project-backend Planning Report

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Report prepared by:
1. Ze Sheng: z5421872@ad.unsw.edu.au
2. Gia Hoang Long Tran: z5461021@ad.unsw.edu.au
3. Jasiah Haque : z5367958@ad.unsw.edu.au

Link:
https://docs.google.com/document/d/1IW-d4BScuhtKfj9EMJF9Tty3UuiJSeo7cX06qQdSzck/edit?usp=sharing

1.0   Requirements Elicitation

Find 2-3 people to interview as target users. Target users are people who currently use a tool like Memes, or intend to. Record their name and email address.

Develop a series of questions (at least 4) to ask these target users to understand what problems they might have with teamwork-driven communication tools that are currently unsolved by Memes. Give these questions to your target users and record their answers.

Once you have done this, think about how you would solve the target users' problem(s) and write down a brief description of a proposed solution.

1.1   Users Information

<u>User1</u>: Tran Gia Minh Thong: minhthongtran2003@gmail.com
<u>User 2</u>: Tran Gia Huu: tgiahuu@gmail.com

1.2   Questions

1. How do you typically use teamwork-driven communication tools like Microsoft Teams for your educational and collaborative needs at UNSW?

<u>User 1</u>*: "I use Teams to attend online lectures and tutorials, and it's great for asking questions and talking to other students. I join study groups too, and we share notes, chat about lectures, and help each other with problems. When we have group projects, we make different channels to work on stuff, share ideas, and have meetings to see how things are going."*

<u>User 2</u>: *"I mainly use Teams to collaborate on group projects and assignments. We usually create dedicated channels for each project, where we can share files, set up meetings, and have discussions. We use the video call feature for some courses, labs and tutorials. With that, use the chat function to communicate with lecturers or tutors to get clarifications on assignment requirements or to ask for feedback on our work."*

2. What features or aspects of Microsoft Teams do you find most valuable, and would you like to see similar functionality in Memes?

<u>User 1</u>: *"I really like the whole channel setup in Teams, because it helps keep everything organised for different projects and subjects. Video calling is pretty useful, especially when you're working with a group or need to talk to tutors. It would be awesome if Memes had something like that, too. File sharing is super important, so having a good way to share and collaborate on documents in Memes would be great."*

<u>User 2</u>: *"The integration with Office 365 apps, like Word, PowerPoint, and Excel, is also super valuable for real-time collaboration on documents. In Memes, I'd like to see similar functionality, such as an easy-to-navigate channel system and seamless integration with popular productivity tools for smooth collaboration among students."*

3. Are there any limitations or issues you have encountered in Microsoft Teams that you hope Memes will address or improve upon?

<u>User 1</u>: "I've experienced some difficulties with the search functionality, which sometimes makes it hard to locate specific messages or files within the platform. I hope that Memes can address this issue by implementing a more powerful and accurate search feature that helps students quickly find the information they need"

<u>User 2</u>: "Microsoft Teams has a cluttered interface, which can make it difficult to find what I'm looking for quickly. I'd love to see Memes address this by creating a cleaner, more streamlined design that's easy to navigate."

4. **Considering the educational context of UNSW, what additional features or tools do you think Memes should provide to enhance the learning experience and collaboration among students?**

User 1: *"I think Memes should have a feature that allows students to easily form study groups based on shared courses or interests. It would also be helpful to integrate a shared calendar that syncs with class schedules, so we can stay on top of deadlines and plan group meetings."*

User 2: *"For a better learning experience at UNSW, Memes could include a virtual whiteboard for real-time brainstorming and problem-solving with classmates.*

5. **How important is the integration of third-party applications or tools within a communication platform for your team's workflow, and which integrations would you find most useful?**

User 1: *"Integration of third-party applications is extremely important for our team's workflow, as it streamlines our processes and keeps everything in one place. Personally, I find integrations with tools like Google Drive instead of OneDrive to be the most useful. Google Drive allows us to collaborate on documents, spreadsheets, and presentations in real-time."*

User 2: *"While third-party integrations can be helpful, they're not a deal-breaker for me when it comes to communication platforms. I can manage my work just fine by switching between different tools when needed. That said, if I were to choose some integrations, I'd prefer having access to a cloud storage service like GoogleDrive or Notion for easy file sharing and maybe an integration with a calendar app like Google Calendar to keep track of deadlines and events."*

6. **Can you describe an ideal user experience with a teamwork-driven communication tool? What features or design elements would contribute to this ideal experience?**

User 1: *"An ideal user experience with a teamwork-driven communication tool would be intuitive and easy to navigate. Features like customizable channels for different projects or topics, seamless file sharing, and real-time collaboration on documents would be essential. Design-wise, I'd appreciate a clean and minimalist interface with clear labels, icons, and a logical layout that makes it simple to find what I need without getting overwhelmed. Integration with third-party apps like Google Workspace would also contribute to a more seamless and efficient workflow for team projects."*

User 2: *"Having robust features that cater to various communication styles and preferences. This includes text chat, voice and video calls, screen sharing, and an interactive virtual whiteboard for brainstorming sessions. I'd like to see customizable notification settings to help*

*manage distractions and stay focused on work. In terms of design, a dark mode option would
be appreciated, as well as the ability to personalize the interface with different themes or colors.
An efficient search function and easy access to essential resources, like class materials."*

**7. What expectations do you have regarding privacy, security, and data
handling? Are there any concerns that need to be addressed to make you
feel comfortable using this platform?**

User 1: *"My primary concern would be ensuring that my personal information and data shared
within the platform remain private and secure. I would like to see features like end-to-end
encryption for messages and robust access control for shared files. A clear and transparent
privacy policy, as well as compliance with relevant data protection regulations, would make me
feel more comfortable using the platform."*

User 2: *"While I understand the importance of privacy and security, I don't have any specific
concerns as long as the platform adheres to standard security practices and guidelines.
However, I would like the option to delete any data or content I've shared on the platform
permanently, and I'd appreciate regular updates on any security improvements or potential
breaches. As long as the platform demonstrates a commitment to user privacy and security, I
would feel comfortable using it for communication and collaboration."*

1.2   Proposed Solutions

1. Inefficient search functionality and cluttered interface

Improve the search functionality in Memes by implementing a more powerful and accurate
search feature that helps students quickly find the information they need. Design a cleaner,
more streamlined interface that is easy to navigate, allowing users to locate essential features,
channels, and resources without feeling overwhelmed. We can implement a debouncing
technique to reduce the number of API calls and improve the search response time which can
be achieved using 'debounce' from 'lodash' library and server-side pagination to improve the
performance of search results.

2. Limited collaboration tools and third-party integrations

Enhance the collaboration experience in Memes by integrating popular productivity tools like
Google Drive and Google Calendar, allowing students to work on documents, presentations,
and spreadsheets in real-time, and manage their schedules effectively. Include features like a
virtual whiteboard for brainstorming and problem-solving sessions, customizable channels, and
seamless file sharing to support diverse communication and collaboration needs

3. Privacy and security concerns

To ensure the privacy and security of users' data we can implement features such as end-to-end encryption for messages, robust access control for shared files such as defining different user roles and permissions using 'enums', and the option for users to permanently delete any data or content they have shared on the platform.

4. Difficulty forming and managing study groups

Develop a feature within Memes that allows students to easily create and join study groups based on shared courses or interests. Provide tools to manage group communication, resource sharing, and scheduling, facilitating a more organized and effective study environment for students.

5. Inaccessibility of course materials and resources

Create a dedicated space within Memes for storing and accessing class materials such as lecture recordings, slides, supplementary resources, and important announcements. This central repository would make it easy for students to find, review, and engage with course content, improving their overall learning experience.

6. Limited personalization and customization options

Offer users the ability to personalize their Memes experience by providing customizable notification settings, interface themes, and color options. This would allow students to tailor the platform to their preferences, enhancing their overall experience and facilitating more efficient communication and collaboration.

2.0   Requirements Analysis & Specification - Use Cases

Once you've elicited this information, it's time to consolidate it.

*Take the responses from the elicitation step and express these requirements as **user stories** (at least 3). Document these user stories. For each user story, add user acceptance criteria as notes so that you have a clear definition of when a story has been completed.*

Once the user stories have been documented, generate at least ONE use case that attempts to describe a solution that satisfies some of or all the elicited requirements. You can generate a visual diagram or a more written-recipe style, as per lectures.

With your completed use case work, reach out to the 2-3 people you interviewed originally and inquire as to the extent to which these use cases would adequately describe the problem they're trying to solve. Ask them for a comment on this, and record their comments in the PDF.

2.1   User Stories and Acceptance Criteria

1. ***As a student, I want an intuitive, organized, and easy-to-navigate communication platform that integrates well with third-party applications, so I can efficiently collaborate with my peers on projects and assignments.***

<u>Acceptance Criteria</u>

- The platform features a clean, user-friendly interface with clear labels, icons, and a logical layout.
- Users can create dedicated channels for different projects and subjects.
- The platform supports seamless integration with popular third-party applications, such as Google Drive, Google Calendar, and Notion.

2. *As a student, I want a communication platform that offers various ways to communicate and engage with my peers, such as text chat, voice and video calls, and interactive virtual whiteboards.*

<u>Acceptance Criteria</u>

- The platform supports text chat, voice calls, and video calls.

- Users can share screens during calls and video conferences.
- The platform includes an interactive virtual whiteboard for brainstorming and problem-solving.

3. *As a student, I want a communication platform that prioritizes privacy, security, and data handling, so I can feel confident using the platform for my educational needs.*

Acceptance Criteria

- The platform implements end-to-end encryption for messages and robust access controls for shared files.
- A transparent privacy policy is provided, and the platform complies with relevant data protection regulations.
- Users have the option to delete any data or content they have shared on the platform permanently.

4. *I want a shared calendar integrated with Memes that syncs with class schedules, so that I can manage deadlines and plan group meetings more effectively.*

Acceptance Criteria

- Calendar integration within Memes
- Calendar should sync with class schedules from UNSW
- Ability to add deadlines, events, and group meetings to the calendar
- Calendar should be visible and accessible to all relevant group members

2.2   Use Cases

Preconditions

Types of users being simulated: Students and Tutors

Main Flow

1. Users have created accounts on Memes.
2. Users have access to the relevant group channels and third-party applications.
3. Main Flow:
4. The student logs in to Memes and navigates to the appropriate group channel for their project or subject.
5. The student shares files or documents with their peers using the integrated third-party applications like Google Drive or Notion.
6. The student communicates with their peers using the available communication methods, such as text chat, voice calls, video calls, or interactive virtual whiteboards.
7. The student schedules a group meeting or study session using the shared calendar that syncs with their class schedule from UNSW.
8. The student receives notifications for upcoming deadlines, events, and group meetings.
9. The student participates in a group meeting or study session using video calls and screen sharing features.
10. During the meeting, the student collaborates with their peers using the interactive virtual whiteboard for brainstorming, problem-solving, or discussing ideas.
11. After the meeting, the student continues to work on their project or assignment using the integrated third-party applications.
12. The student consults the shared calendar to track upcoming deadlines and plan future meetings.
13. Instructors can join the group channels to provide guidance, feedback, and support as needed.

Postconditions

14. Students efficiently collaborate on projects and assignments using the communication platform and integrated third-party applications.
15. Students stay organized and informed about deadlines, events, and group meetings through the shared calendar.
16. The platform maintains privacy and security, ensuring that user data is protected and handled responsibly.

2.2 Comments on Uses Cases

User 1: *"Seems like it would be an ideal solution to enhance collaboration and communication in our educational context. I appreciate the focus on integrating third-party applications and the variety of communication methods available. The shared calendar feature is also something I'm really looking forward to, as it would help me stay organized and manage my time better. The user-friendly interface and the ability to create dedicated channels for different projects and subjects are features I'd love to see in Memes. The focus on integrating with third-party applications and providing various communication options makes the platform more versatile and appealing"*

User 2: *"The inclusion of an interactive virtual whiteboard and seamless integration with popular productivity tools would definitely make our collaboration smoother. The attention given to privacy and security, as it's an essential aspect for me when using a communication platform."*

3.0 Design Interface Design

Now that we've established our problem (described as requirements), it's time to think about our solution in terms of what capabilities would be necessary. You will specify these capabilities as HTTP endpoints, similar to what is described in 6.2. There is no minimum or maximum of what is needed - it will depend on what problem you're solving.

3.1 Interface

Improve search functionality and declutter the interface

GET /search

Searches for resources, channels, or users based on the query parameters provided.

Input parameters:

- query (string): The search query provided by the user.
- type (string): The type of item to search for, such as "resource", "channel", or "user".
- page (integer, optional): The current page of the paginated results. Defaults to 1 if not provided.

Exceptions:
- 400 Bad Request: If the 'query' or 'type' parameters are not provided or are invalid.

GET /resources

Description: Fetches a paginated list of resources.

Input parameters:

- page (integer, optional): The current page of the paginated results. Defaults to 1 if not provided.
- pageSize (integer, optional): The number of results per page. Defaults to a predefined value if not provided.

Enhance collaboration tools and third-party integrations

POST /integrations/google-drive

Links the user's Google Drive account to their Memes account, enabling seamless file sharing and collaboration.

Input parameters:

- token (string): the access token obtained from Google OAuth 2.0 authentication.

Exceptions:

- 400 Bad Request: If the 'accessToken' parameter is not provided or is invalid.
- 409 Conflict: If the user's Google Drive account is already linked to their Memes account.

POST /integrations/google-calendar

Description: Links the user's Google Calendar account to their Memes account, allowing for calendar event synchronization and management.

Input parameters:

- token (string): The access token obtained from Google OAuth 2.0 authentication.

Exceptions:

- 400 Bad Request: If the 'accessToken' parameter is not provided or is invalid.
- 409 Conflict: If the user's Google Calendar account is already linked to their Memes account.

POST /files/upload

Description: Allows users to upload a file to their Memes account for sharing and collaboration.

Input parameters:

- file (binary): The file to be uploaded.
- channelId (string, optional): The ID of the channel where the file will be shared. If not provided, the file will be uploaded to the user's personal files.

Exceptions:

- 400 Bad Request: If the 'file' parameter is not provided, or if the provided 'channelId' is invalid.
- 401 Unauthorized: If the user is not authenticated.
- 403 Forbidden: If the user does not have permission to upload files to the specified channel.

Address privacy and security concerns

POST /messages/encrypt

Description: Encrypts a message for secure communication between users.

Input parameters

- message (string): The plain text message to be encrypted.

Exceptions:

- 400 Bad Request: If the 'message' parameter is not provided or is empty.

POST /access-control/create

Description: This endpoint creates a new access control rule for shared files, defining user roles and permissions.

Input parameters:

- resourceId (string): The ID of the resource the access control rule applies to.
- userId (string): The ID of the user affected by the access control rule.
- role (string): The role assigned to the user (e.g., 'viewer', 'editor', 'owner').

Exceptions:

- 400 Bad Request: If any of the input parameters are not provided or are invalid.
- 401 Unauthorized: If the user is not authenticated.
- 403 Forbidden: If the user does not have permission to create access control rules for the specified resource.

DELETE /content/delete/{contentId}

Description: This endpoint allows users to permanently delete any data or content they have shared on the platform.

Input parameters:

- contentId (string, path parameter): The ID of the content to be deleted.

Exceptions:

- 400 Bad Request: If the 'contentId' parameter is not provided or is invalid.
- 401 Unauthorized: If the user is not authenticated.
- 403 Forbidden: If the user does not have permission to delete the specified content.

Enhance personalization and customization options

PUT /users/{userId}/settings/themes (Update interface theme)

Description: This endpoint allows users to update their interface theme, providing them with personalization and customization options for their Memes experience.

Input parameters:

- userId (string, path parameter): The ID of the user whose interface theme will be updated.
- theme (string, in the request body): The new theme to be applied to the user's interface (e.g., 'dark', 'light', 'blue').

Exceptions:

- 400 Bad Request: If the 'theme' parameter is not provided, is empty, or has an invalid value.
- 401 Unauthorized: If the user is not authenticated.
- 403 Forbidden: If the user does not have permission to update the specified user's interface theme (i.e., the user is trying to change someone else's theme).

4.0 Design Conceptual Modelling State Diagrams

Now that you have a sense of the problem to solve, and what capabilities you will need to provide to solve it, add at least ONE state diagram to your PDF to show how the state of the application would change based on user actions. The aim of this diagram is to help a developer understand the different states of the application.

4.1 Diagram