



**UTM**  
UNIVERSITI TEKNOLOGI MALAYSIA

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## **SECP 1513 Technology & Information System**

Section **04**

### **PROJECT: DESIGN THINKING REPORT**

***Title: Artificial Intelligence***

**Group 1 : Tech Titans**

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## **Introduction**

Design thinking, at its core, is a human-centered design process that emphasizes collaboration between designers and users. It is a method that nurtures innovation by deeply understanding how real users think, feel, and behave. This process unfolds through five pivotal stages: Empathize, Define, Ideate, Prototype, and Test. Each stage is integral to ensuring that the final product is not just innovative, but also aligns closely with the practical and emotional needs of its intended users.

For our project in this course, we have chosen to focus on the theme of ‘Artificial Intelligence in Healthcare’. This topic is both challenging and essential, given the increasing reliance on technology in medical environments and the endless potential of AI to revolutionize healthcare systems. Our group embarked on this journey with a clear objective: to design an AI-based solution that enhances healthcare delivery, improves diagnostic accuracy, and personalizes patient care.

Our journey began with an in-depth exploration of the current landscape of AI in healthcare. We engaged in extensive research, surveys, and interviews with healthcare professionals to gain a comprehensive understanding of the sector's needs and challenges. This initial phase of empathy set the foundation for defining the specific problems we aim to address with our AI solution.

Our proposal is centered around developing an AI system that seamlessly integrates with existing healthcare frameworks. This system is distinct in its ability to continuously learn and adapt from patient data, thereby ensuring its relevance and effectiveness in the dynamic field of healthcare. The uniqueness of our proposed solution lies in its capability to not only process vast amounts of medical data but also to provide insights and recommendations that are tailored to individual patient needs.

In this report, we will chronicle our journey through each stage of the design thinking process. We will detail how we empathized with healthcare professionals and patients, defined the key challenges in healthcare, ideated innovative AI solutions, developed prototypes, and conducted rigorous tests to ensure our solution meets the real-world demands of the healthcare industry. Our experience through these stages has been enlightening, showcasing the transformative potential of AI in healthcare and the power of design thinking in creating solutions that are both innovative and deeply rooted in human needs.

## **Project Title: *E-Health Mate: Shikin***

### ***Objective***

Develop an AI-powered mobile application designed to provide personalized healthcare assistance by assessing symptoms, suggesting home remedies, and offering alternative medicine options.

### ***Detailed Steps and Description***

#### **1. Project Initiation:**

Conceptualization: The team decides on creating a healthcare application leveraging AI, intending to bridge gaps identified in existing health apps.

#### **2. Research and Empathy:**

- Competitive Analysis: We analyze existing health applications to identify common features and gaps in user experience.
- User Interviews and Surveys: Direct engagement with potential users to collect qualitative data on their health management challenges and expectations from a health app.
- Empathy Mapping: Creation of empathy maps to visualize and synthesize user emotions, thoughts, and environment, leading to a deeper understanding of their health management journey.

#### **3. Definition:**

- Problem Statement Articulation: Based on the research, the team articulates clear problem statements, such as "Users need a way to assess health symptoms quickly and receive reliable home care advice."
- Objective Setting: The goals are set to develop a solution that not only assesses symptoms but also educates and empowers users with health management knowledge.

#### **4. Ideation:**

- Creative Workshops: Conducting creative workshops where team members ideate features that address user problems identified in the empathy phase.
- Concept Development: Ideas such as AI symptom analysis, a repository of home remedies, and a database of alternative medicines are developed into concrete features for the app.
- Idea Validation: Each idea is vetted against user needs and technical feasibility, ensuring the selected concepts are actionable and valuable.

#### 5. Prototype Development:

- Wireframing: Developing wireframes for the app to layout the essential structure and user flow without detailed design elements.
- High-Fidelity Mockups: Using the wireframes, students create detailed, colored mockups of the app screens, which include user interface elements and sample content.
- User Feedback Integration: Initial mockups are presented to users to gather feedback, which is then used to refine the designs, ensuring they are aligned with user expectations and usability standards.

#### 6. Testing:

- Prototype Testing: With a workable prototype, the team conducts user testing sessions to observe interaction patterns and identify usability issues.
- Iterative Design: The prototype is refined in successive iterations, incorporating user feedback to improve the interface, flow, and AI functionalities until the design meets the users' needs and expectations.

## **Detailed Description of AI in Healthcare Project**

### **Problem**

In the realm of healthcare, the rise of Artificial Intelligence (AI) has brought transformative solutions to a variety of challenges. One such challenge is the accurate and timely diagnosis of medical conditions. Traditional methods of diagnosis often rely heavily on the expertise of healthcare professionals, which can be limited by factors such as human error and the availability of specialists. To address these limitations, our project aims to leverage AI to enhance the diagnostic process, particularly in the identification of normal diseases.

