UNIVERSITY OF GREENWICH

COMP1682 – Final Year Projects

Coursework

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COMP1682.1 Project Proposal

An experimental analysis of Flutter to develop an online cross-platform gaming communication space

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1. Overview

With the rise of the gaming industry worldwide, gamers have increasingly become a significant global community, leading to a rapid increase in the demand for platforms catering to their communication needs (Marthasari, Suharso and Ardiansyah, 2018). Popular social media platforms such as Facebook and Twitter have long been the choice of most users worldwide based on their large user base (Kaplan and Haenlein, 2010); however, they are gradually losing favour due to their lack of specificity tailored to gamers' needs. Although social networks have a huge amount of content, they lack a focus on a certain community. A number of algorithms to detect communities in social networks have been deployed, but as data is accumulated, the scale of social networks is gradually increasing and becoming huge. This leads to the problem that community detection of large-scale social networks cannot be solved by traditional algorithms (Zhao, Liang and Wang, 2021). Therefore, creating a social networking platform dedicated to a community, specifically for gamers, provides a space to interact, learn and share experiences among like-minded players.

By focusing on the gaming community, these platforms provide a safe and friendly space where players can feel accepted and valued for their interests. Gamers can follow and participate in existing mini-groups or create their own small communities within the platform. From these mini groups, they can share various types of content, including text, images, videos, and files for various purposes. Furthermore, gamers can become content creators when the platform supports livestreaming and allows them to freely upload videos, creating a rich interactive environment for the gaming community. Features such as livestreaming, content sharing, and creating mini-groups enable players to engage in conversations, events, and gaming-related activities naturally and flexibly.

Keywords: Gaming industry, gamers, social media, content creation

2. Aim

The aim of this project is to establish a comprehensive cross-platform social networking platform tailored specifically for the gaming community. By fostering connections and

interactions among gamers worldwide, it aims to create a vibrant space that enhances communication, collaboration, and camaraderie within the gaming community.

3. Literature review

a. Cross-platform development vs native development

As claimed by (Blanco and Lucrédio, 2021), smartphones have become increasingly ubiquitous and are utilized in various aspects of life, leading to a surge in demand for the development of new mobile applications or the migration of existing ones to mobile platforms. To meet this demand, numerous approaches have been proposed, such as native and cross-platform, as highlighted by (Zohud and Zein, 2021).

With the mobile application market becoming one of the largest branches of the software industry (Kuitunen, 2019), the opportunity of a native programmer is huge. However, native development has its own challenges and opportunities that programmers must research and understand. For instance, in the opinion of (Shevtsiv and Struik, 2021), native development holds an advantage over cross-platform development in terms of the availability of academic literature, courses, and market demand (especially in Ukraine). In the opposite direction, native development has its own challenges. (Kuitunen, 2019) analyzed that developing native applications requires a large amount of knowledge about many platform-specific technologies, increasing the need for expertise and knowledge. Not to mention, native development often has higher development costs because the iOS version of the app has very different code and logic than the Android version even though it's the same app (Brito *et al.*, 2018).

On the side of cross-platform development, Flutter's performance is a strong point as it can compile Dart source code into platform specific machine code, allowing the application to run smoothly (Fentaw, 2020). demonstrated by (Nawrocki *et al.*, 2021), by performing better CPU usage analysis completing tasks more quickly than native development. Another advantage of cross-platform development is that it allows application development on multiple platforms (iOS, Android) on a single source code (Fentaw, 2020). However, application size can be a major obstacle to cross-platform development. Based on tests conducted by (GÜLCÜOĞLU, USTUN and Seyhan, 2021), a simple "Hello World" application on Flutter is 4.7 MB in size, and React Native is 7 MB, this could be a significant barrier when the application size built with Kotlin or Java can be very low (around 3 MB for a 'Hello World' app).

In summary, both native and cross-platform development methodologies offer unique advantages and challenges, and developers must carefully consider their project requirements and constraints before making a decision.

b. The impact of Social Media on Modern Society

With the rapid development of technology (Ariantini *et al.*, 2021), many studies have been conducted to assess the impact of social media on society today. These studied studies are conducted to evaluate those aspects in which social networks can negatively or positively affect users.

In modern society, the use of social networks is more than ever, and they have become the most popular medium for everyday communication (AminiMotlagh, Shahhoseini and Fatehi, 2022). With the vast amount of information being posted every second on platforms, the truthfulness of information is a dilemma. In addition, the use of social media as an entertainment tool makes it nearly impossible for users to distinguish between Fake news (FN) and True news (TN) (Olan *et al.*, 2022), making FN a tool for manipulating/directing a group of people to advance an ideology by stimulating strong beliefs and social polarization.

