

# UNIVERSITY OF PLYMOUTH

**In collaboration with Peninsula College**

**School of Technology & Engineering**

**BSc (Hons) Computer Science (Cyber Security)**

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## **MAL2020 – Computing Group Project**

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## Code Repository

<b>Github</b>	<a href="https://github.com/OoiWeiChyeh/MAL2020_SecureFileSharingWebApp_E2EE.git"><u>https://github.com/OoiWeiChyeh/MAL2020_SecureFileSharingWebApp_E2EE.git</u></a>
<b>Pebblepad</b>	<a href="https://v3.pebblepad.co.uk/spa/#/public/mtw79ZbnmcwzfZhW78ZBzZjspW"><u>https://v3.pebblepad.co.uk/spa/#/public/mtw79ZbnmcwzfZhW78ZBzZjspW</u></a>
<b>Prototype</b>	<a href="https://file-share-f8260.web.app/login"><u>https://file-share-f8260.web.app/login</u></a>
<b>Presentation</b>	<a href="https://youtu.be/pZ3IU6vVbHs"><u>https://youtu.be/pZ3IU6vVbHs</u></a>

**Word Count : 3526 words**

## Background and Problem Statement

In academic institutions, examination papers constitute highly confidential documents that require high security measures during creation, transfer and storage. Currently, the Examination Unit in The Ship Campus faces significant challenges in managing examination papers securely. The existing workflow relies on physical transfer methods like Universal Serial Bus (USB) to move examination papers between lecturers, Heads of School (HOS) and the Examination Unit (EU) for printing and distribution.

This may present few critical vulnerabilities. Physical storage devices such as USB drives are susceptible to loss, theft or unauthorized duplication, maybe compromising examination integrity. Furthermore, the lack of audit ways makes it difficult to track who accessed the documents and when modifications occurred. The absence of encryption means that if a USB drive falls into the wrong hands, examination content is immediately exposed. Additionally, the current system lacks version control which lead to potential confusion regarding which document represents the final approved version.

Traditional digital solution such as standard email systems could fail to provide adequate security as they typically lack end-to-end encryption, making confidential examination papers vulnerable to interception during transmission. There exists an urgent need for a dedicated web-based platform that facilitates secure transfer of examination papers through end-to-end encryption (E2EE) which have confidentiality, integrity and authenticity of examination materials whilst maintaining a chain of custody.

## Objective

The primary objectives of this project are:

- I. To ensure data privacy by implementing end-to-end encryption techniques, preventing unauthorized access to messages during transmission and storage.
- II. To verify user authenticity through secure user authentication protocols, preventing impersonation or unauthorized access.
- III. To design a user-friendly mobile interface that provides secure communication without sacrifice usability.

## Scope of the Project

This project expect the design, development and implementation of a web-based secure file sharing system with E2EE called “Kunchee” is designed for academic campus or university. The system will support the workflow of exam papers securely from creation through printing. Moreover, user hierarchy followed by EU staff (Admin) to HOS, then goes to lecturers (User).

## Literature Review

When handling with confidential documents like exam paper and personal information, three security assessments need to be consider:

- I. Keeping the content private
- II. Making sure it hasn't be tampered with
- III. Confirming who sent it.

Everyone knows that it's importance in campus where exam security directly affects the credibility of a student coursework.

### 4.1 End-to-End Encryption for Secure File Sharing

E2EE is a ways that data stays encrypted from the moment it leaves the sender until it reaches the intended recipient. IBM (n.d.) explains that E2EE makes sure only the people communicating can read the messages, even if someone intercepts them during transmission. However, this is useful for exam paper transfer because different people (Lecturers, HOS, EU) need to access the documents at different stages.

Nonetheless, Perkasa et al. (2025) studied how combining Diffie-Hellman key exchange with AES-256 encryption can create secure messaging systems. They shows that having strong encryption isn't enough. They also need to manage the encryption keys properly. For exam paper system, this means still need to think about how to handle keys for different users while keeping the system simple enough for lecturers and staff who might not be tech-savvy.

### 4.2 Existing Secure Sharing Platform

Looking at existing secure file sharing applications helps to understand what features work well and what gaps need to be filled. Table 1 compares three popular platforms that use encryption for secure sharing.

