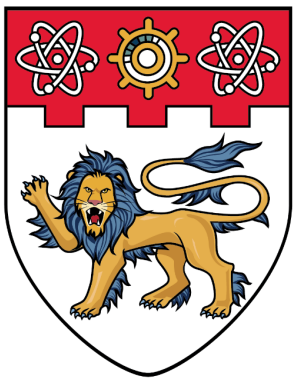
IM3080 Design and Innovation Project



NANYANG TECHNOLOGICAL UNIVERSITY
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DIP Final Group Report

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AY 2021-2022 Semester 2

IM3080 Design and Innovation Project

(AY 2021/22 Semester 2)

Project Report

Title: Focus - A one-stage time management app

Github: https://github.com/DIP-Group1/DIP-Project

Submitted by: Group 1

Supervisor: A/P Erry Gunawan, A/P Chua Hock Chuan

Table of Contents

1. Background and Motivation

Our app takes inspiration from the productivity aspects of the uWave app (i.e. Calendar, Timetable). The previous version of the app targets university students through specially tailored timetable functions and real-time information on campus bus locations (Figure 1.0). Since then, it has incorporated social functions like blog posts, reaction buttons, comment and chat functions (Figure 2.0). While these new features of the current uWave app have diversified its functionality, it has also undermined the quality of user experience of its productivity features [1].

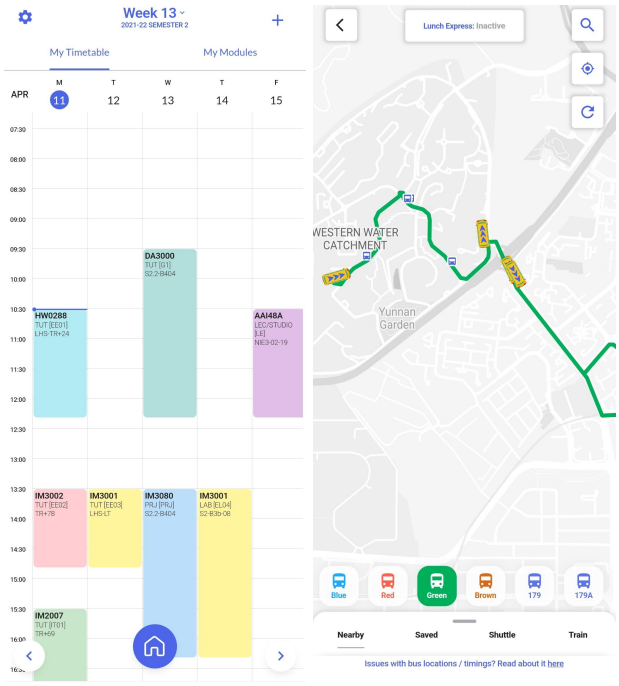

Figure 1.0: *Screenshot of Timetable and Campus Bus Location Functions*

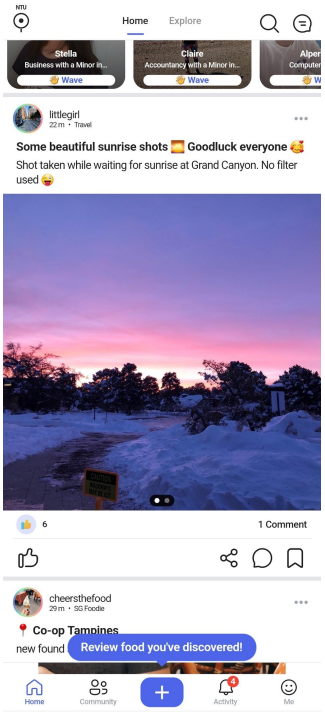

Figure 2.0: *Screenshot of Social Media Functions of the Current uWave App*

As such, our group believes productivity apps should have minimal focus on social functions to preserve a coherent user experience for productivity. Instead of completely doing away with the social aspects of the uWave app, we acknowledge that it can be used to enhance productivity aspects. This can be done by encouraging productivity by incorporating competitive elements among users' productivity levels [2]. Additionally, the original uWave app does not allow users to keep track of essential, non-academic events and tasks, which are an important aspect to productivity applications [3]. Therefore, we wish to build a productivity mobile application with better productivity functions and a smaller social aspect, for tertiary students and young working adults.

2. Aims and Objectives

The aim of our project is to build a productivity mobile application similar to the uWave app, with improved productivity features and a smaller social aspect, for tertiary students and young working adults. To achieve this, we focus on tackling the following objectives:

- Improve the user interface and experience (UI/UX) of the current uWave app;
- Incorporate multiplayer interaction;
- Incorporate progress rankings;
- Incorporate a motivational section within the app.

3. Review of Literature/Technology

3.1 ReactNative

React Native is an open-sourced UI software framework library using the JavaScript language that is mainly used to develop visual applications for platforms including Android and iOS [4]. It is component-based thus enabling the building of individual components and combining multiple components on a screen allowing for high levels of flexibility on individual components while being able to achieve complex UIs.

Additionally, working with React Native also allows the app to look and behave identically across different platforms like iOS and Android allowing for development for both platforms simultaneously.

Changes to the code will also be reflected on the app immediately after saving the file allowing for quick debugging and feedback on the look and feel of the app as well as quick feedback on whether the change to the code has any errors.

3.2 Firebase

Google Firebase is a Google-backed application development software that enables developers to develop iOS, Android and Web apps [5].

The Firebase Realtime Database is a cloud-hosted NoSQL database that enables data to be stored and synced between users in real-time. The data is synced across all clients in real-time and is still available when an app goes offline.

3.3 Notion

Over the course of our project, we have used Notion as the platform to store all the essential data – links to our shared Google Drive, GitHub, meeting details, to-dos, and to keep track of our progress.

