UNIVERSITY'S
TIMETABLE MANAGER
&
AVAILABILITY CHECKER
APPLICATION

DATE: 12 / 04 / 2024

GROUP: 11 - LAB 03

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1. Introduction

The application, “Youni & Friends”, simplifies timetabling and integrates our everyday university experience with our personal life. The app achieves this by creating a platform where Sydney University’s students can find the optimal timetable that meets their personal wants and needs as well as finding time for social interactions. Users can enter their university units and connect with up to 3 friends and the app will then automatically generate a timetable that fulfills these factors. There are features available for users to customise their timetables, such as allocating break times for eating and study sessions, and colour coding to quickly differentiate units, enhancing organisation. This app benefits users by improving time management, increasing social interactions, and allowing for better coordination among university students, resulting in a more productive day. The tools that were incorporated in this project, including Figma and UML diagrams for designing, a priority table for functions and features documentation, and a database software to store the information. In the following points, the Software Development Life Cycle framework of the project is further discussed.

2. Planning

2.1 Problem Statement

The organisation of one’s university timetable is of fundamental importance to a student’s studies, social life, and wellbeing in general. As such, the need for students to organise their timetable around the ‘other activities such as sport, leisure, study, work and rest’ (*6 Tips for Building Your Timetable – Charles Sturt University*, 2021) and in order to avoid issues such as ‘big breaks’ or conversely, ‘cramm[ing] all subjects into one or two days’ (Mortell, 2022) is clearly significant. A potential solution to this problem is a platform that provides users with an interactive interface to help automatically design their university timetables taking into account the user’s desired break periods and aligning break periods where possible with those of friends who also use the application.

2.2 Gantt Chart

	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Names
1		**Phase 1: Planning**	**7 days?**	**Mon 3/4/24**	**Tue 3/12/24**		
2		Problem Statement	3 days	Mon 3/4/24	Wed 3/6/24		
3		Objectives Establishment	4 days	Thu 3/7/24	Tue 3/12/24	2	
4		**Phase 2: Analysis**	**11 days?**	**Thu 3/7/24**	**Thu 3/21/24**		
5		Requirements Analysis	3 days	Thu 3/7/24	Mon 3/11/24		
6		Budget Estimation	4 days	Tue 3/12/24	Fri 3/15/24	5	
7		Case Table (User's Perspective)	4 days	Mon 3/18/24	Thu 3/21/24	6	
8		**Phase 3: Designing**	**6 days**	**Tue 3/12/24**	**Tue 3/19/24**		
9		UML Diagrams	2 days	Tue 3/12/24	Wed 3/13/24		
10		Figma Design Collaboration	4 days	Thu 3/14/24	Tue 3/19/24	9	
11		**Phase 4: Implementation**	**6 days**	**Wed 3/20/24**	**Wed 3/27/24**		
12		Authentication System (SEC-	2 days	Wed 3/20/24	Thu 3/21/24		
13		Timetable Functionalities (TI	2 days	Fri 3/22/24	Mon 3/25/24	12	
14		Navigation Features (NAV-01	2 days	Tue 3/26/24	Wed 3/27/24	13	
15		**Refinement and Optimizatic**	**4 days**	**Thu 3/28/24**	**Tue 4/2/24**	**14**	
16		Profile and Customization	4 days	Thu 3/28/24	Tue 4/2/24		
17		**Documentation**	**3 days**	**Wed 4/3/24**	**Fri 4/5/24**	**15**	
18		Jira (Burnup & Burndown)	3 days	Wed 4/3/24	Fri 4/5/24		

