



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

DESIGN THINKING PROJECT

TECHNOLOGY AND INFORMATION SYSTEM (SECP1513)

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INTRODUCTION

Design Thinking has gained popularity in recent decades. In simple terms, Design Thinking is a problem-solving approach and a critical process in which people seek to understand and address the needs of end-users in a creative and iterative manner. Furthermore, it is to define and tackle the problems faced by users in order to create effective solutions through the creation of prototypes and testing them. The process focuses on five phases which are empathy, define, ideate, prototype, and testing. In addition, it is critical to revisit and adjust phases based on the information gathered during testing. Overall, Design Thinking aims to create unique solutions by generating practical ideas that truly address consumer demands.

Our group was instructed to conduct a research on Design Thinking regarding our chapter which is Privacy, Security and Ethics and we have decided to narrow the scope in the finance tools area. To uncover the problems encountered by people while using financial applications, we conducted a survey to examine the issues of privacy, security, and ethics when using financial tools. Based on the response, we addressed the key issue and the best strategy to overcome it. As a result, we decided to develop a financial application that includes all of the required features to enhance the application's privacy and security, allowing the user to use it seamlessly. The Design Thinking method is centred on how the user interacts with the product, allowing us to constantly enhance it to make it even better.

PROBLEM, SOLUTION AND TEAM WORKING

The successful completion of the assignment was made possible through the active participation of each team member in fulfilling their designated tasks. The collaborative efforts of the team also yielded a noteworthy idea, with valuable contributions from all members. Despite these accomplishments, certain minor challenges were encountered during the assignment process.

A primary challenge stemmed from the disparate and hectic schedules of team members, necessitating the postponement of a scheduled meeting intended for in-person discussion. However, due to unforeseen circumstances leading to the absence of one team member, an alternative digital platform, namely Google Meet, was employed to facilitate a comprehensive two-way discussion. Fortunately, this adjustment did not impede the effective distribution of tasks and the thorough examination of prototype features during the meeting.

An additional challenge emerged in relation to the collection of responses for our survey, which aimed to identify common issues in financial applications and gather feedback for enhancement purposes. Given the time constraints associated with the survey, there was a shortfall in respondents. To address this issue, each team member proactively distributed the survey form to their respective colleagues, thereby broadening respondents' demographic and ameliorating the data collection challenge.

ASSESSMENT

The process of periodically assessing and modifying the strategy is an essential component of design thinking. Assessments are typically undertaken following each design thinking stage to determine the designs' ability to meet programme, functional, and organisational criteria. As a result, measurement points based on design thinking phases would aid in determining whether or not a project's ultimate goal of achieving task goals has been met.

All the members in our group collaborated well throughout the project. During the transition between design thinking phases, our team's detail plan runs smoothly. Due to cooperation of the team, we performed successfully in all phases of design thinking, resulting in a shorter project timeline.

During the initial step, which is empathy, we interact with end-users via a survey form about the challenges they had when using financial applications. We were able to gather a variety of feedback from end customers, which will help us develop realistic concepts that actually satisfy consumer wants.

The next stage is called define, in which we evaluate the empathy phase responses to identify the key problems. The goals here are to analyse and answer end-user demands while also developing an actionable problem statement. The group discussion fostered solution-based thinking among group members with diverse points of view.

Moving on to the following stage, ideate, we used a user-centred approach to issue solving. We used a variety of tactics, including sticky notes and discussion, to generate some concrete ideas. This stage allows us to consider all perspectives while searching for effective answers.

After much thought and study, we can turn the idea into a solution during the prototype step. As a result, we developed a financial application with a variety of measures to ensure privacy and security, allowing the user to have a completely immersive experience. We guarantee that the design fits the requirements for solving the problem.

DESIGN THINKING

EMPATHY

The survey's meticulous categorization of age is purposefully crafted to present a nuanced and comprehensive depiction of perspectives within the computer science student demographic. The 19-24 category is strategically designed to capture the viewpoints of traditional college-aged students, while subsequent age brackets provide a deeper exploration into more advanced educational and professional phases. Within the occupation categories tailored specifically for degree computer science students, including bioinformatics, software engineering, computer networks and security, graphics and multimedia software, and data engineering, the survey seeks to extract specialised insights relevant to this academic cohort.

The survey captures specialised perspectives relevant to degree computer science students by including categories such as software engineering and computer networks and security. Software engineering enthusiasts in "SECJH" offer insights into coding practices, software architecture, and challenges in application development. Similarly, "SECRH" individuals, specialising in computer networks and security, share experiences related to securing systems and networks, addressing cyber threats, and implementing robust security measures. Additionally, "SECVH" experts in graphics and multimedia software provide unique insights into user interface design and multimedia content creation. Meanwhile, those in "SECPH - Data Engineering" offer valuable perspectives on data modelling and database management. This diverse approach ensures a comprehensive exploration of both creative and data-driven aspects within the academic and professional realms of computer science. For example, bioinformatics specialists contribute a distinctive perspective shaped by their application of computer science to biological data analysis.