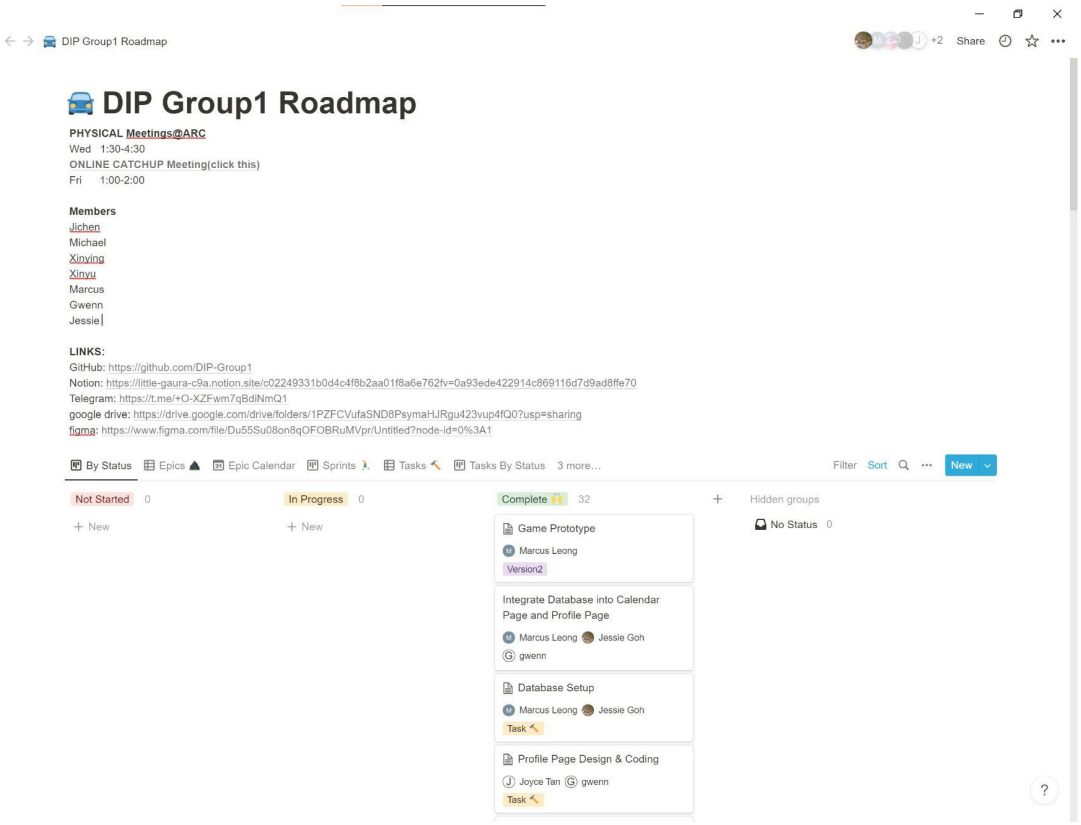

Figure 3.0: *Screenshot of Notion Roadmap for Project Planning*

3.4 Microsoft Teams

We have made use of Microsoft Teams for our update meetings that are held online every Friday afternoons.

Using Microsoft Teams, we could easily add a recurring meeting every Friday and have it synced into our calendars. Other than the video call function, we also used it as a chatting platform to discuss our ideas and share information.

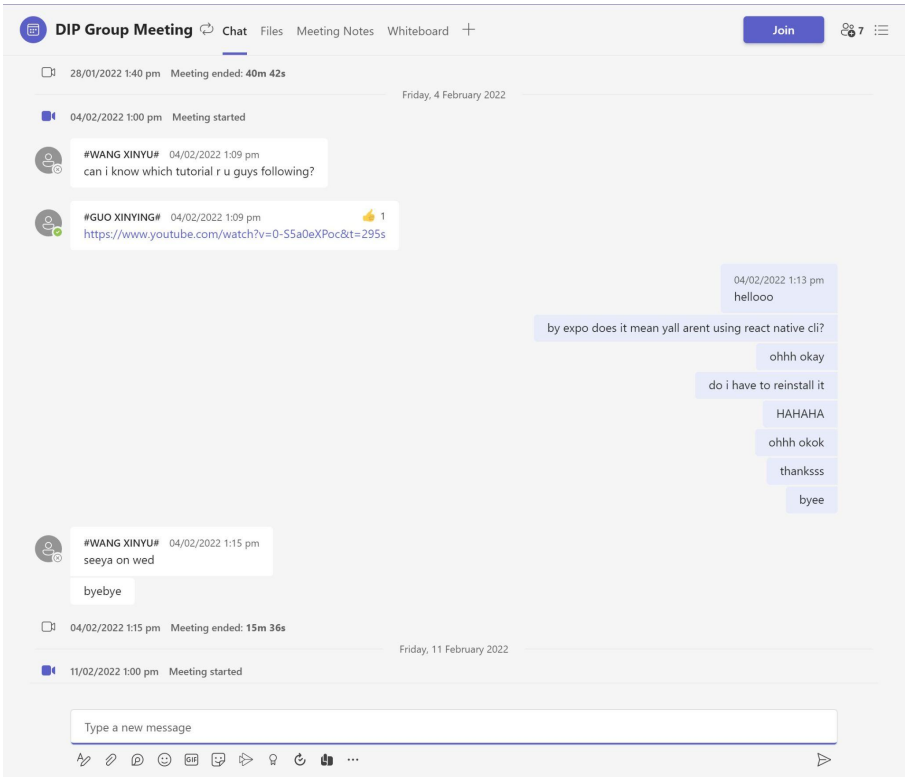

Figure 4.0: *Screenshot of Weekly Microsoft Teams Discussion*

4. Design and Implementation

4.1 Design Consideration

To create a more seamless user experience, we designed the timetable aspect to be highly customisable, capable of including non-academic activities for a more seamless user experience by not requiring separate application for work and leisure (Figure 5.0). We have also made user interfaces improvements to focus on productivity, by streamlining the application to focus on productivity by showing the main productivity feature – calendar – in the first screen (Figure 5.0).

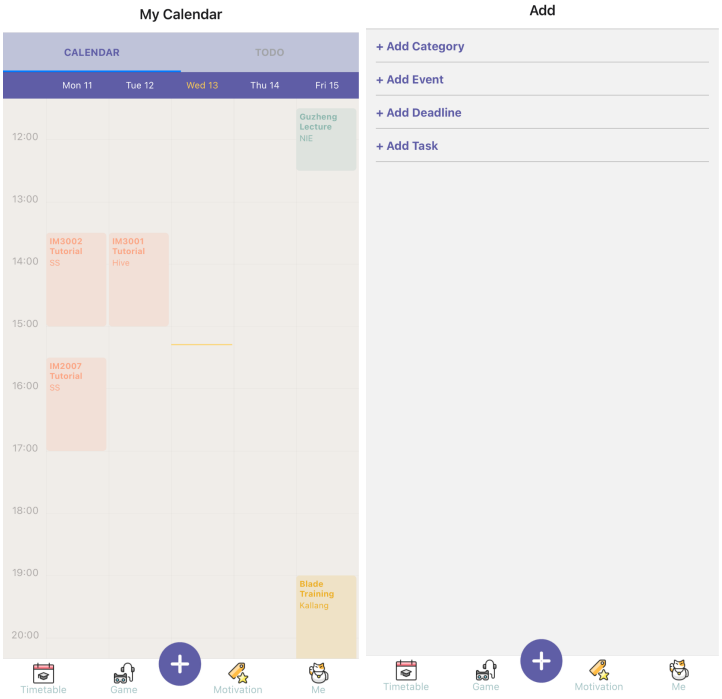

Figure 5.0: *Screenshots of Timetable Home Screen (left) and Add Component Screen (right)*

4.1.1 Minimalistic UI Design

Minimalism is a style in art and design that makes use of only a small range of colours and very simple shapes and forms [6].

We chose to use a minimalistic UI design as not only is it easily adaptable to different mobile screen sizes, it also requires fewer resources and thus improves the loading time of our app as compared to an app with more complex designs.

In addition, a minimalistic style would be less distracting to the user. This is especially important in our app which aims to boost productivity. By eliminating unnecessary elements and keeping the navigation between pages simple and intuitive, we are able to keep the focus on allowing the user to plan their tasks and track their goals easily.

4.1.2 Muted Colour Palette

Figure 6.0: Colour Palette of Next Time

Muted colours are colours with low saturation. They are colours that have been dulled and subdued. These colours have a more calming and soothing effect and are not as jarring to the user's eyes [7].

Focus is an application where the users will be viewing various data visualisation diagrams such as the timetable, and their total number of completed tasks through the week.

Therefore, using such a colour palette (Figure 6.0) is beneficial and appropriate for the users to take their time and evaluate their progress and upcoming tasks on hand. Moreover, these colours would be able to provide a calming effect on stressed users, rather than causing them to feel even more anxious about their uncompleted tasks when using the application.