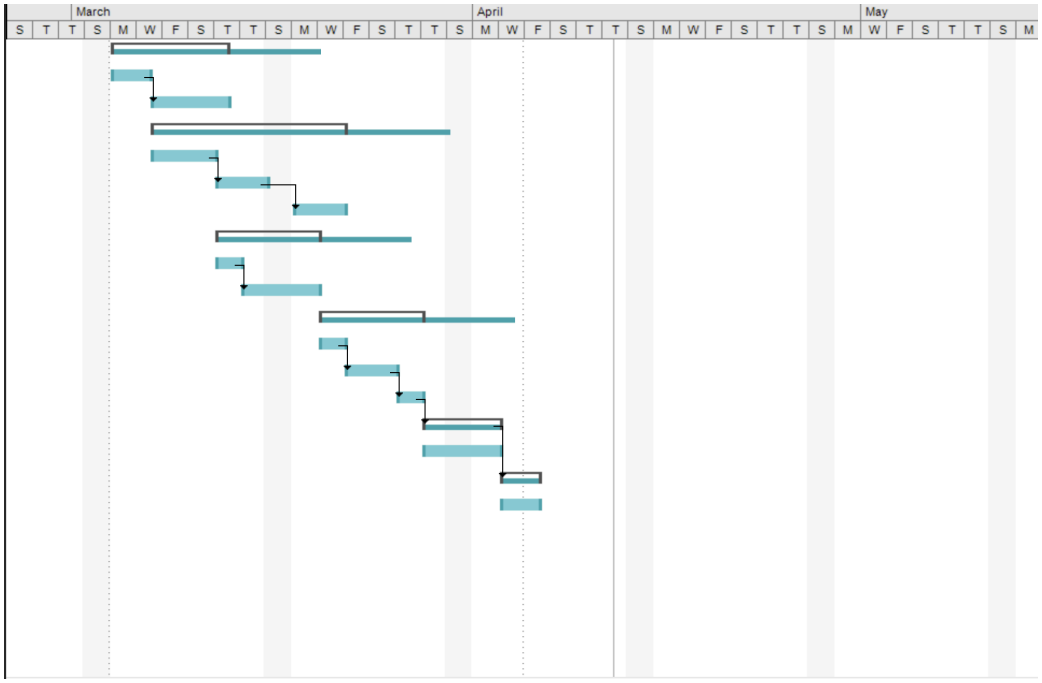


Figure 2.1

Figure 2.1 shows the Gantt chart outlining the development framework of this application. Agile practices were considered in designing this plan.

3. Analysis

3.1 Use Case Table

Requirement ID	Area	Details	Priority
SEC-01	Authentication	Users can create an account by providing their email address and creating a password	High
SEC-02	Authentication	Returning users can log in using their email address and password. If successful, users gain access to their account and the app features	High
SEC-03	Authentication	Users can select the logout button to log out.	High
SEC-04	Authentication	Users can select the delete account button to delete their account.	Medium
SEC-05	Authentication	Users can request an email to reset their password if they forget it.	High
SEC-06	Authentication	Users can change their password.	High
NAV-01	Navigation	After logging in, users are directed to the home page to access the app features	High
NAV-02	Navigation	Users are redirected to the Find Friends page after unit entry is submitted.	Medium
NAV-03	Navigation	Users are directed to the Your Units page from the Home page.	High
NAV-04	Navigation	Users are directed to the Find Friends page from the Home page.	High
NAV-05	Navigation	Users are directed to the Friends List page from the Home page.	High
NAV-06	Navigation	Users are directed to the Your Timetable page from the Home page.	High

NAV-07	Navigation	Users are directed to the Upload Timetable page from the Home page.	High
NAV-08	Navigation	Users are directed to the Share page from the Home page.	High
NAV-09	Navigation	Users are directed to the Customise Timetable page from the Home page.	High
NAV-10	Navigation	Users are directed to the Settings page from the Home page.	High
TIM-01	Timetable	Users are prompted to input which units they are enrolled in which is then displayed to friends and used to determine the optimal timetable.	High
TIM-02	Timetable	Users are prompted to input a desired time, duration and location for a given unit of study.	High
TIM-03	Timetable	Users are prompted to upload an image of their timetable.	Low
TIM-04	Timetable	Users are prompted to input the times of their desired breaks.	High
TIM-05	Timetable	Users are prompted to input their preferred times to be spent in class.	High
TIM-06	Timetable	Users can alter their timetable information.	High
FRE-01	Friends	Users are prompted to enter friends' email addresses and usernames.	High
FRE-02	Friends	Users are prompted to either accept or reject friend requests.	High
FRE-03	Friends	Users are prompted to add friends suggested by the app.	Low
PRI-01	Privacy	Users are prompted to select what information regarding their timetable is visible to their friends.	High
PRO-01	Profile	Users can change their username	Medium

PRO-02	Profile	Users can upload/change their profile photo.	Medium
CUS-01	Customisation	Users can input colour codes for each unit of study to affect how they appear on their timetable.	Low