### **Solution**

Our solution involves the development of an AI-powered diagnostic tool that can analyze medical images with a high degree of accuracy. Here are the key components of our solution:

1. **Image Recognition and Analysis:** We employ state-of-the-art machine learning algorithms for image recognition. These algorithms are trained on vast datasets of medical images to identify patterns and anomalies associated with various diseases.
2. **Disease Classification:** Once an image is processed, our AI system classifies it into different disease categories or provides a likelihood score for a range of potential conditions. This allows for quick and accurate disease identification.
3. **User-Friendly Interface:** We prioritize a user-friendly interface that allows healthcare professionals to easily upload medical images and receive rapid diagnostic results. The interface is designed to be intuitive, reducing the learning curve for users.
4. **Integration with Healthcare Systems:** Our AI diagnostic tool can seamlessly integrate with existing healthcare systems, making it accessible to a wide range of medical facilities and professionals. This ensures that our solution can be implemented efficiently without disrupting existing workflows.
5. **Continuous Learning and Improvement:** To maintain accuracy, our AI system incorporates continuous learning. It adapts to new medical data and evolving disease patterns, ensuring that it stays up-to-date with the latest medical knowledge.

6. Security and Privacy: We prioritize the security and privacy of patient data. Our system complies with stringent data protection regulations and employs robust encryption methods to safeguard sensitive medical information.

7. Cost Efficiency: By reducing the need for extensive manual analysis and specialist consultations, our AI-powered diagnostic tool can significantly reduce healthcare costs while improving diagnostic accuracy and speed.

### **Team Collaboration**

Our team members divided responsibilities to ensure a smooth project development process:

- Research and Market Analysis: Some team members focused on researching the current landscape of AI in healthcare, identifying gaps and opportunities in the market, and comparing our solution with existing ones.

- Interview with Industry Expert: We conducted interviews with experts in the field of healthcare and AI to gather insights into the practical challenges and potential benefits of our solution.

- Survey and Feedback: Another group was responsible for designing and distributing surveys to gather opinions and suggestions from potential users, including healthcare professionals and individuals who may benefit from our AI diagnostic tool.

- Design Thinking Process: Throughout the project, we followed a structured design thinking process. While this brought innovative ideas, it also led to constructive disagreements among team members, which were ultimately resolved with the guidance and support of our course lecturer, Mr. Iqbal.

Our collaborative efforts allowed us to bring together diverse perspectives and expertise, leading to the development of a comprehensive and user-centric AI-powered healthcare solution. Through the challenges and discussions, we were able to refine our project and ensure that it meets the highest standards of quality and usability.

## **Design Thinking Assessment for AI in Healthcare Project**

### **4.1 During the Start of the Design Thinking Phase**

In the early stages of the design thinking process for our AI in healthcare project, we encountered several challenges that required careful consideration and problem-solving:

**Lack of Innovative Ideas:** Initially, our team faced a creative block and struggled to generate novel ideas for designing new features for our healthcare AI application. This challenge arose because the healthcare sector is complex, and identifying unique solutions was not straightforward.

**Time Management:** Additionally, managing our time effectively was a concern, as we were simultaneously handling other academic subjects. Balancing project work with our studies was a significant challenge.

However, we addressed these challenges by taking proactive steps:

**Idea Collection via Survey:** To overcome the lack of innovative ideas, we decided to leverage the collective intelligence of potential users. We created a Google Form survey to gather insights and feature requests from respondents. This approach not only helped us identify valuable features but also engaged potential users in the design process.

**Effective Communication and Collaboration:** To manage our time efficiently, we emphasized open and transparent communication within the team. By discussing individual schedules and priorities, we were able to coordinate our efforts effectively, ensuring that project milestones were met.

Through these strategies, we successfully navigated the initial hurdles of the design thinking process and laid a strong foundation for the development of our AI healthcare solution.

### **4.2 During the End of the Project Demonstration**

As we reached the conclusion of the design thinking phase and prepared for the project demonstration, we gained important insights and faced specific challenges:

**Understanding Customer Needs:** We recognized that the essence of design thinking lies in understanding and addressing our customers' needs effectively. In our case, the challenge was to create a network security application that genuinely meets our customer's requirements and



enhances their lives. Understanding the diverse needs and expectations of potential users was a complex task.

Designing for Universality: Designing an application that caters to a wide range of users with varying preferences and requirements proved to be a challenging endeavor. Striking the right balance between usability and comprehensiveness was a constant consideration.

**To address these challenges, we took the following actions**

Customer-Centric Approach: We invested substantial effort in engaging with our prospective users, gathering their input, and delving deep into their network security needs. This extensive research helped us gain a holistic understanding of our customers' requirements and informed our design decisions.

Iterative Design: Recognizing the complexity of creating a universally useful application, we adopted an iterative design approach. We refined our solution based on feedback from users, continuously improving its usability and relevance.

In summary, the design thinking assessment during the end of the project demonstration highlighted the significance of a customer-centric approach and iterative design in crafting an effective and user-friendly AI healthcare solution. These insights have been instrumental in shaping our project's final direction.

