



**UNIVERSITY  
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**Module: CM2020 Agile Software Projects**

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# **Objectives**

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## **Background Problem**

Singapore is currently heading towards an ageing population (33.3%) which means that the number of elderly will increase in number which may result in our healthcare system being overwhelmed if the majority need medical assistance at the same time. Also, it's more physically tiring and inconvenient for elderly people to head down physically to take a queue at hospitals or healthcare facilities and wait a long time for their turn, especially in an environment where there are germs and viruses around. As elderly are not as technologically savvy, however, having the ability and knowledge to use modern-day technology such as smartphones/computers to access healthcare facilities would be more convenient and essential to them in times of emergency, when they might be alone at home with no one to help them. The current existing healthcare apps either don't have the function to book appointments or are poorly optimised like difficulties while handling administrative matters for medical appointments, lacking essential features such as booking appointments, rescheduling appointments, checking medical history and appointment history. The language barrier for elderly who are unable to understand English is also prevalent as English was not the first language for the baby boomers. Singapore has people from diverse ethnicities and thus, language may become a problem if it is unable to be translated in the applications. As seen from the recent Covid-19 Pandemic, doctors and healthcare systems in Singapore can be overwhelmed by the influx of patients and this could occur again in the future as we reach an ageing population. It is especially in cases like this that we hope that we could provide a solution or at least, a form of alleviation via our application to reduce the burden on our healthcare system by spreading the patient across the various healthcare facilities more evenly and when needed provide elderly people a platform to seek remote medical assistance during cases of emergency.

## **Aim**

- An appointment booking system where elderly can make, amend and check their medical appointment to see their doctor when ill so that they can just head down when it's their turn to avoid waiting.
- A SOS feature for elderly living alone or without a caretaker in times of emergency to seek immediate help
- Options to change app language
- Look through past medical records and track previous appointments
- Simple and easy to use and understand Graphic User Interface (GUI) even for elderly who are not tech-savvy to understand
- Ability to adjust font size

## Possible Implementations

- Doctor's Point of view - Able to manage the time slots of when they are available to take appointments and when they are not to avoid having back to back appointments with no rest in times of the high volume of patients as well as being able to access and track patients past records and results easily.

## Goals

- Business Goals

Healthcare facilities are more efficient with less waiting and a more organised system, minimising dissatisfaction and maximising time efficiency

Lower the chance of the healthcare system being overwhelmed in situations where a high volume of elderly require healthcare assistance at the same time

- Usability Goals

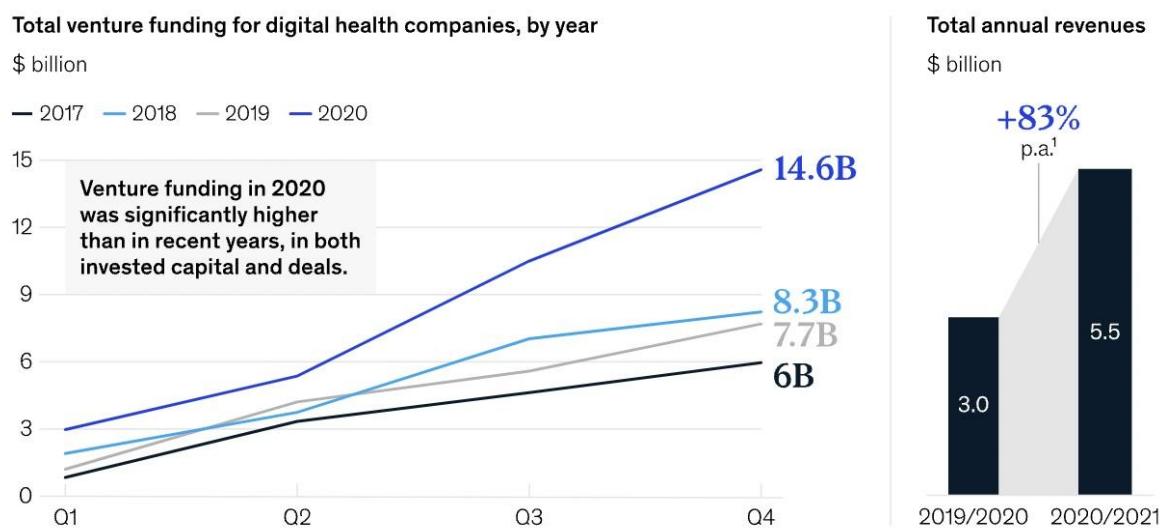
Helping elderly overcome the stigma of using technology and feel comfortable with using the app to attend to their healthcare needs.

# Market Analysis

## Telemedicine Market at A Glance

Based on the study by Mckinsey and Doximity (refer to references), the following were key insights to a study conducted on the telehealth market scenario pre and during the pandemic -

- 1) Since the pre-pandemic period, total venture investments and revenue from telehealth have nearly doubled. According to the first half of 2021, venture capital investment in the digital health space reached \$14.7 billion, nearly twice as much as in 2020 (\$14.6 billion) and nearly twice as much as in 2019. The increase in investments would amount to an annualised investment of \$25 billion to \$30 billion in 2021 if current trends continue.



<sup>1</sup>p.a., per annum.  
Source: Adriana Krasniansky et al., "H1 2021 Digital Health Funding: Another Blockbuster Year...In Six Months," Rock Health, July 2021, rockhealth.com; McKinsey virtual health vendor database

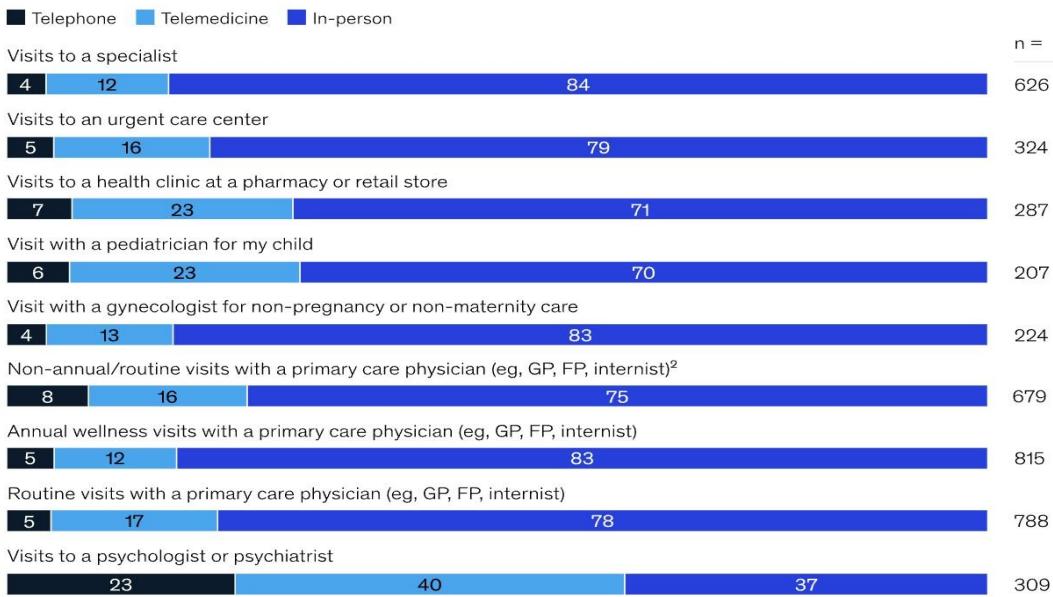
*Figure 1. Venture capital investment in the digital health space*

- 2) Over the past year, telehealth utilisation levels have largely plateaued, ranging between 13 and 17% across all specialities after spiking to more than 32% in April 2020. Two-thirds of the anticipated virtualization visits were incurred with this utilisation. Overall, the use of telehealth has become 38X higher than it was before the pandemic.

**Most recent care received utilized telemedicine, with some moderate increases since January.**

**Modality of most recent appointment by setting, current as of June 14, 2021**

Respondents who reported receiving care in the specified setting (sample size varies by row),<sup>1</sup> %



APPT1. For each of the following types of care below, indicate whether your most recent appointment was either at an in-person appointment, or an online/video visit with a physician (eg, Doctor on Demand, Skype, FaceTime); also called telemedicine, or a telephone (voice call) appointment.

<sup>1</sup>Figures may not sum to 100%, because of rounding.

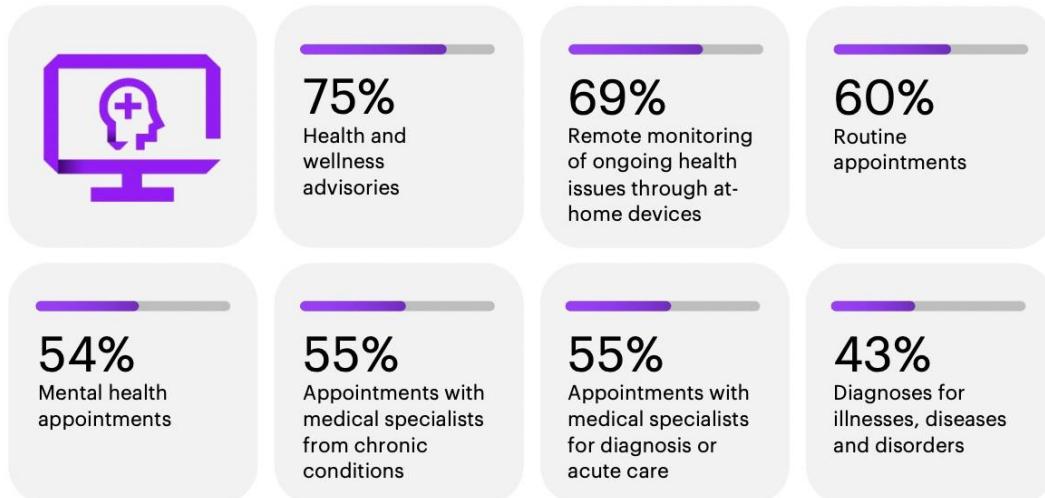
<sup>2</sup>FP, family physician; GP, general practitioner.

Source: McKinsey COVID-19 Consumer Survey 1/15/2021, 6/14/2021

**Figure 2. Most recent care received utilised telemedicine, with moderate increases**

- 3) A high level of interest is being shown by post-pandemic patients toward virtual care. Remote consultations have been shown to improve access to care, particularly for the elderly, the disabled, and patients who are geographically isolated and would otherwise have difficulty contacting healthcare providers.

**Figure 8. Consumers are open to virtual care—from basic to specialty services**



**Figure 3. Consumers are open to virtual care - from basic to speciality services**

- 4) Legal changes have made telemedicine more accessible and reimbursable. During the 2019 flu pandemic, telehealth benefited patients, and it now has the potential to transform virtual and hybrid virtual/in-person care models for greater access, outcomes, and affordability.

Telemedicine does not currently have a single piece of legislation in Singapore. However, this is expected to change when the HSCA (Health Products Act (Cap. 122D)) is implemented in 2022. Several decades ago, the Private Hospitals and Medical Clinics Act (Cap.248) was enacted, which needs to be repealed under the Health Services Bill passed on the 6th of January 2020.

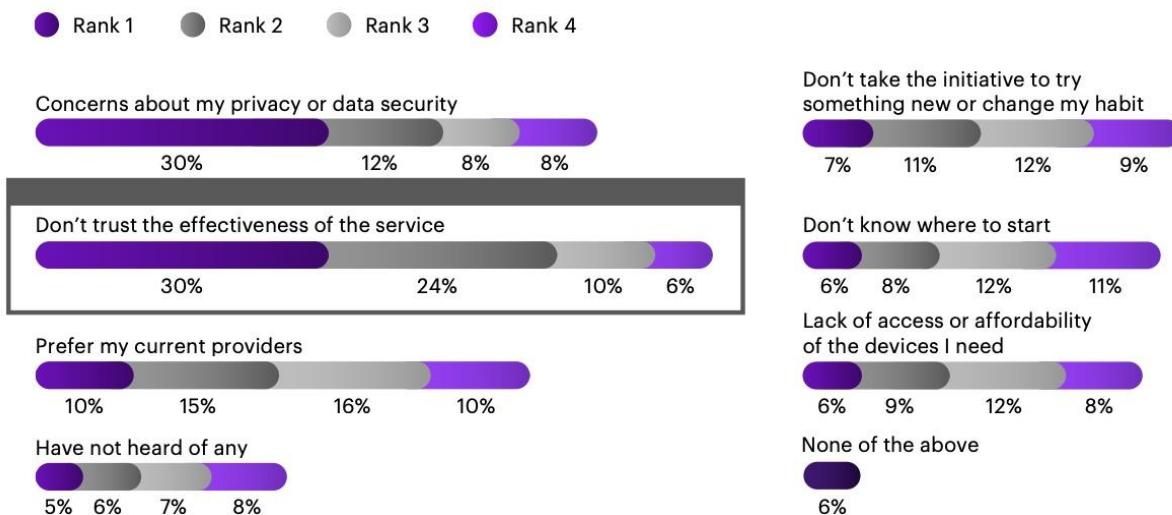
Healthcare services going forward will be regulated based on ‘services’ instead of ‘premises’. This new act would allow for a more flexible modular licensing scheme that will allow for the development of innovative and new healthcare services in accordance with each service’s licensing requirements.

## Concerns

Based on studies conducted by the National Accenture consumer survey (as indicated below), it is prominent one of the main concerns regarding telehealth apps is concerns about privacy about personal data privacy.

With the advent of data-based technology, security and privacy concerns have plateaued in recent years due to the fact that consumers or our target audience have lost or have decreased their trust in the proper handling of their healthcare data. They are hesitant to use such digital services given the circumstance that their data is being mishandled and not being protected appropriately.

In recent times the public has witnessed famous high-end MNCs or tech companies having their data breached significantly. The public is thus not assured or safely trusting such apps to handle their personal data responsibly and in the best interest of the users themselves.



Q: What might keep you from using chatbots, computers or digital devices for your health questions and care?

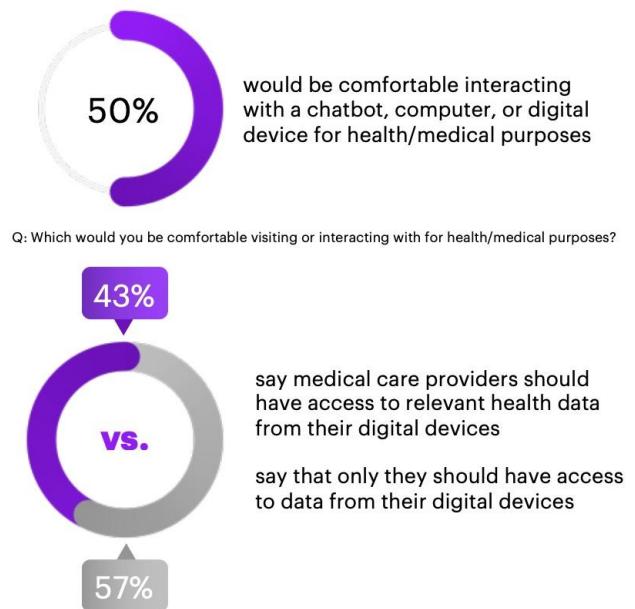
2020 survey data is from November to December of 2019 and reflects consumer attitudes prior to the global spread of COVID-19.

*Figure 4. User concerns*

**Figure 5. Trust in keeping digital healthcare information secure drops significantly for tech companies and government**



**Figure 7. Consumers have limited confidence in digital devices**



*Figure 5. Consumer confidence*

For forced adoption of virtual healthcare services to succeed and be widely adopted, privacy and security concerns MUST be addressed. It is imperative that organisations protect healthcare data to the best of their abilities from compromise of any sort. By doing so, without doubt, patients or consumers of the market would be able to use and trust such services efficiently. The same can be achieved in two ways:

- 1) Providing consumers with **transparency**. The provision of consumers with the metadata concerning the collected information, as well as when it has been altered, is a crucial step to establishing trust. Therefore, patients/consumers remain at ease knowing that third parties have access to and can track the data they have provided.
- 2) **Microsegmentation** of access. The number of parties having access (read, write to or manipulate data) should be extremely limited and segmented by privileges.

## Case Study: Doctor Anywhere App

It was in 2017 that Lin Wai Mun founded Doctor Anywhere which currently serves more than 1.5 million users across the ASEAN and other regions of the world. Being extremely popular in countries such as Malaysia, Singapore, Philippines, Vietnam, and Thailand, it was only recently that the company opened up tech hubs in Bangalore and Ho Chi Minh cities.

Doctor Anywhere offers consumers the convenience and convenience of healthcare services at their fingertips. Instead of spending time travelling to clinics or hospitals and waiting to be seen with the help of a doctor, the healthcare professional everywhere enables customers to access

a number of offers ranging from consultation and claims management to prescription and wellness products, all in one app.

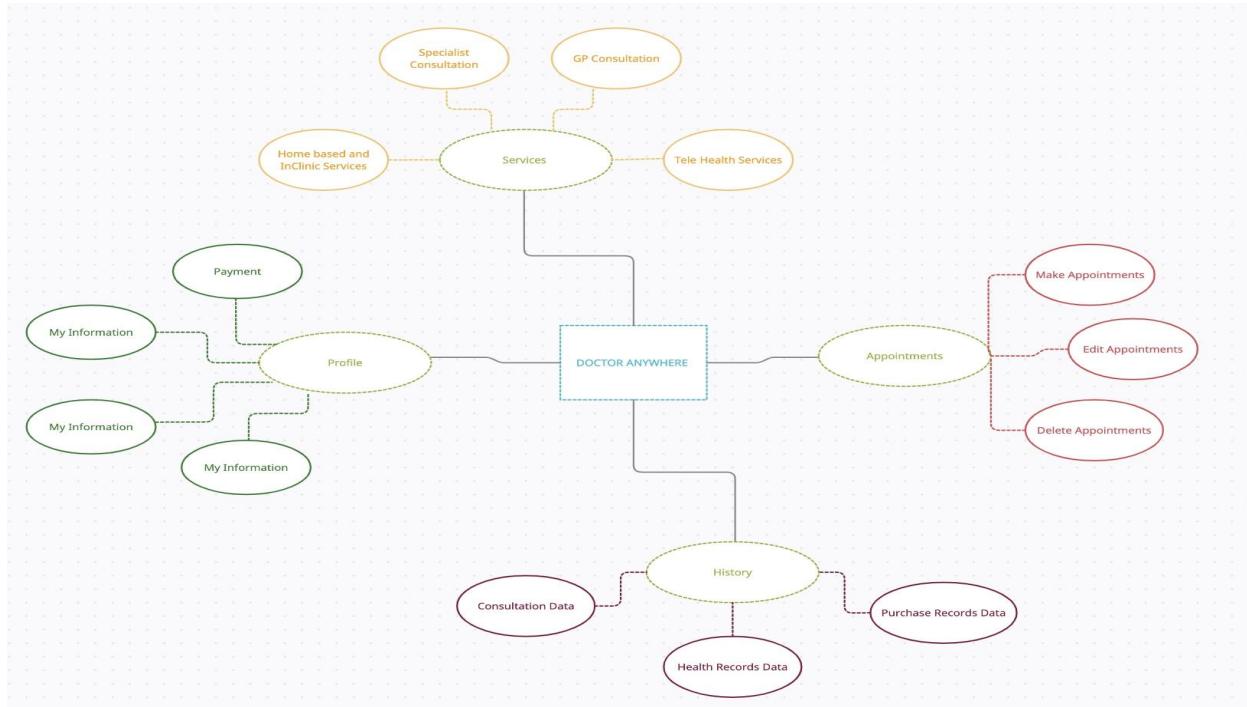


Figure 6. Services provided by Doctor anywhere App

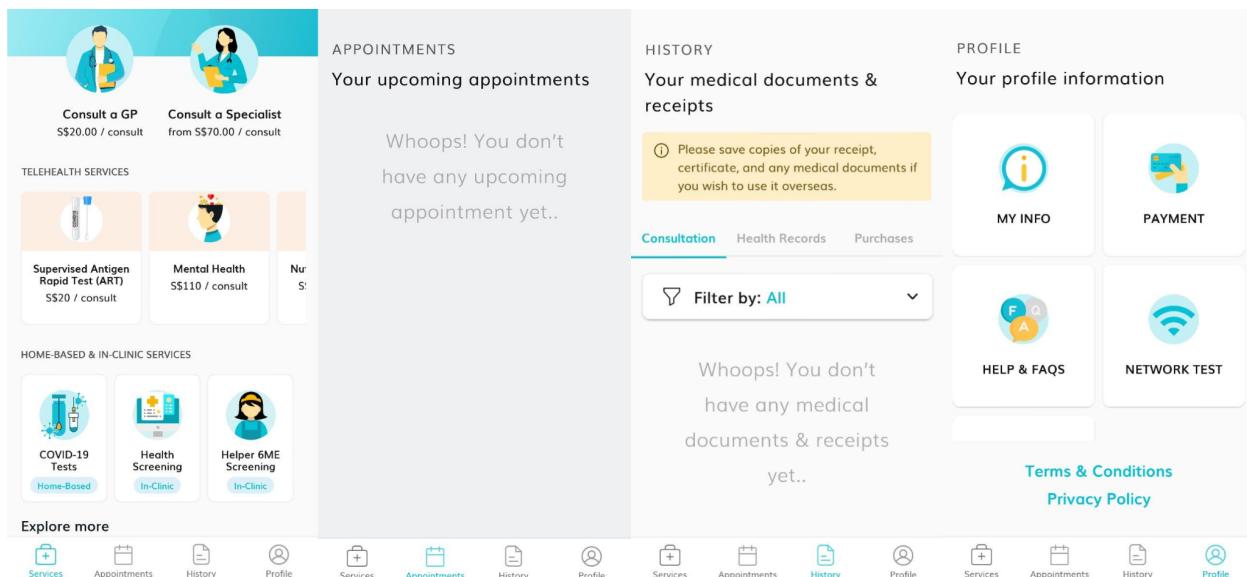


Figure 7. Outlook of App

It is worth noting that Doctor Anywhere is not supported by a major healthcare service unlike its other competitors such as Sata CommHealth and Doctor World.