Table 3.1

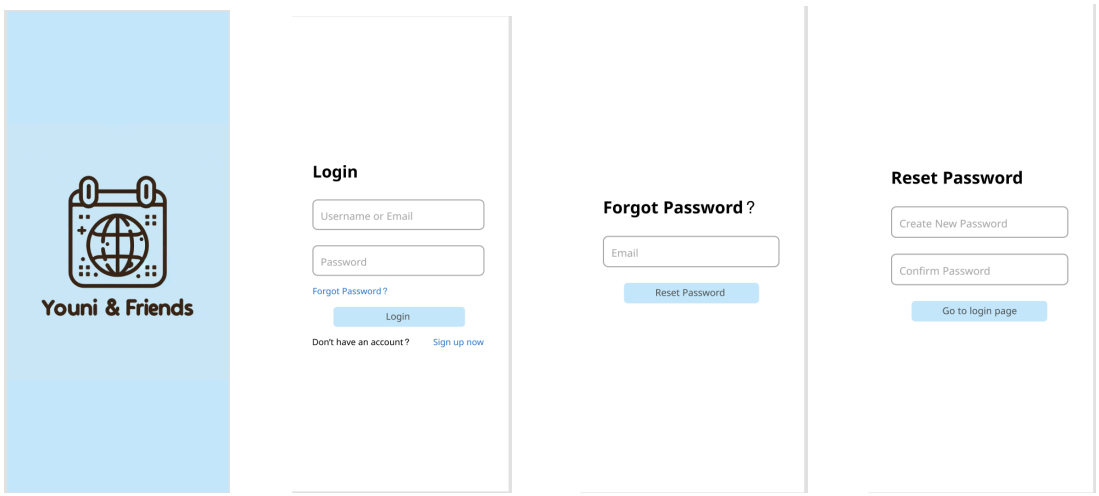
3.2 Requirement Analysis

3.2.1 Functional requirement

“Youni & Friends” application implements a different number of functions to ensure that the system works as intended. The functions’ specifications are as below;

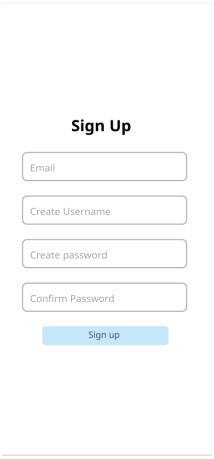
1) User authentication :

- The application displays a login page where after users fill in their details in the boxes provided, a log-in button takes them into their account and timetable.
- The app must offer a way for users to create a new password if they have forgotten their current one by directing them to a new page where they can insert their email.



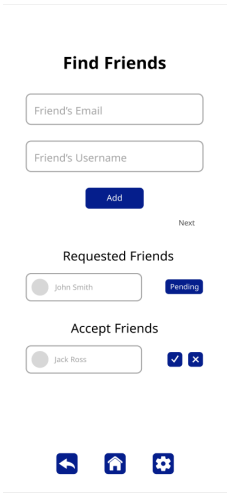
2) User registration :

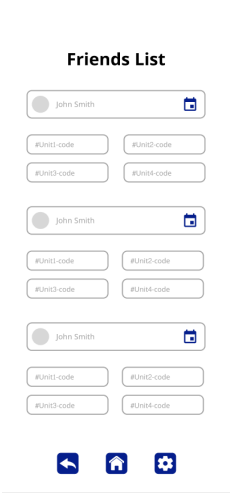
- New users must be greeted with a sign-up page that asks for information to create their personalised account.



3) Adding friends :

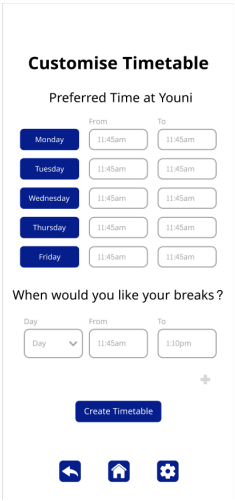
- The application presents an add friends feature to find people to compare timetables to by searching for their usernames and email.
- This function can accept or deny others who have requested to be your friend by clicking the tick [✓] and cross [X] button respectively.
- The accepted friends will be featured on the “Friends List’ page.





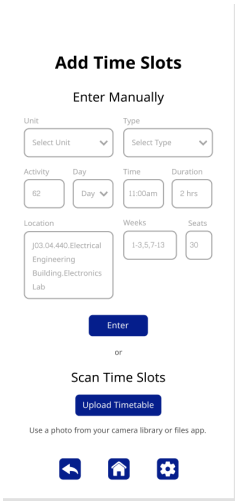
4) Customise timetable :

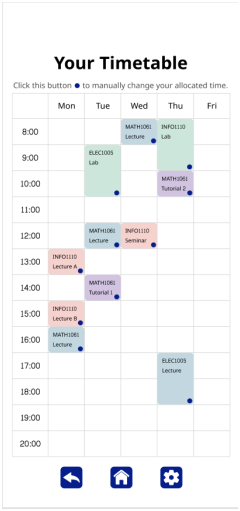
- This page will allow users to enter a day and periods of which they would be busy at university and their preferred break times during the weekdays when they don't have any classes. This feature is to ensure that users can fully optimise their university's timetable while allocating break time for their personal life.
- Users can add as many custom break times by clicking the 'plus' button.