4.2 Choice of Components

4.2.1 Motivation Section

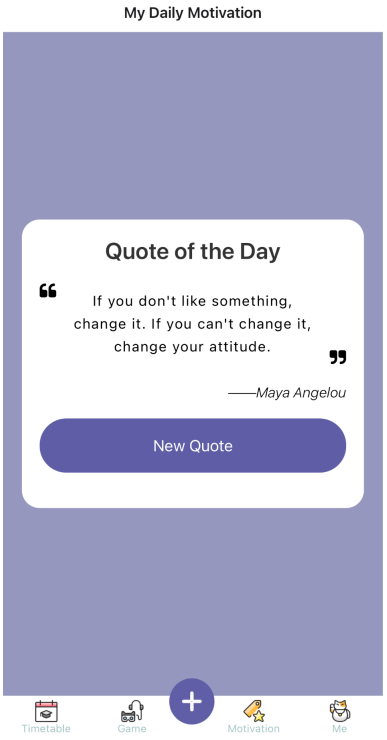

Figure 7.0: *Screenshot of My Daily Motivation Tab Screen*

Motivational quotes can provide inspiration and enable focus to be regained [8]. Therefore, we have incorporated a motivational tab, 'My Daily Motivation' (Figure 7.0), which displays motivation quotes from a pool of quotes in the database. This is to encourage the user to be productive and

achieve the aim of our project, which is to enhance the productivity aspect of our application.

The user also has the ability to refresh to see a different quote. This maintains the incentive to access the motivation section, and hence maintains its relevance.

4.2.2 Gamification

Gamification has been proven to improve productivity. With goals that are measurable, realistic and achievable, games make it clear what the goal is and how to proceed to the next level. In addition, feedback is usually given to the user for their action [9].

This makes it appealing to the user as they are able to make clear choices and actions and be rewarded for it.

A small degree of social comparison such as a leader board also tend to motivate users to try to achieve better results and progress faster.

Therefore, we chose to gamify our progress tracker to incorporate and interactive social component in the game, to encourage users to complete their tasks. This game component enables the user to view how many tasks their friends have completed in comparison themselves and thus initiate friendly competition. Users would also be rewarded for the tasks they have completed.

4.2.3 Choice of Game Design

Figure 8.0: *Game Avatars*

Our game component is designed with a pixel art style to keep up with the simple and minimalistic theme (Figure 8.0). The game component serves as data visualisation for users to track their progress with their friends, as well as a gamification of goal tracking to entice users to increase their productivity.

Over the past decade, pixel art has once again gained popularity due to its usage in indie games and its nostalgic appeal [10]. With our target audience of tertiary students and working adults, this form of digital art can thus appeal to the masses and encourage them to use Next Time.

4.3 Final Design

In Focus, the main page the user is directed to upon signing in is the Timetable page (Figure 9.0). This page displays the different events the user has in that week, both academic and non-academic in containers that are colour-coded based on their category.

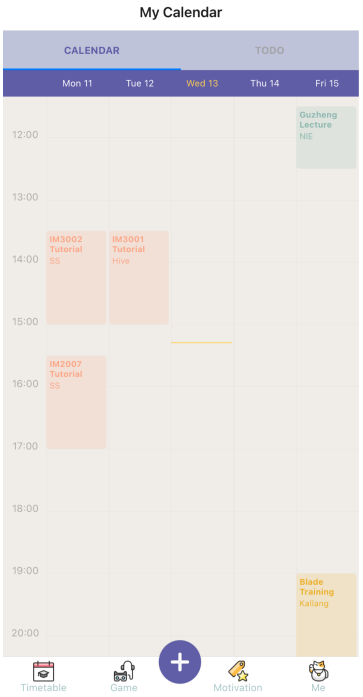

Figure 9.0: *Timetable Home Screen*

On the bottom is a navigation bar (Figure 9.0) that enables the users to easily navigate to the main components of the app (Timetable, Game, adding tasks, Motivation and Profile page).

Focus also features an improved productivity aspect, by allowing the user to add and keep track of non-academic tasks, events, deadlines and categories (Figure 10.0). These records can be viewed through the Timetable (Figure 9.0) above and Todo list Screens (Figure 11.0) below.

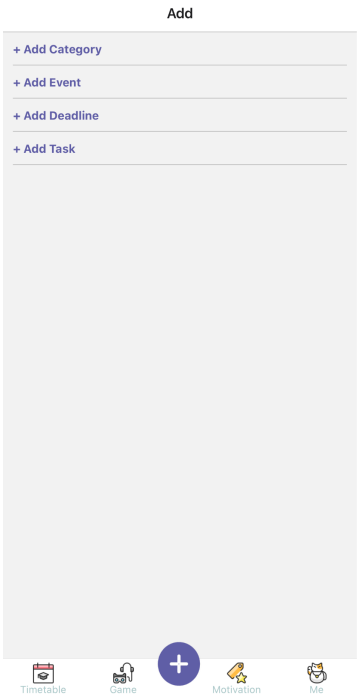

Figure 10.0: *Screenshot of Add Components screen*

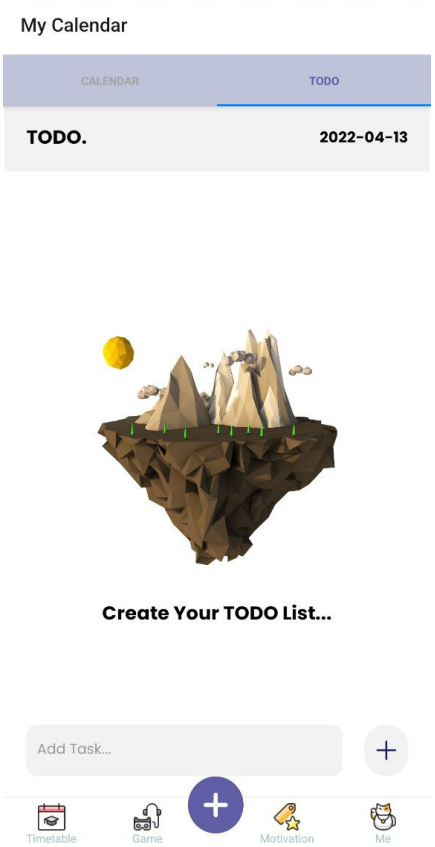

Figure 11.0: *Screenshot of Todo list Screen*

To further enhance productivity, we have incorporated a completed task tracker, which shows itself in the form of a chart in the profile screen (Figure 12.0). This chart displays a graph of the number of tasks completed daily each week. This will encourage users to continue focusing and completing tasks by giving a visualisation of their task completion progress.

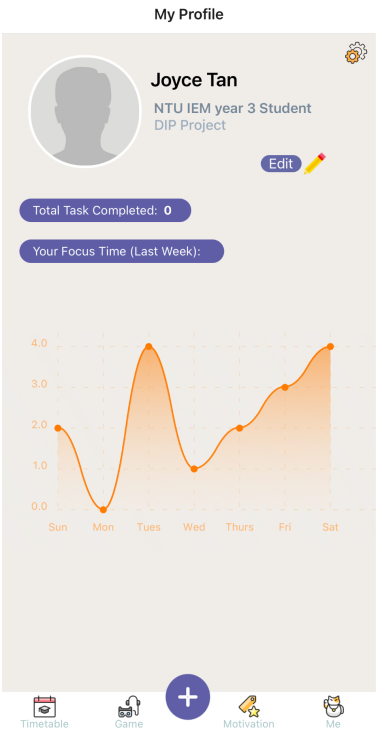

Figure 12.0: *Screenshot of Profile Screen*

Focus features a game component, whereby users can compete with other users in a multiplayer mode, by the number of tasks completed (Figure 13.0). By utilising friendly competition, this component encourages productivity and celebrates the achievement of task completion milestones with visual confetti effects.

Figure 13.0: *Screenshot of Multiplayer Game Component*

Additionally, Focus allows its users to save their information in an account, which will be saved into the online database, Firebase. Users are able to sign in and out (Figure 14.0), and customise their profile pictures and details (Figure 15.0).