	Application	Wormhole 	Signal 	Onionshare 
Features	Encryption	Browser-based end-to-end encryption. Files are encrypted client-side before upload.	Full end-to-end encryption. Files, messages, attachments are encrypted from sender to recipient.	Uses Tor network + direct peer-to-peer sharing. Data doesn't pass through third-party servers in readable form.
	Privacy	<b>Moderate.</b> Doesn't hide sender's IP; once you share link, that link is exposed. But files are encrypted.	<b>Good.</b> Signal hides content; metadata is limited. But IPs/devices still known unless using extra precautions.	<b>Excellent.</b> IP addresses are hidden via Tor, high anonymity.
	Ease of Use	Very easy: no account needed, browser drag-and-drop, share link.	Very user-friendly: apps on phone/desktop. Familiar UI.	More technical: requires running Tor, install or run service. Less seamless.
	File Size	Up to ~10 GB (depending on browser / available resources).	~100 MB per file (some overhead). Not ideal for huge files.	Peer-to-peer; file size limited by sender's bandwidth / system capabilities. Potentially large.
	Setup Required	Very low. Just open browser → upload → share link.	Low. Install app, register, done.	Higher. Need Tor and possibly setup of OnionShare service.
	Control	Has expiry / auto-deletion features for links.	Limited. In chats, files are part of thread (can delete messages). Not designed for expiring share links.	Strong control: you control when to host and when to stop.
	Best Use Case	Quick, secure sharing when both parties' trust identity but need confidentiality.	Private chats + sharing confidential docs between known people.	When you need anonymity, e.g. leak, whistle blow, or sharing sensitive content with risk.

**Table 1 : Comparison with existing solutions**

# LSEP (Legal, Social, Ethical, Professional)

## 5.1 Legal Compliance

Since we're working within a Malaysian context, the design follows the general principles of the PDPA (**Personal Data Protection Act 2010**) that is mainly around limiting unnecessary data collection, restricting access based on user roles and keeping sensitive information encrypted so it can't be misused.

We also pay attention to intellectual property concerns. Exam papers belong to the university, so we avoid storing or distributing them in ways that could look like unauthorized copying. Every dummy uploaded into the system remains encrypted end-to-end, so even the server can't view the content which may help reduce risks of accidental copyright breaches.

There's also a practical side like tools, frameworks, and libraries used in the system—such as React, Node.js, and libsodium are all under open-source licenses we're allowed to use for academic purposes.

Safety-wise, no special government permissions are required, but we still act as if the exam unit is the “data controller”, and the system should support whatever internal policies the campus already uses for exam confidentiality.

## 5.2 Ethical Guidelines

We designed the system with the intention of treating all users fairly, regardless of their position in the workflow. For example, lecturers shouldn't feel pressured by a system that exposes more data than necessary, so we only show information that is strictly relevant to their role.

Another point we considered is transparency. While we can't show users every technical detail (that would overwhelm most people), the system can still explain, in simple terms, how files are encrypted and who can view them.

Lastly, we respect confidentiality not just through technology but by making sure audit logs aren't misused. Logs track actions, not personal opinions or private behaviour. The goal is accountability, not surveillance.

### **5.3 Social Impact**

By replacing USB-based transfer, the system reduces the risk of exam leaks which helps protect the integrity of the university.

There's also a time factor such as approval processes that previously took days due to physical handovers might now speed up significantly.

Of course, every system has potential downsides. Some staff who are less comfortable with technology might feel overwhelmed at first. To reduce that problem, we kept the "K.I.S.S." (Keep it simple, stupid) principle by engineer Kelly Johnson (Linda, 2017), so people don't feel like they're "breaking something" by clicking the wrong button. Another concern is if the network goes down, progress may slow. Still, compared to the risks of USB drives, the trade-off seems worth it.

### **5.4 Professionalism**

As a team, we tried to follow the kind of professional behaviour expected in real development environments. We set our own version of "mini-deadlines" so that progress didn't pile up at the end, although we'll admit some sprints took longer than expected.

Communication was something we took seriously. When someone got stuck on an issue like encryption flow or a React component not rendering correctly. We shared updates instead of silently struggling.

We also aimed to keep our documentation honest. If something didn't work perfectly, we reported it rather than pretending it was flawless.

## 5.5 Risks

Several risks appeared throughout the project, and we tried to address them in realistic ways.