5) Timetable input :

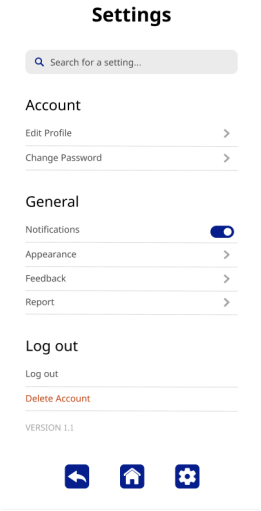
- The application displays a page called “Add Time Slots” that allows user to enter their units of study either manually or by uploading a picture of their timetable. If the user chooses to enter manually, the user would have to enter all the required fields and press the enter button. On the other hand, if the user chooses to upload a picture of their timetable, the user would have to press the upload timetable button.
- The application will then direct the user to a page that shows their timetable that has been crafted by the application’s algorithm. On the allocated timetable page, the user has the option to ‘submit a request’ to change their allocated time for each unit/class if the user is unsatisfied with the outcome.
- The application will also display the user’s friends’ timetables for comparison purposes.





6) Settings :

- The setting feature in this application holds multiple functions. User's profile creation, allow notifications option, space to enter feedback and report issues, a logging out button, and a delete account option.
- Users must be able to press buttons that will allow them to upload or change a profile picture and type a username. In addition to these buttons, an icon of the current profile picture and username must be displayed for users to see.
- Users should have the option to enable or disable notifications for the app by toggling the on/off button.
- Users have the option to change the appearance of their study units such as colour-coding them.
- Users should be able to provide feedback and report issues with the app. This feedback can help improve the app and ensure its security by identifying and removing threatful users.
- Users should be able to log out of their accounts and delete their accounts if they choose to do so.



3.2.2 Non-functional requirement

“Youni & Friends” has a user-friendly User Interface for easy navigation. The security aspect, performance, and limitations of the functions within the app are discussed below;

1) User authentication :

- For security purposes, the application must implement measures to prevent brute-force attempts on the login page, such as limiting the number of login attempts.
- The password reset process must be secure, with email verification to confirm the user's identity.
- The login and resetting password processes should be quick and prompt with login times not exceeding 2 seconds and users receiving the password reset email promptly no later than 90 seconds.
- Users should receive confirmation emails for password resets consistently and promptly no more than 90 seconds.

2) User registration :

- The sign-up page should load quickly, even under high traffic to ensure users can complete registration within a few minutes.
- Users will be asked for a strong password to create an account for extra security.

3) Adding friends :

- Finding friends by their emails and usernames (if they are registered) should be fast and responsive, with search results displayed quickly.
- The feature should be able to handle a large number of search queries and friend requests without significant delays of more than 60 seconds.
- If someone sends the user a request, the user should have the option to deny the request if unauthorised users send a request.
- When getting the emails, this feature should be compatible with verified emails.

4) Customise timetable :

- The customising feature should be easy to understand with simple and meaningful UI with clear instructions.
- When the user presses, the ‘create timetable’ button, the algorithm will analyse the period that the user would like for their free time at university and the period when the user is not free or busy with classes at university.
- If the user wants to add more free time, the ‘plus’ button will create a copy of the text box and add the input to the software database to be analysed.
- The running time for generating the timetable should be at most linear time.
- After generating the timetable, the user will be directed to a page that displays the generated timetable.

5) Timetable input :

- If users choose to enter the timetable’s details manually, once the enter button is pressed, the program will store the information in a database.
- If users choose to upload their timetable instead of entering it manually, once the upload timetable button is pressed, the program will scan the picture and identify the required information, and store it in a database.
- Users will be prompted a request to allow access to their devices’ camera app for this function. For simplicity, the algorithm will only recognise a certain format of pictures (such as well-defined quality screenshots of the timetable).
- The app's algorithm for crafting the timetable should be efficient, analysing the information and producing the timetable within a reasonable time frame of no more than 120 seconds, preferably in linear time.
- If the user wants to change the allocated time, they can click on a button and insert their desired changes. If this flag is set to true, the algorithm will check if the changes are possible. If not, it will display either an error message or will produce the same table that remains unchanged.
- The display of the timetables should be compatible with various resolutions.

