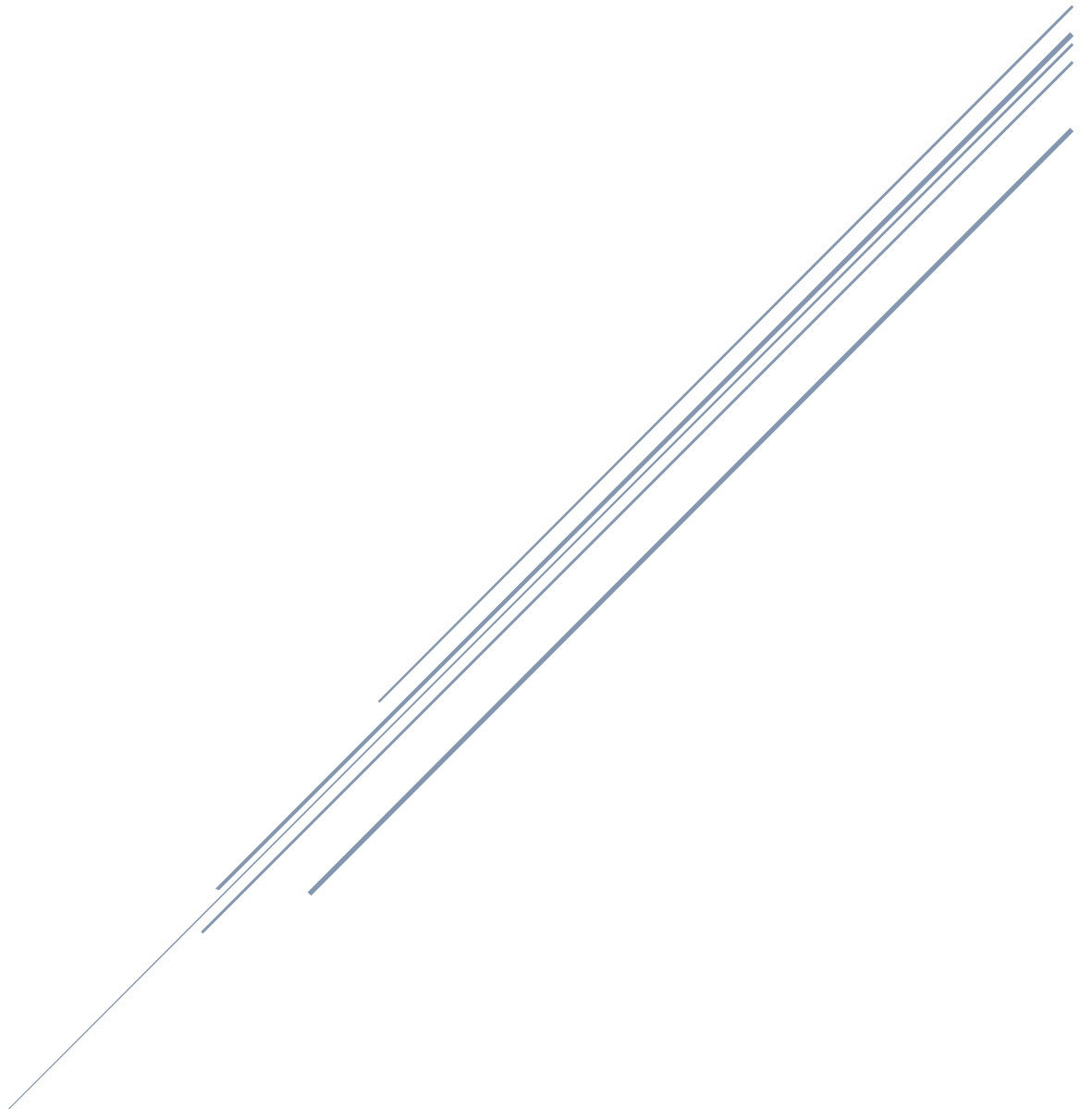


BUSINESS RULES

Dental Office

Version 4



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Revision History:

Version	Changes Made	Date
Version 1	Initial Document	10/15/2019
Version2	Added Definitions to the subject areas, Attributes defined for entities, Improved Overview	10/30/2019
Version 3	Added improved high-level model, Entities and their Attributes	11/1/2019
Version 4	Group Level Draft – Merged In Scope and Out Scope Items, Attributes, Entities and High-level Model	11/15/2019

Overview:

This document comprises of the Business rules which are In scope and Out of Scope, Object Models and High-level Diagrams required to build a database for a dental office. The report gives a brief explanation of what data needs to be stored along with its attributes and datatypes for the developers. The high-level model depicts the relations between the major subject areas along with the attributes. This report covers the main subject areas like the Patients, Dentists, Appointments, Payments etc. along with the essentials associated with them are stored here.

A patient books an appointment at the dental office. The patient's basic data is captured, the appointment details that the patient has made are stored. An appointed dentist will provide the treatment for that patient. The notes, payments, inventory related to the appointment will be taken care of.

Audience:

The database developers, stakeholders and the people in the business are entitled to use this document for the correct understanding of how a dentist clinic database should be built and to get an overview about the various entities involved in this model.

Main Subject Areas:

1. **Recipient:** The recipient subject area contains the details of an individual who is under dental care. The person may be waiting for this care or may be receiving it or may have already received it. The general demographic information of the recipient will be kept in this area. This segment should host the other areas with regards to the recipient such as the history and the insurance related information of the individual.
2. **Provider:** The provider subject area is where information regarding the caregivers at the dental facility will be housed. Information captured here will include the data necessary to allow a provider to perform work on behalf of the facility. Licenses, specializations and general demographic information will be kept in this area. This section should support the other areas within the system with regards to caregivers such as providing services and obtaining reimbursement for the services.
3. **Appointment:** This is an agreement made by the recipient and the provider facility to meet for dental. Information captured here will include the time, date and address of the agreement made. This area also provides support to other areas like the treatment catalog, prescription and the notes with regards to the agreement.
4. **Room:** Room subject area contains the information regarding the place at which the dental treatment will take place. Information here will contain the exact address like the room number, building etc. This subject area should support the other areas like the apparatus's used and required for the dental treatment.

In Scope Items:

ID	Rule	Area
IS01	Capture the patient's demographic information	Patient
IS02	Patient address and contact number can be one or more	Patient
IS03	Patient record can be one or more for a different purpose such as Diagnosis, Medication, Teeth Cleaning etc.	Patient
IS04	Capture the dentist demographic and official details	Dentist
IS05	A dentist can have multiple appointments in a single day	Dentist
IS06	Every appointment should contain a patient, dentist and a location for that appointment	Appointment
IS07	Every patient should have an appointment	Appointment / Patient
IS08	Dentist license data needs to be captured and they can have one or more	Dentist
IS09	Capture the history of the patient	Patient History
IS10	Patient history must include medical conditions, allergies.	Patient History
IS11	Each appointment can serve only one patient.	Appointment
IS12	Room can have multiple appointments but not at the same time	Room
IS13	Capture multiple payment options	Payment
IS14	A patient can have one or more insurances	Insurance
IS15	A patient can have a maximum of 3 insurances	Insurance
IS16	Dental equipment inventory must be maintained	Equipment
IS17	Maintenance for equipment is monitored	Equipment
IS18	Every entity should have name which alone can be used to get access to all the information regarding the entities.	All
IS19	Every invoice must have patient information and billing status	Invoice
IS20	Every invoice must be referenced with the appointment	Invoice
IS21	Treatment Catalog must list all the available services	Treatment Catalog
IS22	A price should be assigned for every service in the treatment catalog	Treatment Catalog
IS23	A prescription can have on or many prescribed drugs	Prescription
IS24	Prescription should be referenced with patient history	Prescription / Patient History
IS25	Only dentist can create notes	Notes
IS26	Notes should be referenced with appointment	Notes / Appointment
IS27	Patient visit status should be recorded	Patient
IS28	If the insurance does not cover the entire amount of the treatment an invoice should be generated for the remaining amount.	Invoice
IS29	A patient can have prescription from more than one doctor.	Prescription
IS30	It's not mandatory that every patient will be prescribed after the treatment.	Prescription