The survey employs a quantitative approach in the rating section to measure perceptions across diverse groups and balances this with the qualitative feedback gathered in the recommendation and experience sections, fostering a comprehensive understanding of the intricate viewpoints within this specific demographic. This strategic survey design aims to yield valuable insights that contribute to the evolving landscape of computer science education.

DEFINE

The Secure Transaction Infrastructure is a robust system designed to ensure the confidentiality and integrity of financial transactions through the implementation of advanced encryption protocols. This framework establishes a secure environment, safeguarding sensitive user data from unauthorised access. Additionally, the system incorporates comprehensive Fraud Prevention measures, employing strategies to identify, mitigate, and prevent fraudulent activities, thereby enhancing user protection against scams and identity theft.

Two-Factor Authentication is a pivotal security feature within this infrastructure, requiring users to provide two distinct authentication factors, such as a password and a one-time code, for account access. This dual-layered authentication process significantly bolsters data protection, adding an extra layer of security.

The implementation of Incognito Mode further augments user privacy during sensitive financial transactions. This feature allows users to conduct transactions without recording them in transaction histories or storing related data, ensuring confidentiality in financial interactions.

To address the ephemeral nature of sensitive information, the system incorporates Self-Destructing Financial Messages. Messages within the app automatically disappear after a specified duration, maintaining the privacy of financial data by limiting its visibility over time.

Furthermore, Behavioural Biometrics introduces an innovative security measure by utilising unique behavioural patterns, such as typing speed or touchscreen gestures, to verify user identity. This adds an additional layer of personalised security, enhancing the overall integrity of the financial app. In combination, these features establish a comprehensive and advanced security framework for financial transactions, prioritising user privacy and data protection.

Group 8

TIS O6 BRAINSTORMING

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Chapter 7 Privacy, Security, and Ethics

- 1 Define a clear topic, then set a timer for 10 minutes to start the brainstorm. Copy and paste the provided sticky notes then type in your ideas. Add as many as you wish!
- 2 After the allotted time, swap boards with the other team. Go through their board, then quietly move ideas that aren't feasible to the cutting room area.
- 3 Have one teammate switch to the other group. Randomly pick a group number between 1-8. Scroll down to find the disrupt card that matches, then drag it to the board. Begin a new 10-minute brainstorm session. This time, factor the disrupt card into the original topic.
- 4 Once again, swap boards, then silently go through the other team's "disrupted" ideas and remove the unfeasible ones.
- 5 Do another 10-minute round of brainstorming with another team member switch and a new disrupt card.
- 6 For the final cut, pick only the best ideas that you're ready to commit to, even if it means only 1 or 2 are left.

Problem: Student's personal information that stored online might be collected by other educational agencies for commercial purpose, for example, unwanted spam emails from the agencies.

Solution: develop a secure student identity system that reducing the risk of unauthorized access of third parties. Besides, students are able to selectively share their certain information only on their preferences.

yap

Problem : People are encountering challenges which related to security, privacy, and ethical consideration when using their personal finance tools to manage their financial information.

Solution :
Designing an Ethical Personal Financial App

1. Secure Transaction Infrastructure with strong encryption protocols to safeguard the data.
2. Fraud Prevention to detect and prevent fraudulent activities, protecting users from financial scams and identity theft.
3. Strong passwords and two-factor authentication for data protection.
4. Incognito Mode for Transactions by Implement an "Incognito Mode" for transactions, allowing users to make sensitive financial transactions without recording them in transaction histories.
5. Self-Destructing Financial Messages, ensuring that the information is only visible for a specified duration.
6. Behavioral Biometrics such as typing speed or touchscreen gestures, to enhance security.

Cutting Room

Discard ideas here

Problem: The constant evolution of cyber threats, including hacking, malware, and phishing attacks, poses a significant risk to the security of personal and sensitive information.

solution: it is crucial to implement robust cybersecurity measures, including regularly updating and patching software to address vulnerabilities, employing advanced threat detection systems, conducting employee training to enhance awareness of phishing tactics, and promoting the use of strong, unique passwords. Additionally, organizations should establish incident response plans to promptly address and mitigate potential breaches, fostering a cybersecurity culture that prioritizes proactive defense against the cyber threats.

consent: The use of biometric data for identification, such as facial recognition, poses potential privacy risks, with the potential for unauthorized access and misuse.

SOLUTION: organizations should adopt transparent data policies, emphasizing supporting all consent. For a features in we standards, reg consent, and, regarding bio encryption, ckr regulations, re policies will co, privacy risks a actions.

Problem: Being online expose users to identity theft and hacked accounts.