## Prototype

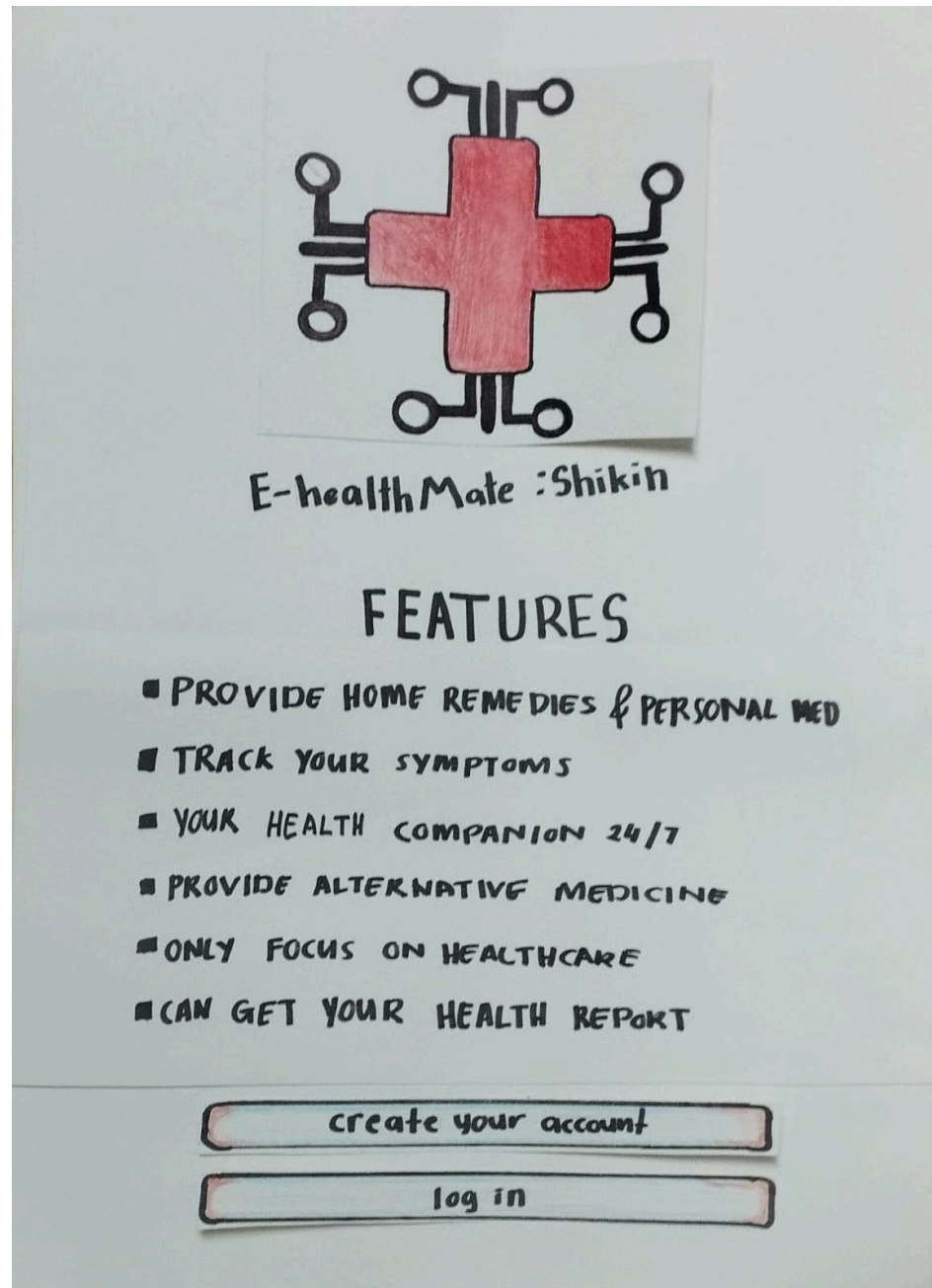


Figure 1

Figure 1 is the cover page of our prototype. Users can see the name of our prototype, and they can also clearly know from the picture that our prototype is about medical care. Users can also clearly understand the functions of our prototype.