6) Settings :

- User profile data should be stored securely with encryption and data protection practices.
- The feedback and reporting functions should be efficient, allowing users to submit feedback and reports without delays. For the feedback, within the app's program, we will set an algorithm to check if there is any input in the feedback heading. If there is, it will be sent to the developer's email to notify them.
- For the report feature, users have the option to report any user that violates the guidelines. Users will have to input the username and the reason and similarly to the feedback feature, we will have a check for report method in our algorithm and if there is any, the developers will be notified of it.
- Before logging out, the app will save any changes if made, by the user to ensure all the data have been saved. The user's information will be deleted to ensure no breach of privacy and enhance security.
- Deleting an account should require user authentication to prevent unauthorised deletion.
- Deleted account data should be securely stored or completely removed and inaccessible to unauthorised users.

3.3 Budget Estimation

[Hardware Resources]
Physical components essential for the project are included in this category. For example, servers and networking equipment that are pivotal in supporting software development and its subsequent operation. For a start-up utilising cloud-based services, the monthly cost is projected to begin at AUD 100-200. However, depending on the project requirements, this cost is subject to escalation.

[Development]
This includes the necessary allocation of space and memory, as well as the graphics interface essential for software creation. For a project of this simplicity, we could engage a small development firm, with the financial outlay ranging between AUD 5,000 - 20,000.

[Human Resources]
This encompasses the personnel pivotal to the execution and management of our project. This includes their technical prowess, specialised knowledge, and collaborative efforts. While typically included within the overall development costs, if the need arises to hire additional specialists, the cost could range from AUD 50 to AUD 150.

[Marketing]
This budget includes promotions and advertisements. For instance, a small scale promotional activity such as a targeted social media campaign could commence from a few hundred AUD, while more large scale campaigns may require a budget of tens of thousands of AUD. However, in the case of a project with a small scale like the one we are currently engaged in, the most basic promotional activities include platforms such as Facebook and Instagram. Those could start at around AUD 300.

[Maintenance & Support]
These costs are dedicated to bug fixes, updates, and user support, generally representing 10-20% of the annual development expenditure. This could amount to an annual figure of at least AUD 500 to AUD 4000.

***However, this cost may increase depending on the project's requirements.**

Cost	Description	Budget Estimation (Minimum)
Hardware Resources	Physical components required for the project, including servers, networking equipment to support software development and operation.	AUD 100
Development	Comprehensive process of software creation, including space, and memory to offset the time complexity, software development, and graphics interface.	AUD 5000
Human Resources	The personnel involved in the execution and management of a project encompassing their skills, expertise, and collaborative efforts.	AUD 5000
Marketing	Promotions and Advertisements	AUD 300
Maintenance & Support	Bug fixes, updates, and user support.	AUD 500

Table 3.2

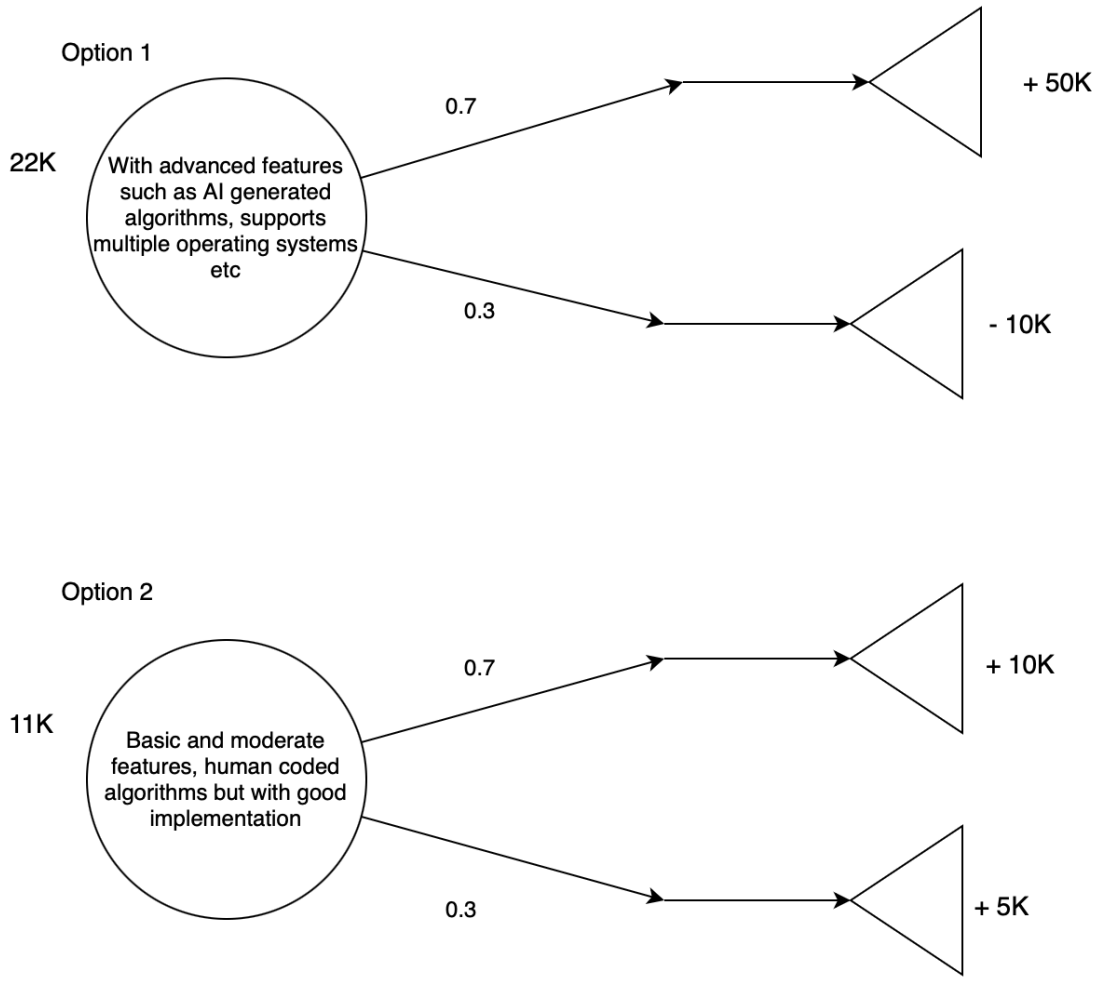


Figure 3.1

Figure 3.1 shows two possible decision outcomes for the application roughly calculated from the minimum budget estimation. Option 1 comes with a higher investment value since it requires advanced features while Option 2 has the investment value based on the estimation table. In Table 3.1, the estimated starting cost for the development is around AUD 10K, taking this as the starting investment, we then approximate the return on investment of the project depending on various factors.

4. Designing

4.1 UML Diagrams

(1) Adding Friends feature

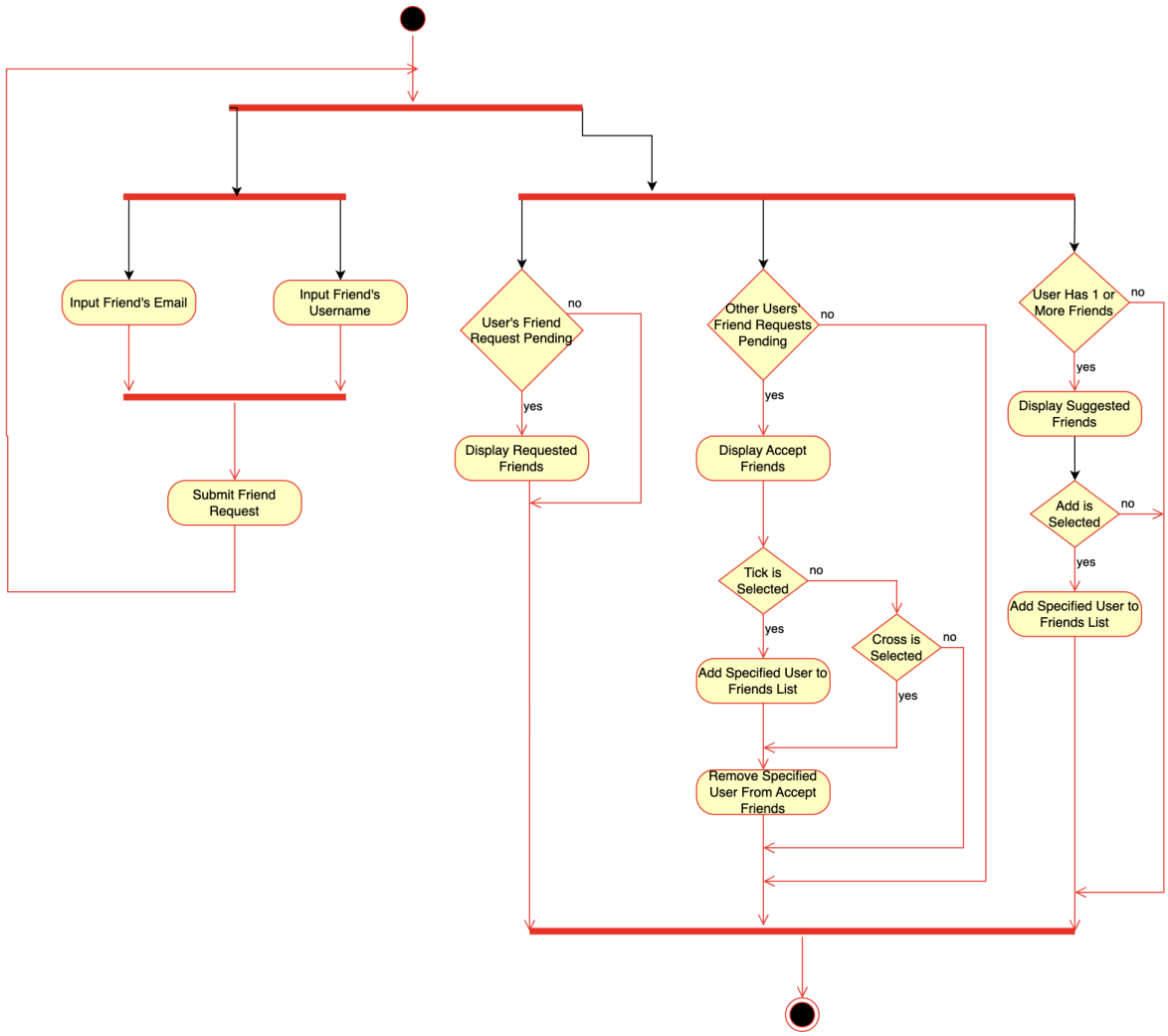


Figure 4.1

(2) Customise Timetable feature

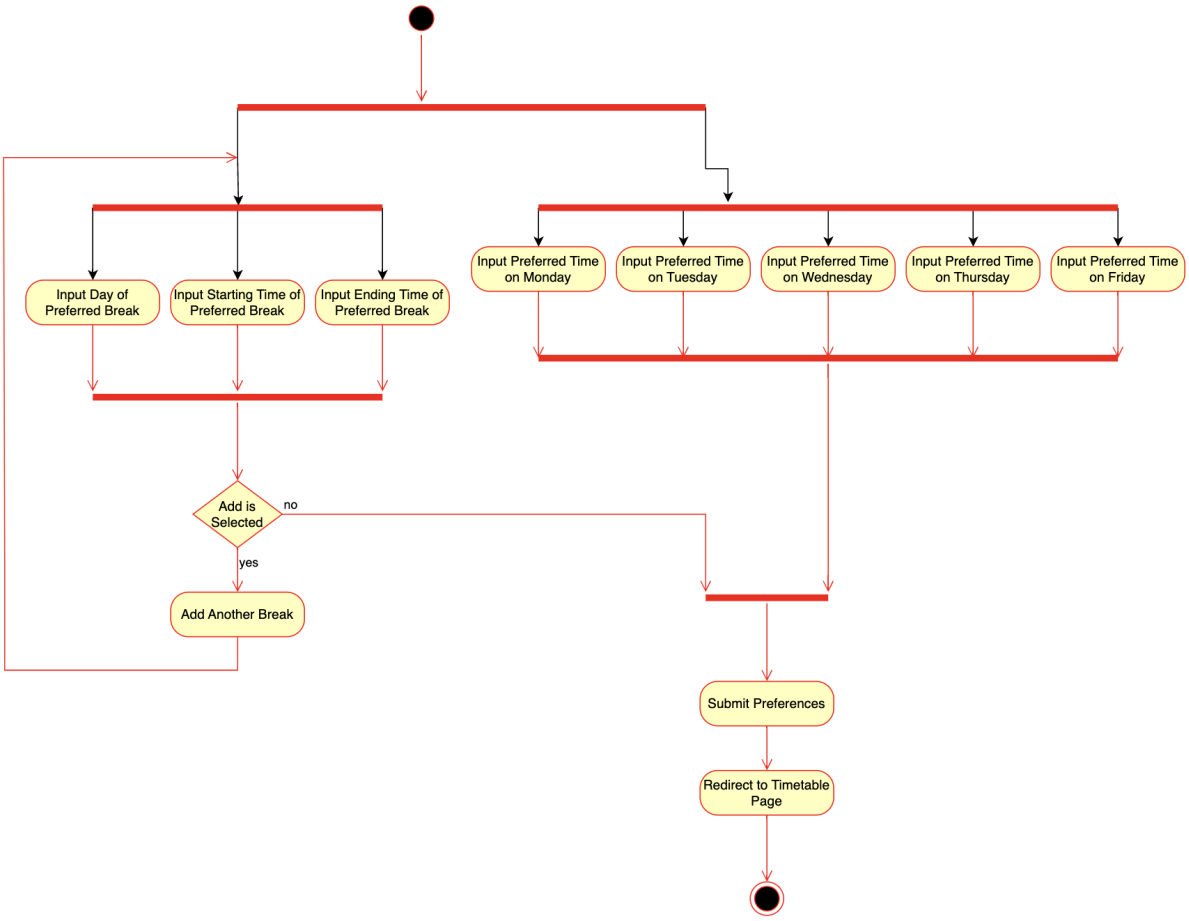


Figure 4.2

5. Agile Model

5.1 Jira Report

[Sprint 1]