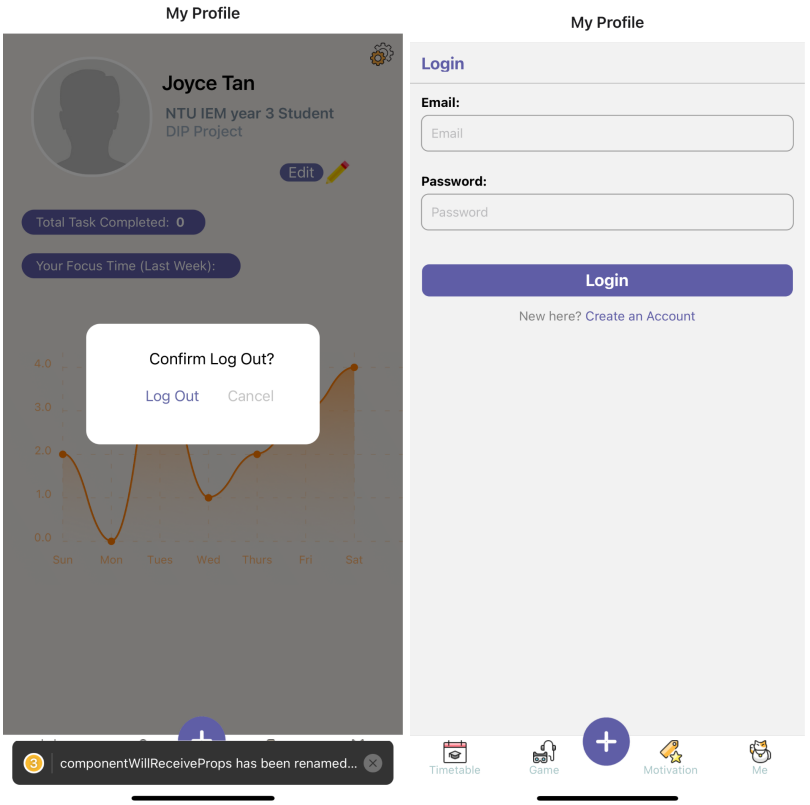

Figure 14.0: *Screenshot of Account Sign out (left) and Sign in (right) Functions*

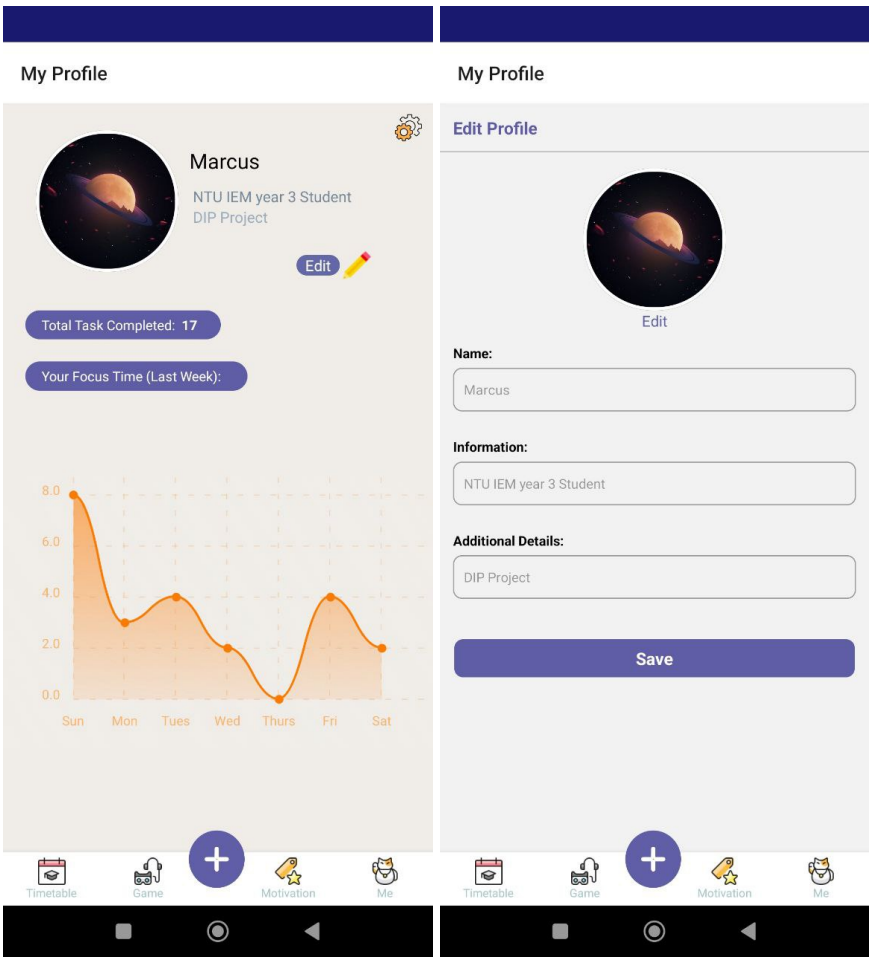

Figure 15.0: *Screenshot of Profile Customisation Functions*

Use-Case, Sequence Diagram can be found in the Appendix A Design Diagrams.

5. Conclusion and Recommendation

5.1 Conclusion

In conclusion, we have achieved the goal of making the timetable component the core of our app, taking students and full-time working adults as our target audience while adding side components which promotes friendly competition without distracting from the main aim of the app. We have also improved the UI/UX experience from the original uWave timetable which was our initial inspiration.

5.2 Recommendation for Future Works

Future works can be done on this project by optimizing the scalability of the app to be able to be used by more concurrent users. The current firebase configuration which requires no cost provides up to 50K reads and 50K writes every 24 hours. Since there is a hard cap for this number, scalability can be improved by purchasing a plan for higher limits according to the user base.

Another possible future implementation would be extending the route of the avatars by creating larger maps. With a larger map, avatars require more steps and will not reach the end point of the map as easily. This can be further improved by generating thematic maps for users to experience something new after completing every map. Another alternative is to make the map procedurally generated for infinite scaling on a single map.

6. References

[1] “Social media affecting workplace productivity: Report,” *Business Today*, 18-Oct-2016. [Online]. Available: https://www.businesstoday.in/latest/corporate/story/social-media-affecting-workplace-productivity-report-68556-2016-10-18. [Accessed: 18-Apr-2022].

[2] S. Georganas, M. Tonin, and M. Vlassopoulos, “Peer pressure and productivity: The role of observing and ...,” Jul-2013. [Online]. Available: https://ftp.iza.org/dp7523.pdf. [Accessed: 18-Apr-2022].

[3] H. Dhaliwal, 1K. Ahluwalia, D. K. Zada, D. Qin, R. Tanveer, J. Botros, and J. Xu, “An analysis of productivity app strengths: An environmental scan,” *Psyarxiv.com*, 24-Aug-2021. [Online]. Available: https://psyarxiv.com/cb9dn/. [Accessed: 18-Apr-2022].

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[5] L. Rosencrance, “What is Google Firebase? - definition from whatis.com,” *SearchMobileComputing*, 25-Apr-2019. [Online]. Available: https://www.techtarget.com/searchmobilecomputing/definition/Google-Firebase#:~:text=Google%20Firebase%20is%20a%20Google,creating%20marketing%20and%20product%20experiment. [Accessed: 18-Apr-2022].

[6] “Minimalism,” *Cambridge Dictionary*. [Online]. Available: https://dictionary.cambridge.org/dictionary/english/minimalism. [Accessed: 18-Apr-2022].

[7] Emily, “What are muted colors? - and when to use them,” *The Creative Folk*, 10-Mar-2022. [Online]. Available: https://www.thecreativefolk.com/what-are-muted-colors/. [Accessed: 18-Apr-2022].