Solution: Develop a system that checks passwords eligibility

1. Making sure no repeating username and passwords are being used
2. Eliminate password that can be found in a dictionary or is related to the user's personal information

Figure 1 : Brainstorming Activity for The Design Thinking Assignment

Upon pinpointing the issue, we swiftly initiated our efforts, meticulously plotting the intricacies of the challenge. We spared no effort, employing innovative thinking to exhaustively explore every conceivable solution.

Table 1: Issues and Solutions from the Brainstorming session

Issues	Solutions
Users use passwords that lack complexity or reuse passwords across multiple accounts.	Enforcing strong passwords, implementing Two-Factor Authentication (2FA) and behaviour biometrics such as typing speed or touchscreen gestures can enhance the security.
Some of default transaction receipts that are generated by financial apps include detailed information such as recipient addresses or transaction amounts.	Users have the option to choose which information that needs to include in transaction receipts when sharing receipts for personal transactions.
Financial apps handle sensitive financial information, making them prime targets for unauthorised access by third parties.	Implementing a stronger privacy policy and strong encryption protocols to ensure that users data both in transmit and at rest, is secure.
Financial transactions contain sensitive information that users may not want to be permanently accessible in records.	Self-destructing Financial Messages can let the specific information only visible for a specific time to decrease risk of unauthorised access.
Users may have transactions that they prefer to keep private.	Incognito Mode allows users to perform specific transactions without recording details in their regular transaction history, offering a discreet financial management option.

PROTOTYPE

"SafeStash", our prototype financial application meticulously crafted to address users' privacy and security concerns. With a specialised focus on enhancing secure online payments and offering robust privacy settings tailored to user preferences, SafeStash is designed to provide an advanced level of protection for financial transactions.



Figure 2 : Main Menu Interface of SafeStash



Figure 3 : Features on SafeStash

REFLECTIONS

My goal is to have all of the qualities required to become a successful software engineer in the future. Design thinking can greatly help me achieve my goal of being a good software engineer by understanding user demands, outline problems, generate tangible solutions, and iteratively develop and test prototypes. Incorporating design thinking into my programming allows me to produce more user-friendly and innovative software. To maximise my potential in the sector, I intend to implement a continuous learning strategy that will keep me up to date on current industry trends, tools, and technology via hands-on projects, workshops and connecting with professionals. - Arinah Filzah

My overarching goal in pursuing my software engineering career is to become a successful professional capable of addressing complex issues, particularly in areas like privacy and security within financial tools. Design thinking has been instrumental in refining my problem-solving skills and user-centric approach, fueling my ambition to innovate in the field. The methodology's impact on my goal is evident through its role in understanding user needs and iteratively developing solutions. To improve my potential in the industry, I plan to engage in continuous learning by pursuing hands-on projects, attending seminars, and connecting with professionals. This proactive approach ensures that I stay current and contribute effectively to the ever-evolving landscape of software engineering. - Ling Yu Qian

The ideation process reflects a holistic approach to address privacy and security concerns in a personal financial app. The solutions proposed, such as strong passwords, Two-Factor Authentication (2FA), behaviour biometrics, customisable transaction receipts, robust privacy policies, self-destructing financial messages and Incognito Mode, collectively aim to address diverse users' concerns to privacy, security and ethical considerations. The solution strikes a balance between privacy and usability by empowering users with control over their financial information, incorporating cutting-edge technologies and providing discreet transaction management. These solutions showcased a forward-thinking mindset, embracing seamless improvement and adaptability to emerge challenges in the ever-evolving technology landscape.

- Wong Jia Xuan

In the design thinking process to create a prototype, a highly insightful and practical experience was provided when our group worked on addressing privacy and security issues in financial applications. Our prototype, named "SafeStash," was crafted with a focus on top-grade encryption, incognito mode, combinational verification, and privacy references. Through this project, we navigated the intricacies of problem-solving within the context of designing a prototype. Moreover, the project not only enhanced our technical skills but also significantly improved our creative problem-solving abilities that are undeniably essential abilities to become a software engineer. - Yap Jia Xin

My objective in pursuing a career in software engineering is to proficiently master relevant programming languages and acquire project management skills that can enhance my employability. Aligned with the first principle of design thinking, the incorporation of empathy into my learning process aids in comprehending the needs and perspectives of end-users, facilitating the creation of more effective and user-friendly code. To bolster my effectiveness in the industry, I should concentrate on establishing clear and well-defined goals, providing a roadmap for professional growth and enabling strategic prioritization. This clarity allows a targeted alignment of learning efforts, emphasizing the need for continuous education to stay abreast of evolving technologies and industry trends. Additionally, building a compelling project portfolio is crucial as it serves as a tangible representation of practical skills and problem-solving capabilities. - Natasha Maisarah

TASK DISTRIBUTION

Table 2 : List of Task Distribution

Name	List of tasks
Arinah Filzah	Introduction, Assessment points
Ling Yu Qian	Empathy, Define
Wong Jia Xuan	Ideate
Yap Jia Xin	Prototype, Survey form
Natasha Maisarah	Detailed descriptions include problem, solution and team working