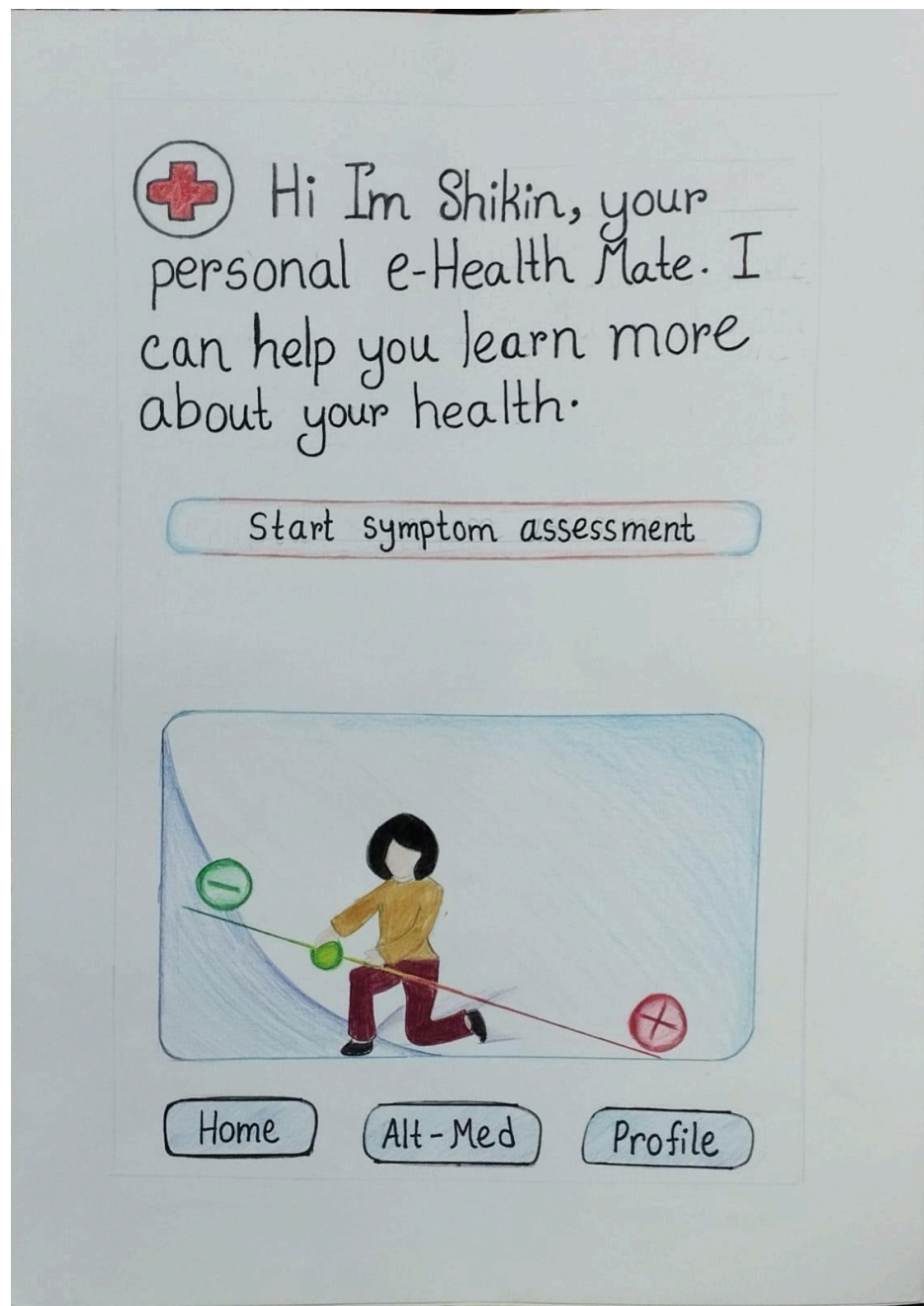


Figure 2

Figure 2 shows a start page after the user logs in to our system. In this page, users can easily press 'Start symptom assessment' to start chatting to the AI. Besides that, we can go to 'home', 'Alt-Med' and 'Profile' when pressing the button at the bottom.

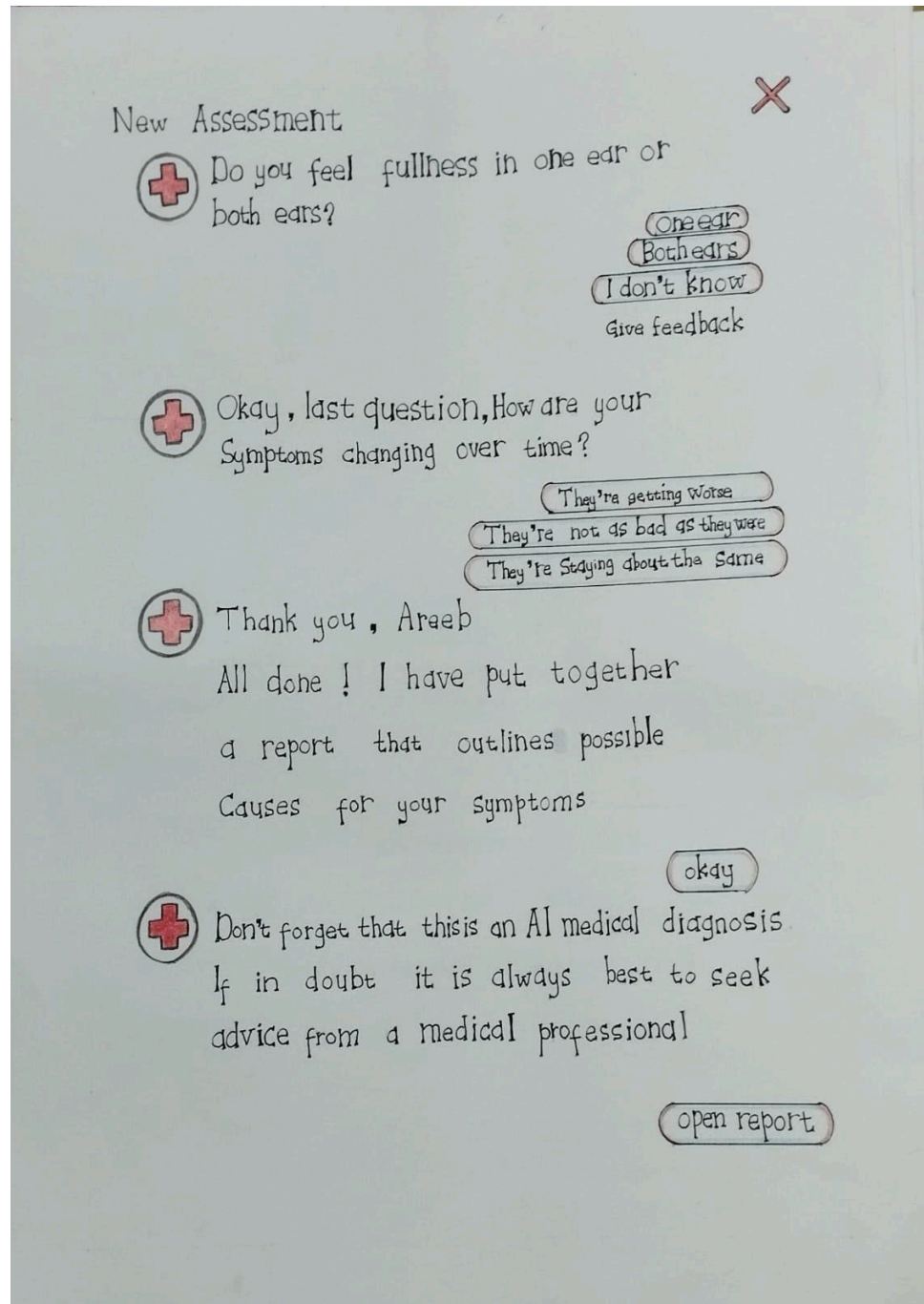


Figure 3

Figure 3 shows a chat interface between users and AI. Users can easily chat with our AI.

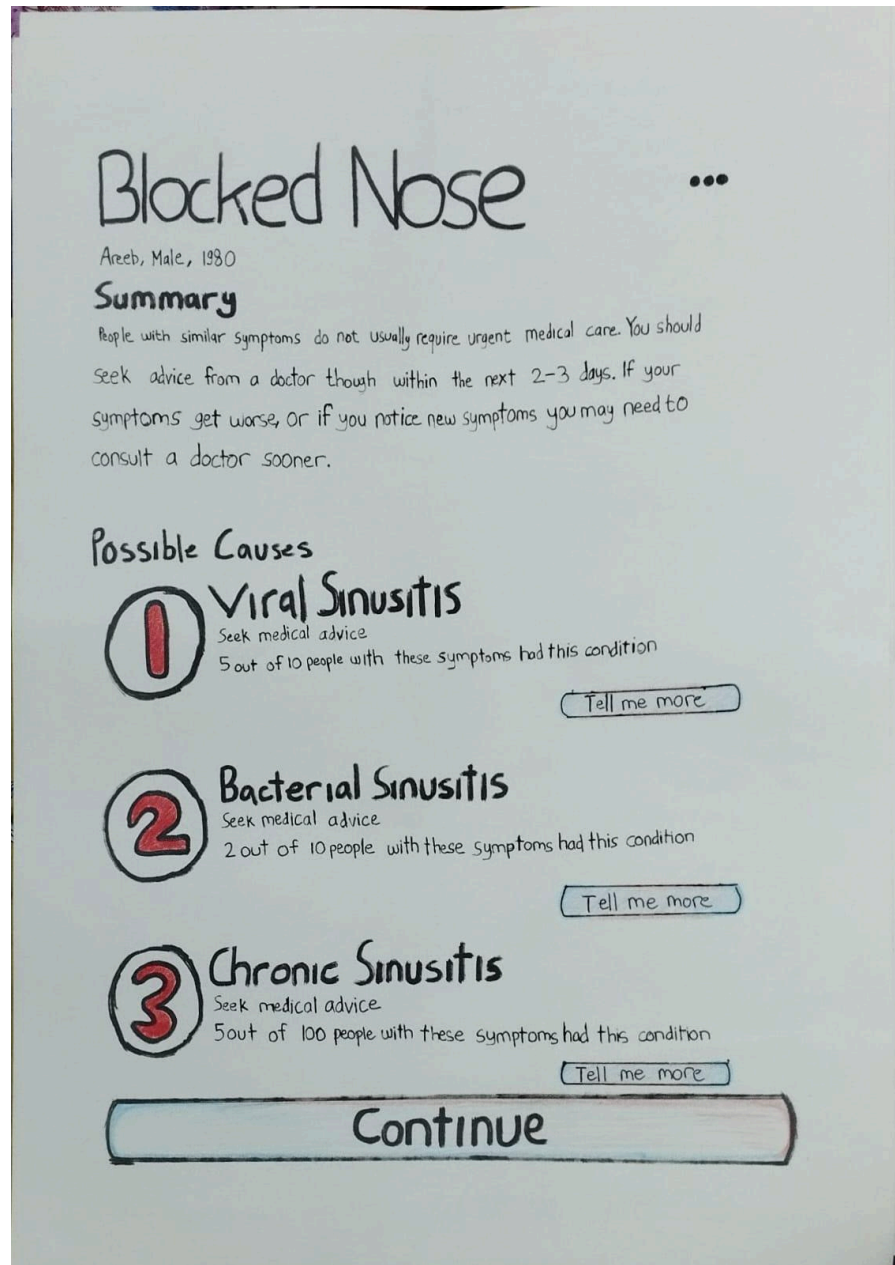


Figure 4

Figure 4 shows users can get some information about the severity of the disease. Our AI will analyze the disease the user is most likely to have based on their symptoms. After that, users can press 'Tell me more' to know more information about the disease.



#### ④ HOME REMEDIES

- Gargle with salt water.
- Drink plenty of fluids.
- Inhale steam to ease congestion.

#### ⑤ FIRST AID

- Cover mouth and nose when coughing.
- Dispose the tissues properly.
- Avoid close contact with others.

#### ⑥ MEDICINES

- For over the counter medicines consult a doctor.
- Antihistamines for allergy related symptoms.
- Pain relievers like acetaminophen or ibuprofen.

⊕ Do you need any other help?

⊙ No, I am good for now.

⊕ Thank you, Arab.  
We are done for now.

I have saved this assessment in your profile section also.

Figure 5

Figure 5 shows some advice from AI about the treatment method. Besides that, our AI will ask the user if they need more help.

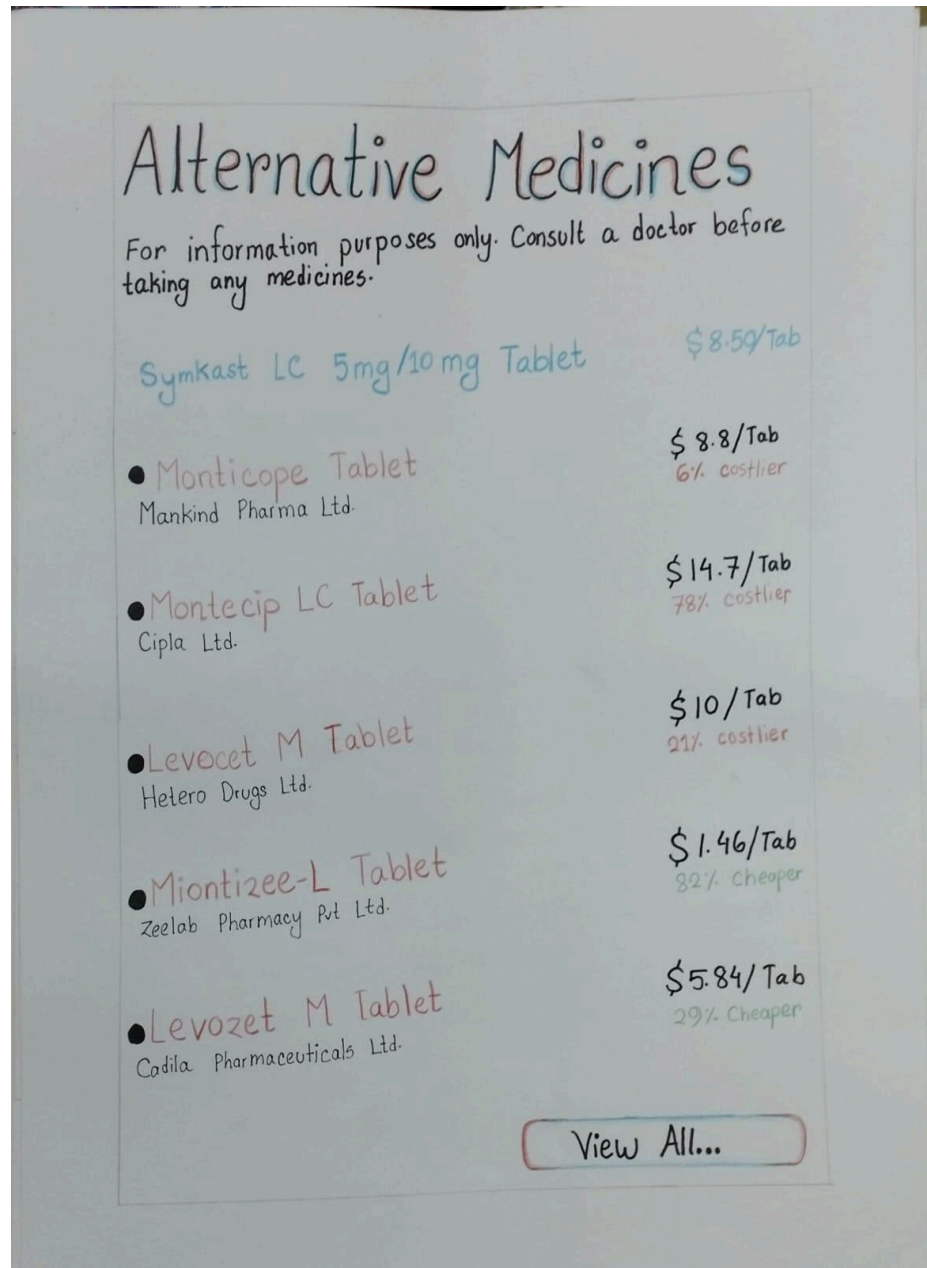


Figure 6

Figure 6 shows our AI will suggest some medicine according to users' disease. Furthermore, our AI will show the information and price about the medicine.



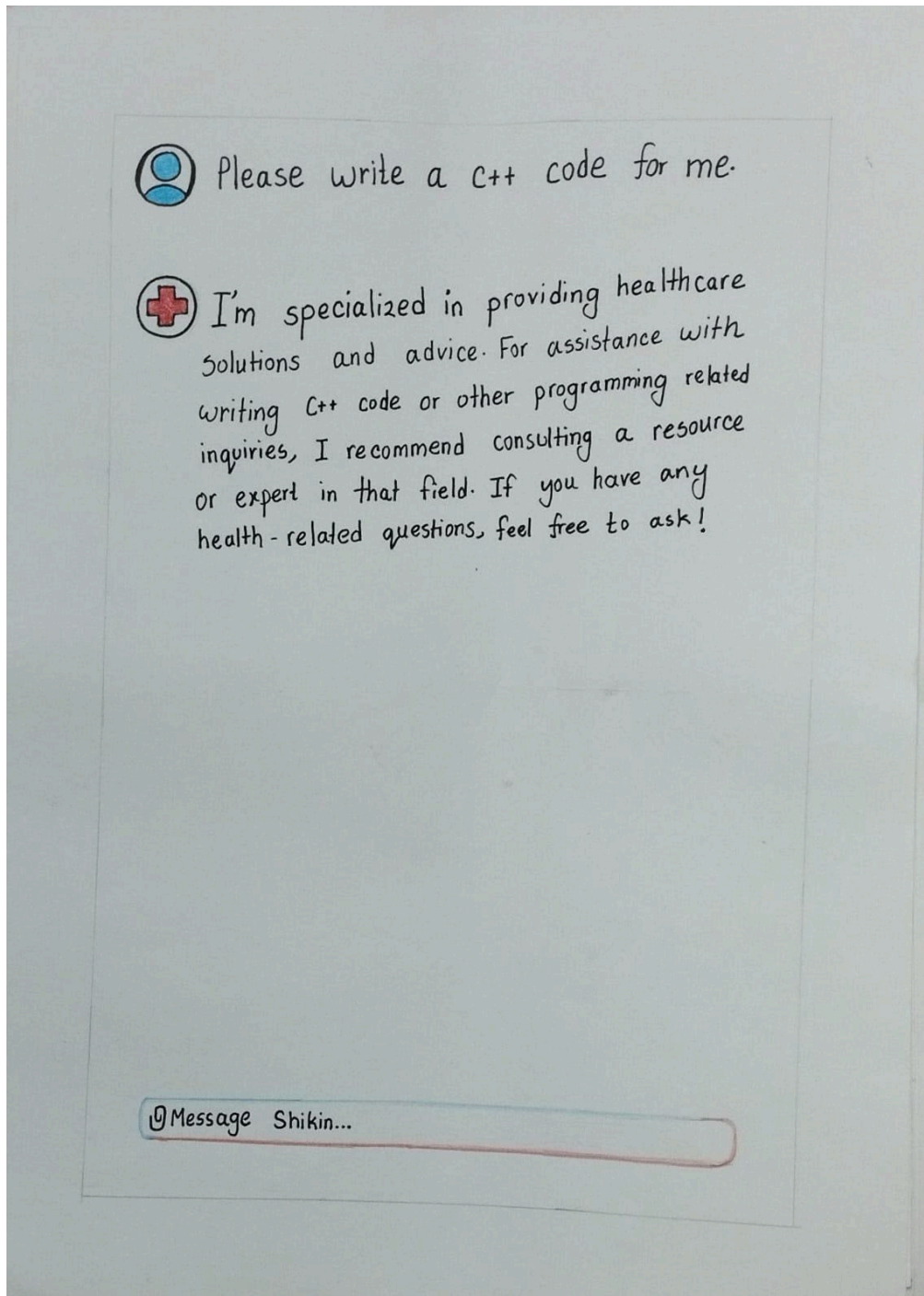


Figure 7

Figure 7 shows a situation when we ask a question about C++ code to our AI. When facing this situation, our AI will give an error message to the user and say that it is unable to help with the question.

## **The records for each phase of the AI in Healthcare project**

Empathy (User Research):

- User Interview Questions:

1. What healthcare challenges do you face regularly?
2. Can you share a recent healthcare experience that was frustrating for you?
3. How do you prefer to access health information?

- User Interview Insights:

- User 1 (John):
  - Age: 35
  - Background: IT professional
  - Needs: Quick access to accurate health information.
- User 2 (Emily):
  - Age: 45
  - Background: Teacher
  - Needs: Reliable symptom assessment for minor health issues.
- User 3 (Maria):
  - Age: 60
  - Background: Retired nurse
  - Needs: Medication management assistance.

Define (Problem Definition):

- Defined Unfulfilled Needs:

- 1) Unfulfilled Need 1: Users need quick access to accurate health information.
- 2) Unfulfilled Need 2: Users require a reliable symptom assessment tool.

- Project Goals:

- 1) Goal 1: Develop an AI-powered symptom checker.
- 2) Goal 2: Create a medication management feature.

Ideate (Idea Generation):

- Brainstormed Ideas:

1. AI-powered symptom checker for quick health assessments.
2. Medication reminder feature for managing prescriptions.
3. Health tips and articles for user education.
4. Integration with wearable devices for real-time health monitoring.

These records provide a detailed account of the activities and outcomes during each phase of the design thinking process for the AI in Healthcare project. They include user interview questions and insights, defined unfulfilled needs, and project goals, as well as brainstormed ideas for potential solutions.

## **Reflections of each group member regarding the AI in Healthcare project**

Samin Sarwat (A22EC4040) aspires to become a skilled AI developer in healthcare. Design thinking, with its user-centered approach, has taught him valuable problem-solving skills that align perfectly with his program's focus on AI in healthcare. To enhance his industry potential, Samin plans to continue learning and seek internships in healthcare AI to gain practical experience.

Mariam Hanif (A22EC4034) dreams of specializing in healthcare AI and improving patient care. Design thinking has equipped her with the mindset to create truly user-friendly healthcare solutions, aligning perfectly with her career aspirations. To achieve her goals, Mariam plans to pursue advanced AI courses and actively participate in healthcare AI research to gain hands-on experience.

Mohammad Areeb (A22EC4035) envisions becoming a proficient data scientist, particularly in healthcare data analytics. Design thinking has helped him develop essential problem-solving skills that are crucial in his field. It aligns well with his career aspirations in data analytics. To improve his potential in the industry, Mohammad plans to enhance his data analysis skills and gain practical experience in healthcare data projects.

Ahmad Razan Alkhawarizmi (A22EC4024) aims to be a healthcare AI consultant, assisting organizations in adopting AI solutions. Design thinking has provided him with a valuable user-centric perspective, which is essential for advising healthcare clients effectively. To enhance his industry potential, Ahmad plans to gain more exposure through internships and expand his professional network in the healthcare AI field.

Ainnur Ashikin (A23CS0208) aspires to lead AI research in healthcare institutions and drive innovation in patient care. Design thinking has nurtured her ability to empathize with users and design AI solutions that align with healthcare goals. To achieve her goals, Ainnur plans to pursue a Ph.D. in healthcare AI and collaborate with renowned researchers in the field.

Choong Chee Wah (A23CS5004) dreams of becoming a healthcare AI architect, designing scalable solutions for hospitals. Design thinking has enhanced his design and architectural skills, which are vital for his career aspirations. To improve his potential in the industry, Chee Wah plans to gain real-world experience by working on large-scale healthcare AI projects and obtaining relevant certifications.

Muhammad Nabil Kindangen (A22EC4038) aspires to be a healthcare AI researcher and contribute to cutting-edge discoveries. Design thinking has nurtured his research-oriented mindset and provided him with a user-focused approach to AI. To excel in AI research and the

industry, Nabil plans to engage in research collaborations, publish research papers, and actively participate in conferences related to AI research.

## **Conclusion**

In conclusion, our AI in Healthcare project has been a journey of innovation and collaboration. Through the lens of design thinking, our team embarked on a mission to address the pervasive issue of scam calls, applying our skills and creativity to develop a scam-call protection app. We identified unfulfilled needs, conducted user research, and brainstormed ideas that culminated in a unique solution.

Each team member played a vital role, contributing their expertise and dedication to various aspects of the project. Our shared goal was to create an application that not only protected users from scam calls but also empowered them to report and block suspicious numbers. The addition of a voice-changing feature added an extra layer of security, preventing scammers from manipulating user voices for fraudulent activities.

Throughout the project, we encountered challenges, including differing opinions during the design process. However, with the guidance of our course lecturer and effective communication within the team, we overcome these hurdles and refined our app's features.

Design thinking has not only equipped us with problem-solving skills but has also instilled a user-centered approach in our work. We believe that this experience has significantly impacted our career goals, aligning our aspirations with the field of healthcare AI.

As we move forward, we are committed to continuous learning and improvement, seeking internships, engaging in research, and collaborating with industry professionals. Our journey doesn't end here; it's a stepping stone towards a future where AI in healthcare continues to make a positive impact on people's lives.

### The Task for Each Member

Phase	Samir	Mariam	Areeb	Razan	Nabil	Shikin	Choong
Phase 1 (proposal)	Benefit of the idea	Existing techsystem used by client	Client background	Compilation and formatting	Problem with existing	Proposal idea to overcome problem	
Phase 2 (information gathering & analysis)	Interviewing client			Creating Survey		Analyzing data	
Phase 3 (prototype presentation,video, report)	Prototype presentation	Prototype design and drawing					Prototype video
	Report						
	Detailed description include problem,solution and team working	Design thinking assessment point	Detail step and description in design thinking and evidence for each phase	Introduction, task of each member, putting it together		Design thinking evidence	