- I. Technical risks: Encryption implementation can fail silently if done incorrectly.
- II. System failure or data loss: Since everything is encrypted, corrupted keys could lock out legitimate users.
- III. Operational risks: Users might accidentally upload the wrong version of an exam paper. Audit logs and version history help trace these mistakes.
- IV. Security risks: Even with E2EE, users could still fall victim to phishing. We can't fully control that.

None of these risks disappear completely, but acknowledging them helps us design around them instead of pretending they don't exist.

## 5.6 Sustainability

Using cloud services like Firebase reduces the need for physical storage hardware, which indirectly cuts down on energy usage and electronic waste.

In terms of long-term usability, the system can scale if the university ever decides to include more departments or new document types. We kept the architecture modular, so future teams can replace components like authentication flows or database structures without rebuilding everything from scratch.

## 5.7 Continuity

To ensure the system can continue after development, we prepared documentation that outlines setup steps, key procedures, and troubleshooting tips. This should make it easier for the next team or the campus IT department to take over.

In terms of cost, the solution currently relies on mostly free or low-cost technologies, but we did highlight where paid extensions might appear (e.g., increased cloud storage). Planning ahead avoids the “surprise bill” situation common in cloud-based projects.

## Methodology

Project using an Agile development methodology to show iterative development with user feedback and ability to adapt throughout the system lifecycle. Besides, Agile framework enables incremental enhancement of system by organizing development into time-boxed sprints. For example, each focused on specific outcomes like user authentication, workflow management and etc.

### 6.1 System Architecture

- 1) Frontend (User Interface):
  - a. Built with React.js for a responsive web interface
  - b. Users can easily upload, view and manage exam papers
  - c. Works on different browsers and screen sizes
- 2) Backend (Server):
  - a. Built with Node.js and Express.js
  - b. Handles user authentication and file storage
  - c. Manages the workflow between different users
- 3) Database:
  - a. Firebase will store encrypted exam papers and user information
  - b. Only encrypted files are stored
  - c. Stores activity logs for auditing

### 6.2 Security Approach

All encryption and decryption happen on the user's computer (client-side) using Web Crypto API and libsodium.js. This means:

- I. Exam papers are encrypted before being uploaded.
- II. The server only stores encrypted files.
- III. Only authorized users with the right keys can decrypt and read the papers.
- IV. Even if someone hacks the database, they can't read the exam papers.

### 6.3 Development Stages

- 1) Requirements gathering - Understanding what the Exam Unit needs.
- 2) System design - Creating diagrams and planning the database structure.
- 3) Development - Building the system in sprints (2-3 weeks each).
- 4) Testing - Checking if everything works correctly and securely.
- 5) Documentation - Writing guides for users and technical documentation.

### 6.4 Testing Plan

We'll test the system in several ways:

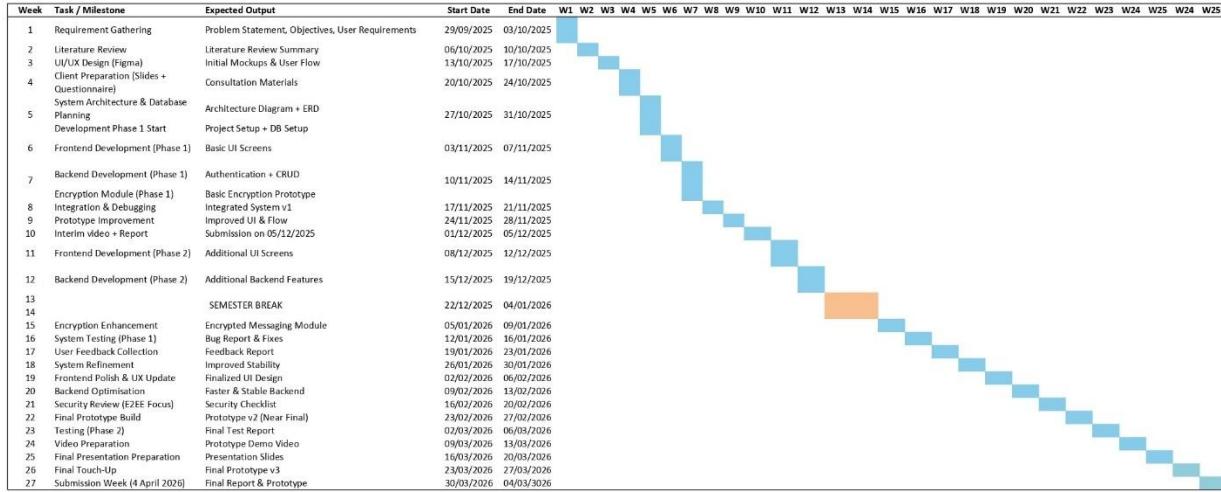
- 1) Unit testing - Testing individual features (login, upload, download).
- 2) Integration testing - Making sure all parts work together.
- 3) Security testing - Following OWASP guidelines to check for vulnerabilities.
- 4) User testing - Having lecturers and staff try the system and give feedback.