Anatomically, Doctor Anywhere uses BigQuery to investigate statistics of affected people and other relevant factual assets, including nationwide fitness datasets to learn the category of an

affected person. This means that instead of buying expensive remedies at the onset of infection, patients and doctors can be educated about prevention to improve long-term health.

Doctor Anywhere saves time by using firebase to relaunch its mobile software with pre-made components, from authentication to push notification. Firebase Authentication allows a patient to log into the Doctor Anywhere app with the use of third-party apps consisting of their insurer's app or private social structures. Effective collaboration is imperative for the realisation of Doctor Anywhere.

Members of unique departments, such as marketing, sales, and engineering, paint together in cross-functional teams to create new merchandise and features. Doctor Anywhere uses Google Workspace products, which include Google Chat, Meet and Force to improve verbal exchanges and communication.

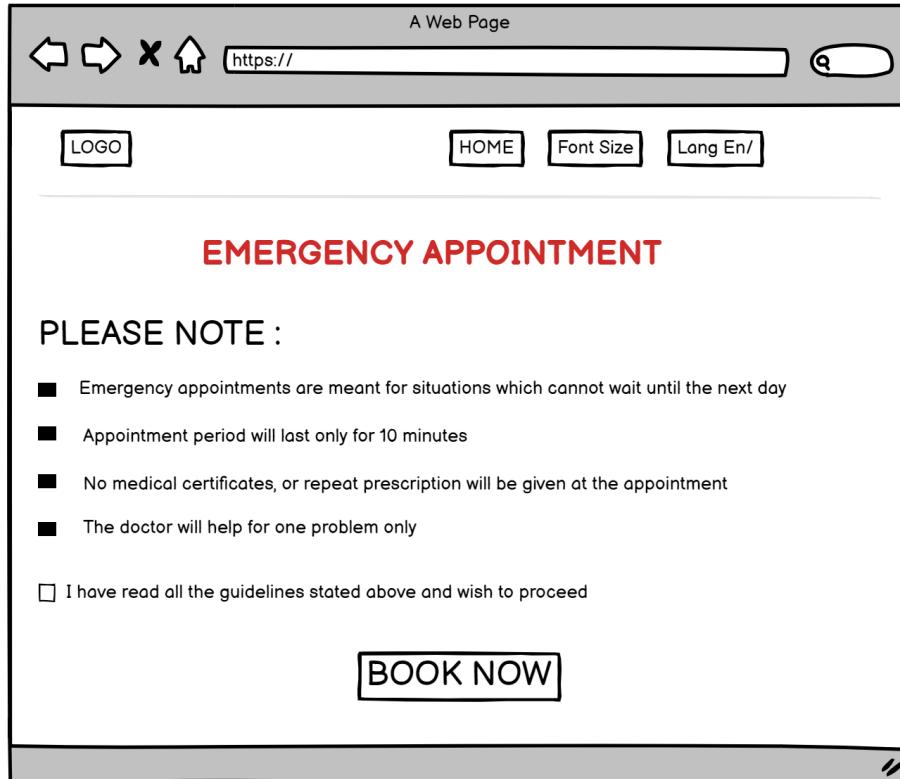
In Southeast Asia, DoctorAnywhere aims to be the largest omnichannel healthcare provider powered by the latest technology and Digi innovations. Although the region has experienced an influx of telemedicine startups, Doctor Anywhere's founder Lim believes that the telemedicine healthcare sector "remains ripe for disruption".

## **Overview of Additional Services**

Our application provides an emergency SOS request feature and views of past medical reports/analyses.

### **SOS Request Service**

SOS request service is intended for emergency situations in different environments. SOS features such as this have greatly benefited the elderly because this service is available 24/7, even on holidays and weekends. Our application includes an SOS button that can be pushed by a patient in a dangerous situation, and they will receive a call to confirm from the hospital.



*Figure 8. SOS feature.*

## Target Customers

We offer a web-based e-Health application that can be used by anyone inside Singapore, regardless of gender or age group, as well as cross-platform (for example, Android, iOS, or Windows). Nevertheless, the primary motive for making this e-Health service is its convenience for elderly citizens.

## Market Strategy

Using both STEEPLE and SWOT analysis, we need to figure out the strengths and weaknesses of our e-Health services application and to ensure our competitiveness in the market.

## SWOT Analysis

SWOT is also known as situational analysis, it will help our e-Health app to identify its strengths, weakness, opportunities, and threats.

## **Strengths**

- Efficacious and time-saving
- Short trackbacks to past health records
- Our clients will benefit from e-Health by having less paperwork to complete and sharing securely and easily with their families.
- Ease of use, a simple and considerably basic user interface for the elderly.
- Cancel or book appointments 24/7. (Effortless appointment scheduling software)
- Close monitoring

## **Weakness**

- Few patients might prefer to see a doctor in person.
- Regular maintenance can be costly to keep the app running.
- Frequent updating requires.
- No long-term data.

## **Opportunities**

- Huge market potential for the future
- This e-service can be used by all ages and can be spread worldwide.
- Increase efficiency and reduce workload.

## **Threats**

- Eyestrains and loss of focus after a long session of treatment.
- It can be challenging to manage a lot of incoming requests from the clients at the same time.
- Already similar apps existed in the market, therefore, can be incredibly competitive.
- Security issues such as patient data privacy protection.



*Figure 9. Swot Analysis*

## STEEPLE Analysis

The word STEEPLE means Social, Technological, Economic, Environmental, Political, Legal and Ethical. This analysis is also called 'The Pest Analysis' it analyses the external factors of our proposal.

### Social

- Have a positive effect on individuals' healthcare among communities.
- Cultural beliefs and values of people might have an impact on digital healthcare service.

### Technological

- Continuous development of new technological solutions may be costly in the long term.
- Staff will require training for implementing innovative technologies.

### Economic

- Due to the unemployment and inflation during the pandemic, the country's population will affect the client's ability to spend on healthcare services.
- Service usage fees will be included in the final medical bills.

## **Environment**

- To store our client's data, we need storage which can harm our environment because of the storage hardware that uses a large amount of energy and electricity.

## **Political**

- Political factors affect the cost of medical expenses as it consists of healthcare organisational reforms and policies.
- It also depends on governmental spending and staffing of medical care.

## **Legal**

- Follow taxing laws.
- Must follow the laws and regulations of the government to provide medical services to people legally.

## **Ethical**

- Need to be honest in providing medical assessments and reports.
- Must be responsible and transparent in handling clients' sensitive data.

## **Conclusion**

The digital marketing industry is fast-growing. A recent study shows that Singapore has one of the highest internet penetration rates in Asia. This means 84% of Singaporeans have access to the internet. The country has 5.83 million people, and 4.92 million of them use the internet (data collected based on World Stats, 2019). 64% of those online users access the web by using their smartphones. It is therefore justified for our team to create a web application for digital health services for Singaporeans. To make our software stand out in the competitive market of Singapore, we add to our web-based application continuously in order to provide better service and convenience to our users.

# **Literature and Introduction**

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## **Introduction**

Today, the health sector comprises medical institutions such as hospitals, community clinics, and Research and development institutions such as medical research labs and medical colleges. Thus, the health sectors aim to provide the best medical facilities and services to every patient regardless of age, gender, or language.

## **Definition and concepts**

This hospital management application brings all the hospital's information together in a single web browser which is then accessed by different cross-platform devices of the patients. It provides the patient with the most unified view of appointments, past medical records, SOS features and doctors.

Based on our market research, we derived the following research questions for which our project aims to answer or address to:

- 1) How do we build sophisticated booking systems for appointment management?
- 2) How do we address and reduce barriers such as age, languages, gender, geographical availability etc?
- 3) How do we review and track medical reports and appointments?
- 4) How do we build a comprehensive UI system in such a way that even elderly are able to navigate through the app swiftly and effectively?
- 5) User Evaluation? (i) List of used medicine(ii) Attended doctors
- 6) Usability Evaluation

Our hospital management app system is expected to automatically generate a highly efficient process and make it fast to provide results back to clients. It also allows hospitals to provide quality service through the web, including professional medical assistance. This system will not only help the elderly but also improve the quality of life of people in society. It will also allow us to optimise and digitalize all the health relating processes, which will help improve patient service such as appointments, cost-effectiveness, streamlining the search of medical records, details of doctors visited and specialty, thus having a database of each module implemented.

## **Usability Evaluation**

The usability evaluation part is used to understand if the system is efficient and usable and how satisfied our clients are after experiencing it. The sole purpose of this hospital management app is to improve the quality of healthcare service and increase the efficiency and effectiveness of the medical workers. The usability evaluation is based on how the user interface of the system and the implementation of the interaction design principles. The results of the usability evaluation study can be referred to as the data provided in the prototyping and iterative development part.

# **Scope**

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Our application is aimed at making it easy and convenient for the elderly population in Singapore to book medical appointments online.

Our project was initiated by researching and surveying users. The result of this survey showed that there is a growing need for a product to help elderly people book medical appointments online, with only a limited number of applications designed for such users. Our application is designed to help elderly people in such scenarios. As we build our product, we will consistently test and seek feedback from our users to improve the product.

## **Development Focus**

So our application will allow users to:

### **Create an account, or login/out:**

Our users can create an account to keep track of their medical records, health status, the appointments they have taken, and so on. Once the user has created an account, our application will store the user data and other related information in our database and display it to them when they login to the application.

### **Book and Manage their appointment:**

Our users (patients) can book appointments online in our application and do not have to go to the hospital and wait in long queues to do so. They also have the option to cancel their appointment or reschedule their appointment for a later date or time. Doctors can view their schedule which contains the appointments along with patients' medical details.

### **Arrange a direct SOS communication with the doctor:**

This is meant for emergency situations when the user is not able to wait for an appointment. They can make a direct call to our doctors and avail immediate medical assistance.

### **View past medical records**

Once the user has created an account, they can fill up a medical report form with details of their medical health status and any health conditions (if any) they have. This report can be viewed by the doctor who has an appointment with the patient.

## **Limitations**

1. Our application will not allow patients to book multiple appointments at the same time.
2. The application design is made simple for the elderly to use.
3. The application has a limited number of features and functionality.
4. Greater preference will be given to elderly people (age 65 and above) for appointment slots.

# Requirements Elicitation

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## Survey Introduction

In order to better understand the landscape of the problem we are trying to solve, the team has come up with a survey that seeks to answer some of the questions we have regarding the usage of health applications, as well as opinions on the existing health applications and the procedures to follow in physical visits of healthcare facilities. By gathering responses, we are hoping to be able to gain insight on how we can better tackle the problem by either adjusting our focus or zooming into an issue that is prominently shared in the survey.

The survey is on an online platform and will be shared as a link via social media platforms. The main stakeholder of this project are the elderlyies that have difficulty getting medical assistance due to the insufficiencies of current health applications. However, it is crucial to note that there are also hidden stakeholders such as any other person who uses the application either for themselves or people who use the app to assist their elderly who have difficulty navigating the app. Thus, the survey should be inclusive of such stakeholders and therefore, they would also be able to assist in answering some of our research questions. The subsequent parts below are some of the questions in the survey as well as their responses in summary:

## Survey Results

- 1. Do you often run into difficulties with administrative tasks at the hospital? (physical)**

**Results:**

	<b>Responses / %</b>
<b>Never</b>	18.2
<b>Rarely</b>	36.4
<b>Occasionally</b>	36.4
<b>Often</b>	9.1
<b>Response received: 22</b>	

**Table 1.**

If the response was rarely/occasionally/often, the follow-up question would be:

**1a. What kind of issue?**

Results:

	Responses / count
Long waiting hours	8
Booking appointment issues	3
Made to wait even though on time for appointment	1
Response received: 9	

Table 2.

**2. Is it often that you/elderly members of your family are alone when they need medical assistance?**

Results:

	Responses / %
Yes	18.2
No	81.8
Response received: 22	

Table 3.

**3. Do you/your elderly family members use e-hospital apps?**

Results:

	Responses / %
Yes	36.4
No/Occasionally	63.6
Response received: 22	

Table 4.

If the response was yes, the follow-up question would be:

3a. How was the experience with the apps?

Results:

	Responses / count	Additional comments
Satisfactory	2	<ul style="list-style-type: none"><li>- May take a while to get response from hospital which is potentially bad in emergencies</li></ul>
Average	2	<ul style="list-style-type: none"><li>- Bothered by the need to always sign in every time</li></ul>
Not very pleasant	2	<ul style="list-style-type: none"><li>- Navigation can be better.</li><li>- Too many apps. Healthhub, healthbuddy.</li><li>- Their functionality is not clear as both allow you to book appointments. But one allows you to access medical records while the other allows you to order medicine and make payments i think.</li><li>- Both are managed by the government. Why do we need 2 apps? More confusing for elderly.</li><li>- Most of the time, there will be an error that is not comprehensible,</li><li>- Slow/no response from the hospital team.</li><li>- The pin or fingerprint login is not working as well, always having to resort to singpass.</li></ul>
Response received: 6		

Table 5.

Else if response was no/occasionally, the follow-up question would be:

**3b. What stops you?**

Results:

	Responses / count
Accessibility	1
Did not try	2
Elderly not tech savvy to use them	1
Unaware of the mobile apps	2
Privacy concerns	1
Response received: 7	

Table 6.

4. What features do you think (neutral pov) would be really attractive/feasible in an e-hospital app?

Results:

	Choice / count
An SOS functionality for emergency cases	7
Appointment management	10
E-consultation	6
E-pharmacy with delivery	8
Find and choose doctors of different specialties	10
Medical reports, vaccines and past health records	7
Additional suggested feature: - 1 app that does everything from start to finish is good. - 1 app focus on one thing	
Response received: 22	

Table 7.

## Survey insights analysis

A quick glance at **Table 1** shows that only 45.5% of respondents had issues with tasks at the hospital directly. This implies that the procedures are generally smooth-sailing and reliable when a direct visit is made. However, we would like to improve upon the online experience with regard to the convenience of being able to handle the same tasks at home. This would not only save time taken to travel but also, account for the elderly that may have difficulties travelling distances.

Therefore, in **Table 2**, we have also asked what sort of issues respondents have faced in the hospital and the prominent issue was long waiting hours with some mentioning appointment dates issue as well as one mention of not getting their appointed time. The aforementioned issues could potentially give us ideas on features we can possibly incorporate into our web application such as online appointments on a first-come-first-serve basis or possibly, online consultation sessions with the doctors for medical cases that do not require physical checkups.

**Table 3** was a simple question for surveying the ground to see if an emergency or assistance feature is needed in the event of elderly living in solitude and based on the results of 81.8% saying no, we can assume that the button may not be necessary. The next question in

**Table 4** was about the usage rate of such health applications, with the response showing 36.4% yes and 63.6% no. Probing further, we decided to question their experiences in

**Table 5** and it turned out rather balanced, with 2 counts in each rating: Satisfactory, Average and Not very pleasant. On the other hand, we also asked 63.6% of respondents in

**Table 6** the reasons why they did not attempt to use the apps and some responses were accessibility, accessibility for the elderly, unaware of the apps and privacy concerns. Lastly,

**Table 7** shows some of the features that respondents would like to see in a health application. The features voted the highest were appointment management and a feature that let users find and choose doctors of various specialisations.

# Planning

## Concerns

The planning of our project began when our group had our first virtual meeting on 12 June. We agreed on having a meeting weekly as much as possible to discuss our progress as well as tasks to be worked on to be reviewed by our next meeting. After every meeting, the meeting agenda is recorded to keep track of our discussion in a summary to ensure that everyone can be constantly aware of their assigned role. Images of our meeting agendas up to the present date of writing this report can be found in Appendix A.

## Timescale

During our first meeting, we agreed on utilising a Gantt chart to help with the planning of our project to work around deadlines and keep progress in check. The following images below show the Gantt chart for our project plans up until the present date of writing this report. We have decided to segregate it by our meetings whereby during each meeting, we would update the Gantt chart to show tasks that we have decided on. The chart shows the estimated time for completion, the name of the person assigned to the tasks as well as the percentage of completion. As the Gantt chart is available to every member, we would update it whenever possible and before the start of the next meeting. This helps us in keeping track of the tasks on hand and understanding our progress to know if we require additional planning or a difference in allocation of resources.