The parent issue in **TM Sprint 1** is Designing the UI and the child issue is
1) Implementing the login and sign-up features.

The sprint timeline for **TM Sprint 1** was changed to better accommodate the team. Story points for certain issues were updated appropriately to their priorities. Initially, several issues were added in this sprint but they were removed and added to a different sprint to ensure the smooth flow of the framework. **TM Sprint 1** has one issue and it was completed earlier than expected.

Burnup Report:

Figure 5.1

Burndown Chart:

Figure 5.2

[Sprint 2]

The parent issues in **TM Sprint 2** are
1) The timetable feature for optimal scheduling and its child issues;
a. Export the data from the user's timetable and store it inside a CSV file in admin systems
b. Implement the algorithm to analyse multiple schedules and find optimal timetables

2) Finding friend feature and its child issue;
a. Prompt users to enter their friend's emails

3) Craft the timetable and its child issue;
a. Get the user to input their timetable by uploading an image or enter it manually

The extra time from completing the first sprint allowed us to focus more on **TM Sprint 2**. Three issues were created in **TM Sprint 2.** All of the issues were completed timely, according to the estimation that had been set.

Burnup Report:

Figure 5.3

Burndown Chart:

Figure 5.4

[Sprint 3]

The parent issues in **TM Sprint 3** are
1) Getting the timetables of users and friends and its child issue;
a. Create a feature that enables users to see what their friends have shared and what their desired timetable looks like to their friends

2) Report or feedback feature to the developers to solve any issues or bugs and its child issue;
a. Create a report and feedback function that prompts user to the developer's contacts such as email

Two issues were created in **TM Sprint 3**. This sprint was completed ahead of the estimated time.

Burnup Report:

Figure 5.5

Burndown Chart

Figure 5.6

5.2 Meeting Log

Date	Progress	Plans for Next Meeting
5/3/24	Experimented with using Microsoft Project to create Gantt charts and tailor the Software Development Life Cycle to a specific assignment. Currently in the process of discussing ideas potential project.	Confirm an idea for a software project. Decide a name for the project. Start SDLC.
12/3/24	Began the design process for the project using Figma to create a UI. The current working project name is “YOUni & Friends” and will fulfill the purpose of determining the optimal timetable for a group of people to have breaks at the same time.	Design a logo and a format for entering timetable details and create a Gantt chart for the project. Assign a PIC to each subtask.
19/3/24	Assigned one of the following roles to each person and began work on each subtask: - Design UML diagram - Design Gantt chart - Design figma prototype	Continue working on these subtasks.
26/3/24	Focused on designing the Figma prototype and designing a Gantt chart with a particular emphasis on setting up the various pages of the prototype and the implementation of buttons and user input.	Complete prototype.
4/4/24	Completed the Figma prototype. Updated the Jira report, Gantt chart and the UML activity diagrams.	Document the budget estimation of the project and write a report.
9/4/24	Completed UML diagrams, Gantt chart and Jira report. Currently working on budget estimation.	Complete budget estimation and finish the application report.

Table 5.1

6. Conclusion

"Youni & Friends" creates the ideal timetable that focuses on the balance between social, study, and personal aspects. We hope to make the students of Sydney University feel a sense of motivation and stress-relief as the app aims to help with organisation, time management, and improving overall work ethic. However, as a newly-made app, we have noted some limitations. This includes runtime implications due to extensive coding for the app's performance, users can only add a maximum of 3 friends, and the potential for glitches. In order to maintain a growing user base, the app will have frequent updates to ensure bugs are fixed, and improvements to the app are made so users feel a desire to continue using the app.

We believe "Youni & Friends" to be a significant addition to university life, as it strengthens a users' study life by improving efficiency and productivity, and social life through the friends feature. Thank you on behalf of our team, Gemma Lee, Kamilia Mohd Nafis, Aneesh Nagaratnam, Rajat Pandey, Hannah Tan, and Callum Webster.

7. References

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