As discovered by (Karim et al., 2020), Social media is a factor that can impact people's mental health, both in terms of the quantity and quality of social media relationships is a factor that can affect mental health, health behavior, physical health and mortality risk. However, social media also serves as a tool to post and share your personal feelings, from the findings of (Zhou et al., 2021) from research on emotional motivation amid the COVID-19 pandemic at its peak shows that people's sentiment remains quite positive amid the negative.

Social media also plays an incredibly important role in a business's digital transformation, the research performed by (Dwivedi *et al.*, 2023) proved that the process of digitization makes customers more and more informed and less dependent on traditional sales initiatives. Based on the survey, 82% of buyers will look to content on social media to decide their buying behavior, putting pressure on B2B salespeople and traditional sales organizations (Ancillai *et al.*, 2019). Demonstrate the undeniable role of social media in the way businesses operate in modern society.

In conclusion, through the evaluation of the conducted studies, it is evident that the role of social media in modern society is undeniable. While social media brings numerous benefits in communication, information sharing, and business development, it also poses potential issues such as impacts on mental health, the spread of misinformation, and increased reliance on technology. Additionally, the research indicates that social media can play a significant role in maintaining positive mood and creating new business opportunities. However, there is a need for continued research and the development of effective strategies to manage the impacts of social media and harness their potential in modern society.

c. Existing social networks aspects analysis

Social networks (SNs) have become an integral part of modern digital life, facilitating communication, information sharing and social interaction on a global scale. The influence of social media can include many aspects such as socializing, advertising, finding jobs and even

business (Aichner *et al.*, 2021). As the popularity of social media continues to soar, more and more studies are done to focus on analyzing their aspects.

One of the factors determining the popularity of social networks today comes from many factors, but a few that stand out are hashtags (#), a character preceded by text (#comedy), used to query to find posts with specific hashtags (Antonakaki, Fragopoulou and Ioannidis, 2021). Popular hashtags can be used as trending topics to represent popular events happening in the world such as politics, public awareness, and brand promotion, so these trends are sensitive to malicious users to mislead the mass audience (Kausar, Tahir and Mehmood, 2021).

Additionally, the fast, real-time delivery of breaking information on the platform's most-discussed topics has allowed journalists and business analysts to discover and predict candidate popularity and product reviews (Kausar, Tahir and Mehmood, 2021). However, in the wake of the disaster, most recently COVID-19 has shown that since the outbreak, the number of searches for "Handwashing" on social media platforms has increased rapidly, along with misinformation about COVID-19 has also increased in popularity (Wang *et al.*, 2020).

Moreover, these effects, social messaging has also evolved into a major communication tool, the most notable trend over the past decade being the dramatic increase in the use of social media and online messaging platforms (Lee, Rojas and Yamamoto, 2022). This reflects a change in the way modern humans interact and communicate in daily life. A good example is how social media has partly shown how it can replace traditional teaching methods, especially in the context of the COVID-19 pandemic, teachers and students have chosen to use the Internet to adapt to the situation at that time (Uong, Nguyen and Nguyen, 2022).

Shortly, these aspects of social media have become an integral part of the vast majority of the population in today's digital life, offering significant benefits in communication, information sharing, and person-to-person interaction. Furthurmore, social media can even create an environment that can temporarily replace traditional teaching methods in the context of the COVID-19 pandemic. However, findings from studies have shown that social media can also create challenges, such as the spread of misinformation in trending hashtags, as well as the psychological and physical health of spending too much time online.

4. Objectives

a. Research & Analysis

4.1. Research and analyze existing online social networks and their functions using academic documents to derive the necessary requirements for a social network [7.0].

4.2. Write a literature review about the aspects of a social network system as well as its development platform, then analyze and conclude [4.0].

4.3. Systematically list in detail the functional requirements and non-functional requirements that the social network system should have based on researched and analyzed documents [2.0].

4.4. Verify whether the requirements are reasonable by conducting primary research to collect opinions from a population interested in social networks and identify core requirements [3.0].

4.5. Analyse the database needed for the system based on functional and non-functional requirements and ensure that there must be relationships and data constraints between tables [5.0].