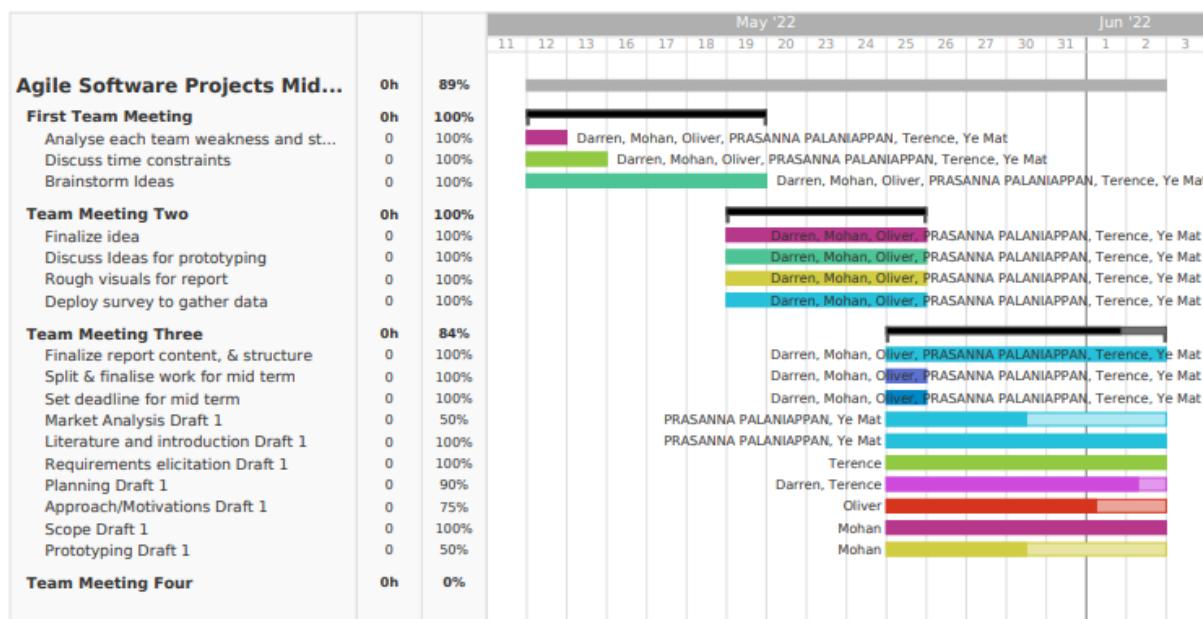
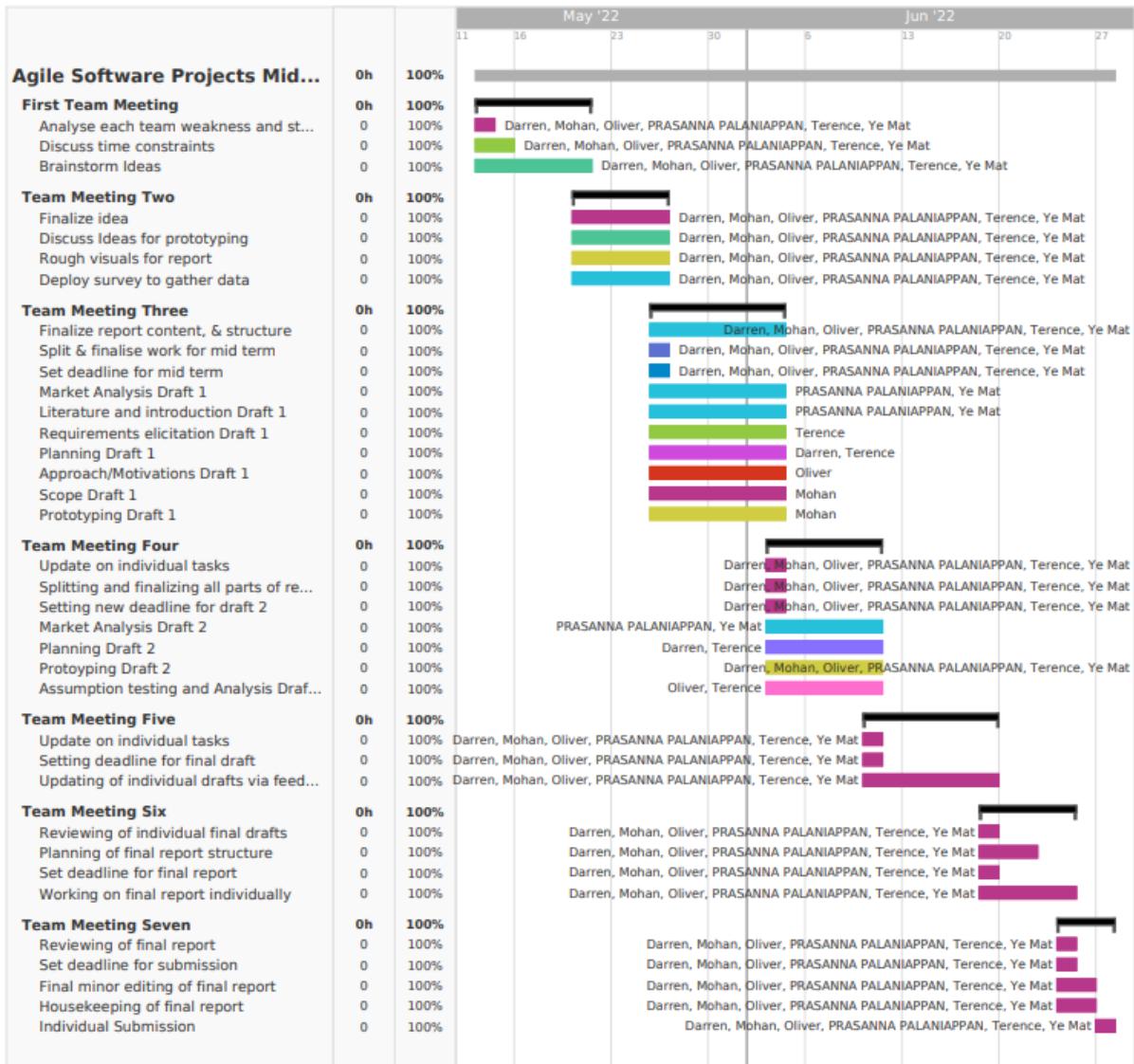


Figure 10. Gantt chart of the project discussed during meeting four



*Figure 11. Final Gantt chart of project before report submission*

## Dependencies

To facilitate the smooth flow of the project, our team has also agreed to utilise a dependency chart to analyse each part of the project beforehand and identify their dependencies. This prevents the awkward situation whereby one is unable to carry out their given task due to it being dependent on another person's task who might be incomplete or not started yet. With this planning, it allows everyone to always be able to work on their parts regardless of the rest and always be efficient with no wastage of time. The image below shows the dependency chart the team followed to work on the project research and report. The team will also create and use a dependency chart for our application for the same purpose.

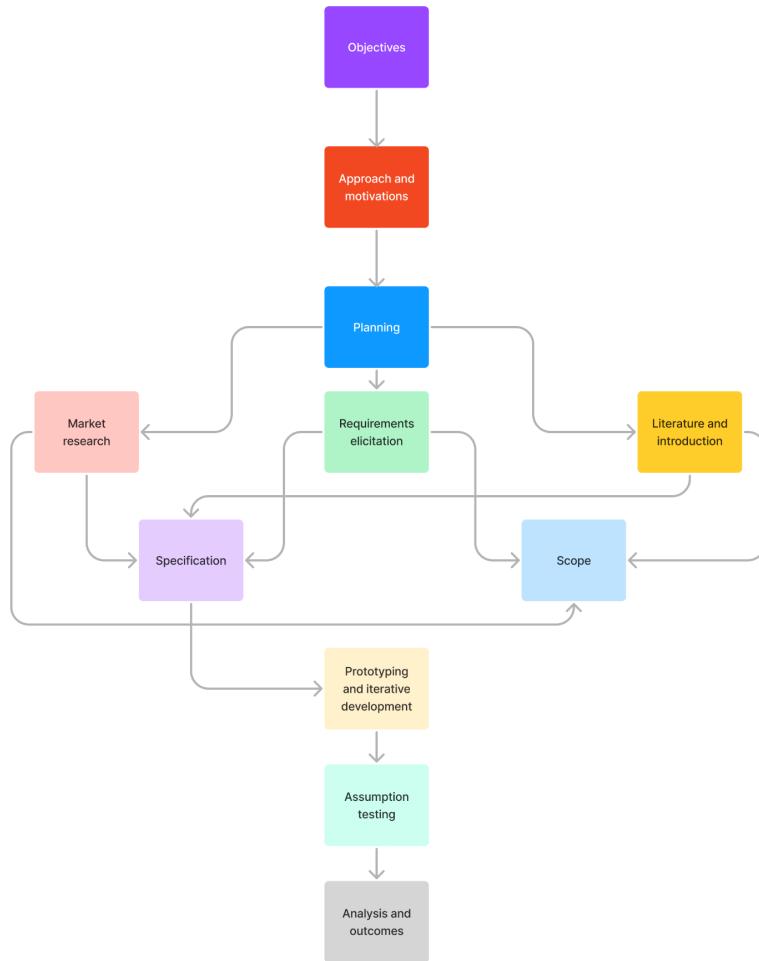


Figure 12. Dependency chart of project research and report.

# Milestones

In addition to keeping the progress of our development, the team has also come up with a project milestone timeline to follow and adhere to. This would provide us with a visible goal as well as a form of motivation to push us through the various challenges that we may face during our journey of developing this application. Furthermore, the milestones also act as checkpoints to remind us of the tasks and backlog we have to complete by the stipulated date so that we do not fall behind schedule. The image below shows the milestone timeline that the team has set to achieve.

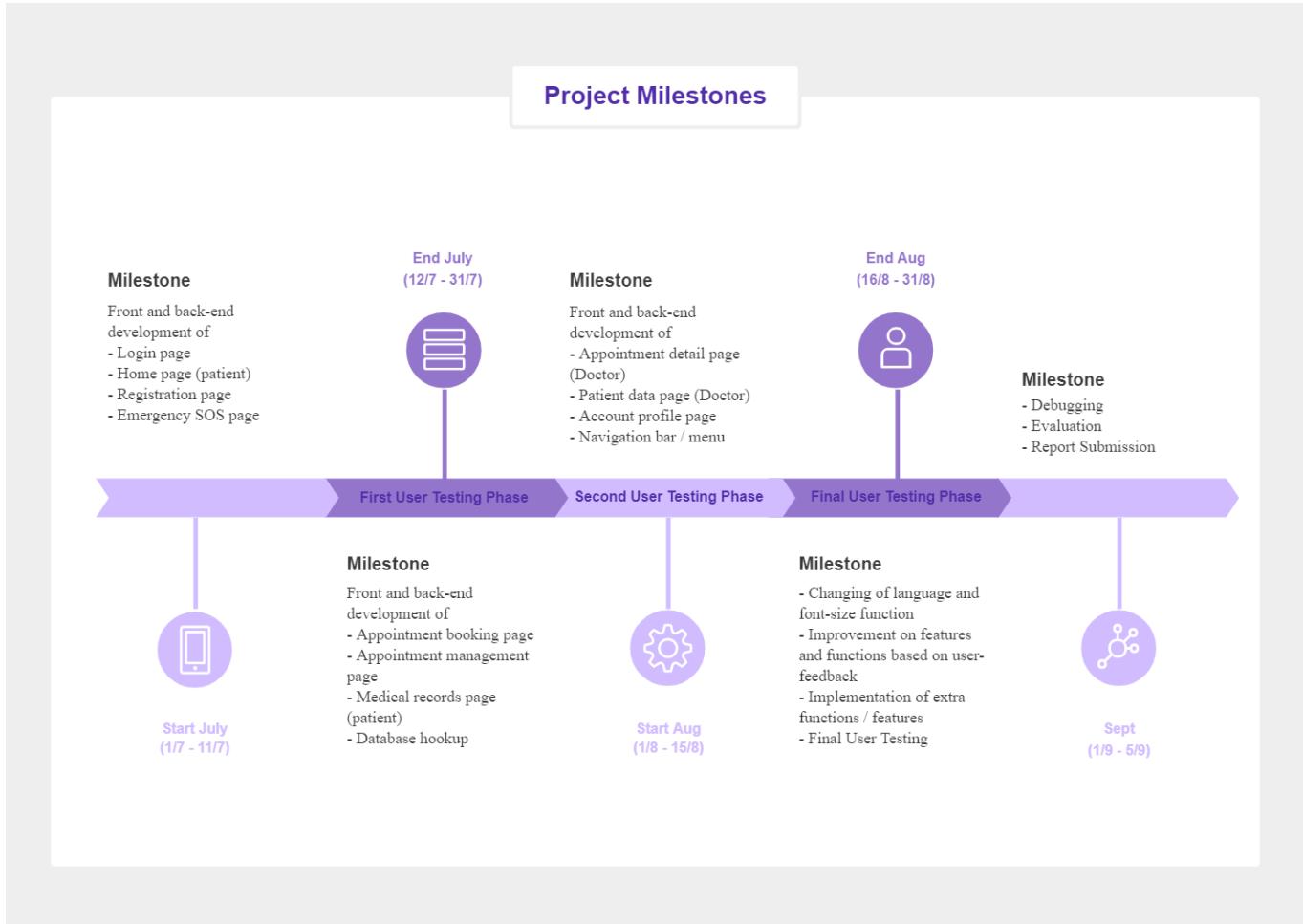


Figure 13. Milestone timeline of project development

## Contingency planning

We have also agreed on a contingency plan system to implement in the event of unforeseen circumstances that may affect or delay the originally planned timeline. The following image below is an example to showcase how the plan would work. During every meeting, the contingency plan table which is accessible to every team member is filled up with the member's name, tasks assigned and timeframe to complete it. If a member foresees a potential problem with their task assigned, they would point it out and list it down on the table and the team would brainstorm for a solution and prepare a response ahead in case the problem is encountered. The contingency plan is also updated whenever a task is completed or when any member encounters a problem so that a response can be immediately come up with, and before every meeting to track the status and progress of the task.

## Contingency Plan

Last updated: 9 June

Tasks	Member(s) allocated	Timeframe	Current status	Potential / Actual Problem	Proposed Solution	Importance	Response (Who)	Response (What)	New Timeframe (Completion Status)
Setting up database	Darren, Terence	4 June to 9 June	Database table created in SQL	Unable to link database to webpages to display right data	Assist in online research and the implementation of the linking of database	HIGH	Prasanna, Mohan	Pages dependent on the database to be put on hold	13 June (Incomplete)
Past Medical Records page	Prasanna	7 June to 13 June (TBC)	GUI for page done, waiting to link retrieval of patient medical records from database (ON HOLD)						
Appointment management page	Mohan	7 June to 13 June (TBC)	GUI for page done, calendar system and JavaScript implemented. Waiting to link calendar to database (ON HOLD)						

*Figure 14. Example of contingency plan table*

# **Approach / Motivations**

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In general, our group chose an agile and User-Centred Design (UCD) as an approach before the mid-term as it is more relevant to our proposed idea and caters to our users. Because we want to develop a web program for medical services, the purpose of the software is to provide the corresponding convenience to the public, especially the elderly. Therefore, the user's experience and feedback are particularly important. And after mid-term, we are going to change our approach to Test-driven Development (TDD) mode so that we can get feedback and keep updating our application.

To this end, we have done corresponding surveys and data collection to develop corresponding functions, and intend to continue to actively seek user feedback in future tests to continuously iterate on software functions

## **Motivations**

Due to the increasingly serious problem of Singapore's ageing population, the development and popularisation of science and technology are accelerating, resulting in some elderly people being unable to quickly adapt to the medical security services in the new technology environment. With the advancement and development of science and technology, most hospitals now adopt online queuing and appointment registration services and even convert the patient's medical records into electronic versions of the file in some corresponding applications, which is convenient for young people, but it will be a great inconvenience for those who are not proficient in technology and have poor vision. The results show that compared with 2020, the proportion of people in Singapore, Malaysia, Indonesia, and Thailand, four Southeast Asian countries, who are willing to receive online medical services, has increased significantly. This made us realise that the development of technology is driving online telemedicine services into a trend.

So to help the elderly better adapt to the new social environment and accept better medical service conditions, we want to develop a more convenient and understandable web application for the elderly, its functions include online consultation with doctors, online queuing, emergency calls, and other functions, to cope with the elderly's poor vision, we also intend to develop functions such as font size change.

## **Approach**

In detail, The first approach our group chose is Agile, which is an approach to project management including quick delivery, adapting to change, and collaboration rather than top-down management and following a set plan. Besides, in this process, constant feedback is also needed which allows team members to adjust to challenges. Each of our team members was assigned some specific tasks to their expectations and self-sufficient to finish their job with minimal assistance. Due to the pandemic, we have to hold meetings online once a week to discuss our progress, any difficulties, and our next step. Agile is an effective method that ensures our development process can be paved forward steadily.

Besides Agile, we also used User-Centred Design (UCD) as an approach for planning and design as it is more relevant to our proposed idea which caters to our users. Because we want to develop a web program for medical services, the purpose of the software is to provide the corresponding convenience to the public, especially the elderly. Therefore, the user's experience and feedback are particularly important. To this end, we have done corresponding surveys and data collection to develop corresponding functions, and intend to continue to actively seek user feedback in future tests to continuously iterate on software functions. Most of us have elderly family members, so it would be easy for us to seek test targets and get feedback as quickly as possible. In this case, UCD is effective in helping us gain a better understanding of the features that users might want from our web app.

After the mid-term, we may use Test-Driven Development (TDD) to further improve the functionality of our app. First, we will use the input gathered in the planning and design section to develop a basic experimental test version and give it to the test subjects we have found before and ask them to help test it. After they have used it, collect their comments and have group meetings to integrate their comments, after which we will again make improvements to the functionality of the web page and continue to test the improved version with other experimenters. Because our target users are the general public, not just the elderly, we will be looking for more test subjects and repeating this improvement process to continuously improve the functionality of our application.

# Specification

---

## User-acceptance Criteria

We have also agreed on the following user-acceptance criteria to aid the development of our software to ensure that it will perform up to development specifications and meet the expectations and needs of our stakeholders.

### User story:

As a user, I want to be able to register an account with my medical details easily, so that my medical information can be remembered and provided for me to make appointments.

### Acceptance criteria:

- There is a registration page to ask for the personal information and medical conditions of the registered user
- These can be done by providing forms and buttons with choices to obtain the user's input
- These forms and buttons should be straightforward and easy to understand to avoid confusion while the questions to be asked are relevant
- The data that the user has input has to be saved and stored to a database
- These can be done by connecting the HTML form to a SQL database

### User story:

As a user on the homepage, I want to be able to see and understand the functions of the app clearly, so that I can navigate to the function based on my purpose easily.

### Acceptance criteria:

- The home page is not too complex with a simple and easy-to-understand graphical user interface (GUI)
- These can be done by only inserting the necessary information on the page
- There are buttons labelled with the functions of the app
- These buttons must navigate to the function of the app the user have selected
- These can be done by assigning the buttons to a link and ensuring the button and font size of the button label is large enough to be visible and easily understandable

## User story:

As a user, I want to be able to see when I can make appointments and what appointments I currently have, so that I can track my scheduled appointments and know when I am able to make one.

## Acceptance criteria:

- An appointment booking page
- A calendar showing available appointment dates up to 3 months from the day of viewing
- Able to select and make an appointment booking slot with details including the time on that date
- Should return a confirmation once the booking is made successfully or a notification if the booking has failed to be made
- An appointment management/record page
- Able to view all the appointments that have already been made and their details.

## Use Case Diagram

We have also come up with a use case diagram describing the interaction between our stakeholders and our application as shown below.

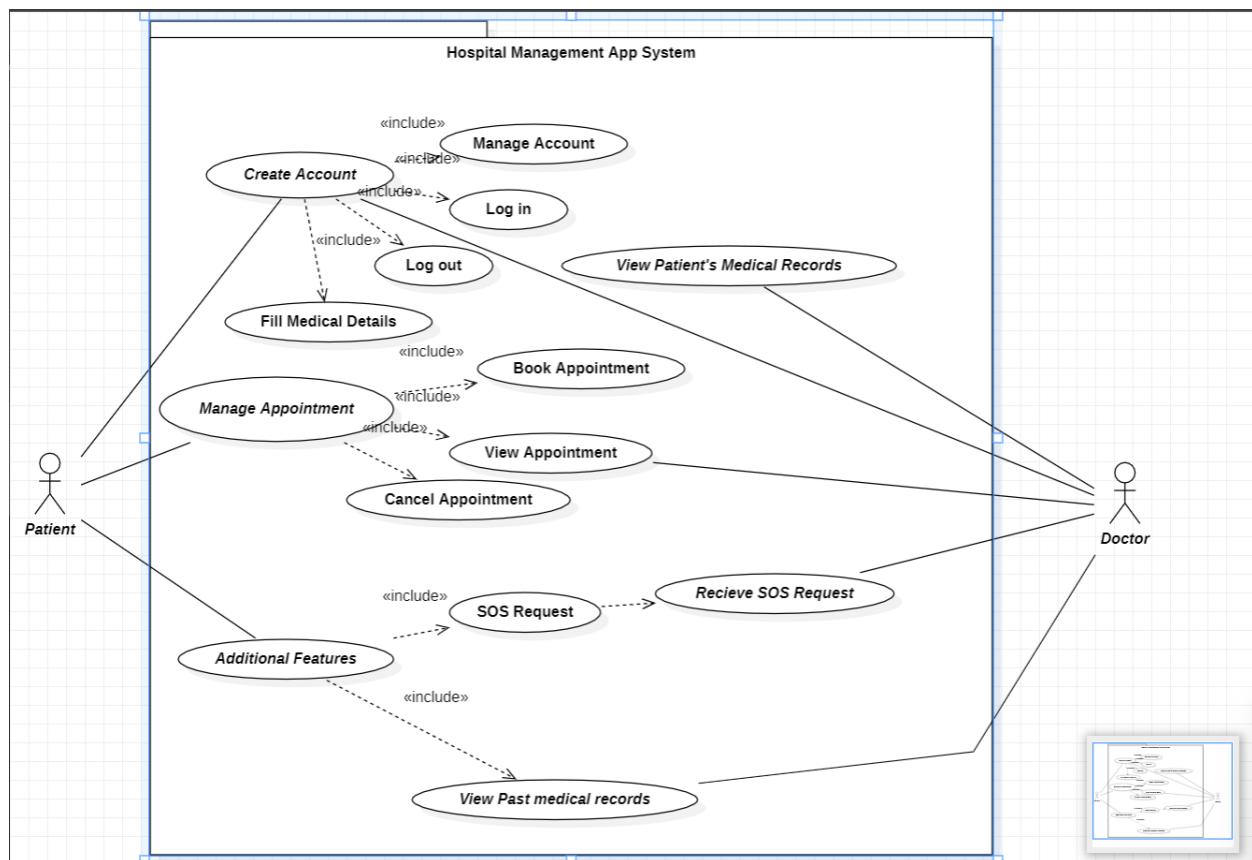


Figure 15: Use Case Diagram for User Story.

## General Design Specification

To maintain consistency and prevent confusion for our users, we have stuck to a similar theme for all pages while keeping their individual functions unique. In general, we used HTML to create the basic elements of the pages, CSS to finish off the artistic design, then JavaScript to implement the functionality, and finally MySQL commands to build the database and store the corresponding data.

