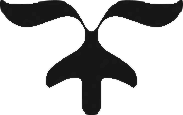


**Dental Chamber aide**

**Software Requirement Specification**



**March 20, 2017**

**Institute of information technology**

**University of Dhaka**

**Dental Chamber Aide**

**Software Project Lab-ll**

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20-03-2017

**Letter of Transmittal**

20 March, 2017

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Subject: Submission of final report on software requirements specifications of Dental Chamber Aide.

Dear Sir,

With due respect, we are pleased to submit the final report on software requirements specifications of Dhaka University Club that you had asked. Although this report may have shortcomings we did try our level best to produce an acceptable report. We would be highly obliged if you overlooked our mistakes and accepted our effort we put in this report.

Sincerely yours,

Afrina Sharmin (BSSE 0727)

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We are grateful to the Institute of Information Technology for giving us the opportunity to do such a project.

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**Abstract**

This document contains the software requirements and specifications for Dental Chamber Aide. It contains a scenario based model, data based model, class based model and behavioral model. Using this document as a guide, developers can understand the current working procedures of the dental chamber and automate it accordingly.

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# Chapter 1: Introduction

This chapter is intended to specify the purpose of this document and the intended audiences of it.

## Purpose

This document is the Software Requirement Specification (SRS) for the Dental Chamber Aide (DCA) of Confident Dental Care. It contains functional, non-functional and support requirements and establishes a requirements baseline for the development of the system. The requirements contained in the SRS are independent, uniquely numbered, and organized by topic. The SRS serves as official means of communicating user requirements to the developer and provides a common reference point for both the developer team and stakeholder community. The SRS will evolve over time as users and developers work together to validate, clarify and expand its contents.

## Modeling Approach

For preparing the SRS at first a quality function deployment (QFD) was prepared by discussing with the stakeholders. Then a complete scenario was prepared in textual form stating each of the requirements in details. From this text based scenario, four graphical models have been created: scenario based model, data model, class based model and behavioral model. Each of these models will provide valuable insights on how the current system works and how a software for it can be developed.

## Scope of the Report

This SRS report is only concerned about the back-end procedures or analysis classes. Only details about how the working procedures should be implemented are discussed here. Any front-end designs such as user interface or user experience are beyond the scope of this report.

Also, this report does not discuss about creating the software. It discusses if such a software is to be made what steps should it follow to automate the current existing system.

## Intendment Audience

This SRS is intended for several audiences including the customers as well as the project managers, designers, developers, and testers.

* The customer will use this SRS to verify that the developer team has created a product that is acceptable to the customer.
* The project managers of the developer team will use this SRS to plan milestones and a delivery date, and ensure that the developing team is on track during development of the system.
* The designers will use this SRS as a basis for creating the system’s design. The designers will continually refer back to this SRS to ensure that the system they are designing will fulfill the customer’s needs.
* The developers will use this SRS as a basis for developing the system’s functionality. The developers will link the requirements defined in this SRS to the software they create to ensure that they have created software that will fulfill all of the customer’s documented requirements.
* The testers will use this SRS to derive test plans and test cases for each documented requirement. When portions of the software are complete, the testers will run their tests on that software to ensure that the software fulfills the requirements documented in this SRS. The testers will again run their tests on the entire system when it is complete and ensure that all requirements documented in this SRS have been fulfilled.

# Chapter 2: Inception

In this chapter, the Inception part of the SRS will be discussed briefly.

## Introduction

Inception is the beginning phase of requirements engineering. It defines how does a software project get started and what is the scope and nature of the problem to be solved. The main goal of the inception phase is to identify concurrence needs and conflict requirements among the stakeholders of a software project. At project inception, we establish a basic understanding of the problem, the people who want a solution, the nature of the solution that is desired, and the effectiveness of preliminary communication and collaborations between the other stakeholders and the software team.

To establish the ground work we have worked with the following factors related to the inception phases:

* List of stakeholders
* Recognizing multiple viewpoints
* Working towards collaboration
* Requirements questionnaire

## List of Stakeholders

Stakeholder refers to any person or group who will be affected by the system directly or indirectly. Stakeholders include end-users who interact with the system and everyone else in an organization that may be affected by its installation. At inception, a list of people who will contribute input as requirements is elicited. The initial list will grow as stakeholders are contacted because every stakeholder will be asked: “Whom else do you think I should talk to?”

To identify the stakeholders we consulted with General Manager and asked her following questions:

* Who is paying for the project?
* Who will be using the project outcomes?
* Who gets to make the decisions about the project (if this is different from the money source)?
* Who has resources I need to get the project done?
* Whose work will my project affect? (During the project and also once the project is completed).

Concluding thoughts on Stakeholders thoughts we identified the following stakeholders for our Dental Chamber Aide

**Patients:** Patients will look for dental service using DCA. They will fix appointments with dentists via DCA. Their prescription will also be handed to them by DCA.

**Dentist:** Dentists will use DCA to manage patients, appointments, history etc. DCA will help dentist to manage their chambers.

**SMS Service Provider:** DCA will send sms notification to patients about their appointments. These sms’s will be sent via SMS service provider.

**Email Service Provider:** DCA will send email notification and portable document of the prescription. These emails will be sent via email service provider.

**System Administrator:** System Administrator oversees the whole system. He is able to control everything in the system.

**Confident Dental Care:** The software is made for Confident Dental Care. The financial aspects of the software and the functional design are made considering the terms and policies of Confident Dental Care.

## Recognizing Multiple View Point

Different stakeholders achieve different benefits from the system. Consequently, each of them has a different view of the system. So we have to recognize the requirements from multiple points of view, as well as multiple views of requirements. Assumptions are given below:

**Patient’s View Point:**

* Easy Access
* Find dentists’ appointment according their convenient time
* Get Reminders of appointments

**Dentist’s View Point:**

* User friendly
* Having a profile
* Maintain patients easily
* Manage appointment system
* Create prescription easily
* Store patient’s information
* View Patient’s diagnosis history

**SMS Service View Point**

**Email Service View Point**

**System Administrator View Point**

* High Security
* Having access of everything
* Store registered account information
* Keep track of everything

**Confident Dental Care View Point**

* Easy access
* Efficient system
* Properly manage the chambers
* Error free system
* Cost within budget
* Less maintenance cost

## Working towards Collaboration

Every stakeholder has their own requirements. There are some common and conflicting requirements of our stakeholder. Considering all the stakeholders view and ambiguity that can exist among the requirements, the final requirements are as following:

* Easy access
* User friendly
* Managing patient’s appointment system
* Notification for appointment schedule
* Easy to create prescription
* Keeping information of registered account
* Automation of prescription generation
* Store patient’s diagnosis information
* View patient’s information
* Properly manage the system

## Conclusion

Inception phase helped us to establish basic understanding about the Confident Dental Care, identify the stakeholders who will be benefited if this system becomes automated, define the nature of the system and the tasks done by the system and establish a preliminary communication with our stakeholders.

In our project, we have established a basic understanding of the problem, the nature of the solution that is desired and the effectiveness of preliminary communication and collaboration between the stake-holders and the software team. More studies and communication will help both side (developer and client) to understand the future prospect of the project. Our team believes that the full functioning document will help us to define that future prospect.

# Chapter 3: Elicitation

## Eliciting Requirements

The purpose of this chapter is to specify the elicitation part.

## Introduction

To complete the elicitation step we face many problems like problems of scope, problems of volatility and problems of understanding. However, this is not an easy task. To help overcome these problems, we have worked with the Eliciting requirements activity in an organized and systematic manner.

## Quality Function Deployment

QFD is the methods or quality management technique that translates the needs of the customer into technical requirements for the software. Ultimately the goal of QFD is to translate often subjective quality criteria into objective ones that can be quantified and measured and which can then be used to design and manufacture the product. It is a method for maximizing customer satisfaction from the software engineering process. We followed this methodology to identify the requirements for the project which are given below:

### Normal Requirements

1. User registration for each Dentist.
2. Automation for patient appointment system.
3. Automate prescription generation.
4. Keep patient information.
5. Creating patient profile providing patient’s history

### Expected Requirements

1. Registration for each patient.
2. Notify about appointment confirmation.
3. Providing a general medicine list where new medicine can be added.
4. Patient’s history searching option.

### Exciting Requirements

1. Confirm appointment via SMS.
2. Sent prescription to patient’s Email address.
3. Can research on a particular patient diagnosis.

## Usage Scenarios

Confident Dental Care is an organization providing dental health care to people with two branches in Gazipur and Uttara. Recently they have planned to automate their dentists’ respective chambers. *Dental Chamber Aide* (DCA) is a web-based solution that aims to automate the dentists’ chambers to a great extent. This automation includes the prescription generation, patient appointment and history management. Patients will have limited access to the web interface, only the patient appointment module. This section describes the scenario of this software including users, modules, etc.

**Types of Users**

DCA comprises three types of users named as patient, dentist and administrator. Patients are peoples who require dental health care from Confident Dental Care and want to be benefitted by DCA. Dentists are the main users of the system, who will provide dental services to the patients and retrieve and store various kinds of data regarding patient and the provided service. Administrator will oversee the whole system, manage dentists and bring changes to the system data.

**Registration and Authentication**

DCA does not require the patient neither to be registered nor to be authenticated in the system. Dentists are subject to both registration and authentication. Admin is the only person to authorize dentist registration. Information like Full Name, Email address, Contact Number, Username and Password are shared by both Admin and Dentist. All registered users will be authenticated by Username and Password. Dentists will have additional information e.g. BMDC registration number, Degree and corresponding institution, Designation, Room number (Chamber), Branch name, Days of availability in the week, Time of availability, Fees etc.

**Patient Appointment Management**

Patients can search the desired dentists by name, or time of availability and company branch. Patient's Name, Age, Gender, Email, Contact Number, brief description of the problem and desired time of appointment with selected dentist available at the desired time is required by DCA. Dentist can view the upcoming patient appointments for the day. Patients will be sent a reminders sms and a reminder email (if available) prior to the day of appointment. If dentist wishes to change the time of appointment, patient will be sent a sms and an email (if available) about adjusted time of appointment or cancellation of the appointment. Except Admin each user can change only update his/her own information.

**Patient History Management**

Dentist should be able to keep track of their patients’ symptoms, diagnosis, prescribed medicines and respective dozes, information about prior respiratory disease, hepatobiliary disease, cardiovascular disease, viral hepatitis/jaundice, neurological disorder, diabetes, TB, rheumatic fever, drug allergy, pregnancy, blood disease, personal history, surgical history, drug history, Allergic history, Socio Economic History, Brushing History etc. General information of the patients consists of weight, temperature, pulse, blood pressure, respiration rate etc. Endodontic Examination consists of affected tooth number, type of affection, presence pain, measure of pain, time and posture of pain, duration, initiated by, and relieved by, optionally if referred to other dentist and suggested tests. Diagnosis consists of suggested tests’ results and a brief description of the diagnosis by the dentist. Dentists expect to search their patients by age, gender, contact number, name and particular disease for future use.

**Prescription Generation**

Prescription consists of patient’s general information and dentist’s general information. Dentists’ will be able to have information about commonly used medicines and their standard doses during prescribing patient. A list of prescribed medicines and their doses will be mentioned in the prescription. This information in prescription will also be saved in patient’s history. Finally the prescription will be printable and a soft copy of the prescription will be emailed to the patient’s email and the printed hard copy will be handed over to the patient during the appointment. Dentist may advise common pre-stored tests to patients.

Suggestion

Only Admin can register new dentists or update existing dentists and can change any data corresponding to anyone at any time. And all the activities of the admin are logged in a log file.

# Chapter 4: Scenario Based Modeling

## 1. Introduction of Scenario Based Modeling

­­**Definition of Use Case**

A use case captures a contract that describes the system behavior under various conditions as the system responds to a request from one of its

**Stakeholders:**  In essence, a use case tells a stylized story about how an end user interacts with the system under a specific set of circumstances. A use case diagram simply describes a story using corresponding actors, who perform important role in the story and makes the story understandable for the users. The first step in writing a use case is to define that set of “actors” that will be involved in the story. Actors are the different people that use the system or product within the context of the function and behavior that is to be described. Actors represent the roles that people play as the system operators.

**Primary Actor:** Primary actors interact directly to achieve required system function and derive the intended benefit from the system. They work directly and frequently with the software.

**Secondary Actor:** Secondary actors support the system so that primary actors can do their work. They either produce or consume information.

## 4.2. Use Case Diagrams

Use case diagrams give the non-technical view of overall system.

### 4.2.1. System Description from Level-0 Use Case

After analyzing the user story we found three actors who will directly use the system as a system operator. Primary actors are those who will play action and get a reply from the system. On the other hand, secondary actors only produce or consume information.

Following are the actors of post examination system-

#### 4.2.1.1. Level-0 Use Case Diagram

* Primary Actors: Patients, Dentists and Admin of the system.
* Secondary Actors: All three actors are directly associated with the system. There are no secondary actors.
* It is level-0 use case diagram of the total system, *Dental Chamber Aide.*

**System**



Figure 1: Level-0 Use Case Diagram

### 4.2.2. Level-1 Use Case Diagram

* Primary Actors: Patient, Dentist and Admin
* Secondary Actors: As mentioned in level-0 all the users actively interact with the system. There is no secondary actor.
* In this figure the whole system is divided into four subsystems, namely - Registration and Authentication subsystem, Patient Appointment Management subsystem, Patient History Management subsystem and Prescription Generator subsystem.
* Actors related with corresponding subsystems are denoted in this figure.

**Dental Chamber Aide**

level1UseCase.png

Figure 2: Level-1 Use Case Diagram

#### 4.2.2.1. Registration and Authentication

* Primary Actors: Dentist and Admin
* Secondary Actors: Only Dentist and Admin interact with this subsystem. There are no secondary actors.
* This is level-1.1 use case model
* This is derived from level-1

**Ragistration & Authentication**

level1.png

Figure 3: Level-1.1 Use Case Diagram for Registration and Authentication

**Description:** This level represents the Registration and Authentication subsystem. Admin will create new dentist account and admin accounts. Admin can manage dentist accounts. Both admin and dentist are required to login providing username/email and password. Dentist can only update their authentication information where, admin can update and remove any dentist account. Both admin and dentist can request for a password reset link in case, they forgot their password.

**Admin:**

Action: Wants to login to the system

Reply: Enter your username/email and password

Action: Username/email and password provided, confirm login

Reply: Login successful

Action: Register/create a new dentist account

Reply: Enter dentist account information

Action: Dentist account information provided, confirm registration

Reply: New dentist account registered/created

Action: Register/create a new admin account

Reply: Enter admin account information

Action: Admin account information provided, confirm registration

Reply: New admin account registered/created

Action: Wants to update password

Reply: Enter old-password and new-password twice

Action: Old-password and new-password provided, confirm update

Reply: Password updated

Action: Recover Password

Reply: Enter email

Action: Email provided, confirm recovery

Reply: Password reset link sent to email

Action: Get list of registered accounts

Reply: List of registered accounts

Action: Update a dentist account

Reply: Enter dentist account id/username/email and update information

Action: Dentist account id/username/email and update information provided, confirm update

Reply: Dentist account updated

Action: Delete a dentist account

Reply: Enter dentist account id/username/email

Action: Dentist account id/username/email provided, confirm delete

Reply: Dentist account deleted

**Dentist:**

Action: Wants to login to the system

Reply: Enter your username/email and password

Action: Username/email and password provided, confirm login

Reply: Login successful

Action: Wants to update password

Reply: Enter old-password and new-password twice

Action: Old-password and new-password provided, confirm update

Reply: Password updated

Action: Recover Password

Reply: Enter email

Action: Email provided, confirm recovery

Reply: Password reset link sent to email

#### 4.2.2.2. Patient Appointment Management

* Primary Actors: Patient and dentist
* Secondary Actors: Third party SMS and emailing API
* This is level-1.2 use case model
* This is derived from level-1

**Patient Appointment Management**

level1-2.png

Figure 4: Level-1.2 Use Case Diagram for Patient Appointment Management

**Description:** Patients will be able view a list of dentists and their respective availability schedule. After filling up necessary information patient can fix an appointment with their desired dentist. Dentist can view a list of his/her appointments for that day. Under any unfortunate circumstances dentist can cancel or reschedule any appointment. Patient will receive a reminder notification via SMS and email (if available) on the previous day and 6 hours prior to the appointment. Patient will also be notified on cancellation or reschedule of appointment. SMS and email notifications are handled by third party SMS and Emailing API.

**Patient:**

Action: Get a list of dentist profile and their respective schedule

Reply: List of dentist profile and schedule

Action: Want to register for appointment

Reply: Enter necessary information

Action: Necessary information provided, confirm appointment registration

Reply: Appointment registration confirmed

Action: Receive reminder SMS/Email notification

Reply: Notified patient

Action: Receive cancellation/reschedule notification

Reply: Cancellation/reschedule notification sent

**Dentist:**

Action: View list of today’s appointments

Reply: List of today’s appointments

Action: Reschedule an appointment

Reply: Enter appointment id

Action: Appointment id provided, confirm reschedule

Reply: Reschedule confirmed

Action: Cancel an appointment

Reply: Enter appointment id

Action: Appointment id provided, confirm cancellation

Reply: Cancellation confirmed

**SMS and Emailing API:**

Action: Provide reminder notification message

Reply: Reminder notification message provided

Action: Reminder notification sent

Reply: Success logged in database

Action: Provide reschedule notification message

Reply: Reschedule notification message provided

Action: Reschedule notification sent

Reply: Success logged in database

Action: Provide cancellation notification message

Reply: Cancellation notification message provided

Action: Cancellation notification sent

Reply: Success logged in database

**4.2.2.3. Patient History Management**

* Primary Actor: Dentist
* Secondary Actor: Only dentist interacts with this subsystem. There is no secondary actor.
* This is level-1.3 use case diagram
* This is derived from level-1

**Patient History Management**

level1-3.png

Figure 5: Level-1.3 Use Case Diagram for Patient History Management

**Description:** During an appointment dentist has to fill up patient’s symptoms information. Any prior history to other diseases will go under disease information. General information contains current physical conditions like weight, BP, RR etc. Endodontic examination contains specific information about the problem of the patient. Dentist may suggest some tests to patient. Results of the suggested tests are also part of the patient's history. Dentist will be able to search their previous patient by patient id, email or contact number. Dentist will also be able to filter previous patients by age, sex, disease etc. for research studies.

**Dentist:**

Action: Create Patient history

Reply: Enter Symptoms, disease, general and endodontic information

Action: Symptoms information provided

Reply: Enter disease, general and endodontic information

Action: Disease information provided

Reply: Enter general and endodontic information

Action: Endodontic information provided

Reply: Suggest Tests

Action: Add Test suggestion

Reply: Test suggestion added

Action: Input test result

Reply: Test result saved

Action: Confirm Save Patient History

Reply: Patient History saved

Action: Search Patient History

Reply: Enter patient id/contact number/email/history id

Action: Patient id/contact number/email/history id provided

Reply: Patient History

Action: Update Patient history

Reply: Enter patient id/contact number/email/history id

Action: Patient id/contact number/email/history id provided

Reply: Enter Update information

Action: Update information provided

Reply: Patient history updated

Action: Filter patient history

Reply: Enter filtering attribute

Action: Filtering attribute provided

Reply: Filtered list of patient history

**4.2.2.4. Prescription Generator**

* Primary Actor: Dentist
* Secondary Actor: Patient, Third Party Emailing API
* This is level-1.4 use case diagram
* This is derived from level-1

**Prescription Generation**

level1-4.png

Figure 6: Level-1.4 Use Case Diagram for Prescription Generator

**Description:** Dentist will be able to have list of commonly used medicines and their standard doses along with their common use cases. Dentist can add from the list of medicines to prescription and alter standard dose. For convenience dentist can add a new medicine, it’s standard dose and other information. Dentists may add extra notes under each medicine added to the prescription. The prescription is then parsed and will produce a printable document. A hard copy of the Prescription will be handed over to the patient and marked as handed over. A soft copy of the prescription will be emailed to patient. The prescription is attached with patient’s history.

**Dentist:**

Action: Get list of commonly used medicines

Reply: List of commonly used medicines

Action: Add to the list of commonly used medicines

Reply: Enter Information of the medicine

Action: Information of the medicine provided

Reply: Medicine added

Action: Add medicine and note to prescription

Reply: Medicine and note added to prescription

Action: Save and Print prescription

Reply: Prescription parsed and printed and Saved in database

**Patient:**

Action: Get hard copy of prescription

Reply: Hard copy prescription handed over marked

Action: Get soft copy email of prescription

Reply: soft copy prescription emailed

**Emailing API:**

Action: Prescription email message content

Reply: Prescription email message content sent

Action: Prescription emailed to patient

Reply: Mark prescription as emailed

# 4.3. Activity & Swim lane Diagrams

**Activity Diagram for Registration from level 1.1 use case:**



Figure 7: Activity diagram of Registration

**Swim lane Diagram for Registration from level 1.1 use case:**



Figure 8: Swim lane diagram for Registration

**Activity Diagram for Authentication from level 1.1 use case:**



Figure 9: Activity diagram of Authentication

**Swim lane Diagram for Authentication from level 1.1 use case:**



Figure 10: Swim lane diagram for Authentication

**Activity Diagram for Update & Recovery of Authentication from level 1.1 use case:**



Figure 11: Activity diagram of Update & Recovery of Authentication

**Swim lane Diagram for Update & Recovery of Authentication from level 1.1 use case:**



Figure 12: Swim lane for Update & Recovery of Authentication

**Activity Diagram for Appointment Registration from level 1.2 use case:**



Figure 13: Activity diagram of Appointment Registration

**Swim lane Diagram for Appointment Registration from level 1.2 use case:**



Figure 14: Swim lane for Appointment Registration

**Activity Diagram for View Scheduled Appointment from level 1.2 use case:**



Figure 15: Activity diagram of View Scheduled Appointment

**Swim lane Diagram for View Scheduled Appointment from level 1.2 use case:**

****

Figure 16: Swim lane for View Scheduled Appointment

**Activity Diagram for Notification from level 1.2 use case:**



Figure 17: Activity diagram of Notification

**Swim lane Diagram for Notification from level 1.2 use case:**

****

Figure 18: Swim lane for Notification

**Activity Diagram for Patient History Management from level 1.3 use case:**



Figure 19: Activity diagram of Patient History Management

**Swim lane Diagram for Patient History Management from level 1.3 use case:**



Figure 20: Swim lane for History Management

**Activity Diagram for Prescription Generator from level 1.4 use case:**



Figure 21: Activity diagram of Prescription Generation

**Swim lane for Prescription Generator from level 1.4 use case:**



Figure 22: Swim lane for Prescription Generation

# Chapter 5: Data Model

## Data Modeling Concept

If software requirements include the need to create, extend or interface with a data base or if complex data structures must be constructed and manipulated, the software team choose to create data model as part of overall requirements modeling. The entity relationship diagram (ERD) defines all data objects that are processed within the system, the relationships between the data objects and the information that how the data objects are entered, stored, transformed and produced within the system.

## Grammatical Parsing and Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| SL  No. | Nouns | P/S | Attributes |
|  | Dental Chamber Aide | P |  |
|  | Confident Dental Care | P |  |
|  | Organization | P |  |
|  | Dental | P |  |
|  | Health | P |  |
|  | People | P |  |
|  | Branch Name | S | 8, 9 |
|  | Gazipur | S |  |
|  | Uttara | S |  |
|  | Chamber | P |  |
|  | Dentist | S | 7, 21 – 33, 88 |
|  | Patient | S | 22, 23, 34 – 36, 86 |
|  | Appointment | S | 21, 22, 23, 34, 38, 86, 88 |
|  | History | S | 20, 40, 44, 81, 86, 89 |
|  | Prescription | S | 21, 34 – 36, 42, 43, 86, 88, 89 |
|  | User | S | 22 - 25, 88 |
|  | System | P |  |
|  | Administrator | p |  |
|  | Admin | S | 22 - 25, 88 |
|  | General Information | S | 62 - 66 |
|  | Dentist Name | S |  |
|  | Email | S |  |
|  | Contact Number | S |  |
|  | Username | S |  |
|  | Password | S |  |
|  | BMDC Registration Number | S |  |
|  | Degree | S |  |
|  | Corresponding Institution | S |  |
|  | Designation | S |  |
|  | Room Number | S |  |
|  | Days of availability | S |  |
|  | Time of availability | S |  |
|  | Fees | S |  |
|  | Patient Name | S |  |
|  | Age | S |  |
|  | Gender | S |  |
|  | Description | S |  |
|  | Time of appointment | S |  |
|  | SMS | S |  |
|  | Symptoms Information | S | 67 - 75 |
|  | Diagnosis | P |  |
|  | Medicine | S | 48, 81 |
|  | Doze | S |  |
|  | Disease Information | S | 45 - 61 |
|  | Respiratory Disease | S |  |
|  | Hepatobiliary Disease | S |  |
|  | Cardiovascular Disease | S |  |
|  | Viral Hepatitis | S |  |
|  | Neurological Disorder | S |  |
|  | Diabetes | S |  |
|  | TB | S |  |
|  | Rheumatic Fever | S |  |
|  | Drug Allergy | S |  |
|  | Pregnancy | S |  |
|  | Blood Disease | S |  |
|  | Personal History | S |  |
|  | Surgical History | S |  |
|  | Drug History | S |  |
|  | Allergic History | S |  |
|  | Socio Economic History | S |  |
|  | Brushing History | S |  |
|  | Weight | S |  |
|  | Temperature | S |  |
|  | Pulse | S |  |
|  | Blood Pressure | S |  |
|  | Respiration rate | S |  |
|  | Endodontic Examination | S |  |
|  | Tooth Number | S |  |
|  | Type of Affection | S |  |
|  | Presence Pain | S |  |
|  | Measure of Pain | S |  |
|  | Time Posture of Pain | S |  |
|  | Duration | S |  |
|  | Initiated by | S |  |
|  | Relieved by | S |  |
|  | Tests | S | 77, 78, 80 |
|  | Test Name | S |  |
|  | Normal Value | S |  |
|  | Medicine Name | S |  |
|  | Test Type | S |  |
|  | Test Result | S | 77, 78, 80, 21, 82 - 89 |
|  | Result | S |  |
|  | Unit | S |  |
|  | Comments | S |  |
|  | Supporting File | S |  |
|  | Patient ID | S |  |
|  | Diagnostic Center Name | S |  |
|  | User ID | S |  |
|  | Date | S |  |

Table 1: Noun Identification

## Potential Data Objects

**1. Branch Name:** Gazipur, Uttara

**2. Dentists:** User ID, Dentists Name, Branch Name, Email, Contact Number, Username, Password, BMDC Registration Number, Degree, Corresponding Institution, Designation, Room Number, Days of availability, Time of availability, Fees

**3. Patient:** Patient ID, Patient Name, Age, Gender, Email, Contact Number

**4. Appointment:** User ID, Patient ID, Time of appointment

**5. History:** Symptoms Information, General Information, Disease Information, Test Result

**6. Prescription:** Prescription ID, Patient ID, User ID, Date, Medicine, Test

**7. Medicine:** Medicine ID, Medicine Name, Doze

**8. User:** User ID, Username, Password, Contact Number, Email

**9. Admin:** User ID, Username, Password, Contact Number, Email

**10. General Information:** Weight, Temperature, Pulse, Blood Pressure, Respiration Rate, Date

**11. Symptoms Information:** Endodontic Examination, Tooth Number, Type of Affection, Presence Pain, Measure of Pain, Time Posture of Pain, Duration, Initiated by, Relieved by, Date

**12. Disease Information:** Respiratory Disease, Hepatobiliary Disease, Cardiovascular Disease, Viral Hepatitis, Neurological Disorder, Diabetes, TB, Rheumatic Fever, Drug, Allergy, Pregnancy, Blood Disease, Personal History, Surgical History, Drug History, Allergic History, Socio Economic History, Brushing History, Date

**13. Test:** Test Name, Test Type, Normal Value

**14. Test Results:** Test ID, Result, Unit, Comment, Supporting File, Diagnostic Center Name, Patient ID, Dentist Name, Date

## Final Data Objects

|  |  |  |
| --- | --- | --- |
| **No.** | **Entity** | **Attributes** |
|  | **Dentist** | User ID, Dentists Name, Branch Name, Email, Contact Number, Username, Password, BMDC Registration Number, Degree, Corresponding Institution, Designation, Room Number, Days of availability, Time of availability, Fees |
|  | **Patient** | Patient ID, Patient Name, Age, Gender, Email, Contact Number |
|  | **Appointment** | User ID, Patient ID, Time of appointment |
|  | **Prescription** | Prescription ID, Patient ID, User ID, Date |
|  | **Medicine** | Medicine ID, Medicine Name, Doze |
|  | **User** | User ID, Username, Password, Contact Number, Email |
|  | **Admin** | User ID, Username, Password, Contact Number, Email |
|  | **General Information** | General Information ID, Patient ID, Weight, Temperature, Pulse, Blood Pressure, Date |
|  | **Symptoms Information** | Symptoms ID, Patient ID, Date, Endodontic Examination, Tooth Number, Type of Affection, Presence Pain, Measure of Pain, Time Posture of Pain, Duration, Initiated by, Relieved by |
|  | **Disease Information** | Disease Information ID, Date, Respiratory Disease, Hepatobiliary Disease, Cardiovascular Disease**,** Viral Hepatitis**,** Neurological Disorder**,** Diabetes**,** TB**,** Rheumatic Fever**,** Drug, Allergy**,** Pregnancy**,** Blood Disease**,** Personal History**,** Surgical History, Drug History, Allergic History, Socio Economic History, Brushing History |
|  | **Test** | Test ID, Test Name, Test Type, Normal Value |
|  | **Test Result** | Test Result ID, Test ID, Result, Unit, Supporting File, Comment, Patient ID, Dentist Name, Diagnostic Center Name, Date |

Table 2: Final Data Objects

## Data Object Relationship

### 5.5.1. Dental Chamber Aide

DataObjectRelation.png

Figure 23: Data Object Model of DCA

## Entity Relation Diagram

### 5.6.1. Dental Chamber Aide for Confident Dental Care



Figure 24: Entity Relationship Diagram

## Schema Tables

|  |  |  |
| --- | --- | --- |
| 1. **User** | | |
| **Attributes** | **Type** | **Size** |
| User\_id | NUMBER | 10 |
| username | VARCHAR2 | 20 |
| password | VARCHAR2 | 30 |
| Contact\_number | VARCHAR2 | 15 |
| Email | VARCHAR2 | 30 |

Table 3: Schema Table for User

|  |  |  |
| --- | --- | --- |
| 1. **Admin** | | |
| **Attributes** | **Type** | **Size** |
| User\_id | NUMBER | 10 |

Table 4: Schema Table for Admin

|  |  |  |
| --- | --- | --- |
| 1. **Dentists** | | |
| **Attributes** | **Type** | **Size** |
| User\_id | NUMBER | 10 |
| Dentist Name | VARCHAR2 | 30 |
| Branch Name | VARCHAR2 | 10 |
| Email | VARCHAR2 | 20 |
| Contact Number | VARCHAR2 | 10 |
| Password | VARCHAR2 | 10 |
| BMDC Registration Number | VARCHAR2 | 15 |
| Degree | VARCHAR2 | 25 |
| Corresponding Institution | VARCHAR2 | 20 |
| Designation | VARCHAR2 | 10 |
| Room Number | VARCHAR2 | 10 |
| Days of availability | VARCHAR2 | 10 |
| Time of availability | VARCHAR2 | 10 |
| Fees | VARCHAR2 | 10 |
| Appointment\_time | VARCHAR2 | 20 |

Table 5: Schema Table for Dentist

|  |  |  |
| --- | --- | --- |
| 1. **Patients** | | |
| **Attributes** | **Type** | **Size** |
| Patient\_id | NUMBER | 10 |
| Patient Name | VARCHAR2 | 30 |
| Age | NUMBER | 5 |
| Gender | VARCHAR2 | 10 |
| Email | VARCHAR2 | 10 |
| Contact Number | VARCHAR2 | 10 |

Table 6: Schema Table for Patient

|  |  |  |
| --- | --- | --- |
| 1. **Appointment** | | |
| **Attributes** | **Type** | **Size** |
| User\_id | NUMBER | 10 |
| Patient\_id | NUMBER | 10 |
| Time of appointment | VARCHAR2 | 20 |

Table 7: Schema Table for Appointment

|  |  |  |
| --- | --- | --- |
| 1. **Medicine** | | |
| **Attributes** | **Type** | **Size** |
| Medicine\_id | NUMBER | 10 |
| Medicine Name | VARCHAR2 | 25 |
| Doze | VARCHAR2 | 10 |

Table 8: Schema Table for Medicine

|  |  |  |
| --- | --- | --- |
| 1. **Test** | | |
| **Attributes** | **Type** | **Size** |
| Test\_id | NUMBER | 10 |
| Test Name | VARCHAR2 | 30 |
| Test Type | VARCHAR2 | 20 |
| Normal Value | VARCHAR2 | 20 |

Table 9: Schema Table for Test

|  |  |  |
| --- | --- | --- |
| 1. **Test Result** | | |
| **Attributes** | **Type** | **Size** |
| TestResult\_id | NUMBER | 10 |
| Test\_id | NUMBER | 10 |
| Result | VARCHAR2 | 20 |
| Unit | VARCHAR2 | 20 |
| Supporting File | VARCHAR2 | 20 |
| Comment | VARCHAR2 | 20 |
| Patient\_id | NUMBER | 10 |
| Dentist Name | VARCHAR2 | 30 |
| Diagnosis Center Name | VARCHAR2 | 20 |
| Date | DATE | 10 |

Table 10: Schema Table for Test Result

|  |  |  |
| --- | --- | --- |
| 1. **Prescription** | | |
| **Attributes** | **Type** | **Size** |
| Prescription\_id | NUMBER | 10 |
| Patient\_id | NUMBER | 10 |
| User\_id | NUMBER | 10 |
| Date | DATE | 10 |

Table 11: Schema Table for Prescription

|  |  |  |
| --- | --- | --- |
| 1. **Prescription Contains Test** | | |
| **Attributes** | **Type** | **Size** |
| Prescription\_id | NUMBER | 10 |
| Test\_id | NUMBE | 10 |

Table 12: Schema Table for Prescription Contains Test

|  |  |  |
| --- | --- | --- |
| 1. **Prescription Contains Medicine** | | |
| **Attributes** | **Type** | **Size** |
| Prescription\_id | NUMBER | 10 |
| Medicine\_id | NUMBER | 10 |

Table 13: Schema Table for Prescription Contains Medicine

|  |  |  |
| --- | --- | --- |
| 1. **General Information** | | |
| **Attributes** | **Type** | **Size** |
| Generaliformation\_id | NUMBER | 10 |
| Patient\_id | NUMBER | 10 |
| Weight | VARCHAR2 | 10 |
| Temperature | VARCHAR2 | 10 |
| Pulse | VARCHAR2 | 10 |
| Blood Pressure | VARCHAR2 | 10 |
| Date | DATE | 10 |

Table 14: Schema Table for General Information

|  |  |  |
| --- | --- | --- |
| 1. **Symptoms Information** | | |
| **Attributes** | **Type** | **Size** |
| Symptoms\_id | NUMBER | 10 |
| Patient\_id | NUMBER | 10 |
| Date | DATE | 10 |
| Endodontic Examination | VARCHAR2 | 10 |
| Tooth Number | VARCHAR2 | 10 |
| Type of Affection | VARCHAR2 | 30 |
| Presence Pain | VARCHAR2 | 30 |
| Measure of Pain | VARCHAR2 | 30 |
| Time Posture of Pain | VARCHAR2 | 30 |
| Duration | VARCHAR2 | 10 |
| Initiated by | VARCHAR2 | 30 |
| Relieved by | VARCHAR2 | 30 |

Table 15: Schema Table for Symptoms Information

|  |  |  |
| --- | --- | --- |
| 1. **Disease Information** | | |
| **Attributes** | **Type** | **Size** |
| Disease\_id | NUMBER | 10 |
| Patient\_id | NUMBER | 10 |
| Date | DATE | 10 |
| Respiratory Disease | BOOLEAN |  |
| Respiratory Disease | BOOLEAN |  |
| Hepatobiliary Disease | BOOLEAN |  |
| Cardiovascular Disease | BOOLEAN |  |
| Viral Hepatitis | BOOLEAN |  |
| Neurological Disorder | BOOLEAN |  |
| Diabetes | BOOLEAN |  |
| TB | BOOLEAN |  |
| Rheumatic Fever | BOOLEAN |  |
| Drug Allergy | BOOLEAN |  |
| Pregnancy | BOOLEAN |  |
| Blood Disease | BOOLEAN |  |
| Personal History | BOOLEAN |  |
| Surgical History | BOOLEAN |  |
| Drug History | BOOLEAN |  |
| Allergic History | BOOLEAN |  |
| Socio Economic History | BOOLEAN |  |
| Brushing History | BOOLEAN |  |

Table 16: Schema Table for Disease Information

# Chapter 6: Class Based Model

## Class Based Modeling Concept

Class-based modeling represents the objects that the system will manipulate, the operations that will applied to the objects, relationships between the objects and the collaborations that occur between the classes that are defined.

## Grammatical Parsing and Analysis

To identify our analysis class we firstly grammatically parsed all the nouns and then categorized them according to general classification and selection criteria.

### 6.2.1. Class Identification with General Classification

First, we need to identify potential class by identifying the nouns from the scenery. Then we compared those with the following criteria whether they matched or not. We noted down the number of the fulfilled criteria at the right column.

**General Classification:**

1. External entities
2. Logical things
3. Occurrence or events
4. Roles
5. Organizational unit
6. Places
7. Physical structure

|  |  |  |
| --- | --- | --- |
| **SL**  **No.** | **Potential Class** | **General Classification (GC)** |
|  | Dental Chamber Aide | **-** |
|  | Confident Dental Care | **-** |
|  | Branch Name | 6, 7 |
|  | Gazipur | 6, 7 |
|  | Uttara | 6, 7 |
|  | Dentist | 4, 7 |
|  | Patient | 4, 7 |
|  | Registration | 2, 3 |
|  | Authentication | 2, 3 |
|  | Appointment | 2, 3 |
|  | History | 2, 3 |
|  | Prescription | 2, 7 |
|  | User | 6, 7 |
|  | Admin | 6, 7 |
|  | Dentists Name | 2 |
|  | Email | 2 |
|  | Contact Number | 2 |
|  | Username | 2 |
|  | Password | 2 |
|  | BMDC Registration Number | 2 |
|  | Degree | 2 |
|  | Corresponding Institution | 2 |
|  | Designation | 2 |
|  | Room Number | 6, 7 |
|  | Days of availability | 2 |
|  | Times of availability | 2 |
|  | SMS | 2, 7 |
|  | General Information | 2 |
|  | Symptoms Information | 2 |
|  | Disease Information | 2 |
|  | Diagnosis | 2, 3 |
|  | Medicine | 2, 7 |
|  | Medicine Name | 2 |
|  | Doze | 2 |
|  | Respiratory Disease | 2 |
|  | Hepatobiliary Disease | 2 |
|  | Cardiovascular Disease | 2 |
|  | Viral Hepatitis | 2 |
|  | Neurological Disorder | 2 |
|  | Diabetes | 2 |
|  | TB | 2 |
|  | Rheumatic Fever | 2 |
|  | Drug Allergy | 2 |
|  | Pregnancy | 2 |
|  | Blood Disease | 2 |
|  | Personal History | 2 |
|  | Surgical History | 2 |
|  | Drug History | 2 |
|  | Allergic History | 2 |
|  | Socio Economic History | 2 |
|  | Brushing History | 2 |
|  | Weight | 2 |
|  | Temperature | 2 |
|  | Pulse | 2 |
|  | Blood Pressure | 2 |
|  | Respiration rate | 2 |
|  | Endodontic Examination | 2 |
|  | Type of Affection | 2 |
|  | Presence Pain | 2 |
|  | Measure of Pain | 2 |
|  | Time Posture of Pain | 2 |
|  | Duration | 2 |
|  | Initiated by | 2 |
|  | Relieved by | 2 |
|  | Test | 2 |
|  | Test Result | 2 |
|  | Test Type | 2 |
|  | Test Name | 2 |
|  | Normal Value | 2 |
|  | Unit | 2 |
|  | Supporting File | 2 |
|  | Result | 2 |
|  | Comment | 2 |
|  | Diagnosis Center Name | 6, 7 |

Table 17: General Classification of potential classes

### 6.2.1. Class Identification with Selection Criteria

The nouns having two or more than two were selected from the general classification list. After that step we compared them with the following criteria list. Those are-

**Selection Criteria:**

1. Retained information
2. Needed services
3. Multiple attributes
4. Common attributes
5. Common operations
6. Essential requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **SL**  **No.** | **Potential Class** | **Selection Criteria (SC)** | |
| **Accepted** | **Rejected** |
|  | Branch Name | 1, 3 | 2, 4, 5, 6 |
|  | Dentist | 1-5 | 6 |
|  | Patient | 1-5 | 6 |
|  | Appointment | 1-4 | 5, 6 |
|  | History | 1-4 | 5, 6 |
|  | Prescription | 1-4 | 5, 6 |
|  | User | 1-5 | 6 |
|  | Admin | 1-5 | 6 |
|  | General Information | 1, 3 | 2, 4, 5, 6 |
|  | Symptoms Information | 1, 3 | 2, 4, 5, 6 |
|  | Disease Information | 1, 3 | 2, 4, 5, 6 |
|  | Medicine | 1, 3 | 2, 4, 5, 6 |
|  | Test | 1, 3, 4 | 2, 5, 6 |
|  | Test Result | 1, 3, 4 | 2, 5, 6 |

Table 18: Selection Criteria of potential classes

## Preliminary Classes

From above table, we have taken the nouns who passed three or more accepted criteria. So there are nine candidate classes who are selected primarily. Those are:

1. User
2. Admin
3. Dentist
4. Patient
5. Appointment
6. Prescription
7. History
8. Test
9. Test Result

## Verb Identification

We have identified the verbs from our scenery to find out the necessary methods for the classes. In the following table, “P” stands for problem space and “S” stands for solution space. The possibility of verbs in the solution space have higher possibilities to become methods of the class.

|  |  |  |
| --- | --- | --- |
| **SL No.** | **Verbs** | **Remarks** |
|  | To automate | P |
|  | Observe | P |
|  | Registered | S |
|  | Authenticated | S |
|  | Authorize | P |
|  | Create account | S |
|  | Update account | S |
|  | Delete account | S |
|  | Recovery account | S |
|  | Get list | S |
|  | Create appointment | S |
|  | Cancel appointment | S |
|  | Confirm appointment | S |
|  | View appointment | S |
|  | Notify | S |
|  | Search history | S |
|  | View history | S |
|  | Sent SMS | S |
|  | Sent email | S |
|  | Change appointment | S |
|  | Adjust | P |
|  | Cancel appointment | S |
|  | Update | S |
|  | Keep track of general information | S |
|  | Keep track of symptoms information | S |
|  | Keep track of disease information | S |
|  | Consists | P |
|  | Expect | P |
|  | Prescribed medicine | S |
|  | Add medicine | S |
|  | Suggest test | S |
|  | Add test | S |
|  | Save information | S |
|  | Save prescription | S |
|  | Print | S |

Table 19: Verb Identification

## Attribute and Methods of preliminary classes

Analyzing the above table, we have categorized the verbs and convert them into methods names put them to their respective classes and showed them in the following table:

|  |  |  |  |
| --- | --- | --- | --- |
| **SL No.** | **Preliminary Classes** | **Attributes** | **Verbs** |
|  | User | Username + Password, Contact Number + Email + User ID | loggedIn() + changePassword() + updateAccount() + deleteAccount() + recoveryAccount() |
|  | Admin | Username + Password, Contact Number + Email + User ID | loggedIn() + changePassword() + updateAccount() + deleteAccount() + createAccount() + recoveryAccount() + confirmRecovery() + getListOfRegAccount() |
|  | Dentist | User ID + Dentist Name + Branch Name + Email + Contact Number + Password + BMDC Registration Number + Degree + Corresponding Institution+ Designation + Room Number + Days of availability + Times of availability + Fees | loggedIn() + changePassword() + updateAccount() + deleteAccount() + recoveryAccount() + updateInformation() + createAppointment() + createPrescription() + viewHistory() |
|  | Patient | Patient ID + Patient Name + Age + Gender + Email + Contact Number | getListOfDentist() + RegisteredForAppointment() + cancelAppointment() + getNotification() |
|  | Appointment | User ID + Patient ID + Time of appointment | viewAppointment() + rescheduledAppointment() + cancelAppointment() + confirmAppointment() + sentSMS() + sentEmail() |
|  | Prescription | Prescription ID + Patient ID + User ID + Date | getListOfMedicine() + addMedicine() + prescribedMedicine() + addNote() + suggestTest() + addTest() + savePrescriptin() + printPrescription() + mailPresciption() |
|  | History | Symptoms Information + General Information + Disease Information + Test Result | createHistory() + searchHistory() + filterHistory() + inputGeneralInfo() + inputSymptomsInfo() + inputDiseaseInfo() + inputTestResult() + saveTestResult() |
|  | Test | Test Name + Test Type + Normal Value | addTest() + suggestTest() |
|  | Test Result | Test ID + Result + Unit + Comment + Supporting File + Diagnostic Center Name + Patient ID + Dentist Name + Date | inputTestResult() |

Table 20: Attributes and Methods of preliminary Classes

## Analysis of Potential Classes

1. For **User**, Admin has similar attributes. So User can be super class and inherit admin class.
2. **Dentist** class inherit **User** class as they have some common methods.
3. Test class have two methods which can be done by Prescription class. So **Test** and **Prescription** has been merged.
4. **Test** **Result** class has been merged with **History** class to avoid unnecessary class.

**Final Classes:**

1. User
   * 1. Admin
     2. Dentist
2. Patient
3. Appointment
4. Prescription
5. History

## Attributes and Methods of Final Classes

|  |  |
| --- | --- |
| 1. **User** | |
| **Attributes** | **Methods** |
| Username + Password + Contact Number + Email + User ID | loggedIn() + changePassword() + updateAccount() + deleteAccount() + recoveryAccount() |

Table 21: Attributes and Methods of User

|  |  |
| --- | --- |
| 1. **Admin** | |
| **Attributes** | **Methods** |
| Username + Password + Contact Number + Email + User ID | loggedIn() + changePassword() + updateAccount() + deleteAccount() + createAccount() + recoveryAccount() + confirmRecovery() + getListOfRegAccount() |

Table 22: Attributes and Methods of Admin

|  |  |
| --- | --- |
| 1. **Dentist** | |
| **Attributes** | **Methods** |
| User ID + Dentist Name + Branch Name + Email + Contact Number + Password + BMDC Registration Number + Degree + Corresponding Institution+ Designation + Room Number + Days of availability + Times of availability + Fees | loggedIn() + changePassword() + updateAccount() + deleteAccount() + recoveryAccount() + updateInformation() + createAppointment() + createPrescription() + viewHistory() + ListOfAppointment() |

Table 23: Attributes and Methods of Dentist

|  |  |
| --- | --- |
| 1. **Patient** | |
| **Attributes** | **Methods** |
| Patient ID + Patient Name + Age + Gender + Email + Contact Number | getListOfDentist() + RegisteredForAppointment() + cancelAppointment() + getNotification() |

Table 24: Attributes and Methods of Patient

|  |  |
| --- | --- |
| 1. **Appointment** | |
| **Attributes** | **Methods** |
| User ID + Patient ID + Time of appointment | viewAppointment() + rescheduledAppointment() + cancelAppointment() + confirmAppointment() + sentSMS() + sentEmail() |

Table 25: Attributes and Methods of Appointment

|  |  |
| --- | --- |
| 1. **Prescription** | |
| **Attributes** | **Methods** |
| Prescription ID + Patient ID + User ID + Date | getListOfMedicine() + addMedicine() + prescribedMedicine() + addNote() + suggestTest() + addTest() + savePrescriptin() + printPrescription() + mailPresciption() |

Table 26: Attributes and Methods of Prescription

|  |  |
| --- | --- |
| 1. **History** | |
| **Attributes** | **Methods** |
| Symptoms Information + General Information + Disease Information + Test Result | createHistory() + searchHistory() + filterHistory() + inputGeneralInfo() + inputSymptomsInfo() + inputDiseaseInfo() + inputTestResult() + saveTestResult() |

Table 27: Attributes and Methods of History

## Class Card of Final Classes

|  |  |
| --- | --- |
| 1. **User** | |
| **Responsibilities** | **Collaborative Classes** |
| Registering  Authenticating | Admin  Admin |

Table 28: Class Card for User

|  |  |
| --- | --- |
| 1. **Admin** | |
| **Responsibilities** | **Collaborative Classes** |
| Getting Registered  Getting Authenticated | User, Dentist  User, Dentist |

Table 29: Class Card for Admin

|  |  |
| --- | --- |
| 1. **Dentist** | |
| **Responsibilities** | **Collaborative Classes** |
| Registering  Authenticating  Confirming Appointment  Creating Prescription  Searching History | Admin  Admin  Appointment, Patient  Prescription, Patient  History, Prescription |

Table 30: Class Card for Dentist

|  |  |
| --- | --- |
| 1. **Patient** | |
| **Responsibilities** | **Collaborative Classes** |
| Registering for Appointment | Appointment |

Table 31: Class Card for Patient

|  |  |
| --- | --- |
| 1. **Appointment** | |
| **Responsibilities** | **Collaborative Classes** |
| Rescheduling Appointment  Sending Notification | Dentist  Patient |

Table 32: Class Card for Appointment

|  |  |
| --- | --- |
| 1. **Prescription** | |
| **Responsibilities** | **Collaborative Classes** |
| Prescribing Medicine  Copying and Sending Prescription | Dentist  Patient, History |

Table 33: Class Card for Prescription

|  |  |
| --- | --- |
| 1. **History** | |
| **Responsibilities** | **Collaborative Classes** |
| Adding History  Keeping Test Result | Dentist, Prescription  Dentist |

Table 34: Class Card for History

## Class Responsibility Collaboration Diagram (CRC)



Figure 25: Class Responsibility Collaborative Diagram

# Chapter 7: Behavior Model

## State Transition Diagrams

The behavioral model indicates how software will respond to external events. Two different behavioral representations are discussed in this chapter. The first indicates how an individual class changes state based on external events and the second shows the behavior of the software as a function of time.

## Sequence Diagram

A state transition diagram represents active states for each class that an event triggers. For this we identified all the events, their initiators and collaborators.

|  |  |  |  |
| --- | --- | --- | --- |
| **SL No.** | **Event** | **Initiator** | **Collaborator** |
|  | Provide information about Dentist account | Admin | System |
|  | Username/email and Password Given | User | System |
|  | Credentials Provided | User | System |
|  | Credentials Matched | User | System |
|  | Credentials mismatched | User | System |
|  | Username Available | User | System |
|  | Username not Available | User | System |
|  | Logged in | User | System |
|  | Logged out | User | System |
|  | Forget Password | User | System |
|  | Registering for appointment | Patient | Appointment, Dentist |
|  | Provide personal Information | Patient | System |
|  | Select Dentist | Patient | System |
|  | Select Appointment Time | Patient | System |
|  | Approve Appointment | Dentist | Appointment, Patient |
|  | Cancel Appointment | Dentist | Appointment, Patient |
|  | Reschedule Appointment | Dentist | Appointment, Patient |
|  | Find Patient | Dentist | Patient |
|  | Find Test | Dentist | Prescription |
|  | Add Test | Dentist | Prescription |
|  | Suggest Test | Dentist | Prescription |
|  | Add Medicine | Dentist | Prescription |
|  | Prescribe Medicine | Dentist | Prescription |
|  | Create Prescription | Dentist | Prescription, Patient |
|  | Provide General Information | Dentist | History |
|  | Add General Information | Dentist | History |
|  | Provide Disease Information | Dentist | History |
|  | Add Disease Information | Dentist | History |
|  | Provide Symptom Information | Dentist | History |
|  | Add Symptom Information | Dentist | History |
|  | Provide Test Results Information | Dentist | History |
|  | Add Test Results Information | Dentist | History |
|  | Search History | Dentist | History |
|  | Print Prescription | Dentist | Prescription |
|  | Email Prescription | System | Prescription |
|  | Add History | Dentist | History |
|  | Send Reminder SMS | System | Appointment, Patient |
|  | Send Appointment Confirm Email | System | Appointment, Patient |
|  | Send Cancellation SMS | System | Appointment, Patient |
|  | Send Reschedule SMS | System | Appointment, Patient |
|  | View Appointments | Dentist | Appointment |
|  | New Password Provided | User | System |
|  | Change Password | User | System |
|  | Update Account Information Provided | User | System |
|  | Update Account | User | System |
|  | Remove User Account | Admin | User |

We used these identified events, initiators and collaborators to draw state transition diagrams of each class which are shown below.

**Admin:**

****

Figure 26: State transection diagram for Admin

**User:**

****

Figure 27: State transaction diagram for User

**Dentist:**

****

Figure 28: State transaction diagram for Dentist

**Patient:**



Figure 29: State transaction diagram for Patient

**Appointment:**



Figure 30: State transaction diagram for Appointment

**Prescription:**



Figure 31: State transaction diagram for Prescription

**History:**



Figure 32: State transaction diagram for History