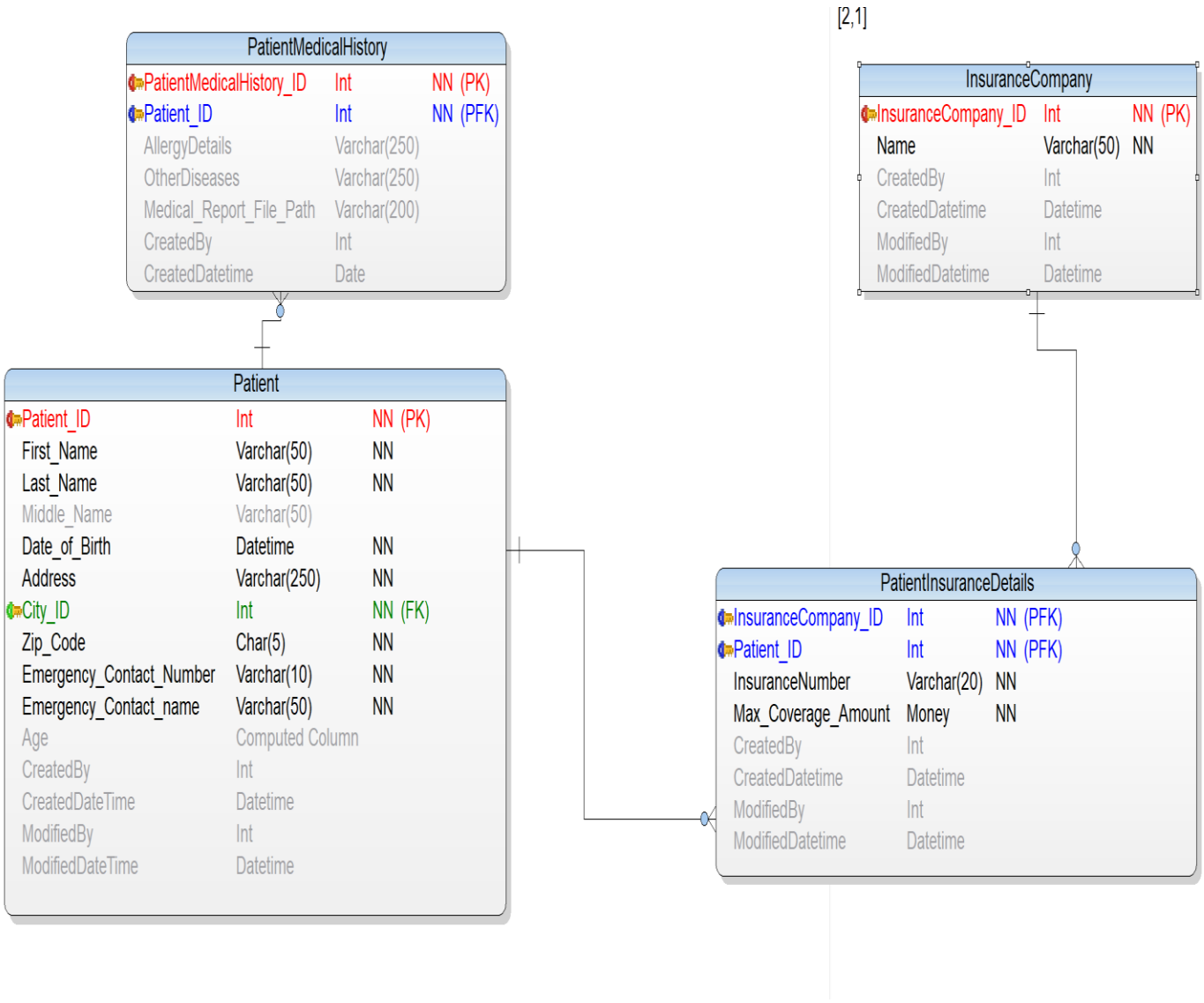
7.0 Data Model

Dentist Cluster



Inventory Cluster

Patient Cluster



Treatment Cluster

8.0 Definition and Abbreviation

PK : Primary Key

FK : Foreign Key

NN : Not Null

PFK : Primary Foreign Key

N : Null