[8] E. Smith, “Why motivational quotes are important for everyone,” *inspiredbyelle*. [Online]. Available: https://www.inspiredbyelle.com/blogs/elle-blog/why-motivational-quotes-are-important-for-everyone#:~:text=Motivational%20quotes%20provide%20us%20with,our%20normal%20motivation%20has%20lapsed. [Accessed: 18-Apr-2022].

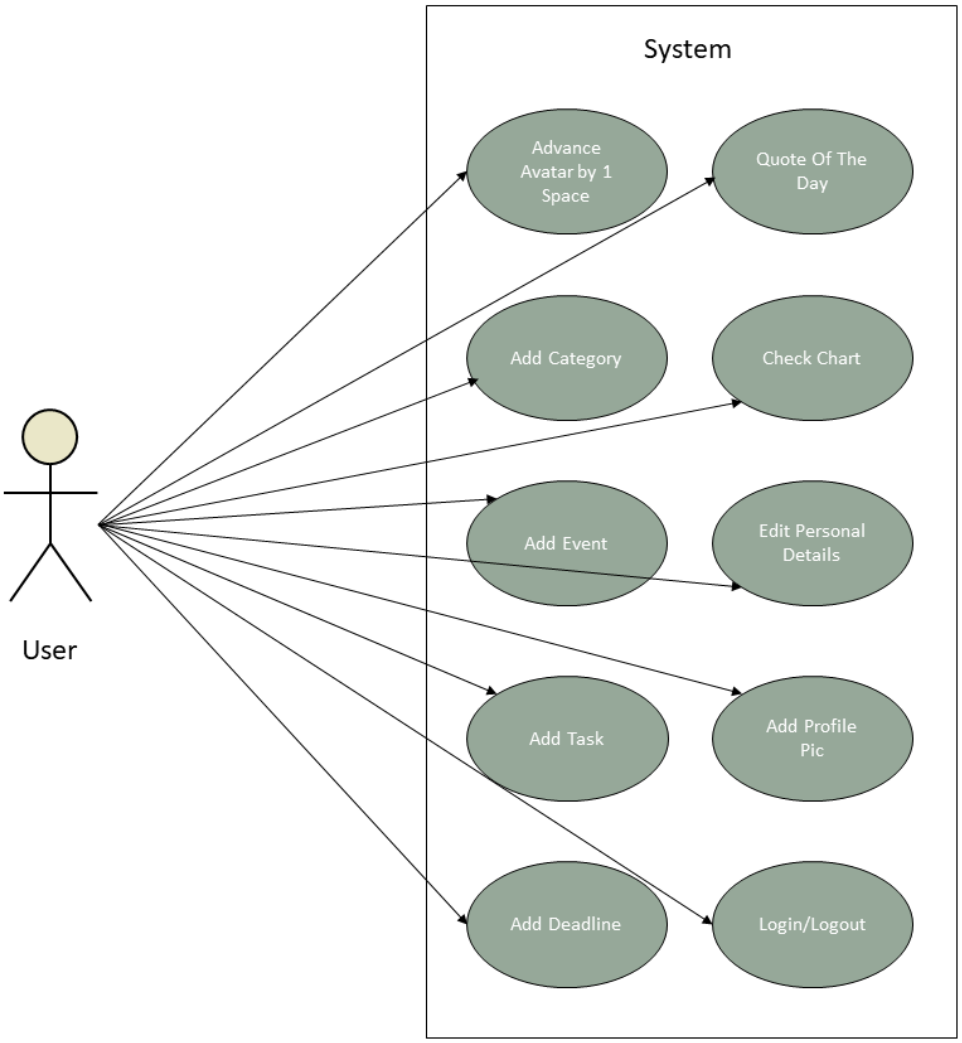
[9]E. N. Webb, “Gamification: When it works, when it doesn’t - Springer,” 2013. [Online]. Available: https://link.springer.com/content/pdf/10.1007/978-3-642-39241-2_67.pdf. [Accessed: 18-Apr-2022].

[10] S. Byford, “Pixel art games aren't retro, they're the future,” *The Verge*, 03-Jul-2014. [Online]. Available: https://www.theverge.com/2014/7/3/5865849/pixel-art-is-here-to-stay. [Accessed: 18-Apr-2022].

Appendix:

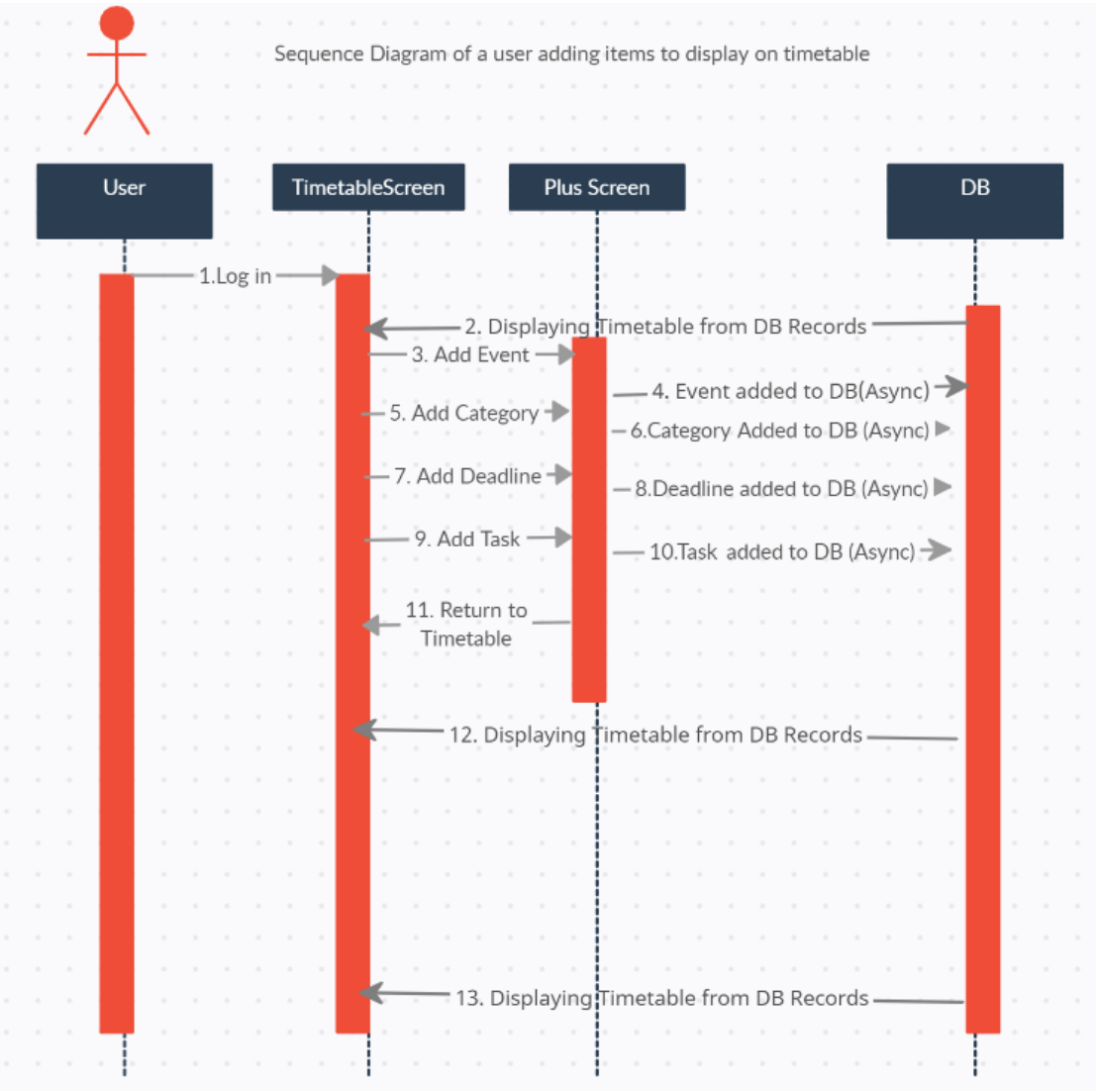
A. **Design Diagrams** (e.g., detailed circuit diagrams, software engineering diagrams)