For the buttons and thematic elements on the web page (e.g. service introduction cards), we used HTML to create them, defining their textual content and their subordination within the overall page. The CSS language is then used to adjust its design, including attributes such as size, background colour, and position style. Finally, JavaScript is used to define its function, such as jumping to another page when the button is clicked.

Next, for some of the pages that require user input (e.g. the medical information record page), the basic page text elements including the page title are created in HTML, then the input box is created in JavaScript and associated with the database so that the user can enter the relevant information and have it read by the database, then the CSS language is used to reposition the elements to make them simple and easy to read. Finally, a database was created using MySQL to store the information and allow other pages to store and read the data.

The team has also decided to use a table to plan and record the design specification of each member's individual task as shown in the image below. This would provide information on what resources are used for every part of the software as well as what they are used for and where they can be located.

Design Specification		
Title / Role	Resources Needed	Description
Darren	Create the front-end user interface for home page	HTML, CSS, JAVASCRIPT
Mohan	Create the front-end user interface for login page	HTML, CSS, JAVASCRIPT, mySQL
Terence	Creation of Calendar System for Appointment Booking and Management	CSS, JAVASCRIPT, mySQL
Oliver		
Myat		

Figure 16. Example of Design Specification Table

# Prototyping and iterative development

## Low Fidelity Prototype

Our low fidelity prototype of the web-application shows the basic view and functionality of the application. It helps our users understand the flow of the application and the services we provide.

### Home page before signing up:

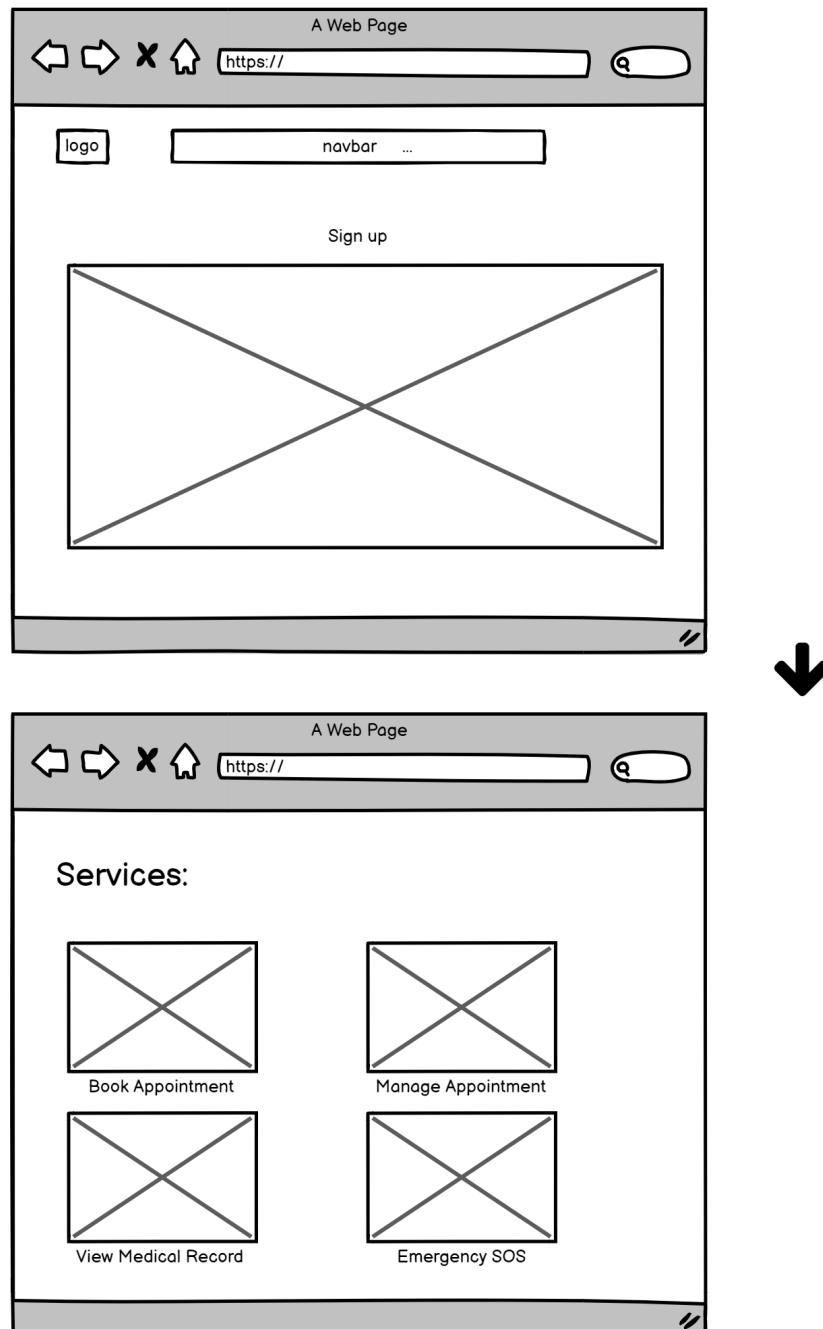


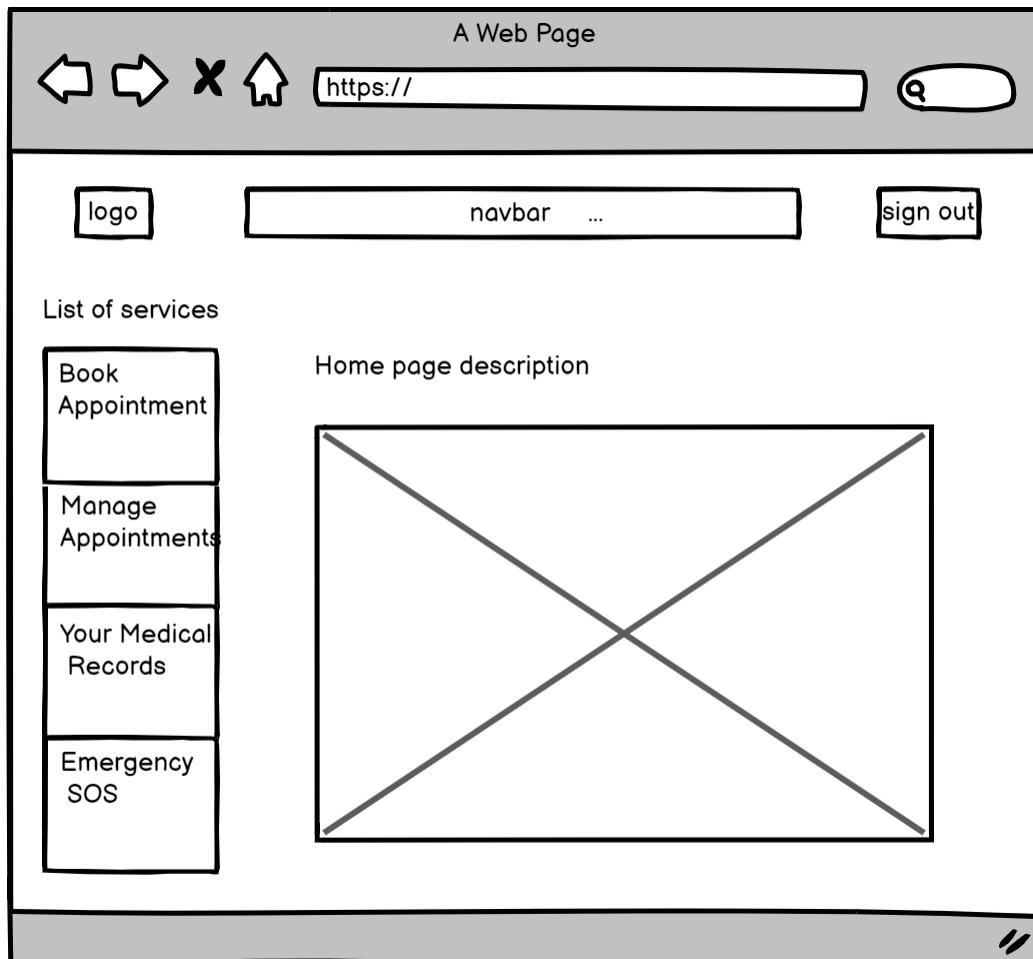
Figure 17. Wireframe of low fidelity prototype of the home page before sign up

## Fill Medical Health Form:

The wireframe depicts a web browser window titled "A Web Page". The header includes standard navigation icons (back, forward, stop, home) and a URL bar showing "https://". Below the header is a header area with a "logo" icon and a "navbar" with three dots. The main content area is titled "Health Information" and contains the instruction "Fill personal information". It lists several fields: Name, Age, Gender, Date of Birth, and Address. Below this section is another instruction "Fill health information" followed by a large rectangular input field with a prominent "X" through it, indicating it is currently empty or disabled. At the bottom of the page is a "Submit" button.

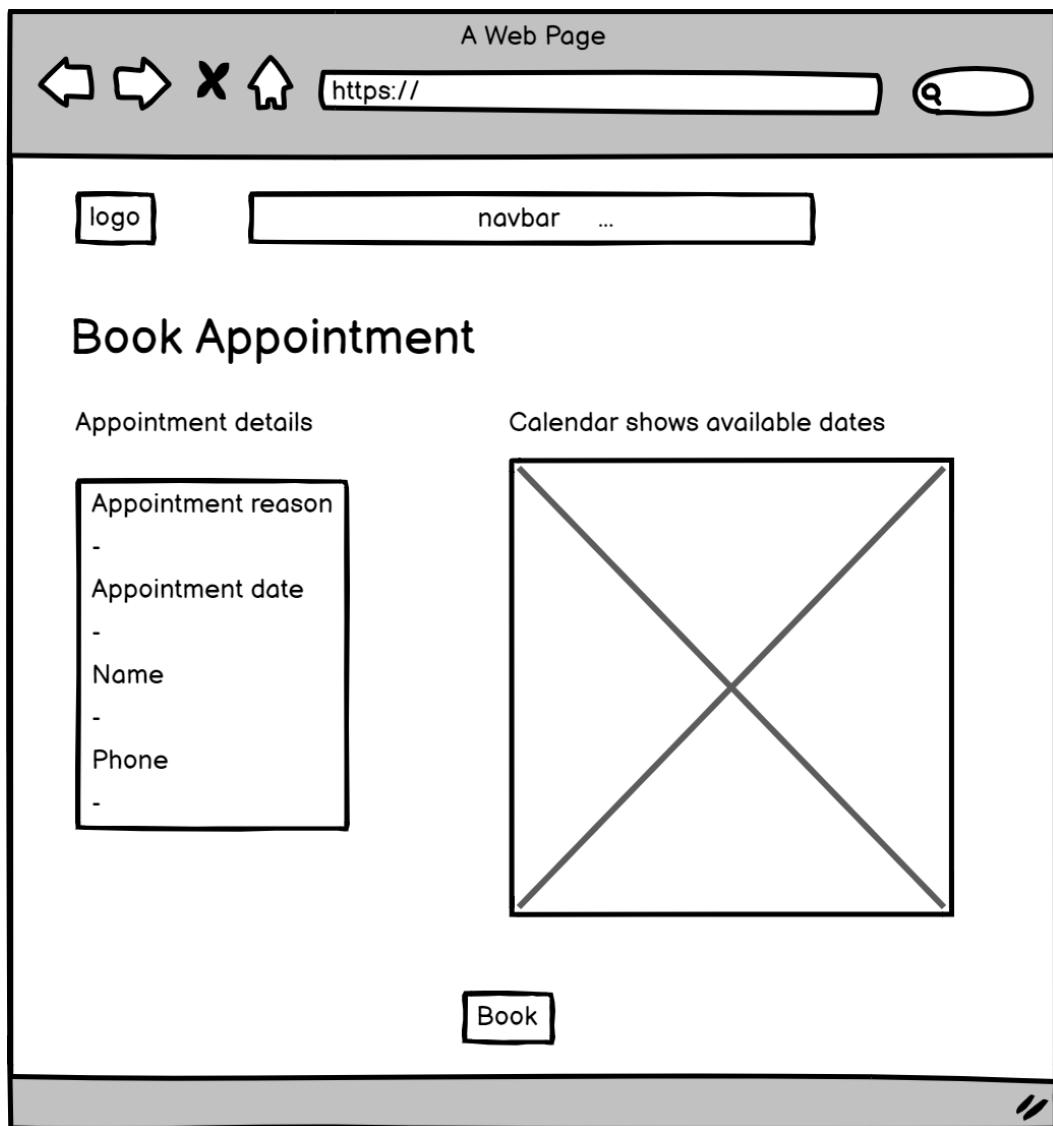
Figure 18. Wireframe of low fidelity prototype of fill up form before sign up

## Home page after signing in:



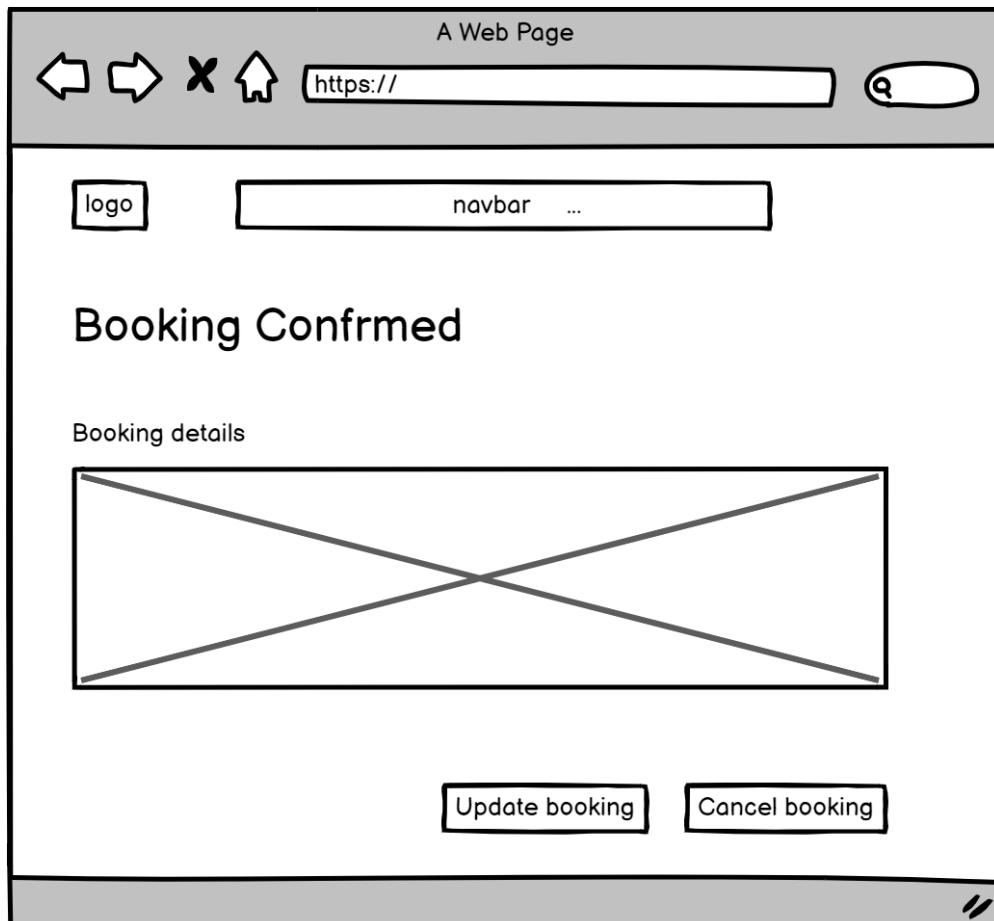
*Figure 19. Wireframe of low fidelity prototype of home page after sign in*

## Book Appointment Page:



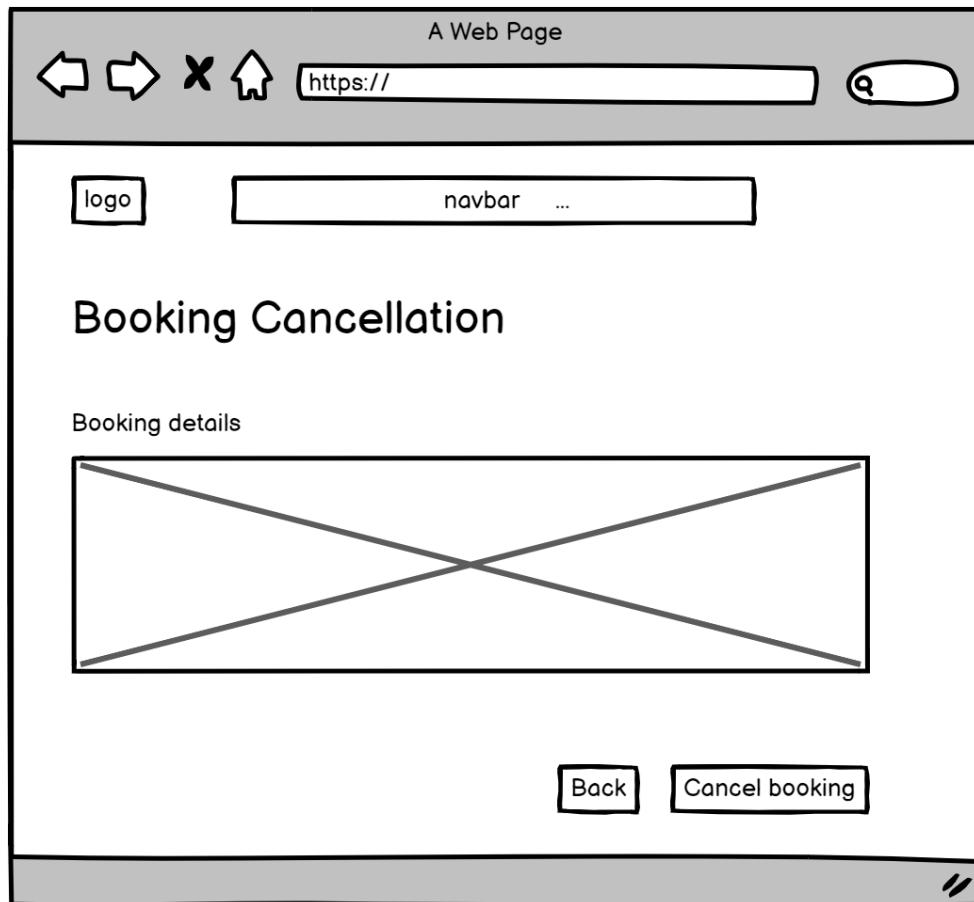
*Figure 20. Wireframe of low fidelity prototype of appointment booking page*

## Booking Confirmation:



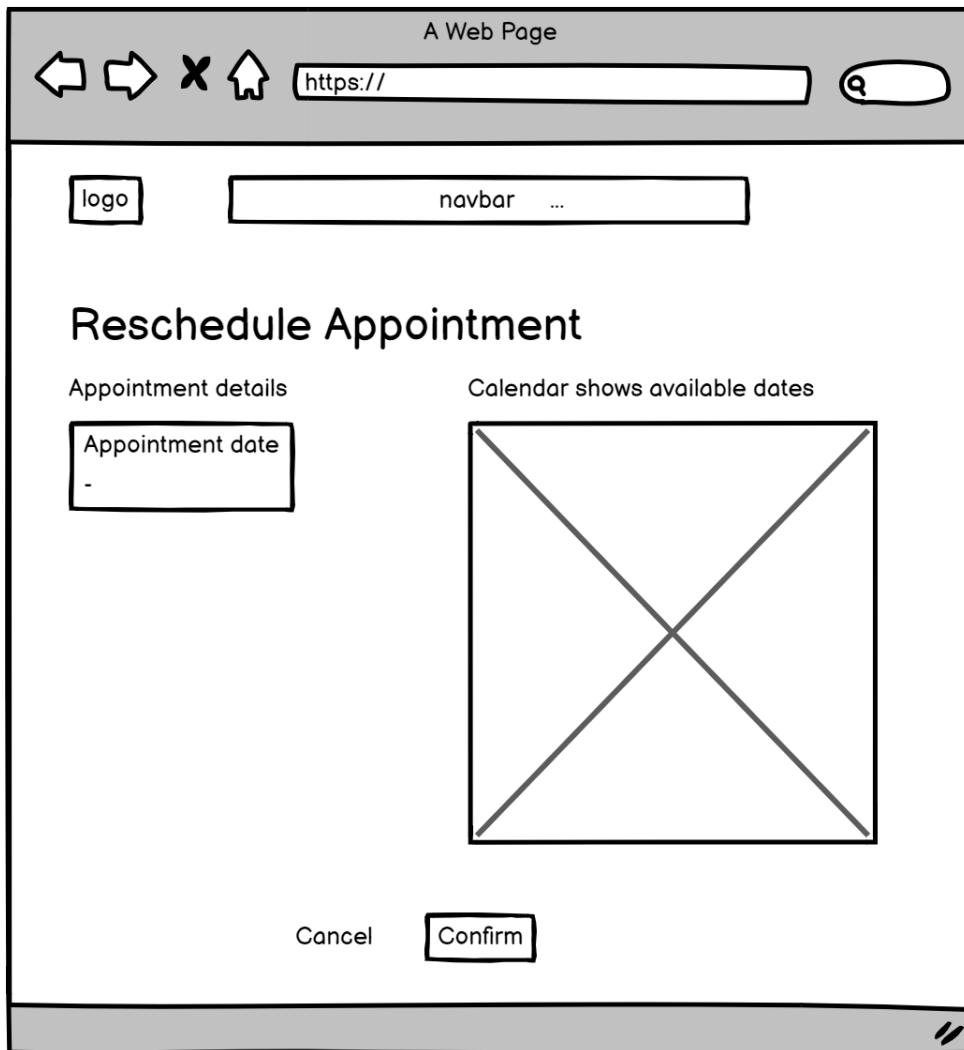
*Figure 21. Wireframe of low fidelity prototype of booking confirmation page*