IS31	Each patient record can be for different treatments such as root canal, bleaching etc.	Patient History
IS32	Invoice must be generated after the treatment.	Invoice
IS33	Every revising patient will have patient history and treatment history which should be tracked.	Patient History
IS34	Only treatment present in the treatment catalogue will be offered in the dental office	Treatment catalogue
IS35	Room will be allocated depending on the date and time of the appointment.	Room
IS36	Patient can see multiple dentist during the treatment period.	
IS37	There should be only one entry per patient in case of multiple visits.	Patient
IS38	Only a health care dentist can provide prescription to a patient.	Prescription
IS39	One room can host multiple appointments in a day	Room

Out of Scope Items:

ID	Rule	Area
OS01	No multiple entries in the patient entity for the same person	Patient
OS02	No multiple entries in the dentist entity for the same person	Dentist
OS03	The other staff like nurse, cleaning staff, assistants etc. are not included	
OS04	Payroll and Human resource information	
OS05	Inventory for supplies	Supplies
OS06	Location change not included	Location
OS07	Emergency appointment scheduling is not included	Appointment
OS08	Security measures for patient and dentist information	Patient / Dentist
OS09	Dentist License Renew	
OS10	Multiple Locations for Dentist	
OS11	Feedback by patients for the dentist is not recorded.	Patient
OS12	People who work in office but do not participate in care of patient are not tracked in the system.	
OS13	Cost involved in maintaining dentists parking is not included	
OS14	Cost of the medicines prescribed to the patient will not be tracked in the system.	Invoice
OS15	Storing scanned files of patient documents	
OS16	Allowing patients to book multiple appointments in a day.	Appointment
OS17	Allowing patients to book emergency appointments.	Appointment
OS18	Time spent by the patient in the waiting room.	
OS19	Online consulting between patient & dentist.	Dentist
OS20	Number of patients treated, or number of surgeries performed by the dentist.	Dentist
OS21	Any sensitive piece of information (say SSN) as primary key.	
OS22	Dental plans or discount schemes.	Treatment Catalogue
OS23	Reusable equipment used during the treatment are not charged for	
OS24	More than 2 payment methods at a time.	
OS25	Track of equipment like printers, telephone	
OS26	Information about parking facilities should not be tracked	
OS27	Walk-in i.e. patients without prior appointments not to be tracked.	
OS28	The details of the purchase of prescribed drugs should not be tracked.	
OS29	No method for discounts or membership plans for regular patients.	
OS30	Information about the treatment which are not available at the dental office Should not be tracked.	

Entities and Attributes:

Index for Constraints:

PK – Primary Key

NN – Not Null

FK – Foreign Key

1: **Dentist** - This entity houses the demographic details of a provider in the dental system. This person must be licensed by the state they are operating in to perform general dentistry. A dentist can have multiple licenses. Dental assistants and other office staff are not represented here.

Attribute	Data Type	Constraints	Definition & Example
Dentist_ID	Int	PK, NN	A unique ID given to the dentist once they register with their license. E.g. 2
First_Name	Varchar (20)	NN	The first name of the dentist. E.g. Sahil
Last_Name	Varchar (20)	NN	The last name of the dentist. E.g. Bagwan
Specialization	Varchar (200)		An area in dental care the dentist is an expert in. E.g. Pedodontics
License No.	Varchar (7)	NN	The number of the dental license the dentist has registered. E.g. DN8735D
Email ID	Varchar (50)	NN	An email ID associated with the dentist for contact purposes. E.g. sahil@gmail.com

2: **Patient** - This entity contains the details of a person under dental care. The person may be waiting for this care or may be receiving it or may have already received it. This entity contains the personal details of the person like the contact details, name and address.