## Expected Deliverables

The project will produce the following deliverables:

- a) **Functional Web Application:** Fully operational examination paper transfer system featuring user authentication, role-based access control, end-to-end encryption, workflow management for the examination approval chain and audit logging capabilities.
- b) **System Documentation:** Technical documentation including system architecture diagrams, database schema specifications, encryption workflow descriptions, API documentation and deployment guidelines.
- c) **User Documentation:** User guides of different stakeholder roles (lecturers, moderators, Heads of School, and Examination Unit administrators) explaining system features, workflow procedures and practices.
- d) **Evaluation Report:** Assessment results documenting usability testing outcomes, security audit findings, performance benchmarks and recommendations for future improvements.
- e) **Project Report:** Final report encompassing literature review, detailed methodology, system design documentation, implementation details, testing results and project conclusions.
- f) **Source Code Repository:** Source code maintained in a version control system (GitHub) with clear commit histories and deployment instructions.

## Project Timeline



**Table 2 : Gantt Chart of Group Project**

## Resource Required

Following table below summarizes all software and hardware with supporting materials used in the group project.

<b>Category</b>	<b>Resources</b>	<b>Description / Purpose</b>
<b>Hardware</b>	Personal Computer (PC/Laptop)	Used for system development, coding, and testing in the local environment. The system should have at least an Intel i5 or AMD Ryzen 5 processor, 8 GB RAM, and 500 GB storage to handle local servers and database simulations efficiently.
<b>Software</b>	React.js	Frontend framework for building a responsive and interactive user interface.
	Node.js with Express.js	Backend framework for handling server-side logic and API communication.
	Firebase	Cloud-based database for storing encrypted notes and metadata.
	WebCrypto API & libsodium.js	Cryptographic libraries for implementing client-side end-to-end encryption.
<b>Development Tools</b>	Visual Studio Code	Integrated Development Environment (IDE) for code editing and debugging.
	GitHub	Version control and collaborative code management platform.
<b>Testing Tools</b>	Jest & Mocha	Used for unit and integration testing to ensure functionality and reliability.
	OWASP ZAP	Security testing tool for identifying vulnerabilities and verifying E2EE implementation.
<b>Documentation Tools</b>	Draw.io	Used for creating diagrams and UML models.
	Microsoft Word	For report writing, documentation and formatting of project deliverables.
<b>Network Resources</b>	Internet Connection	Required for accessing APIs, databases and deployment environments.

# Expected Outcome and Significance

## 10.1 Expected Outcomes

The successful completion of this project will yield:

- I. Working web-based system for secure exam paper transfer with E2EE
- II. Replacement of the unsafe USB drive method with a digital encrypted solution.
- III. Clear tracking of who accessed or modified exam papers at each stage.
- IV. Faster approval process from lecturer to HOS to Exam Unit.
- V. Better security for confidential exam content.

## 10.2 Significance

This project solves security problem faced by the EU. Currently, using USB to transfer exam papers is risky because they can be lost, stolen or copied without anyone knowing. Our system provides a safer digital alternative that's specifically designed for the university's exam paper approval workflow which most file sharing apps don't support maybe.

Next, project demonstrates how encryption technology can be implemented in university settings without making things complicated for non-technical staff like lecturers and administrators. Like focusing on usability alongside security, we show that strong protection doesn't have to mean difficult-to-use systems. This is important because many secure solutions fail simply because users find them too complicated.

Beyond exam papers, this system can serve as a foundation for other confidential document handling in the university. The same security approach could be applied to student records, confidential meeting minutes or research proposals. This makes the project valuable not just for the Exam Unit, but potentially for multiple departments that handle sensitive information.