## Booking Cancellation Page:



*Figure 22. Wireframe of low fidelity prototype of booking cancellation page*

## Reschedule Appointment page:



*Figure 23. Wireframe of low fidelity prototype of reschedule appointment page*

## Reschedule Appointment Confirmation Page:

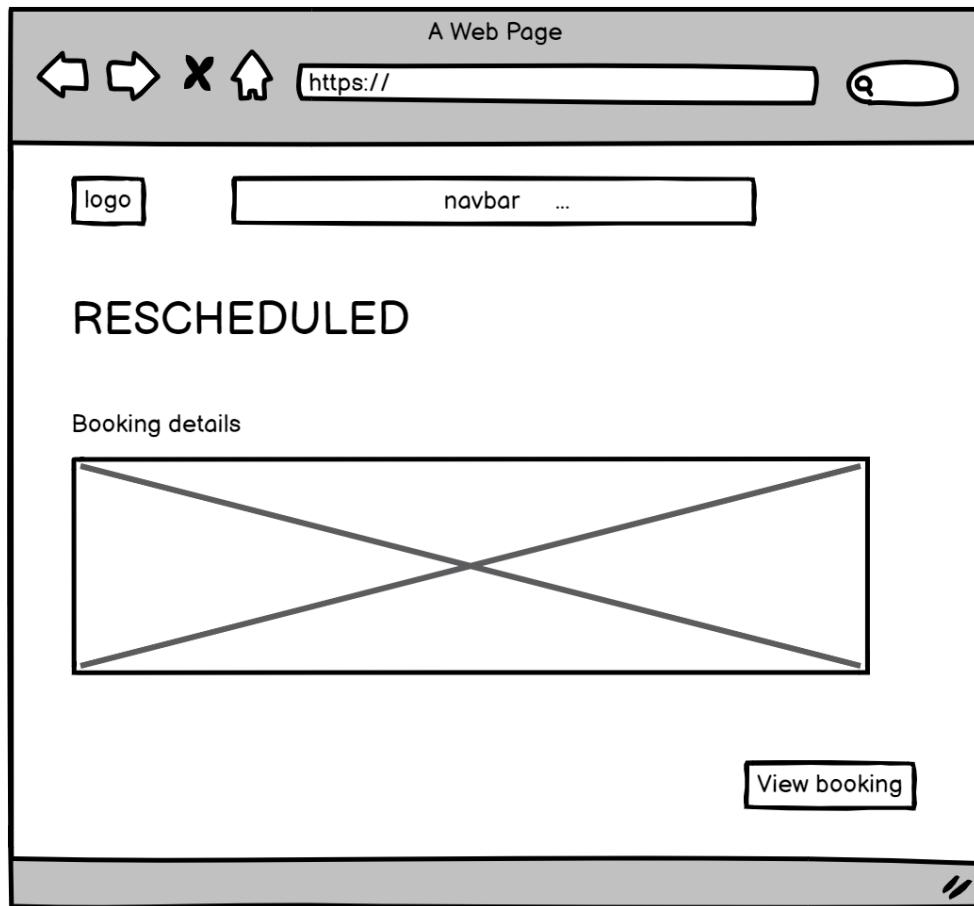


Figure 24. Wireframe of low fidelity prototype of rescheduling appointment confirmation page

**Emergency SOS page:**

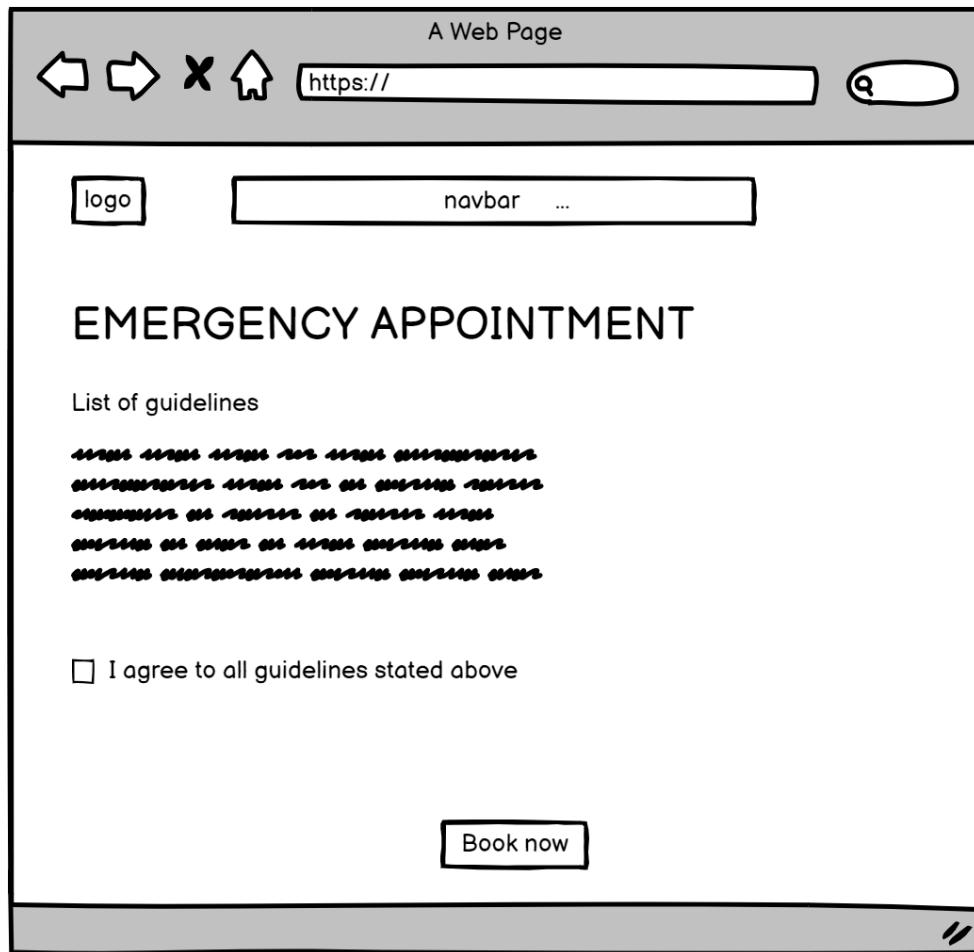


Figure 25. Wireframe of low fidelity prototype of SOS page

## Your Medical Records Page:

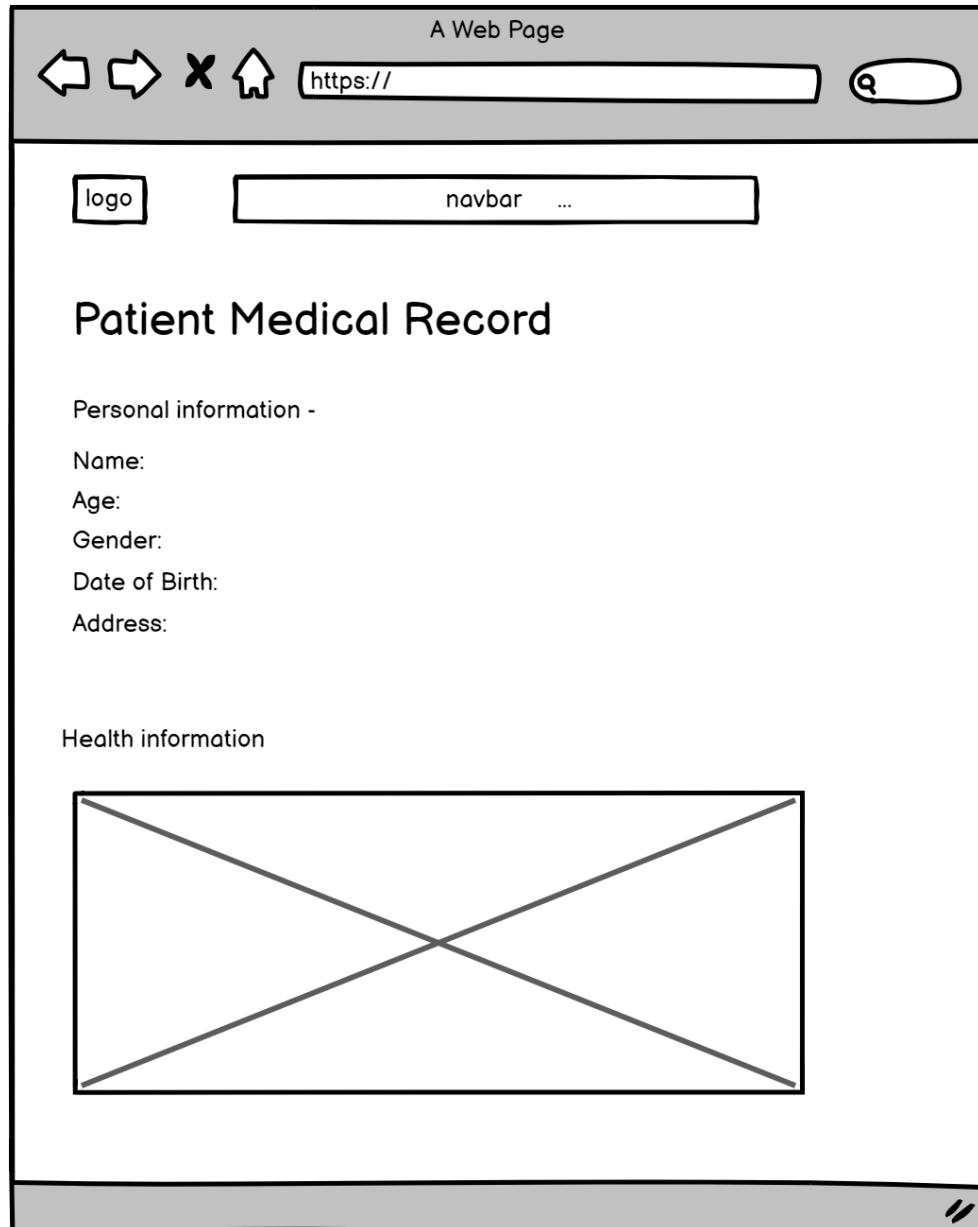
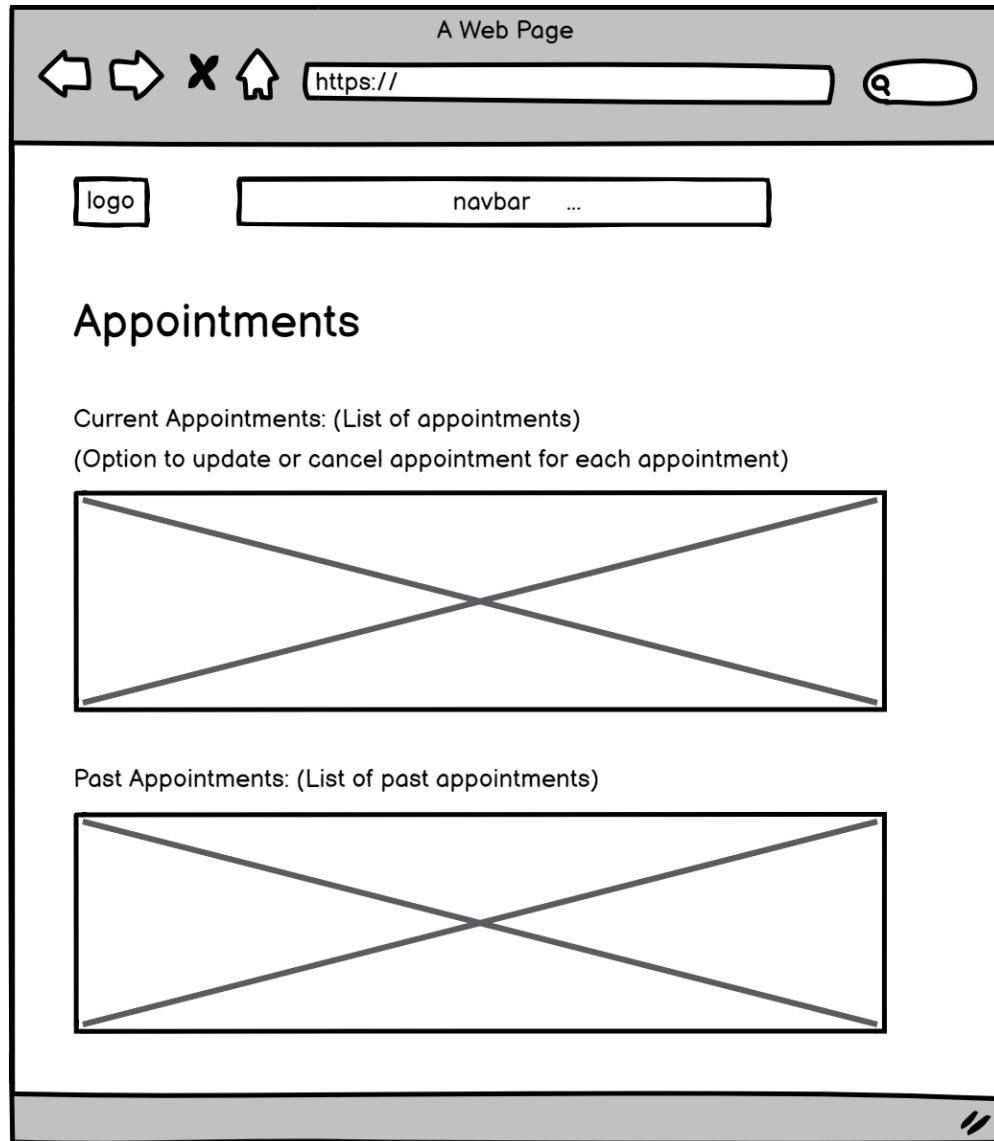


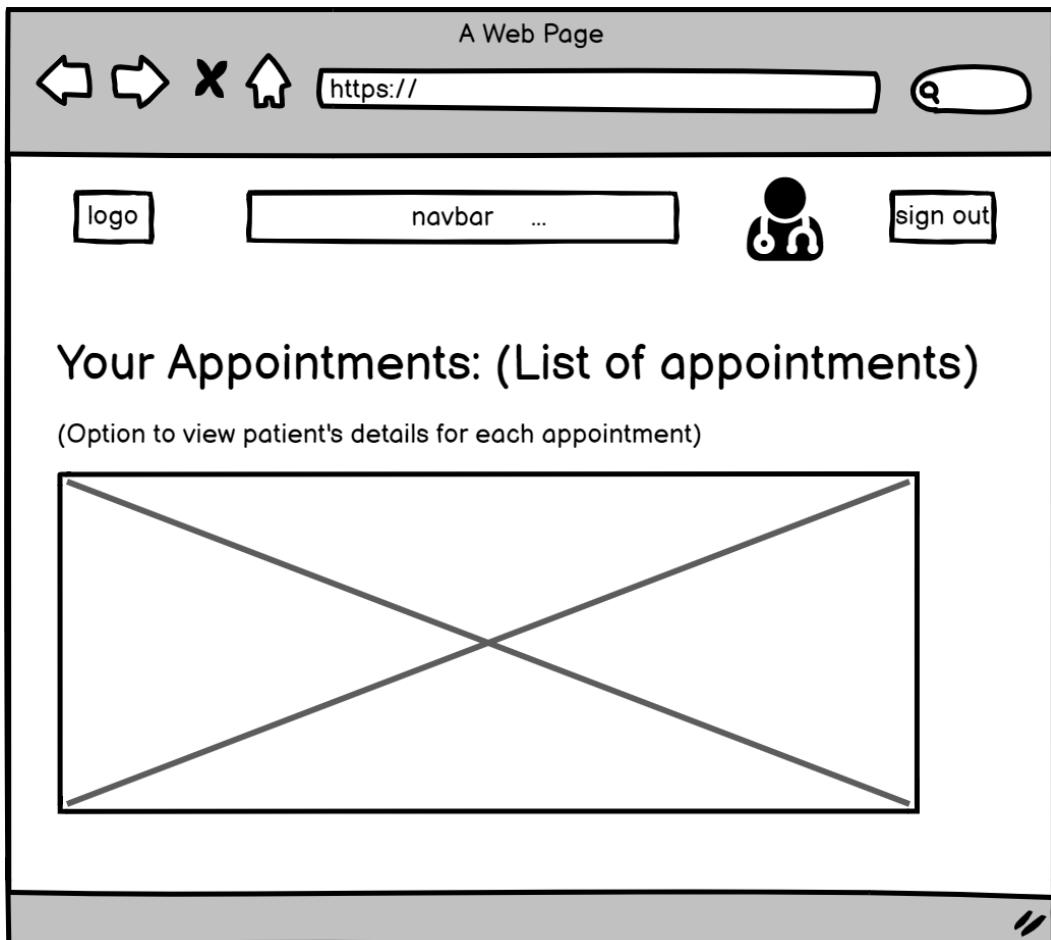
Figure 26. Wireframe of low fidelity prototype of medical record page

## Manage Appointments Page:



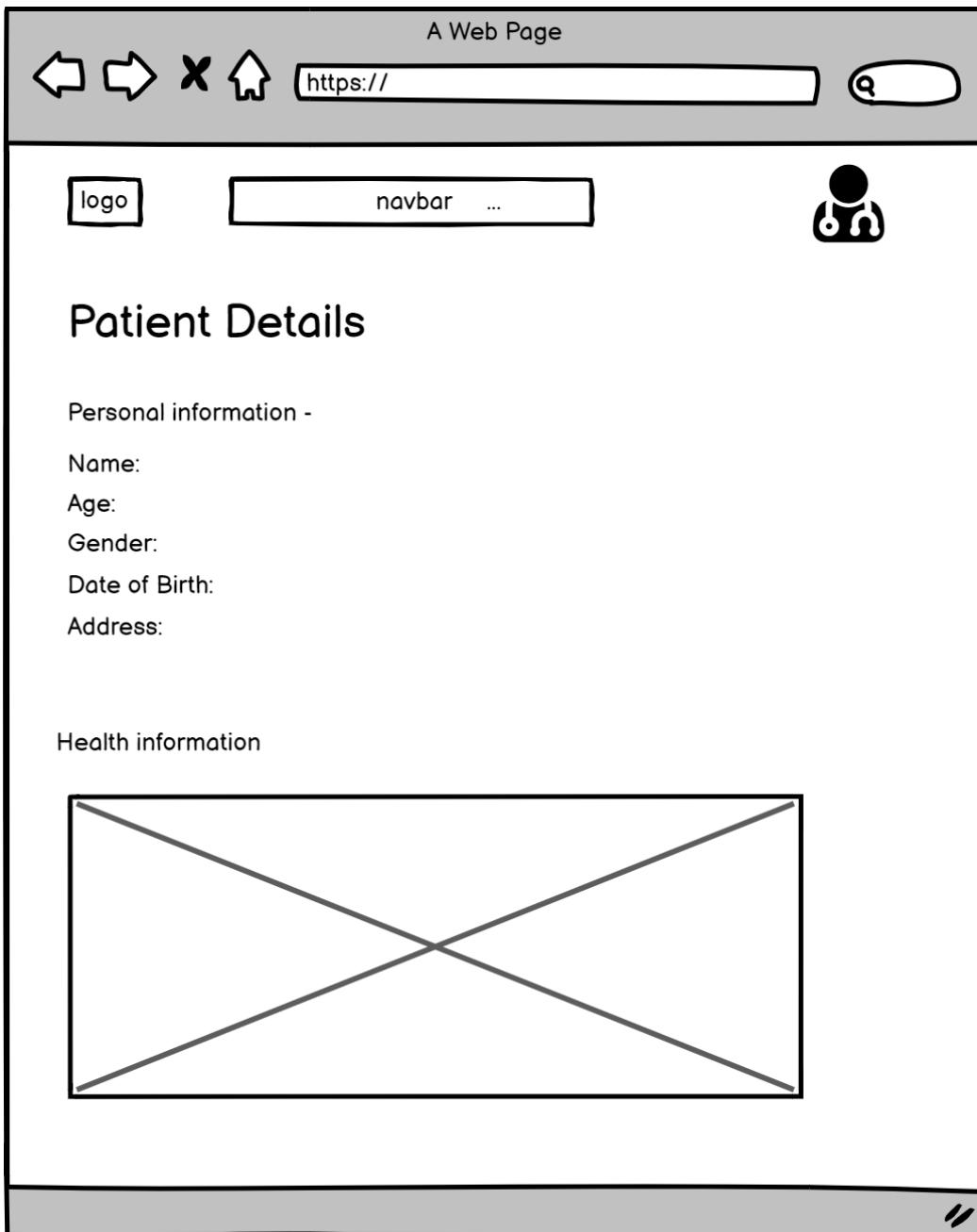
*Figure 27. Wireframe of low fidelity prototype of manage appointment page*