Attribute	Data Type	Constraints	Definition & Example
Patient_ID	Int	PK, NN	A unique ID given to the patient once they register with the dental care provider. E.g. 1
First_Name	Varchar (70)	NN	The first name of the patient. E.g. Sahil
Last_Name	Varchar (70)	NN	The last name of the patient. E.g. Bagwan
Address	Varchar (200)	NN	The primary address of the patient. E.g. 132 Hemenway Street, Boston, MA, 02115
Birthdate	Date	NN	The age of the patient in years. E.g. 14/10/1995
Email ID	Varchar (50)	NN	An email ID associated with the patient. E.g. sahil@gmail.com
Contact No	Char (13)	NN	The patients contact number. E.g. +91 8573905177

3: **Appointment** - This is an agreement made by the patient and doctor to meet at a specific time, date and location. A patient can schedule an appointment in the available slots. This entity contains the basic information about the patient, the dentist associated with it and the location for the appointment.

Attribute	Data Type	Constraints	Definition & Example
Appointment_ID	Int	PK, NN	A unique ID given to every appointment once the patient schedules one. E.g. 123
Date	Date	NN	On what date is the appointment scheduled. E.g. 10/10/2019
Time	Date	NN	At what time is the appointment scheduled. E.g. 10:30 AM
Room_ID		FK	Place at which the appointment will take place. E.g.
Patient_ID	Int	FK	This will be a reference to the Patient_ID from the patient entity.
Dentist_ID	Int	FK	This will be a reference to the Dentist_ID from the patient entity.
Location_ID	Int (2)	FK	This will be a reference to the Location_ID from the location entity.

4: **Patient History** - A summary of the patient's medical history that is updated when first visiting the practice and yearly or per visit thereafter. It comprises of the list of medications given to the person or any other medical conditions of the person and if the person has any type of allergies.

Attribute	Data Type	Constraints	Definition & Example
History_id	Int	PK, NN	Contains the identification number used to uniquely fetch the patient's history and records
Description	Varchar (MAX)		The history of the patient including dental history and other medical conditions and allergies. E.g. Tooth Number 17 removed. Allergic to latex.
Patient_ID	Int	FK	This will be a reference to the Patient_ID from the patient entity.
Birthdate	Date	NN	Contains the birthdate of the patient. Eg: 11/15/1997

5: **Room** - This entity defines a physical space where a dental service will take place. The room and the unit number are represented over here. Contact information of the provider is not included in this entity.

Attribute	Data Type	Constraints	Definition & Example
Room_Number	Int (3)	PK, NN	A unique ID given to every location where the dental appointment will be held. E.g. 3
Address	Varchar(200)	NN	It is defined as the physical address of the room. 23 Buckey Ave, Boston, MA.
IsAvailable	Boolean	NN	Check for the room if it is available or not. E.g. Yes

6: **Treatment Catalog** - An organized collection of all the different types of treatments available in a dental system. A cost can be associated with every treatment. Information about the dentist and the patient is not represented here.

Attribute	Data Type	Constraints	Definition & Example
Treatment_Number	Int	NN	A unique ID given to every treatment in the catalog. E.g. 27
Price	Float	NN	A cost associated with every treatment in the catalog. E.g. 300.5\$
Description	Varchar(max)	NN	Description for every treatment in the catalog. E.g. Braces – A dental brace is a device used to correct the alignment of teeth and bite-related problems. Braces straighten teeth by exerting steady pressure on the teeth.

7: **Insurance** - This entity holds the information about the insurance plans a patient has. A person can have one or more insurance plans but a maximum of three.

Attribute	Data Type	Constraints	Definition & Example
Insurance_ID	Int	NN	A unique ID given to every insurance the patient has. E.g. 2134
Description	Varchar(max)	NN	Details about the insurance like what the insurance covers, the coverage amount, how much is the cover etc. E.g. This insurance covers 70% of the cost for braces up to a 1000\$.
Insurance_company_name	Varchar(100)	NN	Contains the name of the insurance company. Eg: Sunshine Insurance
Patient_ID	Int	FK	This will be a reference to the Patient_ID from the patient entity.