a. Use-Case Diagram



Focus System Use-Case Diagram

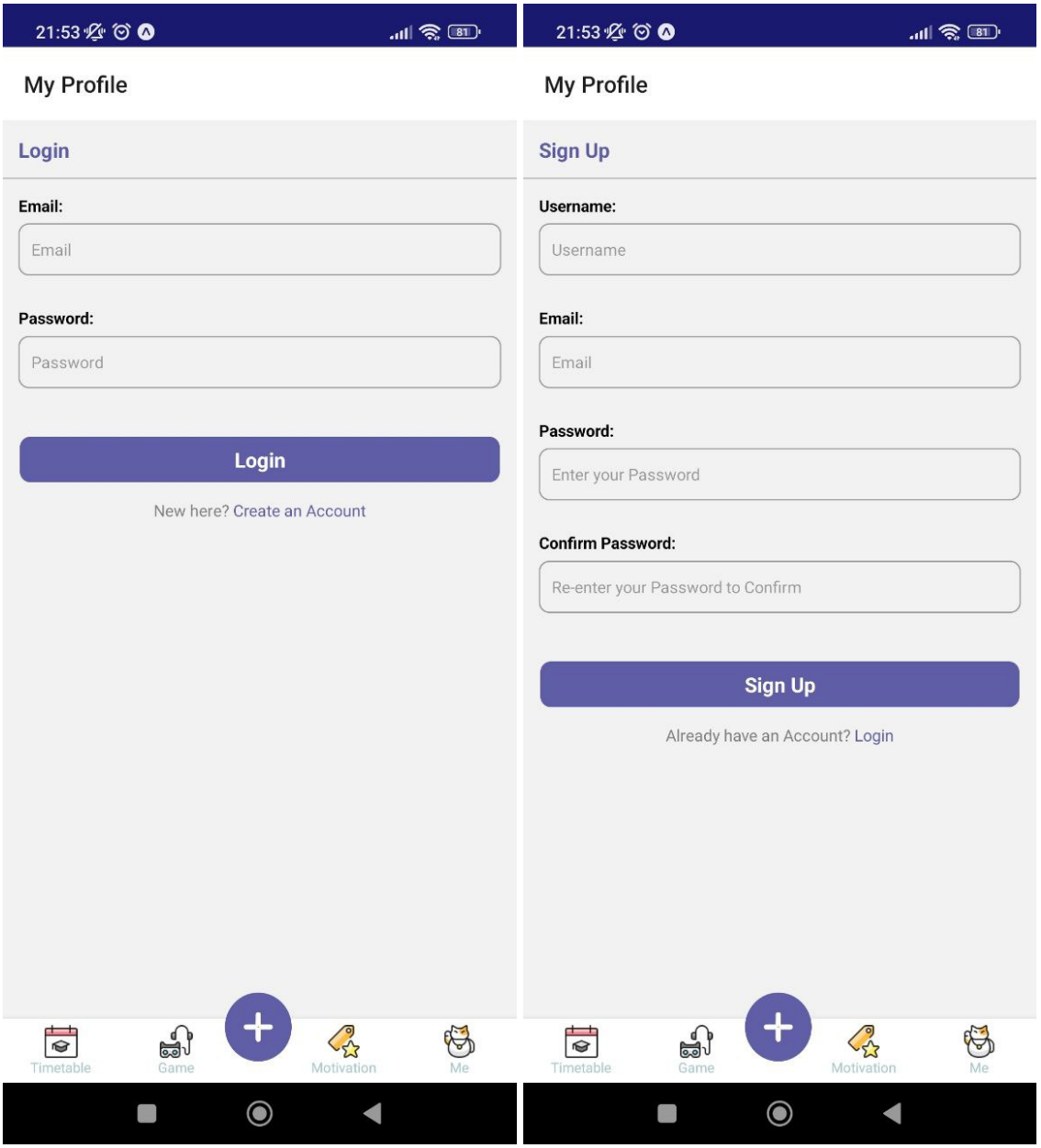
b. Sequence Diagram



B. User Guide

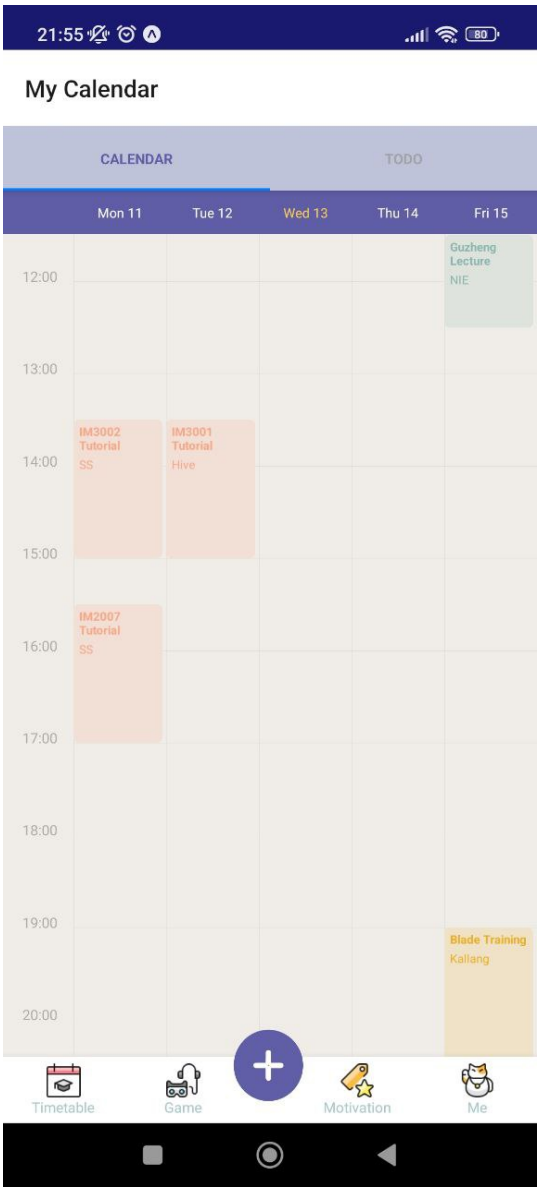
Login Screen: Initial Screen for New User

New users can create an account while existing users can proceed to login if they have logged out in the past. Otherwise existing users who did not log out will land on the screen showing their weekly timetable



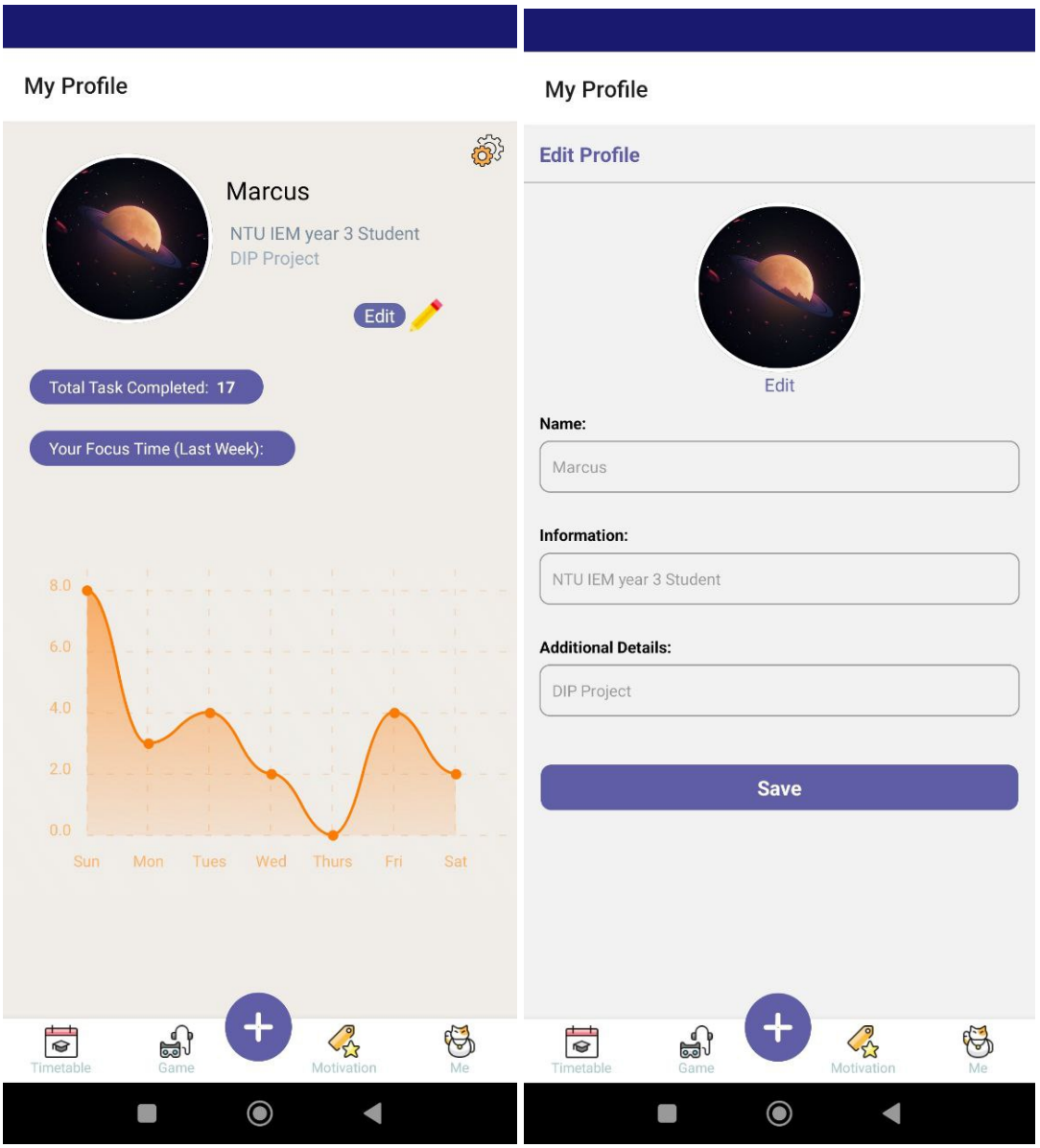
Timetable Screen: Initial Screen for Existing User

Existing users who have logged in previously will land on this page upon reopening the app. The user will get all their needed information for the week at a glance immediately.. The user can also navigate to all the screens from this screen.



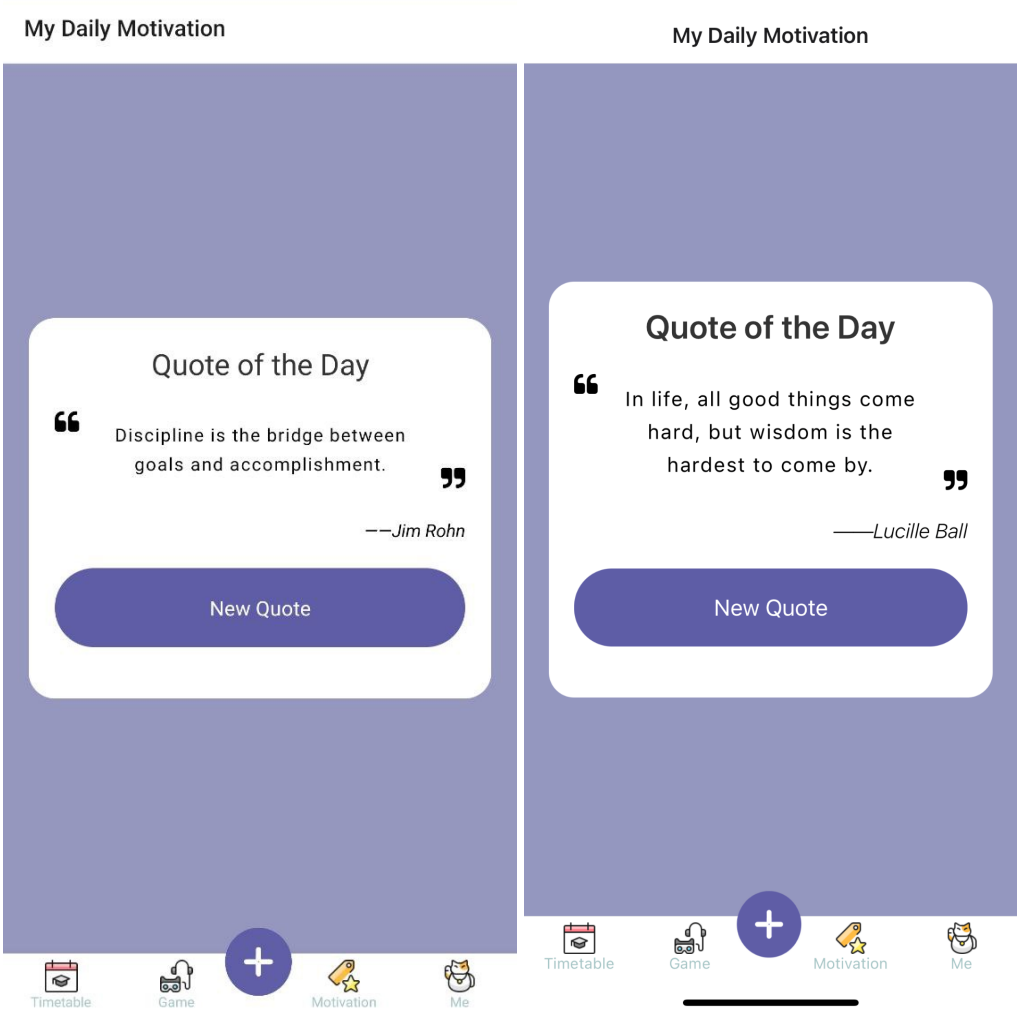
Me Screen: Screen to check personal progress and edit personal information

In this screen, the user can check their total task completed for the week, change their display picture, and their information like Name, Couse, Year and any other additional details



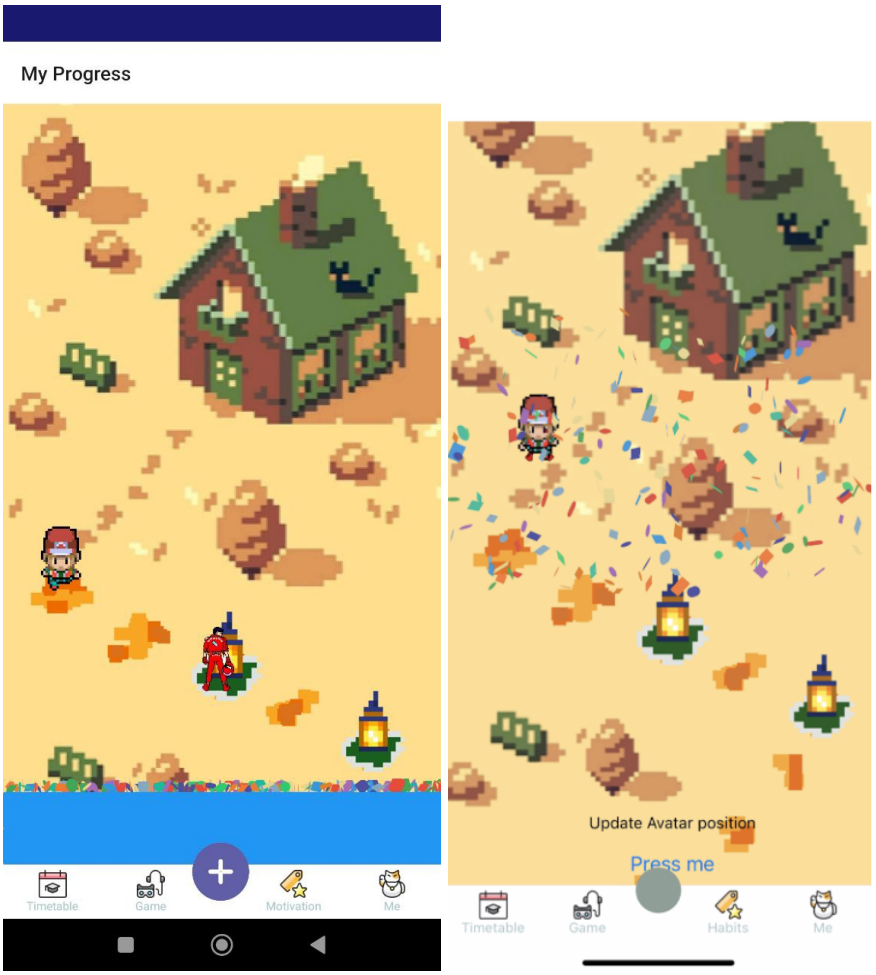
Motivation Screen: Get the quote of the day

In this screen, the user can get some motivation by checking out the inspiring quote of the day. The user can also refresh the quote displayed by tapping on the new quote.



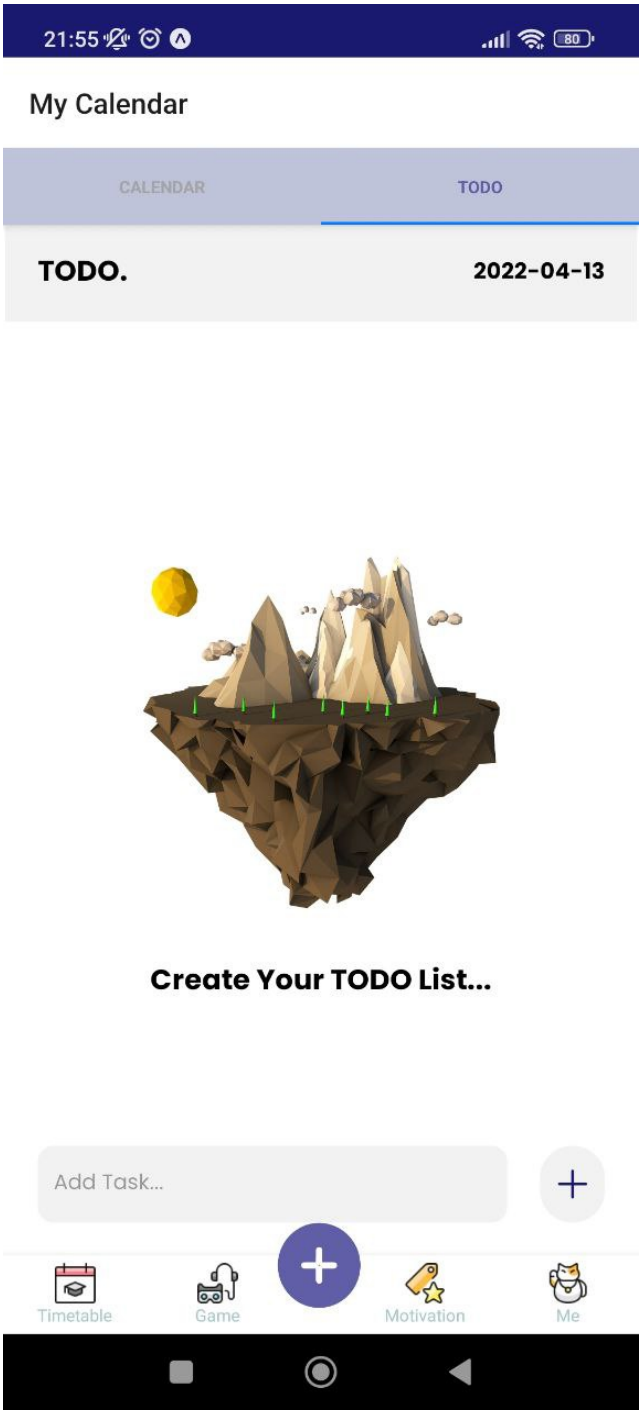
Game Screen: Compare avatar positions

In this screen, the user can compare the amount of work they have done compared to their friends by looking at how far their avatar has moved from the house for a friendly competition and motivate them to complete more tasks.



To Do Screen: Important one off task for the day not displayed on the weekly calendar

In this screen, the user can check their to-do tasks for the day which are not related to their academics for those working full-time or one-off events that do not recur.



C. Maintenance Guide

Game Component:

Page included: GameScreen.js, Globals.js, renderers.js, systems.js

Package Used: React-Native-Game-Engine

Explanation for pages:

GameScreen.js: holding the overall control of the gamepage, this including the position updating logics of avatars, the configuration of different avatars, and the page outlooking styles.

Global.js: holding several global variables which are used interactively in several pages.

renderers.js: holding the renderer of React-Native-Game-Engine.

systems.js: holding the functions used in the game components. Including avatar position updating, wirework displaying and progressing percentage computation.

General Problems and Solutions:

Problem: Fireworks are not properly displaying

Solution: Check the parameters of firework function in the systems.js. It may be the logic issue or the global variables are not properly exported/imported.

Problem: Avatar image is not properly displaying

Solution: Check whether the path (or relative path) in the GameScreen.js for each avatars are accessible. And make sure your file type is either jpg/png/gif.

D. How-To Guides

https://reactnative.dev/

https://firebase.google.com/docs

E. Source Code

https://github.com/DIP-Group1/DIP-Project

Declaration of Academic Integrity

IM3080 Design and Innovation Project

Assignment title: Final Group Report

Student's (official) name: Guo Xinying, Gwenn Tan Yiru, Marcus Leong, Goh Jessie, Michael Cahyadi Tjondro Kusumo, Tan Jichen, Wang Xinyu
Group number: 1

Tutorial day/time: Wednesday 13:30 - 16:30

Tutor's name: Chua Hock Chuan, Erry Gunawan

Declaration

I/we have read and understood the guidelines on academic integrity found at http://bit.ly/1PMaL42 and the penalties for academic dishonesty (as stated in *General instructions*), and declare that this assignment is my own work and does not involve plagiarism or collusion according to the University's honour code and pledge. Sources which I have included in my work have been appropriately referenced. I have also not submitted any part of this assignment for another course.

Students' Signature:

Date: 16 April 2022

Note: The assignment will not be marked unless this form is completed and signed. Penalties will be imposed for late submission and plagiarism. Please refer to the *General Instructions* for details.