**Doctor's Home page after signing in:**



*Figure 28. Wireframe of low fidelity prototype of doctor's home page*

## Patient Details to be viewed Doctor:

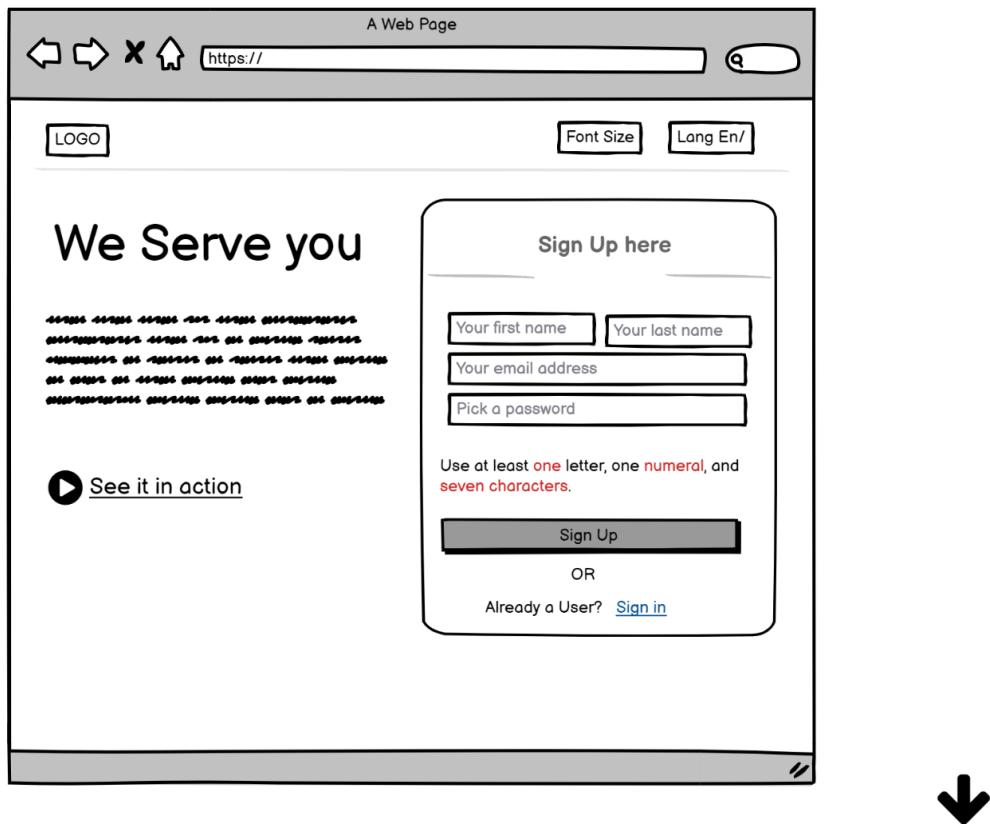


*Figure 29. Wireframe of low fidelity prototype of patient details*

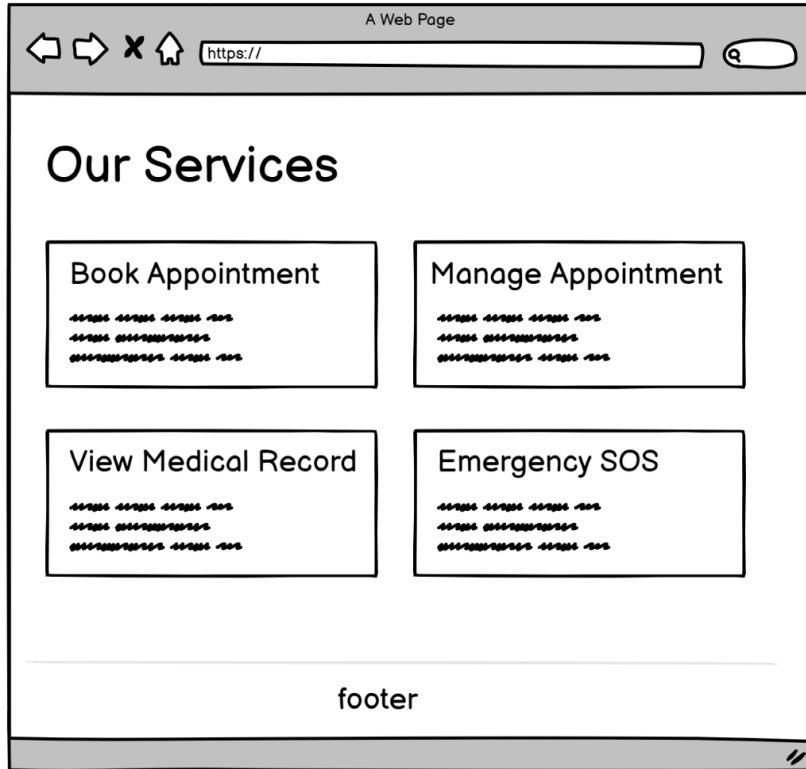
## Medium fidelity prototype:

Our medium-fidelity prototype shows a front-end display of what our application will look like and what features and functionality it will have. It also shows how our users will interact with the application in general. This prototype is a wireframe representation of our application.

### Home Page before Sign up:



*Figure 30. Wireframe of medium fidelity prototype of home page before sign up*



*Figure 31. Wireframe of medium fidelity prototype of home page before sign up (continued)*

#### Description (refer Fig 30 & Fig 31):

For a new user, the application shows a sign up option where they can create an account, else, if it is an already existing user, then they can just sign in. In the top navigation, we allow our users to change the font size in case they find it difficult to read the content of the web page. It also includes a language option to change the language of the web page to a desired language. Next, we give a brief description of the services our application will provide. As mentioned in the prototype above, our users can book appointments, manage appointments, view their medical record, and book emergency medical appointments. At the bottom of the webpage is the footer.

#### Reasoning:

We show a sign up option in a box at the beginning of the web page so that our users (the elderly) know that they need to create an account in order to use our services. Creating an account is the most important step toward becoming our user and using our services, so we decided to put that in the first section of our webpage. We asked our users for feedback on this design choice, and they were supportive of it and approved it saying that it made it clear to any new user the steps to start using our application. For already existing users, they can just log in when they revisit our application by clicking the 'sign in' option in the box. Regarding our services, we want to give a brief description to our users so that they clearly understand what our application does. We designed this to be clear and visible to our users as shown in the prototype above.

## Fill Medical / Health Information page:

A Web Page

LOGO

### Medical / Health Information

**Personal Information:**

**Full Name**

First Name  Last Name

**Your Age**   
 Male  Female

**Date of Birth**  
Day  Month  Year

**Your Residential Address**

Street address  
 Address information  
 Postal Code

**Medical Information:**

Check the conditions that apply to you or any of your family members

Asthma  Diabetes  Cancer  Hypertension

Are you currently taking any medications?

Yes  No

Do you have any medical allergies?

Yes  No

**Covid Vaccination Doses:**

Dose 1  
 Dose 2

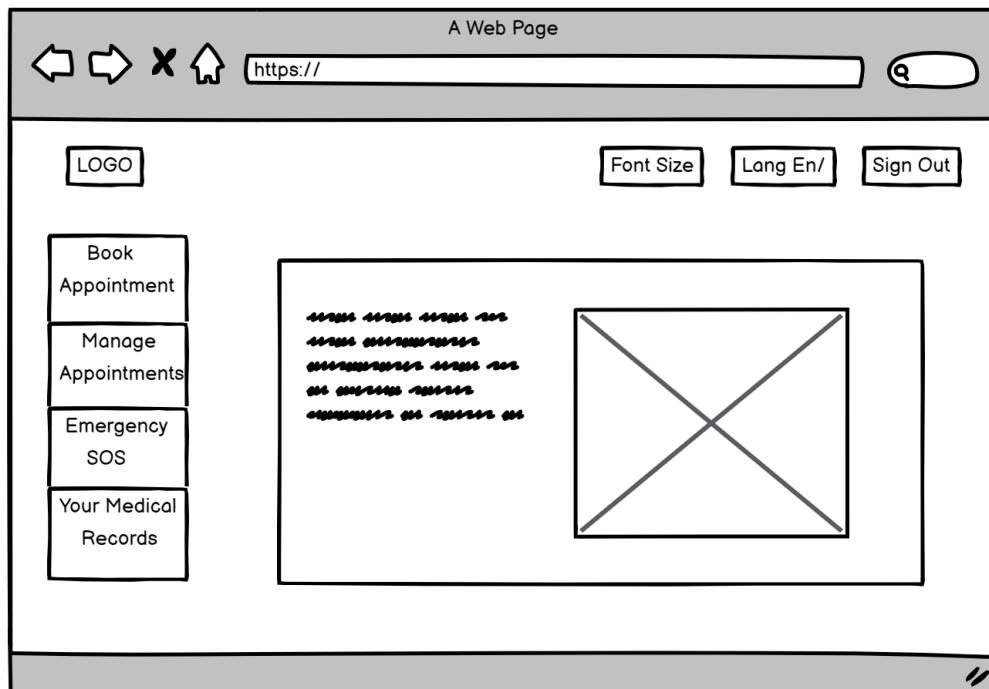
Please list any medical health conditions you have, or have had in the past

Figure 32. Wireframe of medium-fidelity prototype of medical information page

### Description (refer Fig. 32):

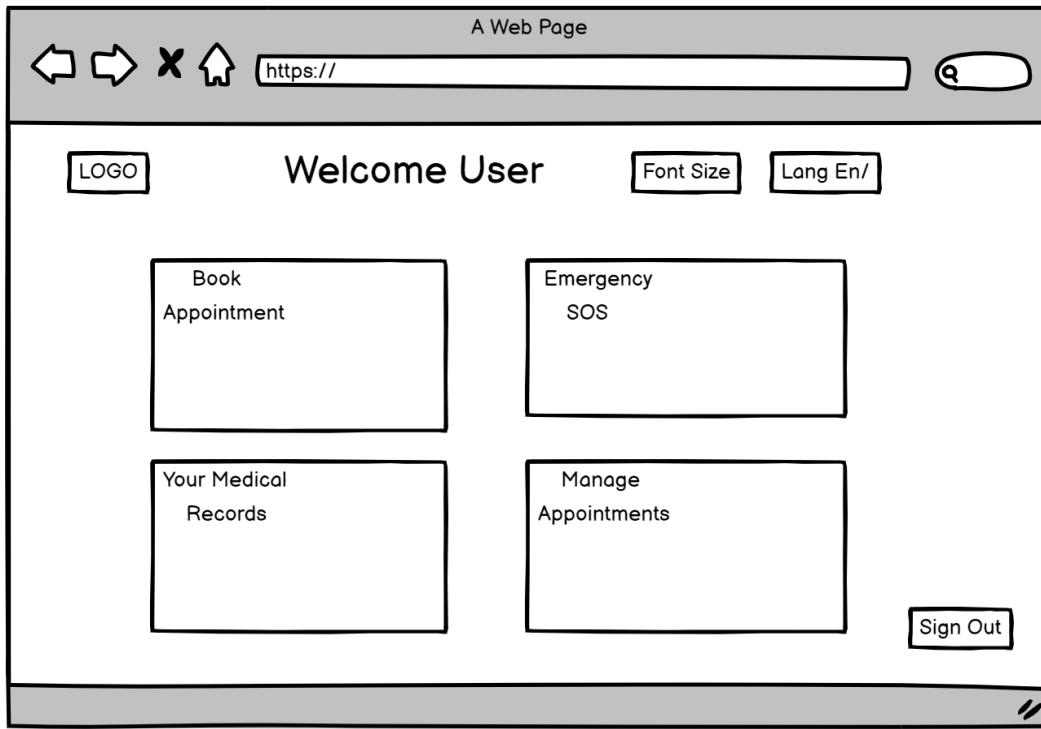
After the user has created a new account, they will be asked to fill up a form regarding their personal and health information. The user can see this information on the 'Medical Records' page once they have filled and submitted the form. This information will be used to create a user profile for a particular user. The user's health profile will be available for the doctor to see when they have an appointment with the patient. This gives the doctor a general idea about the patient's health status.

### Home page after sign-in (INITIAL):



*Figure 33. Wireframe of medium fidelity prototype of initial homepage after sign in*

## Home page after sign in (FINAL):



*Figure 34. Wireframe of medium fidelity prototype of final home page design (continued)*

### Description (refer Fig. 34):

This is the home page of our web application which is displayed after the user has created an account or signed in. We want to make our services clear and easily accessible to our users, so we display them at the centre of our web page.

### Reasoning:

We created an initial wireframe (refer **Fig. 33**) to test with our users to see their responses. They suggested that we display the application services in the centre of the web page instead of the left navbar because the elderly users can easily understand this structure and it draws their attention to the main services of our application.

## Appointment Booking Page:

The wireframe shows a web browser window titled 'A Web Page'. At the top, there are navigation icons (back, forward, stop, refresh) and a URL bar with 'https://'. Below the header, there's a logo icon, a 'HOME' button, a 'Font Size' button, and a 'Lang En/' button. The main content area is titled 'Book Appointment'. On the left, there are four input fields: 'REASON FOR VISIT' (dropdown menu showing 'Regular Checkup'), 'APPOINTMENT DATE' (dropdown menu showing '12/09/2022'), 'NAME' (text input), and 'PHONE NUMBER' (text input). To the right of these fields is a calendar titled 'JUNE 2022' with arrows for navigating months. The calendar grid shows dates from 29 May to 4 June. A blue circle highlights the date '18' in the third week. A curved arrow points from the text 'Calendar will show available slots' to the highlighted date. At the bottom of the form are two buttons: 'CANCEL' and 'BOOK NOW'.

REASON FOR VISIT  
Regular Checkup

APPOINTMENT DATE  
12/09/2022

NAME

PHONE NUMBER

JUNE 2022

S	M	T	W	T	F	S
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	1	2
3	4	5	6	7	8	9

CANCEL      BOOK NOW

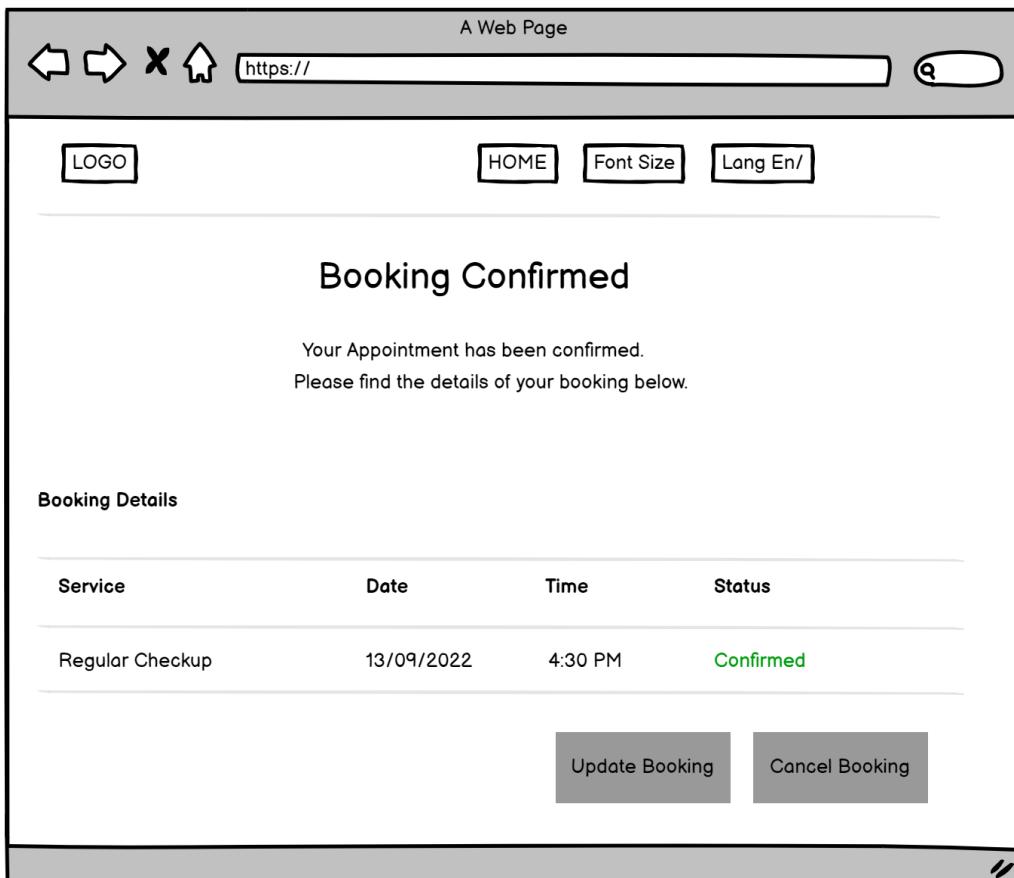
Calendar will show available slots

*Figure 35. Wireframe of medium fidelity prototype of appointment booking page*

### Description (refer Fig. 35):

The appointment booking page includes a calendar to show the available dates to book an appointment. We chose a calendar display for the available dates so that it is easy for our users to understand and choose an available date. The 'Book Now' button will book the appointment for the user for a specified date. The user can also choose the 'cancel option' and go back if they don't want to book the appointment. Every page has a 'Home' option in the top nav to direct the user back to the home page.

## Booking Confirmation Page:

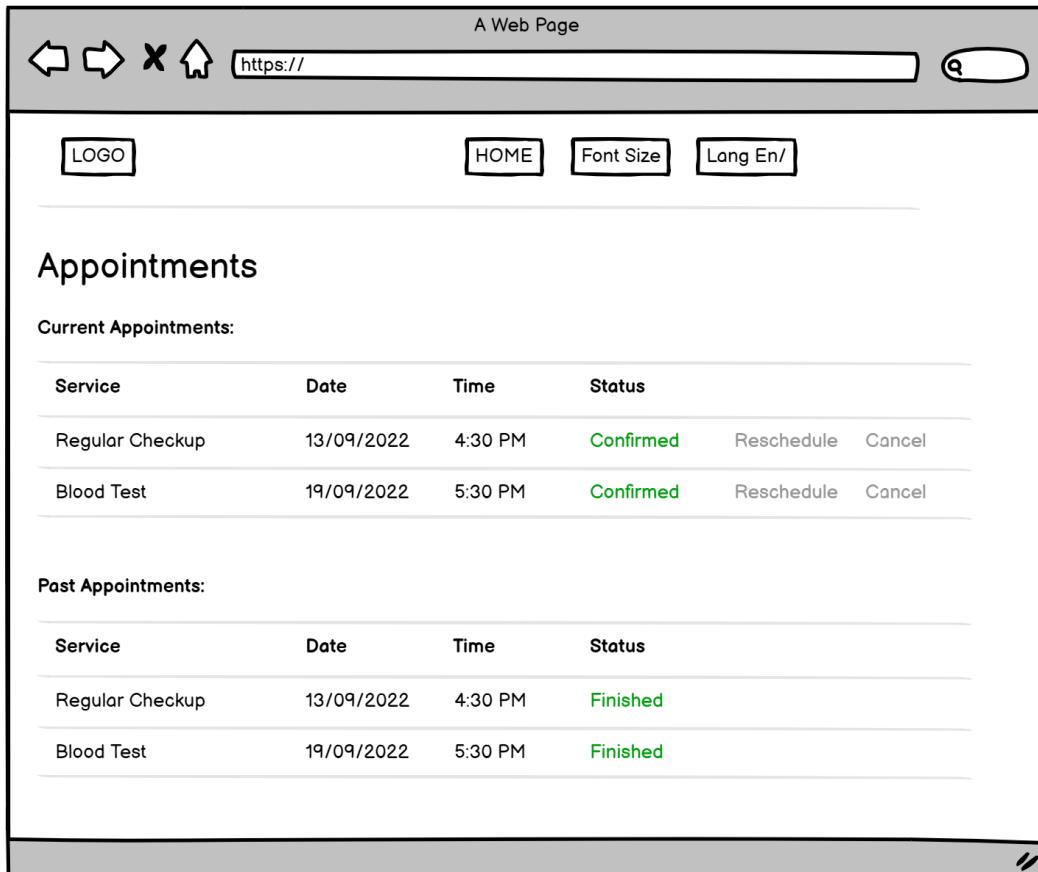


*Figure 36. Wireframe of medium-fidelity prototype of booking confirmation page*

## Description (refer Fig. 36):

The booking confirmation page shows the appointment details such as the service, date, and time of the appointment. The user also has an option to update or even cancel their booking if they need to.

## Manage Appointments Page:



*Figure 37. Wireframe of medium fidelity prototype of manage appointment page*

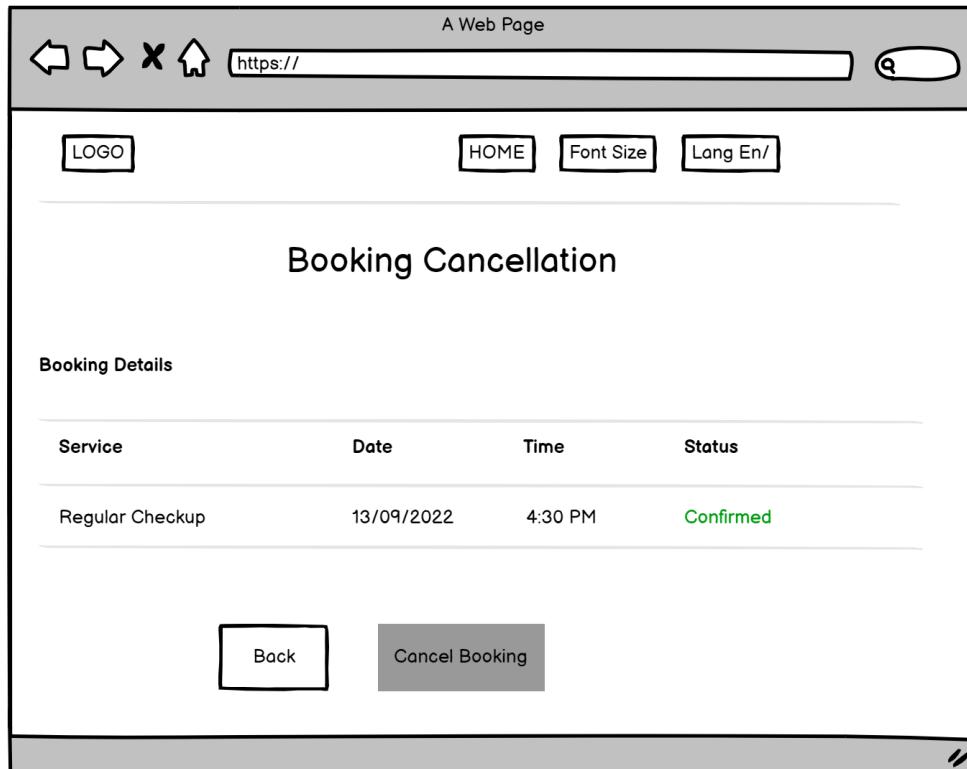
### Description (refer Fig. 37):

The appointments management page displays the current and past appointments of the user. For current appointments, users can choose to reschedule the appointment or cancel the appointment. For rescheduling, they will be directed to a reschedule page where they can reschedule their appointment. And for cancelling, they will be directed to a booking cancellation page.

### Reasoning:

We created the option to reschedule or cancel appointments for users so that in case they change their mind or are busy on the date of the appointment, they can simply reschedule the appointment or cancel it.

## Booking Cancellation Page:

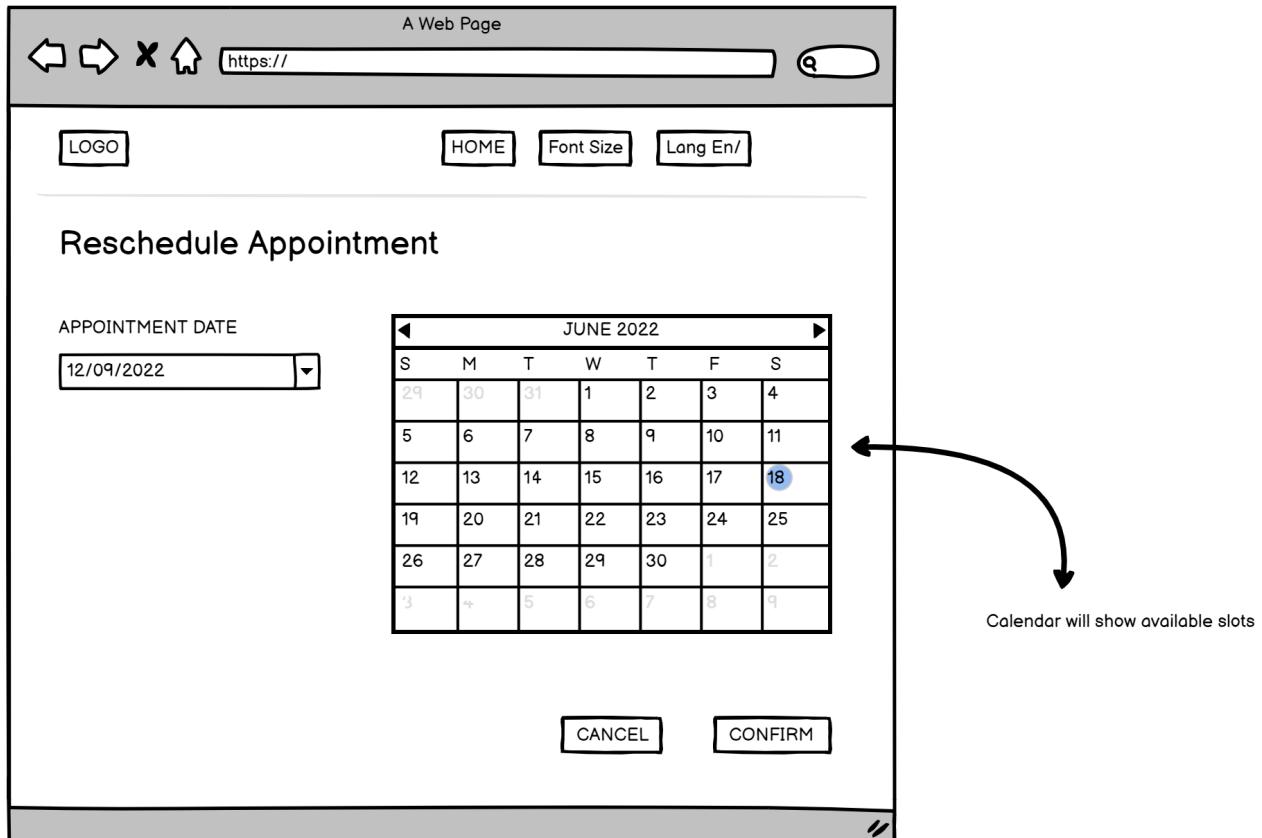


*Figure 38. Wireframe of medium fidelity prototype of booking cancellation page*

### Description (refer Fig. 38):

When the user wants to cancel their booking, they can do so by clicking the 'reschedule appointment' option on the 'Manage Appointments' page. On the booking cancellation page, we display the booking details to make it clear to the user the appointment they are cancelling. They also have an option to go back if they don't want to cancel their booking.

## Reschedule Appointment Page:

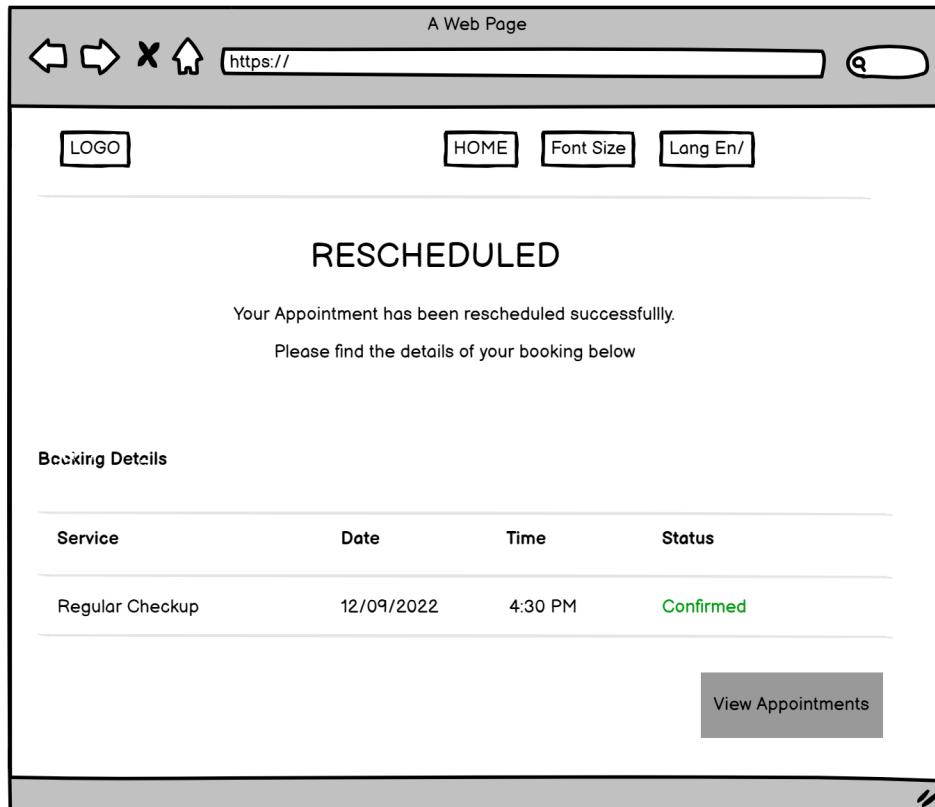


*Figure 39. Wireframe of medium fidelity prototype of appointment reschedule page*

### Description (refer Fig. 39):

When the user wants to reschedule their appointment, they can do so by clicking the 'reschedule appointment' option on the 'Manage Appointments' page. This page displays to the user a calendar showing all the available dates to book an appointment and an input option to enter a new date. They can click 'cancel' to go back or click 'confirm' to reschedule the appointment.

## Appointment Reschedule Confirmation Page:

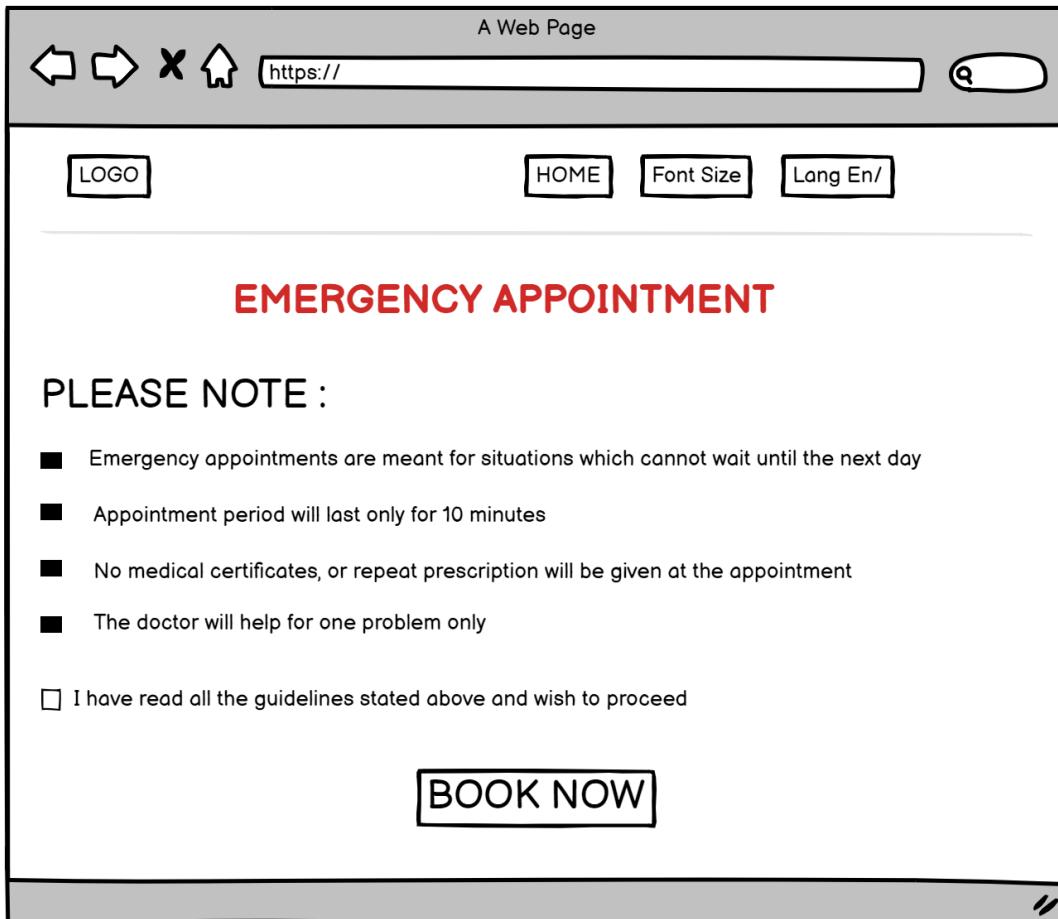


*Figure 40. Wireframe of medium fidelity prototype of appointment reschedule confirmation page*

### Description (Fig. 40):

After successfully rescheduling the appointment, we display the updated appointment details for the users to view. They can also view other appointments by clicking the 'View Appointments' button.

## **Emergency Appointment Page:**

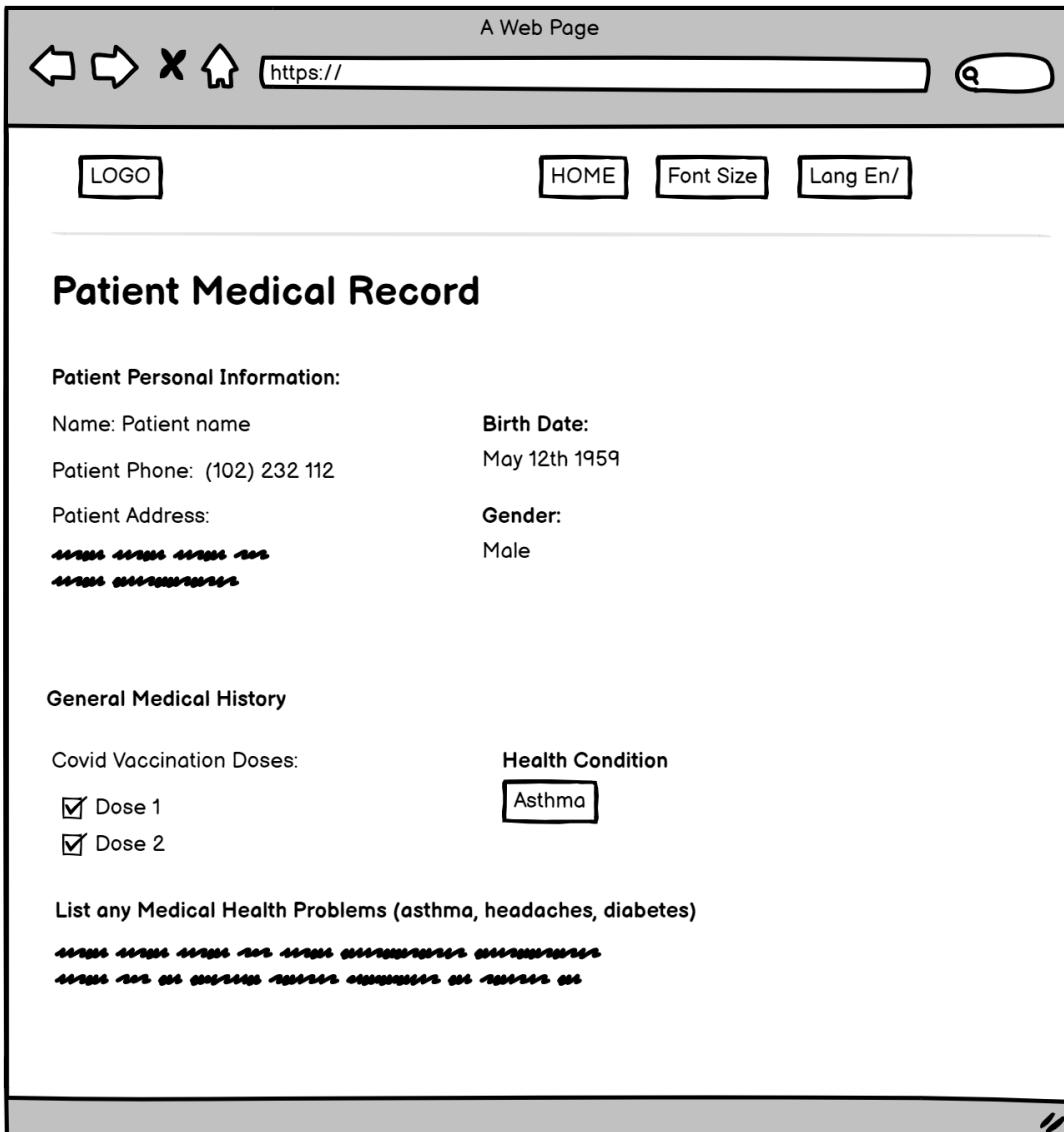


*Figure 41. Wireframe of medium fidelity prototype of emergency appointment page*

### **Description (refer Fig: 41):**

The emergency appointment page allows our users to book a quick appointment in cases of emergency. On this page, we list the guidelines and important information about the emergency appointment service. By reading this, users will understand the use of this service. They can book an emergency appointment once they confirm they have read all the guidelines.

## **Medical Record Page:**



*Figure 42. Wireframe of medium fidelity prototype of medical record page*

### Description (refer Fig: 42):

This page shows all the medical information of the user after they have filled out their medical information form when signing up. This page has two main sections, the patient personal information section, and the general medical history. The first section shows general information such as the name of the patient, phone, address, gender, etc. The second section shows the vaccine doses taken for Covid-19, and any health conditions and health problems they have.

## Doctor's Home Page:

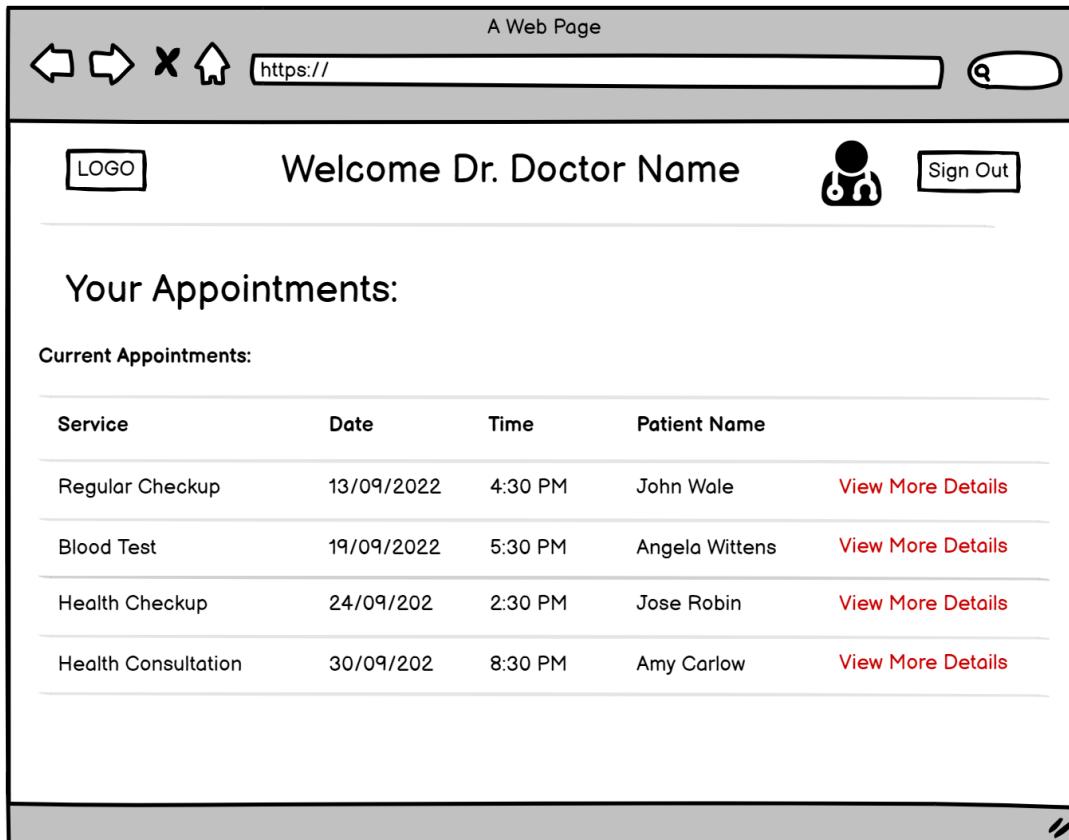
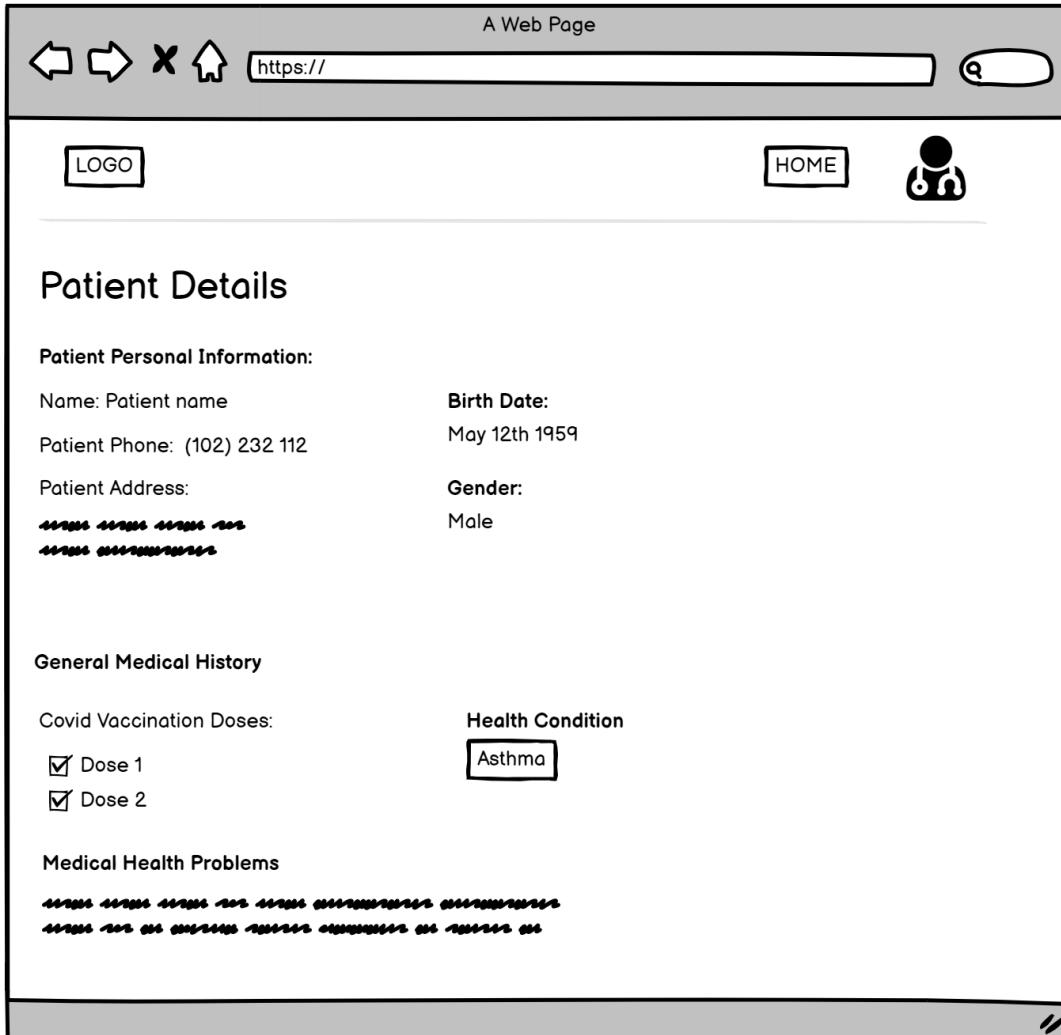


Figure 43. Wireframe of medium fidelity prototype of doctor's home page

## Description (refer Fig: 43):

For the doctor's home page, we show the list of appointments they have. Each appointment has the name of the appointment service, date, time, and patient name. There is also an option to 'View More Details', which directs to a new page containing the patient's personal and medical health information. This is for the doctor to know about the patient's health status.

## Patient Medical Information Page for Doctor's reference:



*Figure 44. Wireframe of medium fidelity prototype of patient medical information for Doctor's*

### Description (refer Fig: 44):

This page shows the patient's general health and personal information for the doctor to view. They can use this to prepare for the upcoming appointment and to know about the patient's health in general.

# Assumption testing

---

With the insights gathered from the survey mentioned under our requirements elicitation section, we proceeded on to making our prototypes. However, there were aspects of the design where certain assumptions were made about the stakeholders. Below are some of the assumptions made:

## Assumptions

1. A larger and simpler UI would be easier for the elderly to navigate.
2. A simple application with a few important and well-made functions is preferred and easier to understand for elderly compared to an application with many features making it complex.
3. Since the logo is not obvious as a link back to the homepage, we assumed it cannot be used and hence an extra button is used to link back to the homepage.
4. We assumed it would be easier for the elderly to understand a calendar as an illustration of the available slots than a list.
5. We assume that the elderly would rather start from the home page as opposed to switching between pages from the navigation bar, also they may not notice the navigation bar.

To ascertain our assumptions were valid, a few of us have gone on to interview a few elderly, with some being our grandparents themselves. As some assumptions are hard to validate with just instructing them to perform certain tasks within our product (an example would be assumption 4), we will be asking them about these design choices directly. The interview process starts off with introducing to them the application we are making, then we will reveal our medium fidelity product to them and explain to them that this is a placeholder for our final product. We will then instruct them to try and navigate their way through the application while trying to perform a few tasks. These tasks include the following actions but are not limited to: book an appointment, checking their medical history, return to homepage. The following table records their responses as well as observations made when they are performing tasks instructed by us:

Interviewee No.	Assumption 1	Assumption 2	Assumption 3	Assumption 4	Assumption 5
1	"Either replace images with more text or have both image and text to explain where to click to go to the other pages would be good"  <b>Took some time to read through the</b>	"Easy to use, not clogged up with too many confusing imagery"  <b>Interviewee was satisfied with the simplicity of the UI.</b>	<b>Interviewee was able to return to the homepage immediately.</b>	"Both should be ok but calendar does make it easier to look at all the available dates at one go"	<b>Interviewee initially felt lost as to how they will go to the other pages from where they were at but afterwards, they knew that returning to homepage was</b>

	<b>homepage before executing tasks but did not have much of an issue.</b>				<b>the way to the other pages.</b>
2	"The buttons for adjusting the font size should be made more prominent so that they are easier to find" <b>Interviewee spent some time looking for this functional button and a small amount of time trying to learn how to use it</b>	<b>Interviewee was very satisfied with the functionality of the applications we have developed</b>	"This feature could be done in the same way as other page jumps, or at least be more visible than a small button"	<b>Interviewee was very satisfied with this functionality</b>	<b>Interviewee was easily spotted the corresponding text on the page and were directed to click to jump to other pages, picking up the basic usage of the app very quickly.</b>
3	Upon showing the initial homepage wireframe and the current homepage wireframe, the interviewee selected the current homepage wireframe to be easier to understand and navigate	<b>Interviewee understood what every function the application provided was for and felt that they were sufficient</b>	Upon showing the interviewee that the logo could be clicked on to be directed back to the home page, the interviewee was surprised and claimed that he would never have thought of that and thought it was just a simple image of the applications logo.	Although the interviewee had trouble understanding how" the calendar worked at first, upon explanation, he agreed that it is easier to see due to the similarity of traditional calendars and preferred over lists.	The interviewee naturally used the back function back all the way to the home page to navigate to another function page and had no awareness of the navigation bar in place and what it does.
4	"SoS feature is included in the app making it more efficient in emergency situations"  Interviewee was satisfied with the feature included in the app.	The interviewee was overall satisfied with the simple UI by looking at the medium-fidelity prototype of the app.	The interviewee is satisfied with the web based app, making it easily accessible for cross-platform users.	Interviewee is satisfied with the appointment booking, and able to manage freely and efficiently.	Since it is a web-based app the interview finds it easy to navigate back and forth through the app.
5	"Having better images which act as hyperlinks may be better"  <b>Interviewee was satisfied with the layout and functionalities of the same</b>	"These functionalities are exactly what I would expect from an e-health app"  <b>Interviewee was at content with the features available in the</b>	"these buttons are small. if possible, try to find an appropriate alternative"	"I prefer having a calendar since its very neat and fast in a way"	The interviewee was lost and unsure of how they would go from where they were to the other sites.

		app			
<b>Assumption met</b>	5/5	5/5	4/5	5/5	4/5

*Table 8. Assumption Testing Interview Results*

## **Analysis and outcomes**

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For the report, we have produced a low and medium fidelity prototype of our application and have tested it on a few of our stakeholders, mainly elderlies. In order to gauge our successes, we have evaluated the feedback and reviews given in the table found under the Assumption Testing section and gave each of them a point if we felt that the assumptions were valid and met. Otherwise, points were not given. Overall, we felt that our assumptions were mostly met, with a few pointers about size of buttons or giving more instructions on how to navigate the site without a navigation bar. As most health applications in the current market is not catered for elderlies as learnt in our market research, I believe that by pinning our efforts on this focus on the elderlies, we will be able to stand out with a niche in the field of telemedicine.

The purpose behind our application is to help elderly people to easily and conveniently book hospital appointments from their home. They should not have to wait in long queues waiting to register their appointment. Modern applications are very complex and difficult to use for elderly people who are not very tech-savvy. They need an application that is easy to understand and use. Our web-application is designed to meet their needs, with a simple user interface design. We constantly ask feedback from our users to improve and make sure that they are satisfied with our design ideas.

We learned that focusing on simple design and functionality for our web-application is more helpful for our users than having complex features that are difficult to understand.

# References

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## Resource used:

1. Wireframes: <https://balsamiq.com/>
2. Survey forms: <http://monday.com/>
3. Milestone timeline, contingency planning, design specification table: <https://cacoo.com/>

# Appendices

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## Appendix A: Meeting agendas

BSc Computer science programme



Course name: Agile Software Projects

Tutor group number: 91

Team number: 91

Team meeting date: 12/05/2022 Thursday

Team members present: Prasanna, Terrence, Ye Myat, Mohan, Oliver Fan, Darren

Team members absent: Nil

Agenda item/Time	Description	Discussion	Action Points
List strengths and weaknesses	Each member's strengths and how versed everyone was in different programming languages was discussed	We all had Javascript, Html, MySQL, and Python in common	The same were set to top priority when choosing the app developmental language.
Time constraints	How we plan on investing our time to meet appropriate deadlines	We planned on how we wanted to distribute the given time anyhow often we'd have checkpoints to ensure everyone was on track.	By the end of May- thoroughly researched on proposed app, detailed plan, and prototype. (inclusive of allocation of roles)  Begin working/coding Early June onwards.
Proposed ideas	Kind of app we want to build which aims to solve today's societal issues	We all pooled in the kind of issues we thought was prevalent and had a deep discussion on the same.	Made a drive folder to which all members had access to. By the end of the week, each member would have put in their proposed idea (detailed) and would present the same in the next meeting

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Figure 1. 12/05 Meeting agenda

BSc Computer science programme



Brainstorming features/scope for project	Changed our scope slightly to focus more on the patients' side.	- Initial discussions led to us deciding to look into both the patients' and medical staffs' perspective of the lack lustre features of the health apps currently available. - After this meeting, we shifted our attention more towards the patients' side.	
Make a rough gantt chart	One of our team member Prasanna made a gantt chart to keep us within schedule.	- Planned our time towards midterm submissions as well as a very rough outline of our plans after.	
Created a survey to gather information for research	We made a survey in order to better understand the ground situation in our local area so we that we can possibly adapt or pinpoint our aim to fit the problem more accurately.	- All of us worked on the survey questions that targeted some of our underlying questions we had about the local scene regarding the efficiency of the health apps available.	- Spread the survey around to gather responses

Figure 2. 12/05 Meeting agenda (continued)

Course name: **Agile Software Projects**

Tutor group number: **91**

Team number: **91**

Team meeting date: **19/05/2022**

Team members present: **Prasanna, Terrence, Ye Myat, Mohan, Oliver Fan, Darren**

Team members absent: **Nil**

Agenda item/Time	Description	Discussion	Action Points
Decide Project Focus/ Final Topic.	Based on past week's individual research on topics (which were collated in the team's drive folder) decide final deliverable to present.	Each proposed idea is to analysed for its the strengths, weaknesses, and market demands	The finalised topic was to build a tele health app with various features which can compete in the market based off of current demands and trends
Go through project deliverables for the mid terms.	Based on the marking criteria, familiarise with needed content, and plan for the same.	Realised that the mid term deliverables are very comprehensive. Planning is key.	By mid terms we should have a final prototype and a final plan-out /know how of the workflow. Each call meeting to be recorded, into both agendas and gantt charts to facilitate and promote workflow and tracking

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Go through the final project deliverables.

Plan and elaborate a list of deliverables and targets points for final project

Set targets and aims for the final project to be submitted

Post mid terms, hard coding begins. Based on planned and for tasks(that were split) each member to finish their parts before their assigned deadlines.

Plan rough time line of worklist.

Based on the deliverables estimate to do and prepare worklist.

For the two mark points, the mid terms and finals time should be allocated effectively.

Based on key features of app, and with reference to the designed Gantt chart, wordlist and do to be assigned and updated in the same.

Split up work based on SWOT analysis of team members.

Based on each members strengths and weaknesses, estimate work splitting

Discussed what each member was best at.

Each member met a different task criteria and hence was assigned to the same.

*Figure 2.5. 19/05 Meeting agenda (continued)*

Course name: Agile Software Projects

Tutor group number: 91

Team number: 91

Team meeting date: 25/05/2022 Wednesday

Team members present: Prasanna, Wei Xiang, Ye Myat, Mohan, Oliver Fan, Darren

Team members absent: Nil

Agenda item/Time	Description	Discussion	Action Points
Role delegation	We appointed sections of the midterms report to every team members to work or research on.	<ul style="list-style-type: none"> <li>- Agreed on the few segments to work on first such as market research, planning, aims and objectives etc</li> <li>- Put prototyping or analysis for later as we do not currently have enough things to work on it</li> </ul>	
Create rough visuals for report	We have decided to get started on a few visuals to aid in explaining our project in the report.	<ul style="list-style-type: none"> <li>- Discussed about using UML diagram, SWOT analysis etc</li> </ul>	

Figure 3. 25/05 Meeting agenda

Brainstorming features/scope for project	Changed our scope slightly to focus more on the patients' side.	<ul style="list-style-type: none"> <li>- Initial discussions led to us deciding to look into both the patients' and medical staffs' perspective of the lack lustre features of the health apps currently available.</li> <li>- After this meeting, we shifted our attention more towards the patients' side.</li> </ul>	
Make a rough garnett chart	One of our team member Prasanna made a garnett chart to keep us within schedule.	<ul style="list-style-type: none"> <li>- Planned our time towards midterm submissions as well as a very rough outline of our plans after.</li> </ul>	
Created a survey to gather information for research	We made a survey in order to better understand the ground situation in our local area so we that we can possibly adapt or pinpoint our aim to fit the problem more accurately.	<ul style="list-style-type: none"> <li>- All of us worked on the survey questions that targeted some of our underlying questions we had about the local scene regarding the efficiency of the health apps available.</li> </ul>	

Figure 4. 25/05 Meeting agenda (continued)

Course name: Agile Software Projects

Tutor group number: 91

Team number: 91

Team meeting date: 02/06/2022 Thursday

Team members present: Prasanna, Wei Xiang, Ye Myat, Mohan, Oliver Fan, Darren

Team members absent: Nil

Agenda item/Time	Description	Discussion	Action Points
Delegated the sections for midterm report to everyone to work on	We felt that we had sufficient materials to get started on our midterm report.	<ul style="list-style-type: none"><li>- We each agreed to work on the draft of a few sections of the report</li><li>- We will be reviewing the draft the following week</li><li>- Agreed to leave assumption testing and analysis/outcomes for later as we need to work on the other sections first before being able to do these sections</li></ul>	<ul style="list-style-type: none"><li>- Planning: Darren+Terence</li><li>- Specification: Darren+Oliver</li><li>- Scope: Mohan</li><li>- Requirements: Terence</li><li>- Literature: Myat+Prasanna</li><li>- Market Research: Myat+Prasanna</li><li>- Approach/Motivation: Oliver</li><li>- Prototyping: Mohan</li></ul>

*Figure 5. 02/06 Meeting agenda*

Update one another on work done on the project	The group shared with one another what they have done for the past week.	<ul style="list-style-type: none"><li>- UML diagram was made</li><li>- Scope was worked on partially</li><li>- SWOT analysis was done and visualized on a diagram</li></ul>	
Discuss about future plans	The group discussed on what we will be doing for the coming weeks till midterms submission.	<ul style="list-style-type: none"><li>- Talked about updating/refining the garrett chart</li></ul>	

*Figure 6. 02/06 Meeting agenda (continued)*

Course name: Agile Software Projects

Tutor group number: 91

Team number: 91

Team meeting date: 09/06/2022 Thursday

Team members present: Prasanna, Wei Xiang, Ye Myat, Mohan, Oliver Fan, Darren

Team members absent: Nil

Agenda item/Time	Description	Discussion	Action Points
Update members absent from consultation	We informed the 2 members that were absent from consultation the same day what we asked the teacher and what feedback was given	<ul style="list-style-type: none"> <li>- Clarified about the differences between approach/motivations and aim and objective</li> <li>- Share about some changes to our low fidelity prototypes</li> </ul>	-
Update one another on work done on the project	The group shared with one another what they have done for the past week.	<ul style="list-style-type: none"> <li>- Partially done market research and literature</li> <li>- Mostly done with requirements elicitation</li> <li>- Partially done with planning</li> </ul>	

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Figure 7. 09/06 Meeting agenda

Discuss about future plans	The group discussed on what we will be doing for the coming weeks till midterms submission.	<ul style="list-style-type: none"> <li>- Decided to continue working on the same sections assigned, also getting started on prototyping and testing.</li> </ul>	
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Figure 8. 09/06 Meeting agenda (continued)

Course name: Agile Software Projects

Tutor group number: 91

Team number: 91

Team meeting date: 17/06/2022 Thursday

Team members present: Prasanna, Wei Xiang, Ye Myat, Mohan, Darren

Team members absent: Oliver

Agenda item/Time	Description	Discussion	Action Points
Discuss about report flow	The group will get together and agree on the order we shall arrange the various sections in the report.	<ul style="list-style-type: none"><li>- Discussed about the font used</li><li>- Made a rough content page</li></ul>	<ul style="list-style-type: none"><li>- Will be adding all our works into this document from now on</li></ul>
Update one another on work done on the project	The group shared with one another what they have done for the past week.	<ul style="list-style-type: none"><li>- Worked on specifications, added a table describing the technology used for different parts of the website</li><li>- Worked on market research</li><li>- Worked on planning, made contingency table and milestone time chart</li></ul>	

Figure 9. 17/06 Meeting agenda

Discuss about future plans	The group discussed on what we will be doing for the coming weeks till midterms submission.	<ul style="list-style-type: none"><li>- Dispersed and finish up our individual section and then add it into the main document for submission</li><li>- Talked about formatting and proofreading for our next meeting</li></ul>	
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Figure 10. 17/06 Meeting agenda (continued)

Course name: Agile Software Projects

Tutor group number: 91

Team number: 91

Team meeting date: 23/06/2022 Thursday

Team members present: Prasanna, Wei Xiang, Ye Myat, Mohan, Darren, Oliver

Team members absent:

Agenda item/Time	Description	Discussion	Action Points
Compile individual sections into one document and standardise format	The group will collate all our sections together into one single document for our report		<ul style="list-style-type: none"><li>- Add all our parts into one document</li><li>- Proofread one another</li></ul>
Discuss about final analysis and testing	The group will be brainstorming and working on these 2 parts	<ul style="list-style-type: none"><li>- Discuss about the assumptions on our product and from there, craft questions to validate and gather feedback for our product</li></ul>	<ul style="list-style-type: none"><li>- Finish discussion and work on analysis and testing</li></ul>

*Figure 11. 23/06 Meeting agenda*