8: **Invoice** - A bill generated for the treatment taken by the patient. This entity is represented by the list of the treatments that the patient has undergone and the associated price total for those treatments.

Attribute	Data Type	Constraints	Definition & Example
Invoice_Number	Int	NN	A unique number given to every invoice generated after an appointment has been completed. E.g. 856944
Description	Varchar(max)	NN	Details about the treatment done, the cost associated with that treatment and the payment details. E.g. New braces added. Total Cost 700\$ and payment received.
Patient_ID	Int	FK	This will be a reference to the Patient_ID from the patient entity.
Appointment_ID	Int	FK	A reference to the Appointment_ID from the appointment entity.
Amount	Float	NN	Amount to be paid to the dentist office.
Status	Boolean	NN	Used to check the status of the payment. Eg: Yes.
Date	Date	NN	It is the date at which invoice has been generated. 11/1/2019

9: **Equipment** - This unit holds the data about the dental equipment present in a dental office. It holds the maintenance details for the machines.

Attribute	Data Type	Constraints	Definition & Example
Item_ID	Int	NN	A unique number given to every invoice generated after an appointment has been completed. E.g. 856944

Description	Varchar(max)	NN	Information about the item and other essential data like safety instructions.
Price	Float	NN	A cost associated with the equipment in the dental office used for dental treatment. E.g. 800\$
Maintenance_Date	Date	NN	The next due date where the maintenance activity of the item needs to be done. E.g. 10/20/2022
Warranty	Int (2)	NN	Warranty for the item in number of years. E.g. 2

10: **Supplies** - Includes all the items that are required during a dental treatment. These items are not included in the billing statement of the treatment.

Attribute	Data Type	Constraints	Definition & Example
Supply_ID	Int	NN	A unique number given to every type of supply. E.g. All the Gloves will be under one ID 4.
Name	Varchar (30)	NN	Name of the supply. E.g. Gloves, Syringes
Price	Float	NN	A cost associated with the supplies. E.g. 200\$
Purchase_Date	Date	NN	Date when the supplies were purchased. E.g. 4/4/2019
Quantity	Int (5)	NN	Quantity of the supply available. E.g. 200

11: **Prescription** - A dentist's order for the preparation and administration of a drug or device for a patient after the patient has received a dental service. This entity only contains the drugs list and a schedule for those drugs.

Attribute	Data Type	Constraints	Definition & Example
Prescription_ID	Int	PK, NN	Contains the identification number used to identify and track each prescription uniquely. Eg:122
Prescription_Details	Varchar (max)	NN	The drugs prescribed by the dentist to the patient in that appointment.
Appointment_ID	Int	FK	A reference to the Appointment_ID from the appointment entity.