OUTCOME: The phase yielded comprehensive insights and requirements for developing a robust social network system, validated through both academic literature and primary research.

b. Implementation:

4.2. Optimize user experience by building the project's core interfaces through integrating widgets and interface components. [12.0]

4.3. Develop user-related functionalities such as registration/login, as well as account customization and friend/unfriend with other people. [20.0]

4.4. Construct functionalities enabling users within the system to interact with each other, such as CRUD operations for posting, reacting, commenting, and sharing others' posts. [20.0]

4.5. Build features to enhance interaction among users, including messaging, livestreaming, and joining groups. [45.0]

4.6. Facilitate system-wide search by implementing search functionalities based on keywords, hashtags, posters, and posting times. [15.0]

OUTCOME: This phase focused on optimizing user experience and developing a comprehensive set of user-related functionalities and features to enhance interaction, fostering a dynamic and engaging social networking environment.

c. Testing:

4.7. Web and mobile application testing by checking compatibility, basic functionality to ensure application stability. [6.0]

4.8. Conduct user acceptance testing by focusing on appeal and user experience to improve app interactivity and friendliness. [4.0]

4.9. Conduct content management testing by reviewing the appropriateness of posted content for users and ensuring effective content management. [3.0]

4.10. SEO (Search Engine Optimization) testing to ensure that the application is optimized to increase its searchability on search engines. [2.0]

OUTCOME: A comprehensive web and mobile application testing ensured application stability and security, complemented by user acceptance testing focusing on improving interactivity and appeal. Additionally, content management and SEO testing were conducted to enhance user experience and increase the application's visibility.

d. Project Framework or Any Methodology used

During the deliberation process, the author arrived at the decision to utilize the Flutter framework, a cross-platform development framework based on the Dart programming language. With its advantages in fast development, expressive UI, and native performance, Flutter was deemed the optimal choice for building the social networking platform. Furthermore, its extensive widget library, hot reload feature, and strong community support were influential factors in the decision-making process. By leveraging Flutter, the author aims to streamline the development process, enhance the user experience, and ensure compatibility across various platforms.

As for the methodology, Scrum is the author's final choice, based on their experience with this methodology in previous projects through university coursework. With its advantages in iterative development, flexibility, and adaptability to changing requirements, Scrum aligns well with the needs of the author's personal project. Additionally, its emphasis on regular feedback, collaboration, and transparency fits the dynamic nature of individual projects. By implementing Scrum, the author aims to effectively manage tasks, prioritize features, and maintain a steady pace of progress throughout the development lifecycle of their personal project.

5. Legal, Social, Ethical and Professional

The platform aims to enhance the gaming experience by fostering collaboration, facilitating the exchange of ideas, and promoting camaraderie among gamers of all levels. By offering a unified space where gamers can connect irrespective of their preferred gaming platform, the project endeavors to break down barriers and cultivate a sense of inclusivity within the gaming community. Additionally, the platform will provide opportunities for gamers to discover new games, share gameplay strategies, and engage in discussions about industry trends, thereby enriching their overall gaming journey.

As the digital landscape continues to evolve, the importance of addressing Legal, Ethical, Social, and Professional (LESP) issues within the technical industry becomes increasingly evident (Rogerson, 2021). Given the vast and diverse community of gamers worldwide, it is imperative to establish clear guidelines and regulations to ensure fair and ethical practices across platforms (Figueiredo, 2022). Additionally, as gaming increasingly intersects with social and professional spheres, there arises a need to uphold standards of conduct that promote inclusivity, respect, and responsible engagement. Furthermore, by proactively addressing LESP considerations, the project not only mitigates potential risks and liabilities but also demonstrates a commitment to fostering a sustainable and thriving gaming ecosystem for all stakeholders involved.

5.1. Legal

In the progression of this project, strict adherence to key legal considerations is essential to ensure its integrity and compliance with relevant regulations.

First, the project will pay careful attention to Intellectual Property Rights, by respecting the originality and ownership of authors and developers.

In addition, the project will also try to ensure Data privacy and protection issues by complying with security standards such as GDPR, as well as providing information about data collection and its use in a transparent manner.

It is impossible not to mention that Third-party software and dependencies will be of special interest to the project. By carefully selecting third-party software as well as carefully reading the terms and conditions of the third-party software's license.

5.2. Social

The project must ensure knowledge about basic issues of ethnicity and culture as well as religion in the world to guarantee the Global impact and cultural sensitivity issue, this is an important issue because social networks are a place for all types of users in the world.

In addition, to ensure the Diversity of the project, the author must ensure the implementation of basic community principles such as prohibiting hate speech, racial and

religious discrimination. It is also impossible not to mention that the content on the platform must be diverse and ensure the Diversity of the content genre while not being hostile or inflammatory.

5.3. Ethical

Respecting user privacy and consent is a priority that projects must focus on, by providing details on how the product collects data, and transparently disclosing the types of data collected, along with ensuring that the collected data is protected.

Moreover, the project must ensure reliability and safety right from the design stage. It is imperative that the project is designed to achieve high security standards, while continuously improving through feedback from highly skilled professionals.

5.4. Professional

Professionalism in a project is an extremely important factor, especially in a personal project, through establishing a detailed and specific work plan. Along with that, the project must also ensure the correct application of Flutter methodologies and frameworks, as well as compliance with Testing Approaches for Social Media Applications.