Finally, the project will make daily work easier for lecturers and administrators by providing a simple, secure way to handle exam papers. They won't need to worry about losing USB or wondering if someone accessed files without permission, since everything is logged and tracked automatically. This would increase both security and peace of mind for everyone involved in the exam paper process.

## Individual Contributions to the Group Project

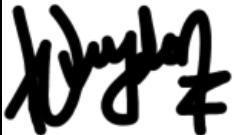
Teammate (Name)	Contributions to Team	Commendations	Percentage of contribution
OOI WEI CHYEH	1. Coordinated group meetings and monitored project progress. 2. Combined all team members' work into the final submission.	Ooi Wei Chyeh did an excellent job leading the project flow, especially when he delegated the tasks for everyone throughout each sprint. – Shahridan Ooi Wei Chyeh did a commendable job organizing the final documentation, particularly when he ensured formatting consistency across all sections. – Danial	25%
DANIAL IZZUDDIN BIN MOHAMAD SHAHIR	1. Designed the system interface and created visual mock-ups. 2. Prepared design elements for the presentation slides.	Fantastic job designing the interface, particularly when he made last-minute layout revisions based on team input. - Ooi Wei Chyeh Danial did a great job enhancing the visual flow and colour scheme, especially while creating the slides. - Farah	25%
SHAHRIDAN NORIMAN BIN BAHARUD DIN	1. Developed the system prototype and integrated design elements. 2. Conducted testing and fixed technical issues.	Shahridan's implementation of the prototype was outstanding, particularly the way he resolved the interface function issue during testing - Farah Shahridan performed an excellent job troubleshooting the system, especially when he promptly resolved the navigation problem. - Danial	25%
NUR FARAH AQILAH BINTI NORAZAM	1. Conducted research and prepared system analysis documentation. 2. Organised project content including objectives, problem statement, and slide materials.	Farah did a fantastic job assessing the user requirements, particularly when she clarified the problem description for the team. - Shahridan Excellent task of planning the presentation's flow, especially when it came to structuring the material. - Ooi Wei Chyeh	25%

**Table 3 : Contribution Table**

All group members agree to acknowledge the above contributions. (Yes/No)

\*We understand that if we answered No to the above, we will be called for a viva with the Module Leader to mediate the dispute.

### Signatures

OOI WEI CHYEH	
DANIAL IZZUDDIN BIN MOHD SHAHIR	
SHAHRIDAN NORIMAN BIN BAHARUD DIN	
NUR FARAH AQILAH BINTI NORAZAM	

#### 1. OOI WEI CHYEH

**Role:** Team Leader

**Main Task:**

- Coordinated all group meetings and ensured every member understood their tasks.
- Monitored the project progress.
- Consolidated all group work into the final project submission.

**Impact to Project:**

- Ensured the project ran smoothly and stayed on schedule.
- Increased team productivity by giving clear instructions and reminders.
- Helped maintain consistency and quality in all deliverables.

**Collaboration Efforts:**

- a) Regularly communicated with team members.
- b) Provided guidance and support whenever issues arose.
- c) Encouraged teamwork and resolved conflicts.

**2. DANIAL IZZUDDIN BIN MOHAMAD SHAHIR****Role:** Designer**Main Task:**

- a) Designed the project mock-ups and visual elements for the KUNCHEE system.
- b) Created the UI layout based on the team's requirements.
- c) Produced graphics and visual materials for presentation.

**Impact to Project:**

- a) Improved the aesthetic and usability of the system.
- b) Helped the team visualize the outcome early in the project.
- c) Enhanced the quality of the final presentation.

**Collaboration Efforts:**

- a) Discussed and revised design ideas based on team feedback.
- b) Worked closely with the programmer to ensure design matched functionality.
- c) Contributed to group discussions and decision-making.

**3. SHAHRIDAN NORIMAN BIN BAHARUD DIN****Role:** Programmer**Main Task:**

- a) Developed the system features according to the project requirements.
- b) Integrated the design into a functional prototype.
- c) Tested the system to ensure smooth operation.

**Impact to Project:**

- a) Delivered a working prototype that reflected the core idea of KUNCHEE.
- b) Ensured the system's core functions met requirements.
- c) Helped the team demonstrate a practical and usable solution.

**Collaboration Efforts:**

- a) Actively collaborated with the designer and analyst for accurate implementation.
- b) Fixed issues and improved features based on team feedback.
- c) Shared progress updates during meetings.

**4. NUR FARAH AQILAH BINTI NORAZAM****Role:** Analyst**Main Task:**

- a) Gathered and analysed user requirements for the KUNCHEE project.
- b) Conducted research and identified problems faced by users.
- c) Prepared documentation including problem statement, objectives, and system scope.

**Impact to Project:**

- a) Ensured the system was designed based on accurate and relevant user needs.
- b) Helped create a strong foundation for system design and development.
- c) Improved the clarity and direction of the project.

**Collaboration Efforts:**

- a) Shared findings with the team to support design and development decisions.
- b) Worked closely with the leader to refine project requirements.
- c) Helped teammates with content for slides and documentation

## Personal Reflection

### 1. OOI WEI CHYEH

Earlier this project, I volunteered to take on the role of team leader and the experience was more challenging and more eye-opening than I expected. At first, I focused heavily on planning and assigning tasks, assuming that clear structures would be enough. However, I later realised that real teamwork depends just as much on flexibility and communication as it does on schedules with Agile sprints in supervision of module leader.

One moment that stood out was when our development and documentation started drifting out of sync. I felt frustrated, partly at myself for not spotting it earlier. Reflecting on it, I learned that maybe continuous check-ins are more effective than waiting until the end to compile everything.

From this experience, I gained a better understanding of what leadership actually looks like. For example, being supportive by noticing when others need help and admitting when I need clarification myself. If I were to lead another project, I'd prioritise clearer communication, earlier alignment and more frequent feedback loops. Last but not least, the project helped both my organisational skills and my confidence in guiding a group through complex tasks.

### 2. DANIAL IZZUDDIN BIN MOHAMAD SHAHIR

As the Designer for this project, my main responsibility was to create the visual identity of our 'Kunchee' system. I spent most of my time designing the user interface (UI) layouts and creating the mock-ups to ensure the system looked professional and was easy to navigate. I also took charge of the visual elements for our presentation slides, focusing on the colour scheme and visual flow to make our pitch more engaging. This role was a great learning experience because I had to figure out how to translate the complex requirements the analyst found into a simple, clean interface that non-technical users could use.

In terms of teamwork, I learned a lot about the importance of being flexible and open to feedback. I worked very closely with the programmer to ensure that my designs were functional and not just pretty pictures. We had a few moments where I had to make last-minute layout revisions based on the team's input, which was stressful but necessary. This collaboration taught me that good design is a two-way street; it required constant communication with the developer to fix navigation issues and ensure the final product worked as smoothly as it looked.

### **3. SHAHRIDAN NORIMAN BIN BAHARUD DIN**

In this project, I took on the role of the Programmer, where my main responsibility was to turn our concepts into a fully functional prototype. I focused on developing the system's core features using React and Node.js, ensuring that the design elements were properly integrated into the code. One of the biggest technical challenges I faced was resolving interface function issues during the testing phase, specifically a tricky navigation problem that kept causing errors. Troubleshooting these issues was stressful at times, but it really improved my debugging skills and taught me the importance of building a stable backend before adding too many features.

On the teamwork side, I learned that a programmer cannot work in isolation. I collaborated very closely with Danial (the Designer) to ensure that his visual layouts were implemented accurately without breaking the system's functionality. I also relied on the clear requirements provided by the Analyst to make sure I wasn't wasting time coding the wrong features. We had regular progress updates where I would demonstrate the prototype to the team, and their immediate feedback helped me fix bugs faster than if I had tried to do it all alone.

### **4. NUR FARAH AQILAH BINTI NORAZAM**

In this project, I took on the role of the Analyst. My main responsibility was to conduct research and gather the user requirements to make sure we were solving the actual problem. I focused on defining the problem statement regarding the risks of using USB drives and outlining the system objectives for the team. This part was important because I had to clarify the problem description so that the developers knew exactly what features were needed. It taught me that a project can't succeed without a solid foundation and clear goals from the start.

On the teamwork side, I collaborated closely with the team leader to refine these requirements and ensure we were on the right track. I also took charge of organizing the presentation flow and structuring the slide materials to ensure our final pitch was logical and easy to follow. We had a good dynamic where I would share my findings to support the design decisions, and helping my teammates with the documentation content really showed me how different roles rely on each other to get the job done.

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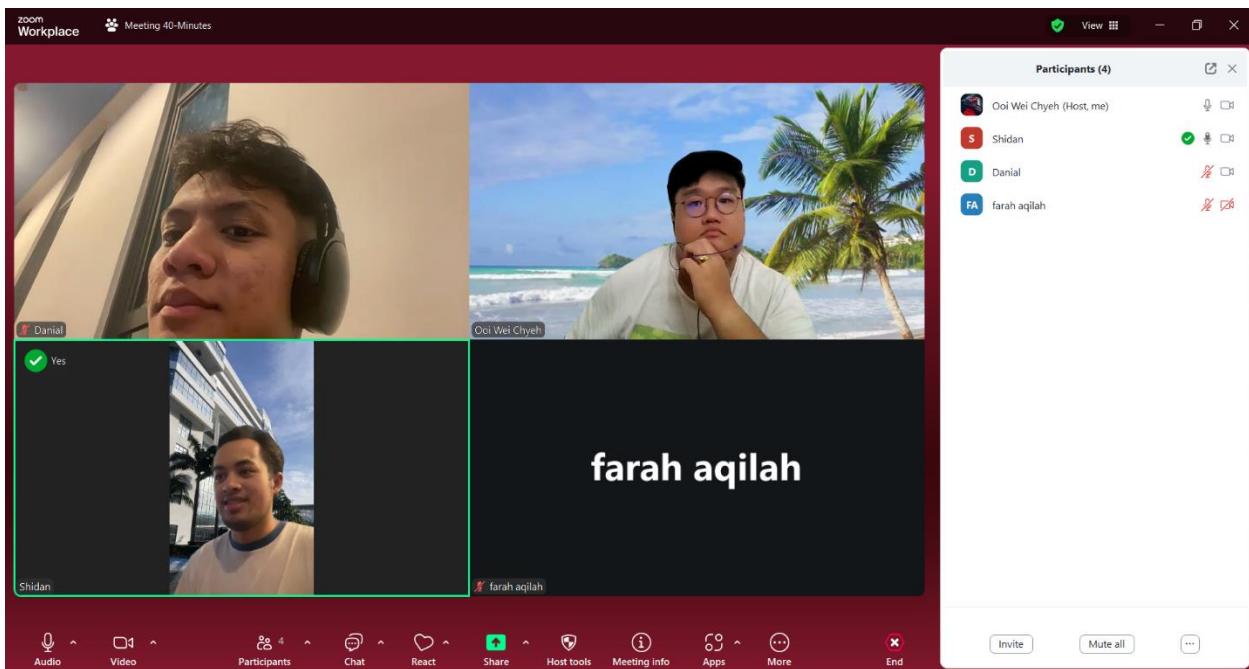
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## Appendices

### Appendix A : Meeting Picture with Group Member



**Appendix B : Online Zoom Meetings with Group Member****Appendix C : Regular project meetings on sprints**

**Appendix D : Meetings with our stakeholders (The Ship Campus Exam Unit representatives)**



## Appendix E : Minutes of meetings done when meetings with stakeholders

The image displays two side-by-side screenshots of the Kunchee mobile application interface, showing meeting minutes from a session held on October 24, 2025.

**Left Screenshot (Meeting Details):**

- Kunchee Logo:** A circular logo featuring a book icon and the word "Kunchee".
- Meeting Information:**
  - Location: Barcelona – Francis Light Library
  - Date: 24/10/2025
  - Time: 2:30 p.m.
- Section Headers:**
  - Meeting Minutes**
  - Agenda items**
- Agenda Items:**
  - I. Project overview and objectives
  - II. Client requirements clarification
  - III. System design and user interface discussion
  - IV. Database and backend planning
  - V. Discussing workflow in exam unit
- Action Items Table:**

Action Items	Owner(s)	Deadline	Status
Privacy control	Farah	[28/10/2025]	In Progress
User Interface	Danial & Wayden	[TBC]	In Progress
Function	Shahridan	[TBC]	In Progress
- Privacy and Security Disclaimer:**

Kunchee is designed as a secure note and code snippet sharing web application developed for the Exam Unit of The Ship Campus to ensure confidentiality, integrity, and controlled access to examination-related materials and communications.

By using Kunchee, all stakeholders agree to the following privacy and security terms:

  - Data Confidentiality**: All information, notes, and code snippets shared through Kunchee are strictly confidential and accessible only to authorized users designated by the Exam Unit. Unauthorized access, distribution, or disclosure of any stored content is strictly prohibited.
  - End-to-End Encryption**: Kunchee implements end-to-end encryption to protect data in transit and at rest. The system ensures that only the sender and intended recipient can decrypt the shared information.

**Right Screenshot (Meeting Details):**

- Kunchee Logo:** A circular logo featuring a book icon and the word "Kunchee".
- Meeting Information:**
  - Location: Barcelona – Francis Light Library
  - Date: 24/10/2025
  - Time: 2:30 p.m.
- Section Headers:**
  - 3. User Authentication and Access Control**
  - 4. Data Integrity and Storage**
  - 5. Liability and Responsibility**
  - 6. Compliance with Institutional Policy**
- Signatures:**
  - Created by:** Signature of Nur Farah Aqilah, Date: 24/10/2025
  - Authorized by:** Signature of Farah Shida, Date: 24/10/2025

**Figure 1 : Minutes of meetings (24/10/25)**

## Appendix F : Minutes of meetings done when meetings with stakeholders

The image displays two side-by-side screenshots of the Kunchee mobile application interface, showing meeting minutes from two different stakeholder meetings.

**Left Screenshot (Meeting 1):**

- Header:** Kunchee
- Location:** Barcelona – Francis Light Library
- Date:** 24/10/2025
- Time:** 2:30 p.m.
- Section:** Meeting Minutes
- Section:** Agenda items
- List:**
  - I. Project overview and objectives
  - II. Client requirements clarification
  - III. System design and user interface discussion
  - IV. Database and backend planning
  - V. Discussing workflow in exam unit
- Table:**

Action Items	Owner(s)	Deadline	Status
Privacy control	Farah	[28/10/2025]	In Progress
User Interface	Danial & Wayden	[TBC]	In Progress
Function	Shahridan	[TBC]	In Progress
- Section:** VI. Privacy and Security Disclaimer
- Text:** Kunchee is designed as a **secure note and code snippet sharing web application** developed for the **Exam Unit of The Ship Campus** to ensure confidentiality, integrity, and controlled access to examination-related materials and communications.
- Text:** By using Kunchee, all stakeholders agree to the following privacy and security terms:
- 1. Data Confidentiality**  
All information, notes, and code snippets shared through Kunchee are strictly confidential and accessible only to authorized users designated by the Exam Unit. Unauthorized access, distribution, or disclosure of any stored content is strictly prohibited.
- 2. End-to-End Encryption**  
Kunchee implements end-to-end encryption to protect data in transit and at rest. The system ensures that only the sender and intended recipient can decrypt the shared information.

**Right Screenshot (Meeting 2):**

- Header:** Kunchee
- Location:** Counseling Room – Francis Light Library
- Date:** 19/11/2025
- Time:** 2:30 p.m.
- Section:** Meeting Minutes
- Section:** Agenda items
- List:**
  2. End-to-End Encryption  
Kunchee implements end-to-end encryption to protect data in transit and at rest. The system ensures that only the sender and intended recipient can decrypt the shared information.
  3. User Authentication and Access Control  
Each user is required to log in using a verified institutional account. Role-based access controls are enforced to limit permissions according to user responsibilities within the Exam Unit.
  4. Data Integrity and Storage  
All stored data is protected from unauthorized modification or tampering. Regular integrity checks and audit logs are maintained to track system access and changes.
  5. Liability and Responsibility  
While Kunchee strives to maintain the highest level of data security, the development team and The Ship Campus are not liable for damages caused by user negligence, such as sharing credentials or misuse of the system.
  6. Compliance with Institutional Policy  
The application adheres to The Ship Campus' data protection and cybersecurity policies, ensuring alignment with ethical, academic, and regulatory standards.
- Section:** Created by:
- Signature:**
- Name:** Nur Farah Aqilah
- Date:** 19/11/2025
- Section:** Authorized by:
- Signature:**
- Name:** Farahzad Shahridan
- Date:** 19/11/2025

**Figure 2 : Minutes of meetings (19/11/25)**