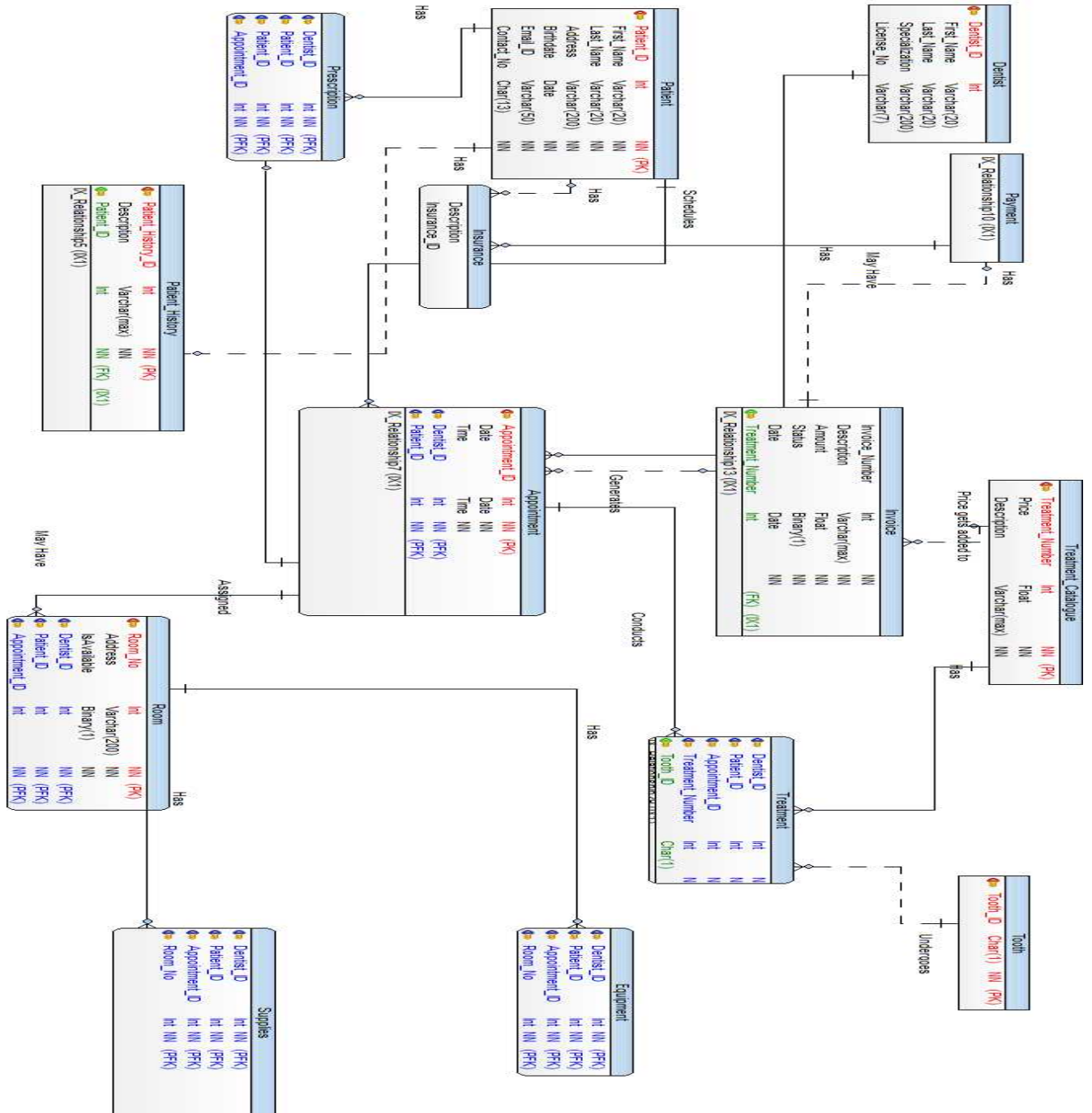
12: **Payment** - This entity tracks the details of the payments made by a patient for the dental services. The types of payments by which the patient can pay is included here.

Attribute	Data Type	Constraints	Definition & Example
Payment_Status	Boolean	NN	Status for the invoice if the payment is made or not. E.g. Pending
Payment_Type	Varchar (20)	NN	The mode of payment used to pay the bill. E.g. Cash
Invoice_ID	Int	FK, PK	A reference to the Invoice_ID from the invoice entity.
Insurance_ID	Int	FK	A reference to the Insurance_Number from the insurance entity.

13: **Tooth** - This entity is related mainly to patients for the database but also has a relation with the Treatment entity for tracking different treatments performed on it. Treatment can be performed on a single tooth or a set of teeth.

Attribute	Data Type	Constraints	Definition & Example
Tooth_ID	Int	PK, NN	Unique identifier for each tooth
Treatment_Id	Int	FK	A reference to the Treatment_ID from the treatment entity.
Patient_Id	Int	FK	A reference to the Patient_ID from the Patient entity.

High Level Model:



Data Model:

