I.A Management System for a Speciality Clinic

Group 2 Members

Faith Mangwiro	1308753	(Group Leader)
Sibongile Mahlake	1139941	
Darlington Manhema	785976	
Timukudzei Mapurisa	1308769	

Team member name	Contribution (%)
Darlington Manhema	25
Timukudzei Mapurisa	25
Sibongile Mahlake	25
Faith Mangwiro	25
Total	100

Vision

Introduction

We envision an integrated Dental Management System with online booking functionality, automated accounting functionality, with the flexibility to adapt to the Dentistry business rules, user intuitive Human Computer Interaction, and integration with various 3rd-party supporting systems.

Problem Statement

The clinic has been using a file based system since it started. It started as a small dentistry practice centre and had little resources. Since then, it has gained popularity and the trust of its patients. More people have been recommending this clinic and with its increasing membership, the file based system has not been very efficient. Patients have been finding themselves having to wait in long queues to fill in forms. The staff is struggling to do its work effectively with the increasing amount of paperwork it has to deal with and the storage, security and ease of access of each of the patients' files is also becoming a big problem.

Proposal

The clinic needs an information system that will be able to help the staff to better manage the increasing amount of information. It should keep track of data such as appointments dates, doctor schedules, etc. The system should also be able to make the whole process less cumbersome for patients and provide security for their records. This needs to be in the form of a web-based application.

Anticipated Outcomes

Implementing this system would mean that the clinic will be able to manage the increasing data it has to keep on its members. The staff will have instant access to patients' records and will spend less time on the phone managing appointments. This will give them more time to focus on more pressing issues. Patients will be able set up their online accounts allowing them to request future appointments and make changes to their appointments. This will save them time as they will not have to call the clinic. Real time reports that can be generated from the system will allow the clinic to be of better service to its patients.

Recommendations

A web-based application with which the three users, namely the patients, doctors and front desk operator, can communicate is the best solution to the problems that the clinic is facing. The web-based application solves the clinic's main concern of increase in the membership count and dealing with the data of its patients. Using the system will enable the doctors to keep better track of their patients. This application will be accessible anywhere outside of the office, given there is internet connection. This will allow the doctors, staff and patients to collaborate more effectively.

Justification

The introduction of a web-based application will be able to solve the clinic's core problem and ultimately improve service it provides to its patients. With an increasing membership count, the clinic will be able to handle the data on its patients more effectively with the unlimited storage capacity of cloud-based data and the reliability of the data will be increased. The data of the patients will be safer since it will be cloud-based should anything such as a natural disaster or fire occur. Less time will be spent by staff on the phone booking and managing appointments. In the long run, this project will not only save the clinic's time but also money since there would not be a need to hire more staff members to handle the increasing workload of managing patient appointments and files.

Estimates for the project:

- Improved business process

Constraints/Risks

- Required to create a web-based application
- Training required for staff
- Patient demographics - ease of transition to the web-based application
- Access to the internet for patients
- Regular maintenance of system
- Implementation of the system may increase the number of resources needed, due to continuous updating of accurate records

Market Research/Competition

The clinic faces competition from other clinics in the area which practice dentistry. The competition clinics are quite small and also make use of a file-based system.

More health care centers are becoming aware of the advantages that come with having advanced software systems. This software system would automate a large amount of the administrative tasks that were done manually and help the clinic focus more on providing quality service to its patients. The clinic will, for now, be ahead of the competition as far as management is concerned.

Stakeholder Summaries

- Doctors: Provides medical services from the office. They want increased efficiency in the workplace.
- Patients: The clinic provides the patients with service. Patients want quality medical care.
- Front desk: Takes care of bookings and managing appointments. It is time consuming dealing with a file-based system so they want easy access to patients' records.
- Development team:
    - Faith Mangwiro: Group leader
    - Sibongile Mahlake
    - Darlington Manhema
    - Timukudzei Mapurisa

User Level Goals

High-Level Goals	**Priority**
<u>Doctor:</u>	
● Quick access to patient records	● High
● View daily schedule	● High
● Prevent appointment clashes	● High
<u>Patient:</u>	
● Book/cancel appointment online	● High
● View profile and upcoming appointments	● High
● View amount due	● High
● Get reminders of appointments	● Medium
<u>Front desk:</u>	
● Add new patients	● High
● Capture payment	● High
● Quick access to patient records	● High

Key High Level Goals and Problems

Problems:

- There are appointment clashes and prescription mix ups during peak times.
- Taking booking calls during business hours slows productivity since front desk has to cater to patients at the clinic and the calls.
- It takes longer for front desk to retrieve patient files.

Goals:

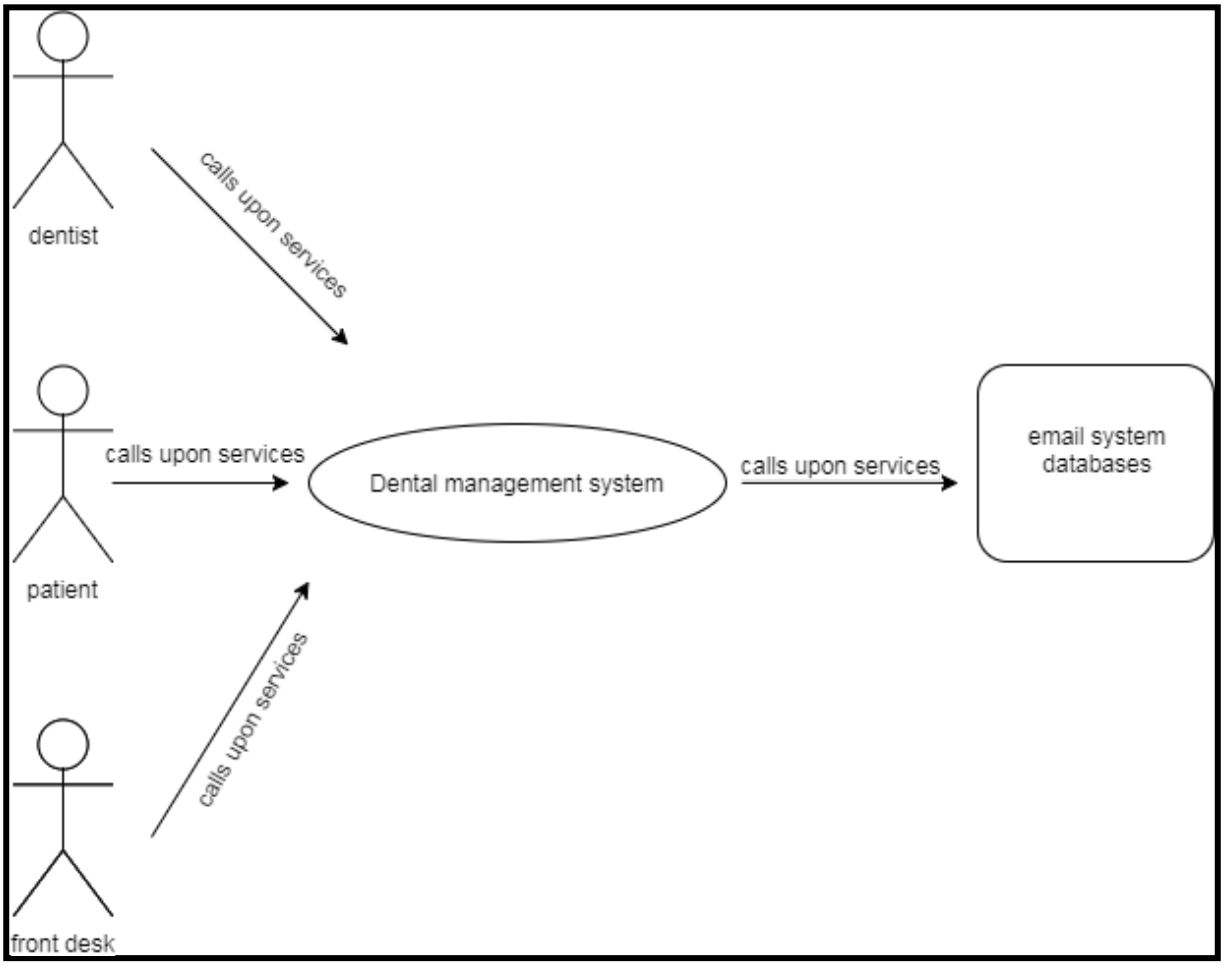
- Reduce amount of calls made to clinic.
- Make patient records easily accessible.
- Keep track of doctor schedules and patient appointments.

User Environment

- There will be three user environments. One for the doctors, one for the patients and one for the front desk.
- The doctors' environment will make use of tabs that lead to daily schedule and patient information for easy access to patient records.
- The patient's environment will consist of tabs to view appointments dates, prescription information and contact details of the clinic that will be easy to use.
- The front desk environment will consist of tabs to add new patients, view patient records and appointments.

Product Overview

The Dental management system is an online cloud based system accessible from almost any modern device with a web browser. It will provide services to users, and collaborate with other systems as in the figure below.



Summary of Benefits
Less time spent on phone calls
Improved quality of medical care
Quick and easy access to patient records
Decreased chances of appointment clashes
Better collaboration with other clinics
Easier to manage patient data
Increased security of data
Greater accessibility for patients

Assumptions and dependencies

- Patients have internet access.
- Any hardware that the client lacks will be affordable for them to purchase.
- Customers are either depositing money into our client's bank account and client (clinic) receives notifications; or customers are paying cash at the clinic. If there is a credit payment we assume that the client will keep track of the customer's payment.
- Our client's hardware will support the system.
- Patients are computer literate to a certain extent so that they can be able to use the web-based application.

Cost/Benefit Analysis

- Faster services, efficient performance
- Increased accessibility for patients and dentists

Summary of Risks

- Prank appointments
- System crash
- Data corruption
- Unprotected data
- Traffic overload

Supplementary Specification

Introduction

This is the repository of all the Dental Management System requirements not captured in the use cases.

Functionality

Functionality common across many use cases:

1. Allows new patients to be added
2. Security is provided for the dentists and patients in the form of a username and password
3. Password reset
4. Summary reports are provided to show the number of appointments made and those that are cancelled at a given point in time
5. Customize web page used by dentists and patients
6. Change or edit patient details
7. Quick search function of patients already in the database
8. Appointment and email confirmation.
9. Security and privacy on the patient's files and medical history
10. Allows patients to see how much they have paid and how much they still owe and also the dentists and front desk users to view the payment information.
11. The doctors can view the appointments they have for the day and can also add comments and prescriptions to those patients' profiles through the appointments.
12. Sends appointment reminders to patients.

Logging and Error handling

Keeping track of all errors in the database

Pluggable Rules

At various scenario points of several use cases, support the ability to customize the functionality of the system with a set of arbitrary rules that execute at that point or event. For example the dentist can filter appointments to view only those required in the current week.

Security

All usage requires user authentication. (example: an appointment can only be booked by a registered patient)

There are also levels of authentication, for example a dentist can view all the patient profiles and patients can also view the dentist's' profile but patients have no access to each other's medical records.

Usability

Human factors

- Text should be easily readable, and in san serif.
- Avoid using colours normally associated with colour blindness.
- The web application must have an interface designed using common Human Computer Interaction practices.
- Requires basic computer literacy.
- Fast, easy and error-free system.
- Use of help functions, tooltips and guidelines for the process steps can be provided – animation on how to use system

Reliability

Recoverability

Provide a function that allows you to restore your last activity in power failure or loss of an internet connection.

Performance

The system should be able to handle multiple user requests simultaneously with ease. Send email notifications fast in less than 60s. Appointment status is in real time. One bottleneck is a poor internet connection of the user.

Implementation Constraints

The Dental Management System stakeholders insist on an online cloud based solution, predicting this will improve their business processes in the long term. The system must be an MVC (C#, ASP .Net) framework with SQL Server.

Free Open Source Components

In general we recommend maximizing the use of free JavaScript open source components on this project. We suggest the following as likely candidates:

- ReactJS
- MySQL
- PHP
- HTML5
- NodeJS
- Bootstrap
- CSS3

Interfaces

Noteworthy Hardware and Interfaces

- The system can be accessed either using a phone, laptop, desktop, tablet or any other device that supports a web browser.

Software Interfaces

For external collaborating systems (Email system, Databases) we need to plug in various systems and various interfaces.

Business Rules
Domain(Business) Rules

ID	Rule	Changeability	Source
Rule D1	A patient can only make an appointment after patient registration	Low	Client
Rule D2	An appointment can only be cancelled before the set time and there will also be a cancellation fee incurred.	Low	Client
Rule D3	A patient can only register once with the same email address and should have one account at the Dental Clinic to keep all the medical history in one file	Low	Client
Rule D4	A dentist cannot comment or add prescriptions to a patient's profile before the appointment	Low	Client
Rule D5	A doctor cannot have two or more different appointments scheduled for the same time	Low	Client
Rule D6	An appointment cannot be cancelled after the appointment time has passed	Low	Client
Rule D7	If a patient does not show up for an appointment they will be responsible for paying a "no show" fee.	Low	Client

Legal Issues

The use of open source components is highly recommended if their licensing restrictions can be resolved to allow resale of products that may include open source software. All intellectual rights of the system are owned by the University of The Witwatersrand.

Information in Domain of Interest

Pricing

Costs such as the consultation fee and the total cost of the dentist's services and charges incurred for cancelling an appointment after it was due or not showing up for an appointment.

Reports

Reports and summaries of the total appointments made,appointments cancelled ,outstanding payments and all financial transactions made.

Risk List and Management Plan

1. **System crash**

   Our client will back up system records with manual records and operate as they have done in the past, only now their guesses will be much more educated.

2. **Data corruption**

   The system will have a function to be reset to a time just before the data corruption occurred. Data recovery can be used to retrieve the corrupted data from a second storage

3. **Unprotected data**

   The database architecture will be designed so that all data will belong to an appropriate dataset.

4. **Traffic overload**

   A test will be conducted at our client's busiest business periods. We will ensure that the server can handle the peak traffic experienced on their webpage.

Use case model

UC1: Register Patient

Use case:	Register Patient	
Scope:	Online dental clinic management system	
Triggering event:	Patient requests to book appointment	
Brief description:	The patient requests to book an appointment at the clinic. They need to first register. Once patient is registered, the system sends an email to the patient which contains patient's login details.	
Actor(s):	Patient Front desk	
Related use cases:	N/A	
Stakeholders & interests:	● Patient: wants an easy way to register to the clinic in order to book appointments.	
Pre-conditions:	N/A	
Post-conditions:	● Patient details are added to the database table PATIENT with the following attributes: Patient_medicalaid_scheme, patient_medicalaid_no, patient_referred_by	
Flow of Activities:	**Actor**	**System**
	<u>Walk-in:</u> 1. Front desks requests to add new patient **<u>Login:</u>** 2. Patient requests to create new account	1.1 Front desk adds initial information about patient into database. Confirmation email is sent to patient with link to site and login details. 2.1 Prompts user to enter full names, email address,
Extensions:	**Actor**	**System**

UC2: Book Appointment (a)

Use case:	Book appointment for not registered patient	
Scope:	Online dental clinic system	
Brief description:	Patient provides initial information (full names, email address, insurance scheme and details of the primary primary person insured). The information is entered into the database at the front desk. The patient receives an email from the clinic with a link to its site and patient password.	
Pre-conditions:	Patient not registered as member of clinic	
Post-conditions:		
Flow of Activities:	**Actor**	**System**
	1. Front desk requests to add a new patient to the database. 2. Add new patient 3. Patient requests urgent appointment.	1.1 Front desk page will prompt user to enter user_email,user_firstname and user_lastname,user_contact and use_dob. 2.1 System adds patient details into database and an automated email is sent to new patient. 2.2 If user logs into their account or calls clinic, they can book an appointment. 3.1 Front desk page will allow to create an appointment for patient that didn't set an appointment. The page will add this appointment to into a free time slot.
Extensions:	**Actor**	**System**
	1. Patient requests to view appointment details.	1. 1 Patient account page will allow patient to view future appointments they have set.

UC3: Book Appointment (b)

<table>
<tr><td>Use case:</td><td colspan="2">Book appointment for registered patient</td></tr>
<tr><td>Brief description:</td><td colspan="2">When the patient logs into their user account and books an appointment for a certain date and time, the system checks if any doctors are available at that given time slot and updates the doctor's' schedule.</td></tr>
<tr><td>Pre-conditions:</td><td colspan="2">Patient must registered as member of clinic</td></tr>
<tr><td>Post-conditions:</td><td colspan="2">Appointment added to APPOINTMENT (table) with the following attributes: patient_id, specialist_id, frontdesk_id, appointment_type, appointment_datetime, appointment_reason, appointment_status, appointment_created</td></tr>
<tr><td rowspan="2">Flow of Activities:</td><td>Actor</td><td>System</td></tr>
<tr><td><u>Via login:</u>
1. Patient requests to book an appointment.
2. Patient confirms the booked appointment.

<u>Via phone call:</u>
A. Patient calls to book appointment</td><td>1.1 System checks if time slot is available.
1.2 If time slot is available, doctor schedule is updated and appointment is set.
1.3 If time slot is not available the system will block out that slot.

A1. Front desk page contains “tab controller” allowing to view list of scheduled appointments for selected day. Front desk will be able to add new appointment to available time slot.</td></tr>
<tr><td rowspan="2">Extensions:</td><td>Actor</td><td>System</td></tr>
<tr><td></td><td></td></tr>
</table>

UC4 : Doctor Commentary and Prescription

Use case:	Doctor commentary and prescription	
Scope:	Online dental clinic management clinic	
Brief description:	After the doctor has seen the patient, the doctor can make comments about the appointment and information about prescribed medication.	
Actor(s):	Doctor	
Stakeholders & interests:	● Doctor: easy way to update and keep patient records ● Patient: to be able to view diagnosis and prescription information in user account	
Pre-conditions:	● Doctor has seen patient	
Post-conditions:	● Appointment status is set to “over” ● Doctor commentary added to database	
Flow of Activities:	**Actor**	**System**
	1. Add comments on appointment	1.1 Update patient records
Extensions:	**Actor**	**System**

Half dressed use cases

UC5: View patient records
View patient records

The Doctor (dentist) can view all their patient records and have full access to their medical history both before or after a set appointment, as long as there is a record of the patient details in the Clinic database (registered). This helps the dentists to track the progress of their patients’ recovery, help with future diagnosis and also keep track of recurring patterns for reference in gathering statistics. Patients can also view their own profiles and are able to edit if necessary.

UC6: Manage Appointment
Manage Appointment

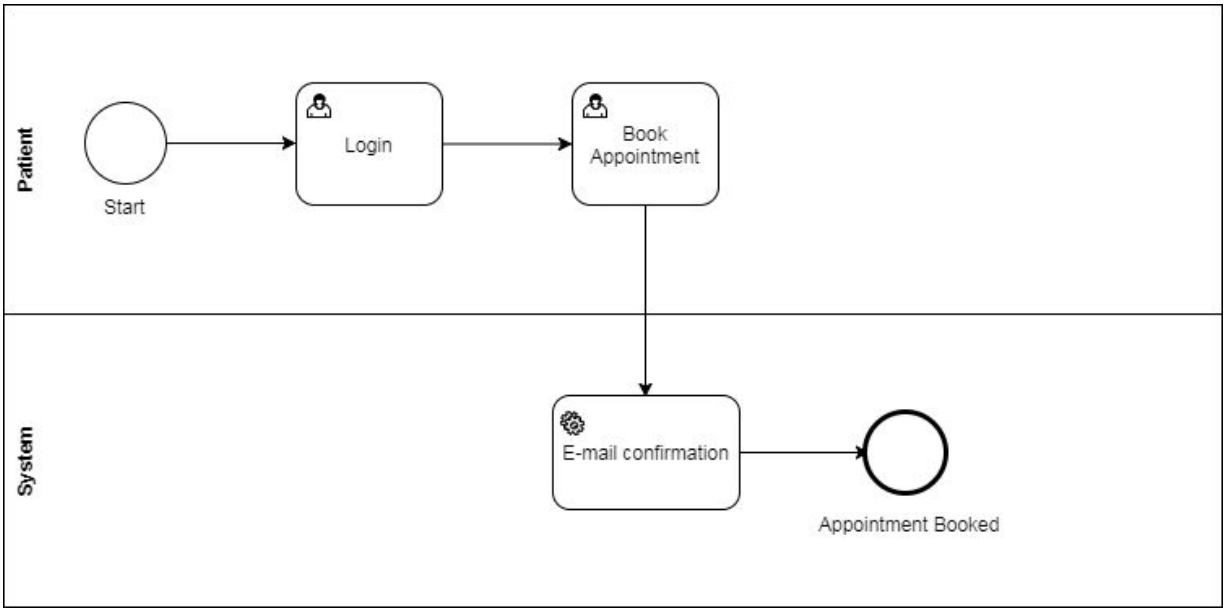
A patient is only allowed to cancel an existing appointment before the set appointment time passes.When they decide to cancel a confirmed appointment, a cancellation fee is incurred. A patient can also edit their appointment for example, move it to a later available time slot .The resulting available timeslots could then be used by walk in patients who may not have internet access or pre-registration before visiting the clinic, or the emergency cases.

UC7: Manage Profile
Manage Profile

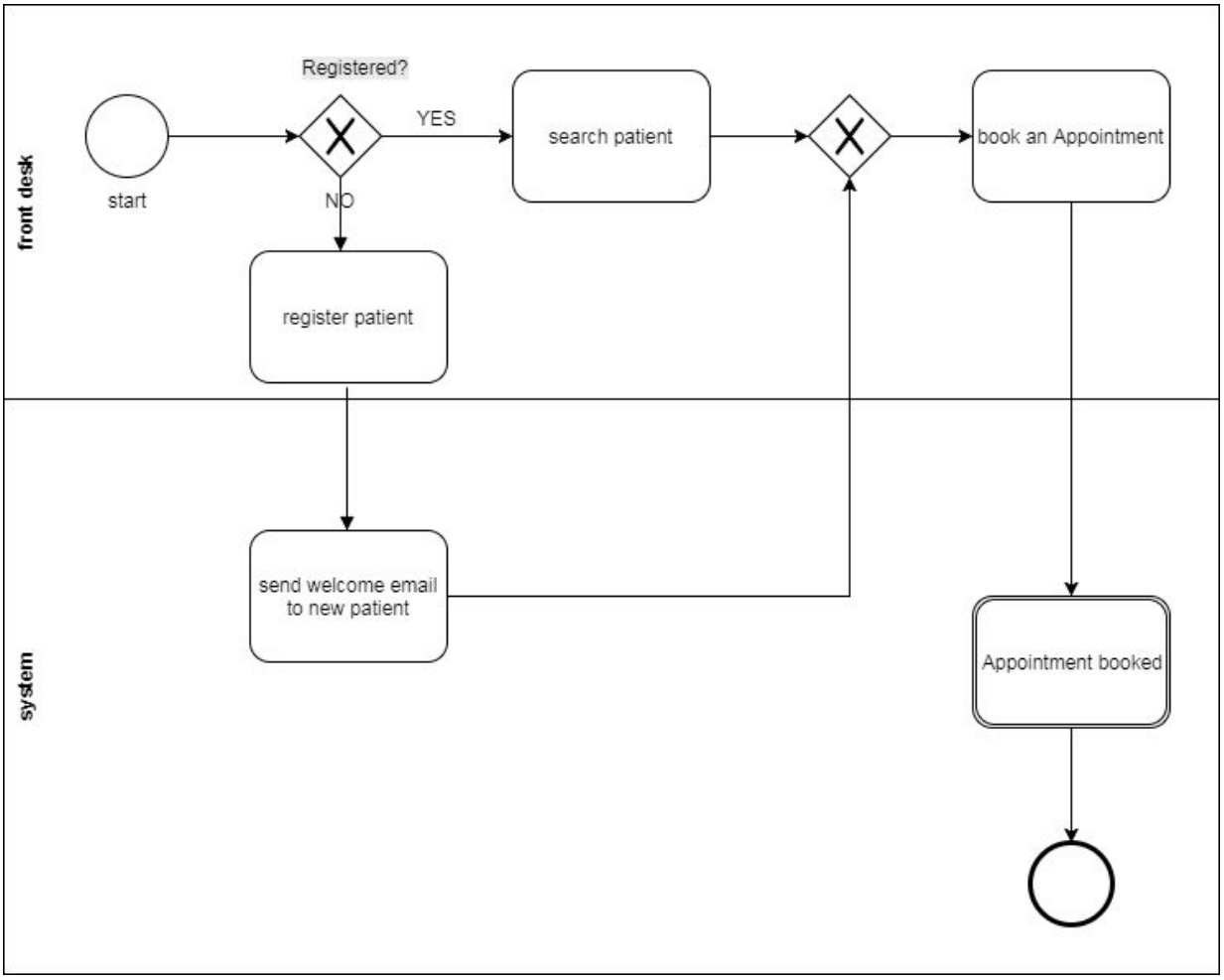
Upon login, users(patients and doctors) will be able to update their personal information. Patients will be able to provide additional information such as full residential as well as postal address, any allergies, previous medical diagnosis, all medications the patient is currently taken,etc.
Doctors will be able to update their contact details, addresses, etc in the event of changes to keep the system up to date.

Business Process Model

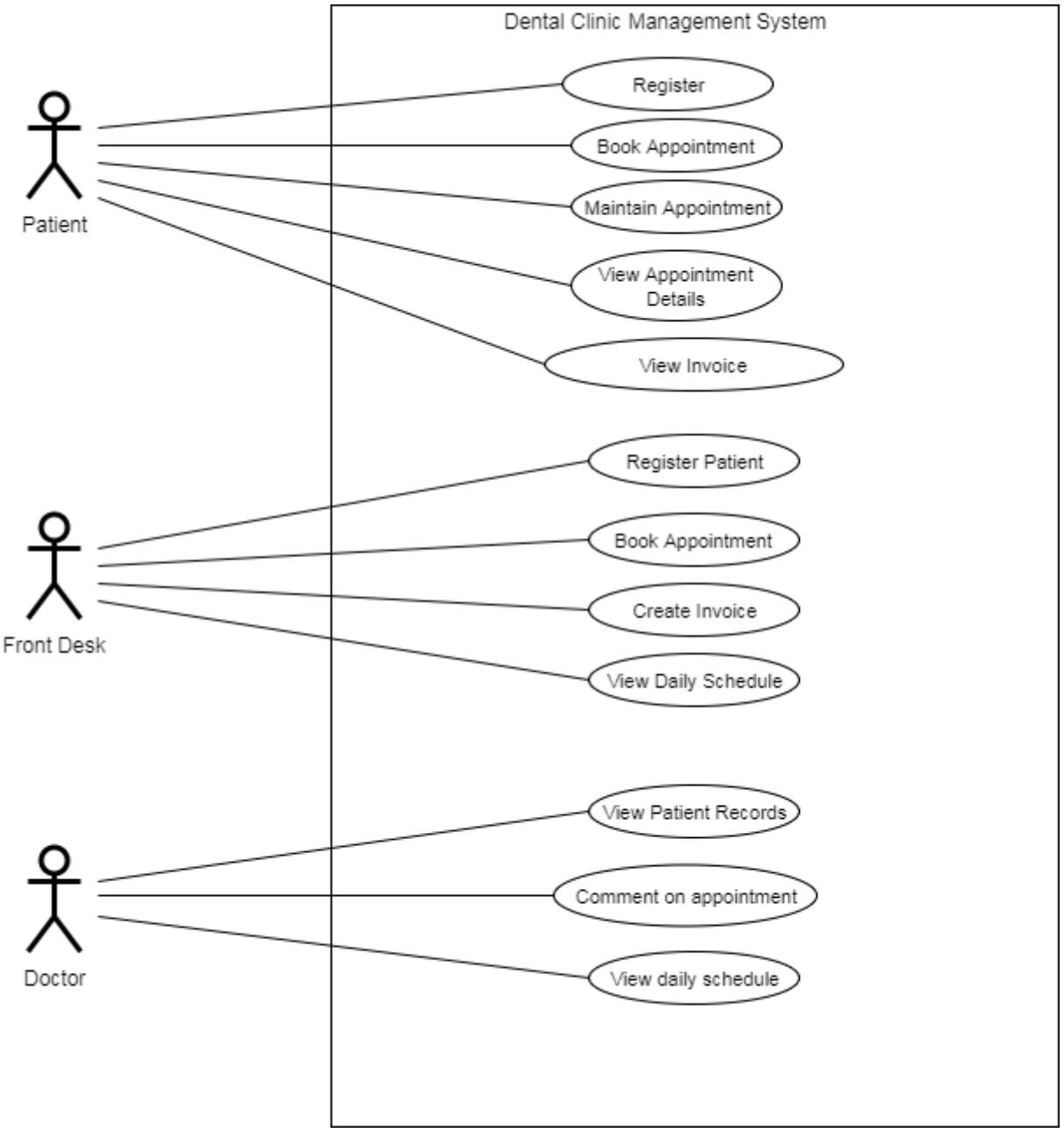
Patient-System Model



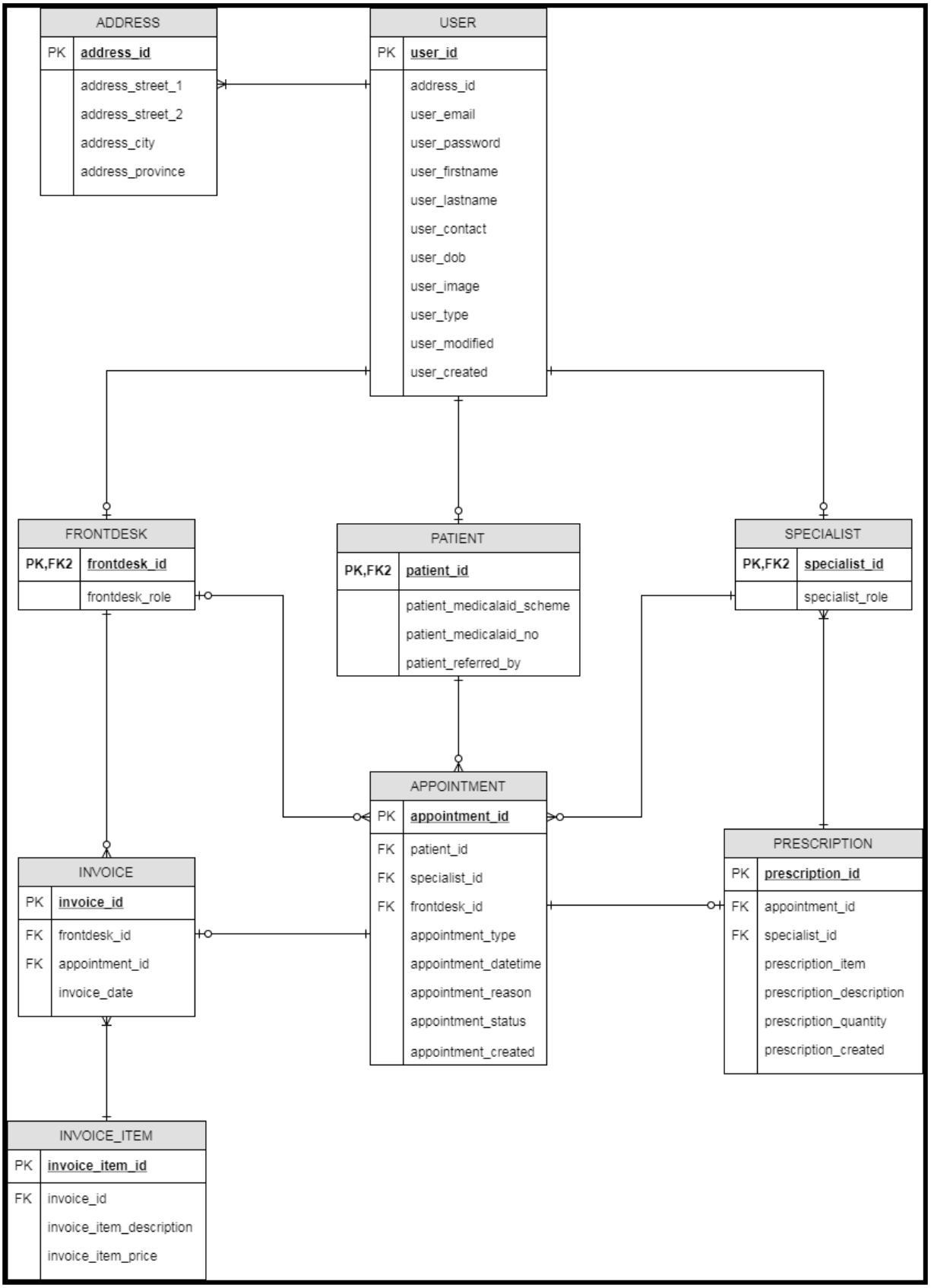
Front desk-System Model



Use Case Diagram



Domain and Design Models



Sprint Planning

Sprint Planning						
	Task	Priority	Related use case	Hours spent	Status	Responsible
Home page						
Week 1	register	high	UC1	8	ongoing	Darlington
	login	high	UC1	6	ongoing	Timukudzei
	write test cases	high		2	completed	Faith
	testing	high		3	ongoing	Sibongile
	documentation	high		4	ongoing	Darlington
	documentation	high		4	ongoing	Timukudzei
Total				27		
User's Page						
Week 2	register	high	UC1	3	completed	Darlington
	login	high	UC1	5	completed	Timukudzei
	documentation	high		2	completed	Darlington
	documentation	high		2	completed	Timukudzei
	manage appointment	medium	UC6	7	completed	Sibongile
	manage profile	high	UC7	6	ongoing	Faith
	documentation	high		3	completed	Sibongile
	documentation	high		2	ongoing	Faith
	write test cases	high		2	completed	Darlington
	testing	high		5	ongoing	Timukudzei
Total				37		
Doctor's Page						
Week 3	manage profile		UC7	2	completed	Faith
	comment and prescription	high	UC4	5	completed	Darlington
	view patient	medium	UC5	5	completed	Faith

	records					
	view schedule	high	UC5	5	completed	Timukudzei
	documentation	high		3	completed	Darlington
	documentation	high		2	completed	Faith
	documentation	high		3	completed	Timukudzei
	testing	high		6	ongoing	Sibongile
Total				31		
Front Desk Page						
Week 4	view patient records	medium	UC5	4	completed	Sibongile
	manage appointments	high	UC6	6	completed	Darlington
	documentation	high		2	completed	Faith
	documentation	high		2	completed	Darlington
	testing	high		3	completed	Timukudzei
Total				17		

Sprint Retrospective

The retrospective includes three main questions/points for discussion:

- What went well during the sprint cycle?
- What went wrong during the sprint cycle?
- What could we do differently to improve?

Factors that affected us:

- Communication
- Delivering on time
- Roles and responsibilities clearly defined
- Well defined project tasks
- Tasks appropriately assigned
- Team collaboration
- Goals attainable within time frame
- Regular meetings
- School work
- Distribution of workloads
- Underestimation of tasks
- Testing not completed on time

- Failed tests
- Prioritizing tasks
- Late work nights
- Availability of resources

Week 1 Sprint
During week one we failed to meet all our goals. We underestimated the tasks we had set for the week which ended up exceeding the time we had allocated to them.We also had a problem of poor communication which led to an unclear definition of roles and responsibilities. As a result we had two group members working on the same task and it affected our productivity as a team, we could not accomplish our set goal for the week and hence carried the work into week two.

Week 2 Sprint
We learnt from the mistakes we made in week one and we collaborated more as a team during week two. We distributed our workload fairly among ourselves and had more regular and short meetings to brief each other on our progress. We also helped each other more with our individual tasks and as a result attained our weekly goals within the planned time frame.

Week 3 Sprint
We made so much progress in week 3,we worked together very well and were actually ahead of schedule for sometime.We completed our work effortlessly and everything was in order. However, as the week progressed we worked late nights to try and finish early and balance the project with other schoolwork, that negatively affected our productivity since we always came exhausted on the following day.

Week 4 Sprint
In week four which is our final week, we are just putting everything together now, polishing up and taking note of the little details we missed during week one, two ,three and also four and getting ready for submission.

Testing

Functional Testing

The main objective of functional testing is to test the system functionality and features of the system to make sure that it adheres to its requirements. We will be primarily using our use cases to test our system functionality to ensure that the system meets its functional requirements. The use cases developed during analysis and design best describes the process of business logic and depicts what the user and system will be doing to achieve a particular outcome.

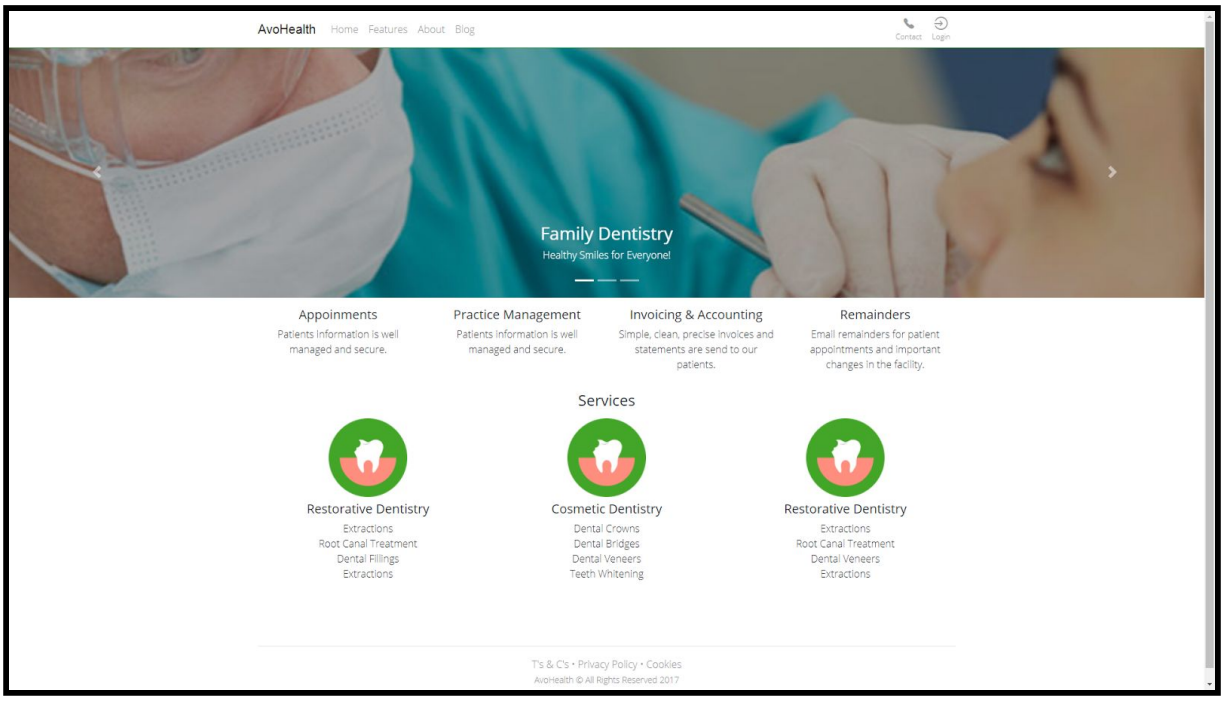
Test objectives

- To ensure the system meets its functional requirements
- To ensure there is no mismatch between the system and the requirements
- To ensure there are no defects

Test strategy

We will be using our use cases as well as the supplementary specification as specifications against which we can compare the system to and find defects. We will use these documents because they help determine what the system should and should not have or do and it will also ensure that business logic and processes are adhered to. The use cases and supplementary specification was created using the requirements gathered by the client and best describes functional requirements of the system.

We start at the home page, the guest page of the web_based application as shown below:

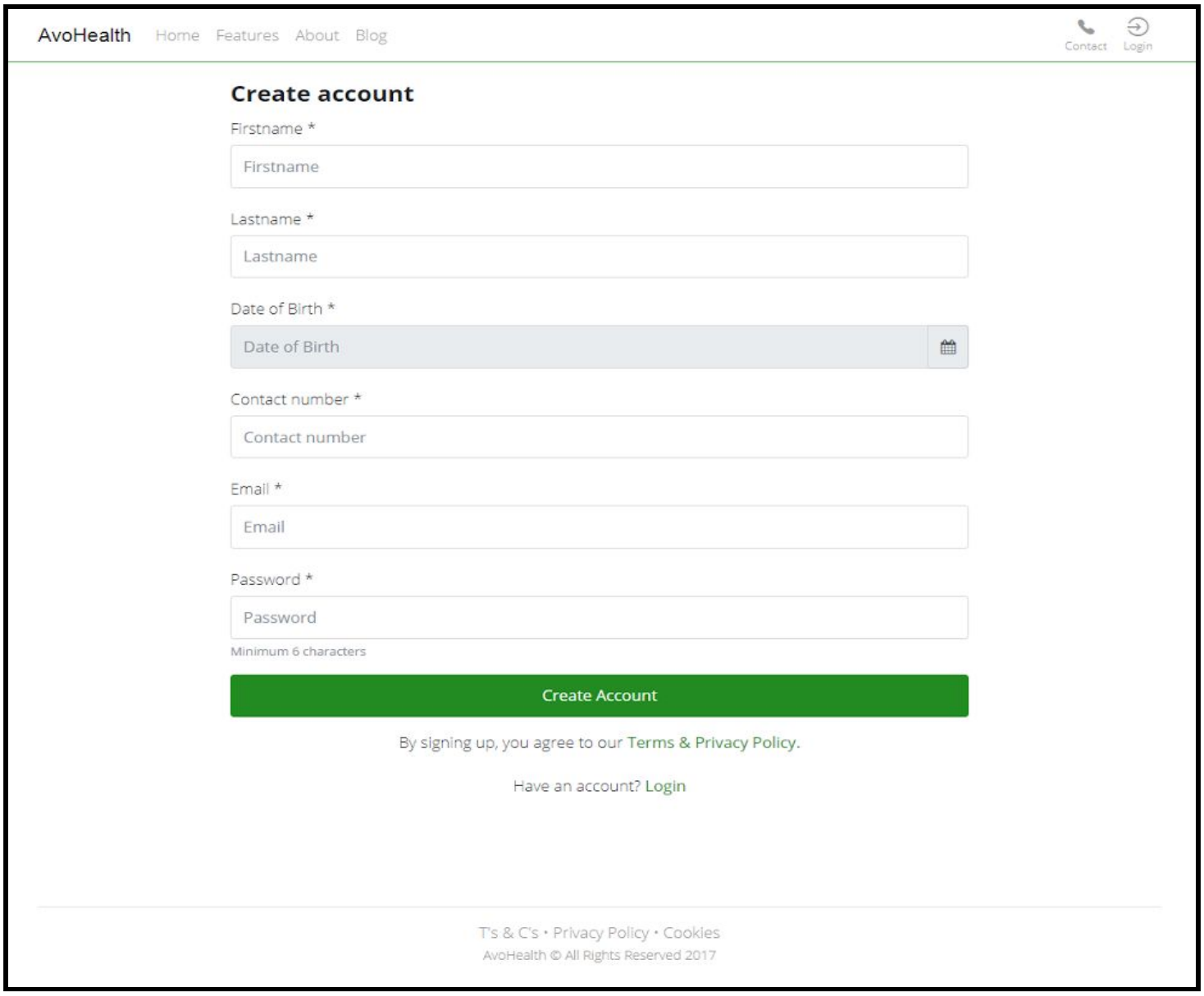


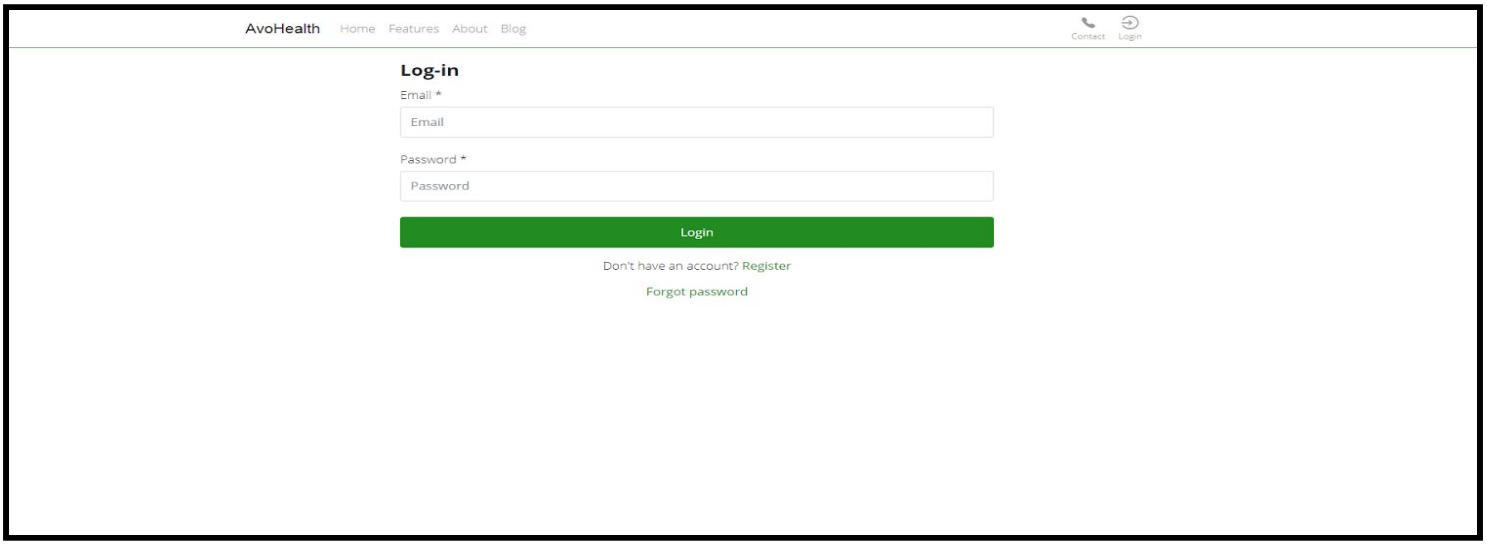
Test cases

<u>Test case 1: Register Patient</u>

Basic path

1. Patient requests to create account
2. Patient provides user details
3. System asks for confirmation of details
4. Patient confirms details
5. Account is created


AvoHealth
Home
Features
About
Blog
Contact
Login
Create account
Firstname *
Firstname
Lastname *
Lastname
Date of Birth *
Date of Birth
Contact number *
Contact number
Email *
Email
Password *
Password
Minimum 6 characters
Create Account
By signing up, you agree to our Terms & Privacy Policy.
Have an account? Login
T's & C's • Privacy Policy • Cookies
AvoHealth © All Rights Reserved 2017

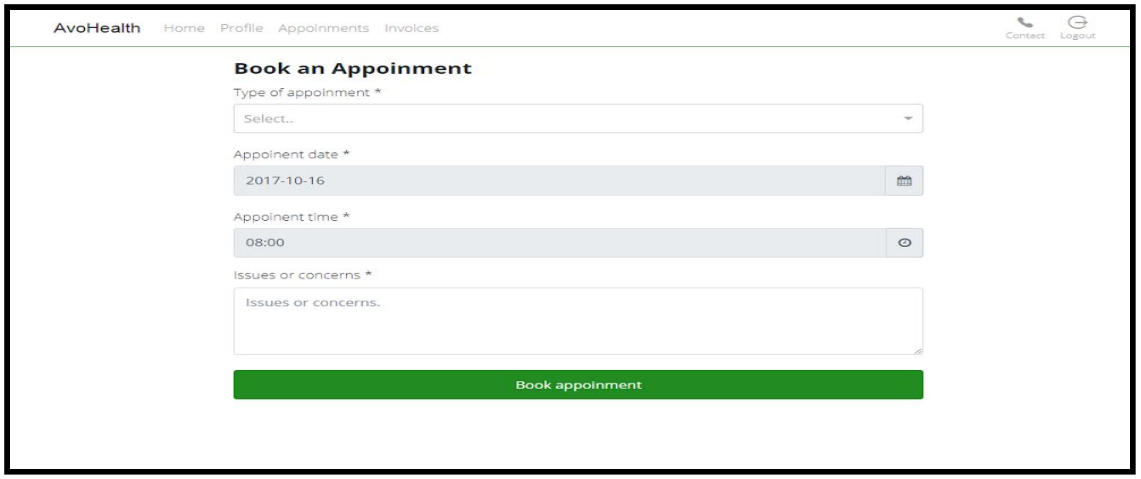

AvoHealth
Home
Features
About
Blog
Contact
Login
Log-in
Email *
Email
Password *
Password
Login
Don't have an account? Register
Forgot password

Scenario no.	Scenario	Input values	Expected result	Actual result	Pass/ fail	Comments/ Recommendations
1	Patient creates account	Firstname,Lastname,Date of Birth,contact number, email and password	Allows the user to enter their details	Page is provided for user to enter their details and after entering,patient is now able to login and will be directed to the patient dashboard as shown in the image below	pass	
2	Patient enters their personal details	john@gmail.joburg	Details displayed on the screen	Details displayed on the screen	pass	Validation needs to be implemented to ensure the correct data is captured for example data types needs to be adhered to
3	Patient receives Confirmation email		Confirmation email sent to patient	Confirmation email sent to patient	pass	
4	Patient confirmed creation and the account created and success message displayed		Success message displayed	No confirmation prompt shown	fail	Details entered need to be shown on the screen with a prompt asking the user to confirm the details.
5	Patient confirmed creation and the account created and success message displayed		Success message displayed	Success message displayed	pass	

6	Patient tries to register with an email address that someone else has used to register before	Familiar email address	Error message notifying the user and advice them to use a different email address	Error message notifying the user and advice them to use a different email address	pass	

Test case 2: Maintain appointments

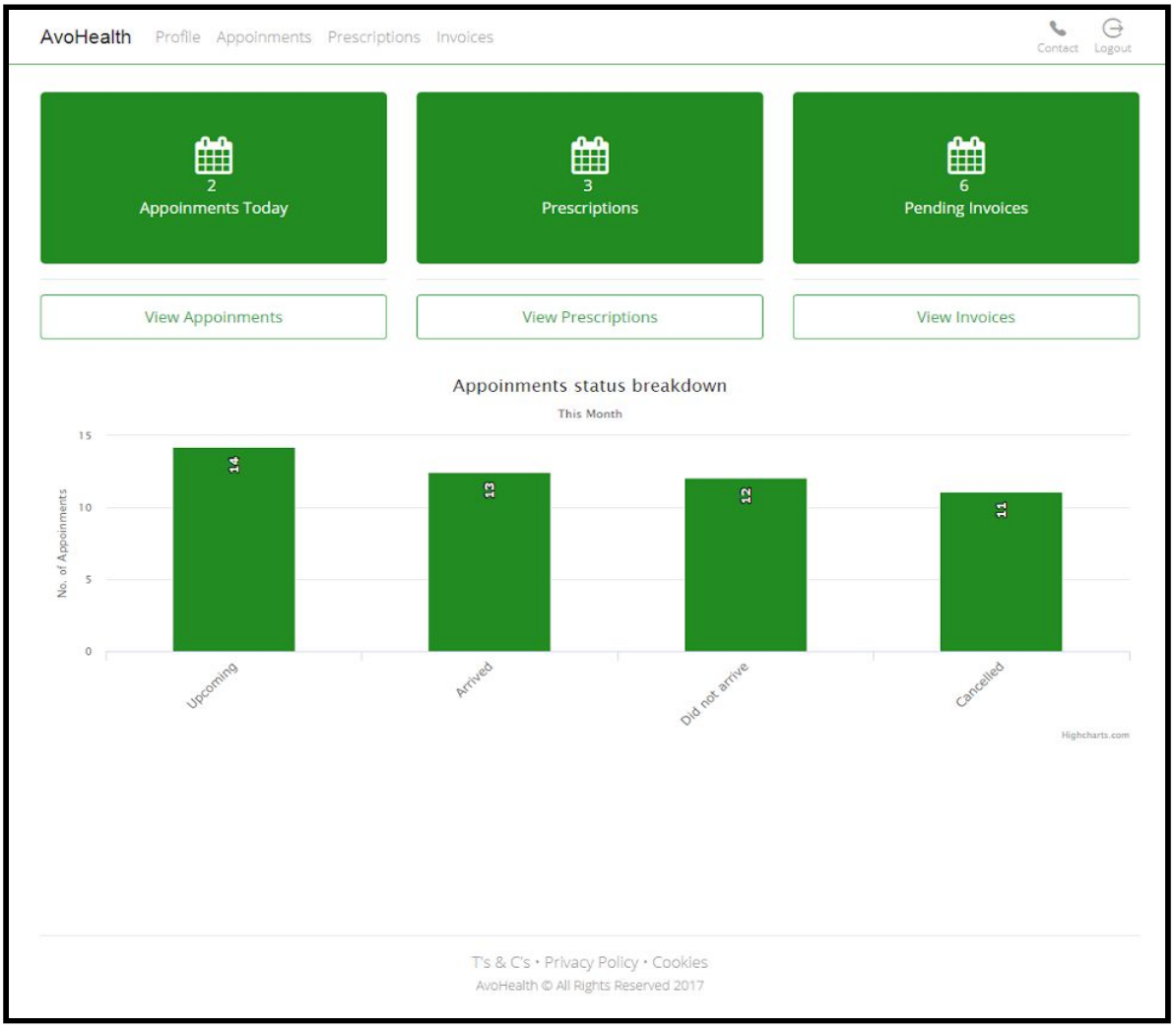
Scenario no.	Scenario	Input values	Expected result	Actual result	Pass/ fail	Comments/ Recommendations
1	Patient books appointment	Type of appointment,appointment date,appointment time,issues or concerns	Doctor schedule updates	Appointment is booked and the doctor's schedule is updated	pass	
2	Patient requests to edit appointment	All the changes eg changing the timeslot for the appointment	Patient appointment set for different time, doctor schedule updated	Appointment is rescheduled	pass	
3	Patient requests to cancel appointment	Request to cancel appointment	Appointment cancelled, doctor schedule updated, cancellation fee charged	Appointment cancelled, doctor schedule updated, cancellation fee charged	pass	



Test case 3: Doctor Commentary and Prescription

Scenario no.	Scenario	Input values	Expected result	Actual result	Pass/ fail	Comments/ Recommendations
1	Doctor adds commentary on appointment	Comments and prescription	Comments displayed in patient account	Comments and prescription displayed in patient account	pass	

The doctor/dentist can also view their daily scheduled appointments,upcoming appointments and a brief appointment status breakdown,on their dashboard, as shown below:



Security Testing

Security testing involves testing to ensure that data is protected on the system and that required functionality is maintained. It is needed to find vulnerabilities in the security of the system and fix them to avoid insecure software. Currently on the system we need to be looking at process of logging in to the system to determine if access is protected

Testing objectives

- Ensure that users' access is restricted based on their email address and password – access managed
- Test to see if password control is in place
- Test password recovery process
- Test navigational flow

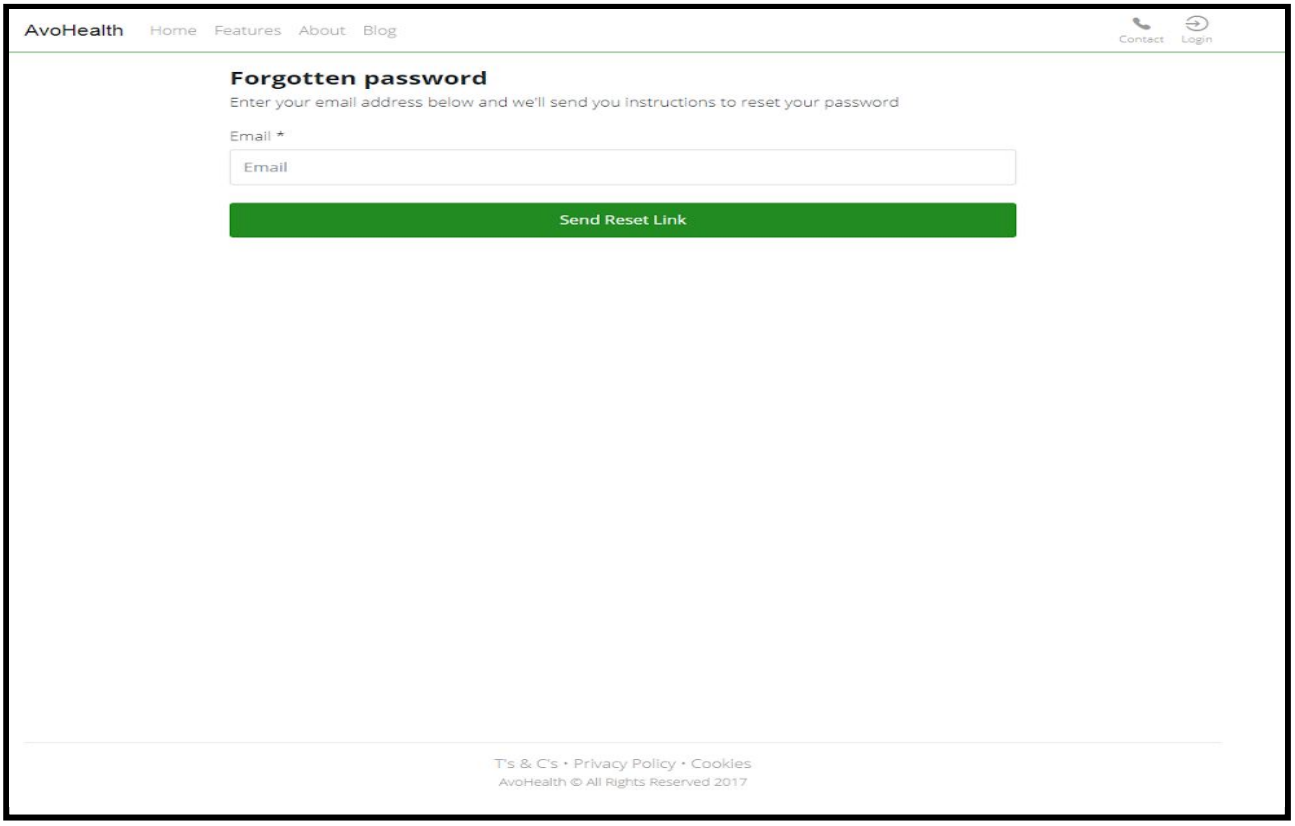
Testing strategy

Security testing performed here will look at the functions users can perform based on their username and password. It will focus on access management.

We will be looking for the following aspects in the system:

- **Confidentiality** – system, its data and who has access to it is protected and is only accessible to those who have authorized access
- **Authentication** – identity of the user is determined
- **Authorization** – user should have access to the system and certain functions based on the permission he has to perform those functions
- **Availability** – the user can access the information at any time
- **Integrity** – the data entered on to the system needs to be correct to ensure data integrity. This is also taken care of in validation and verification testing.

For security reasons or in the event of a loss (forget),the user can be able to reset their password as shown in the prompt below:



Validation and Verification Testing

This testing is meant to look at the validation and verification rules that are needed for the business process to be carried out. This is needed to ensure that system being developed meets its requirements and that it also meets user needs correctly. For example a patient cannot be assigned to a dentist at a time when that dentist is booked by another patient. Certain rules need to be enforced when functions are being performed on the system. This ensures that data can be captured more accurately and things such as appointments are verified.

Testing objectives

- Data captured when patients register and update their profiles, appointments are maintained and data captured correctly
- Accounts are verified
- Business logic is adhered to

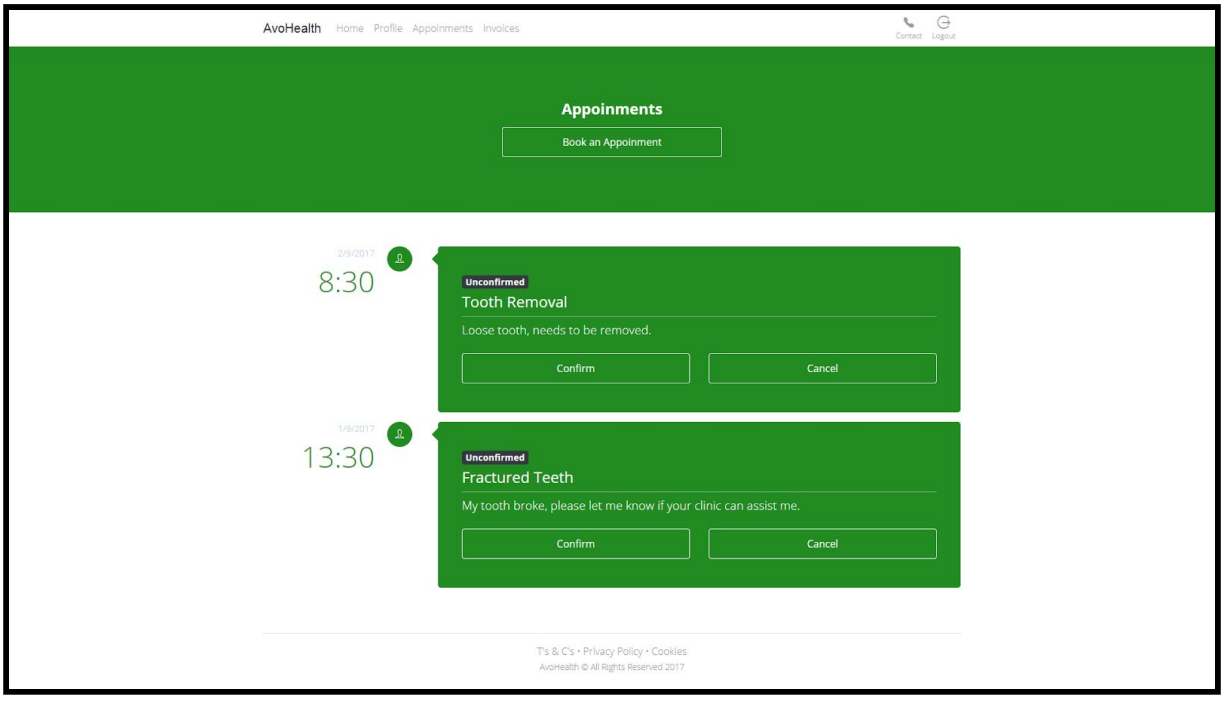
Testing strategy

The testing scenarios provided will look at 2 important objects of the system, namely the users and appointments. Each section has its own set of scenarios that were required for testing.

User accounts:

Scenario no.	Scenario	Input values	Expected result	Actual result	Pass/ fail	Comments/ Recommendations
1	User enters a unique and valid email address when creating an account	Registered email address and password	User logs in correctly	User logs in correctly	pass	
2	User enters and email address correct email address but with a wrong password	Registered email but with wrong password	Error message saying that the password is incorrect and prompts to reset password	Error message saying that the password is incorrect and prompts to reset password	pass	
3	User enters a string when the required input is numeric for contact number	“abcde”	Error message saying “invalid input”	Logs in correctly	fail	We should preset the field to only accept numerical values

Appointments:



Interface Testing

Justification:

The Graphical User Interface (GUI) is the main window between the user and the system, therefore, it plays a big part in the User-Experience. If any defects are found in the User Interface, the user may not be able to complete tasks. Users often judge a system by its interfaces rather than its functionality. The system will fail if users are constantly frustrated with the interface because of errors, inconsistency or lack of clarity. A well-designed User Interface will ensure user satisfaction.

Factors considered:

- **Navigation:** This is concerned with the user's ability to get from one page to the next, be able to find the appropriate navigation aids
- **Consistency and clarity:** all the pages have a consistent look and feel, controls are labelled similarly and same messages mean the same thing in every page. The user performs similar tasks in a similar way in all pages.
- **Feedback and Response:** Error messages and confirmations are displayed to the user. Controls are responsive to user input and requests. Progress bars are used where appropriate to minimise the user's frustration thinking that the system is unresponsive.
- **Usability:** The system should be user-friendly

Strategy for testing:

1. Step 1: Test navigation
   Test that the navigation from page to page is clear and the user is able to go back to previous pages.
   - ➢ Test that navigational flows are clear
   - ➢ Test that tabs and buttons navigate to appropriate pages
   - ➢ Tabs should be displayed in sequence.
   - ➢ Check for any broken links
2. Step 2: Test consistency and clarity
   Test that the all pages of the site are coherent in terms of design, theme is kept throughout the different pages.
   - ➢ Test that fonts and colours are clear and consistent across pages
   - ➢ Test that the language is simple, clear and consistent across all pages
   - ➢ Test that layout of controls and headings is consistent
   - ➢ Test for grammar and spelling
   - ➢ Test consistency, that similar functions perform the same way across different pages
3. Step 3: Test for response
   Test that interface displays appropriate feedback and responses
   - ➢ Test that all links/buttons are clickable
   - ➢ Test that controls respond to keyboard input

- ➢ Test that links/button respond with appropriate actions
- ➢ Test tab orders and response to keyboard input such as clicking the enter or tab buttons

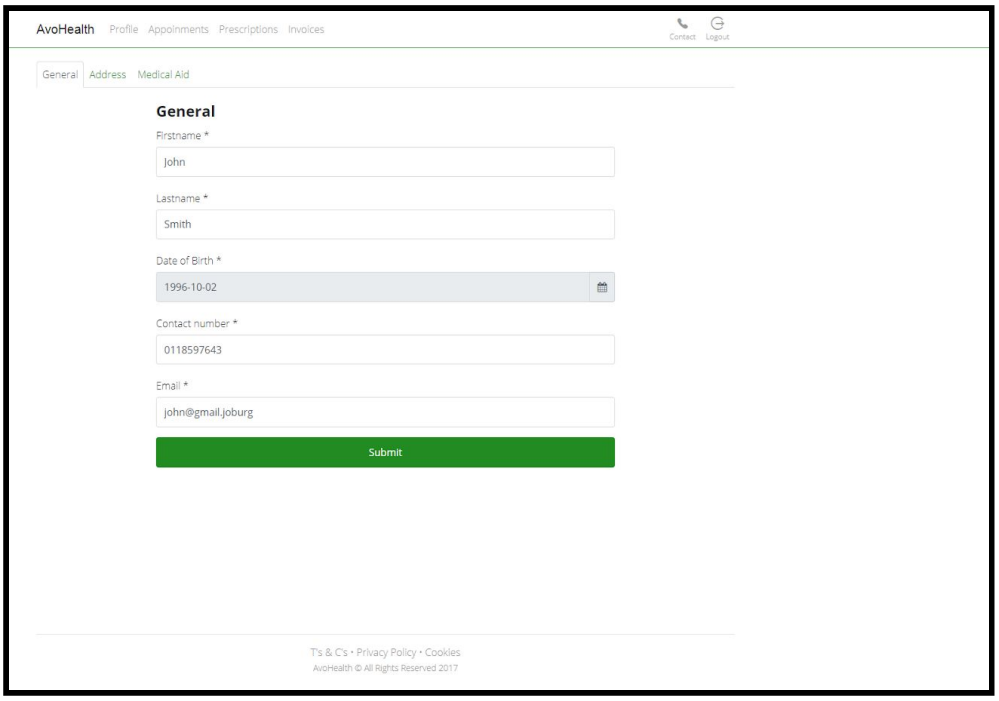
4. Step 4: Test for feedback
   Test that interface displays appropriate and useful feedback
   - ➢ Test that appropriate errors display correctly, and they are helpful to the user
   - ➢ Test that the search errors are displayed appropriately
   - ➢ Test that where there is a time lag, an appropriate progress bar appears
5. Step 5: Test shortcuts and flexibility
   - ➢ Test that search bar produces the correct patient records

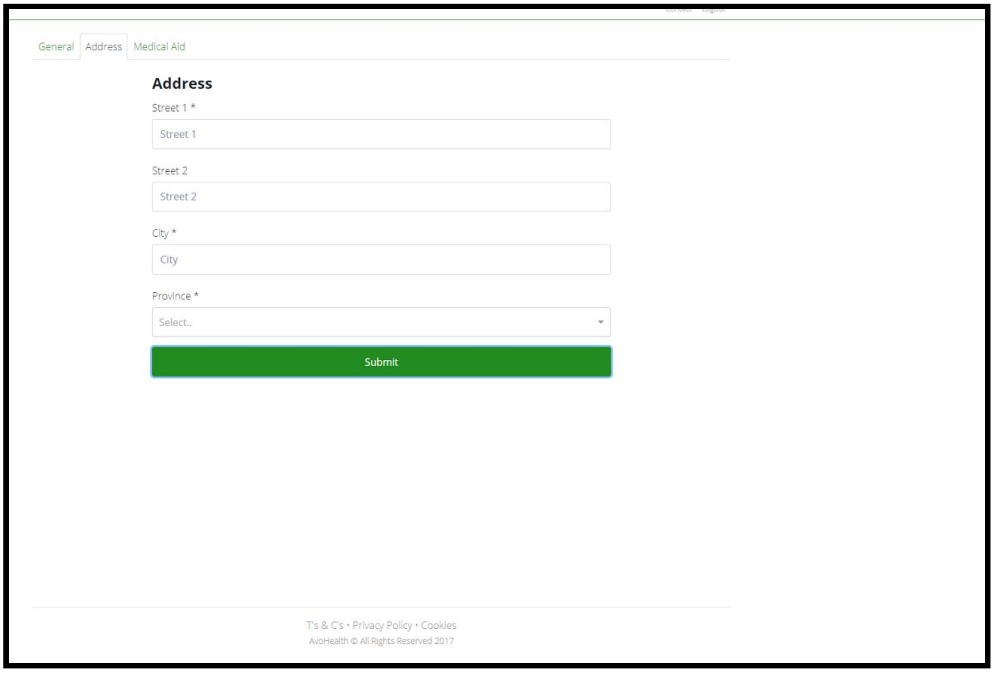
Scenario no.	Action/Task	Expected Results	Actual Results	Pass/ Fail	Comments/ Recommendations
1.1	Does a correct navigation sequence appear at the top of each page?	When a user goes from page to page, the navigation sequence is shown and the user can click on any page he/she wants to go back to	When a user goes from page to page, the navigation sequence is shown and the user can click on any page he/she wants to go back to	pass	
1.2	Can the user access the login/logout button from any page?	The login/logout button is found at the top of every page	The login/logout button is found at the top of every page	pass	
1.3	Can the user get to the home page from any page?	The home link/icon appears at the top of every page.	The home link/icon appears at the top of every page.	pass	
1.4	Is the back button available?	The back/previous button appears at the top or bottom of every page excluding confirmation pages	Back button is not available on every page	fail	
2.1	Are all required fields are marked?	Required input fields must be marked	Yes required input fields are marked	pass	

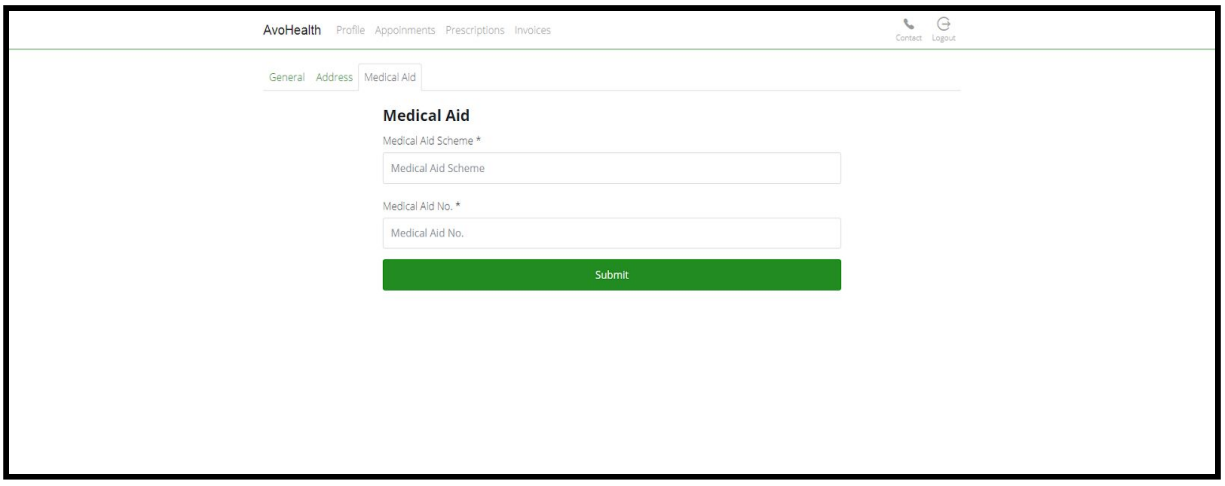
2.2	Are pages for data verification read-only?	When a user is asked to confirm data or details, it is displayed in read only, until the user requests to edit it	Yes,for example the welcome email after registration in read-only	pass	
3.1	Are all links and buttons are clickable and responsive?	When a user clicks a button, it responds and performs the intended action	Some are responsive but some are not	fail	We did not implement some buttons like the “contact us” for enquiries,comments or complains from the patients
3.2	Are text input controls responsive to keyboard input?	Textboxes allow the user to type in text from the keyboard	Yes textboxes allow the user to type in text from the keyboard, eg when logging in	pass	
4.1	Are error messages displayed next to the appropriate fields?	When a user missed a required field or inputs incorrect data, an error message is displayed next to the field	Yes error messages are displayed next to the appropriate fields, eg when a user tried to register with an email address that was already used before the error notifies the user and advice them to use a different email address	pass	

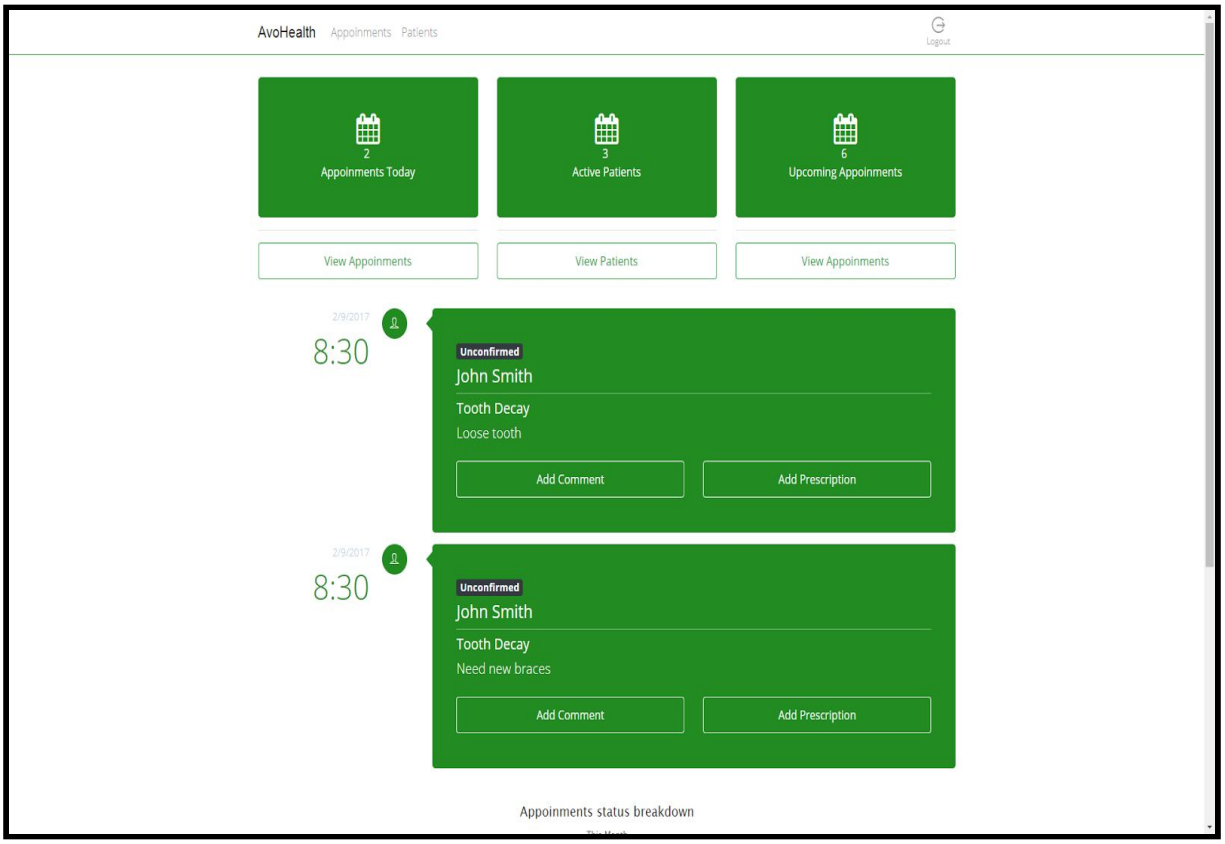
4.2	Are error messages for failed tasks/ responses displayed clearly where the user can see them?	When the system fails to complete a task or respond to a user request, an error is displayed at the top of the screen	When the system fails to complete a task or respond to a user request, an error is displayed at a relevant and clear place where the user can be able to see it	pass	
4.3	Are confirmation messages for completed tasks are displayed?	When the system has completed a task, a confirmation message is displayed	When the system has completed a task, a confirmation message is displayed eg after a user's successful registration a confirmation email is sent.	pass	
4.4	Are progress bars displayed for all tasks that take longer than 1.5 seconds?	When the system takes longer than a second to complete a back-end task, a progress bar is displayed	When the system takes longer than a second to complete a back-end task, a progress bar is displayed	pass	

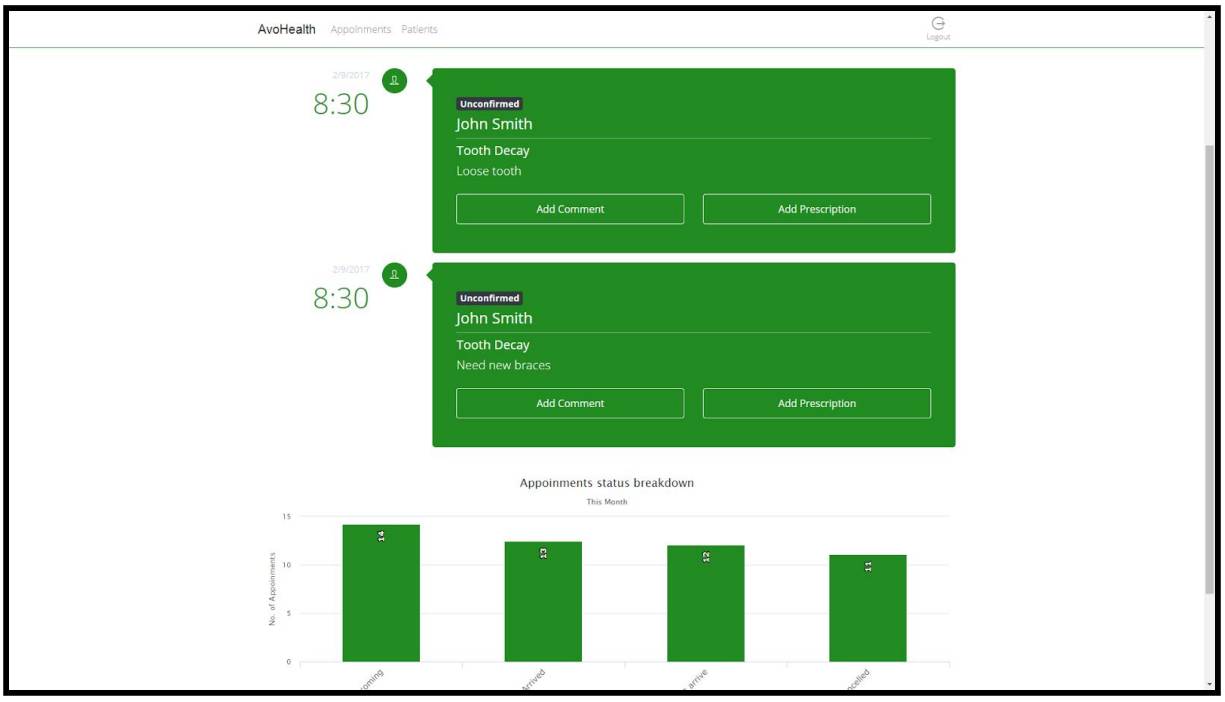
Some more screenshots to further show how our system works and the design, are given below, this is just a demonstration of how our tabs work and how all those buttons are responsive.


AvoHealth
Profile
Appointments
Prescriptions
Invoices
Contact
Logout
General
Address
Medical Aid
General
Firstname *
John
Lastname *
Smith
Date of Birth *
1996-10-02
Contact number *
0118597643
Email *
john@gmail.joburg
Submit
T's & C's • Privacy Policy • Cookies
AvoHealth © All Rights Reserved 2017


General
Address
Medical Aid
Address
Street 1 *
Street 1
Street 2
Street 2
City *
City
Province *
Select..
Submit
T's & C's • Privacy Policy • Cookies
AvoHealth © All Rights Reserved 2017


AvoHealth
Profile
Appointments
Prescriptions
Invoices
Contact
Logout
General
Address
Medical Aid
Medical Aid
Medical Aid Scheme *
Medical Aid Scheme
Medical Aid No. *
Medical Aid No.
Submit


AvoHealth
Appointments
Patients
Logout
2
Appointments Today
3
Active Patients
6
Upcoming Appointments
View Appointments
View Patients
View Appointments
2/9/2017
8:30
Unconfirmed
John Smith
Tooth Decay
Loose tooth
Add Comment
Add Prescription
2/9/2017
8:30
Unconfirmed
John Smith
Tooth Decay
Need new braces
Add Comment
Add Prescription
Appointments status breakdown


AvoHealth
Appointments
Patients
Logout
2/9/2017
8:30
Unconfirmed
John Smith
Tooth Decay
Loose tooth
Add Comment
Add Prescription
2/9/2017
8:30
Unconfirmed
John Smith
Tooth Decay
Need new braces
Add Comment
Add Prescription
Appointments status breakdown
This Month
No. of Appointments
15
10
5
0
14
13
12
11