Alongside, ensuring Quality is also crucial in guaranteeing the product's overall quality. By applying the Nielsen Heuristics Evaluation model to assess the UI of the project, a detailed, accurate evaluation can be conducted, leading to improvements in the final product's UI. Additionally, gathering user feedback is another critical factor as it has the potential to highlight common user issues such as device compatibility or performance issues.

6.   Planning (See Appendix A)

Prior to commencing the project, the author conducted thorough research on Scrum methodology with the aim of optimizing the development process for their personal project. Scrum was chosen due to its flexibility and focus on delivering value from the earliest stages of the project. This approach also fosters close collaboration between the author and stakeholders, enhancing continuous interaction and feedback. Particularly for the author's personal project, Scrum provides a structured yet adaptable approach, enabling efficient time and resource management. Moreover, it facilitates the optimization of the final product according to both functional and non-functional requirements.

During the planning phase, the author utilizes Microsoft Project to create a detailed Gantt chart, encompassing all project stages, including Research & Analysis, Implementation, and ultimately Testing. The time estimation for each activity in the Gantt chart is carefully considered by the author based on factors such as complexity, difficulty, and the author's previous experience with similar tasks. Additionally, the author takes into account any potential interruptions or external factors that may impact the project timeline, ensuring realistic and achievable deadlines for each task. Since this is a personal project, the author also factors in their own availability and commitments outside of the project to ensure a balanced workload and realistic scheduling.

Table 1. Overview of the project

Task Name	Duration	Start	Finish
An experimental analysis of Flutter to develop an online cross-platform gaming communication space	**151 days**	**Fri 15/03/24**	**Mon 12/08/24**
Research & Analysis	**21 days**	**Fri 15/03/24**	**Thu 4/04/24**
Implementation	**112 days**	**Mon 8/04/24**	**Sun 28/07/24**
Testing	**15 days**	**Mon 29/07/24**	**Mon 12/08/24**

This table provides an overview of the project schedule, including a detailed plan for the development of the project.It is divided into three main phases: **Research & Analysis, Implementation, and Testing**. Each phase has a specific expected time, from requirements research and analysis to final implementation and testing.

Table 2. Research & Analysis phase

Task Name	Duration	Start	Finish
Research & Analysis	**21 days**	**Fri 15/03/24**	**Thu 4/04/24**
Research and analyze existing online social networks and their functions using academic documents to derive the necessary requirements for a social network.	7 days	Fri 15/03/24	Thu 21/03/24

Write a literature review about the aspects of a social network system as well as its development platform, then analyze and conclude.	4 days	Fri 22/03/24	Mon 25/03/24
Systematically list in detail the functional requirements and non-functional requirements that the social network system should have based on researched and analyzed documents.	2 days	Tue 26/03/24	Wed 27/03/24
Verify whether the requirements are reasonable by conducting primary research to collect opinions from a population interested in social networks and identify core requirements.	3 days	Thu 28/03/24	Sat 30/03/24
Analyse the database needed for the system based on functional and non-functional requirements and ensure that there must be relationships and data constraints between tables	5 days	Sun 31/03/24	Thu 4/04/24

The detailed schedule for the **Research & Analysis** phase provides an overview of the specific activities and tasks performed to research and analyze the requirements of the social network system. This phase includes tasks such as researching and analyzing existing online social networks, writing a review article on aspects of a social networking system as well as its development platform, and especially is to list detailed functional and non-functional requirements based on researched documents.

Table 3. Implementation phase

Task Name	Duration	Start	Finish
Implementation	**112 days**	**Mon 8/04/24**	**Sun 28/07/24**
Optimize user experience by building the project's core interfaces through integrating widgets and interface components.	12 days	Mon 8/04/24	Fri 19/04/24
Develop user-related functionalities such as registration/login, as well as account customization and friend/unfriend with other people.	20 days	Sat 20/04/24	Thu 9/05/24
Construct functionalities enabling users within the system to interact with each other, such as CRUD operations for posting, reacting, commenting, and sharing others' posts.	20 days	Fri 10/05/24	Wed 29/05/24
Build features to enhance interaction among users, including messaging, livestreaming, and joining groups.	45 days	Thu 30/05/24	Sat 13/07/24
Facilitate system-wide search by implementing search functionalities based on keywords, hashtags, posters, and posting times.	15 days	Sun 14/07/24	Sun 28/07/24

The Implementation schedule details the steps taken to develop the project's main functions and interfaces. This process lasts for about 112 days, starting from 04/8/24 to 07/28/24. Specific tasks include optimizing user experience by integrating interface elements, developing user-related functions such as registration/login, account customization, and

making friends/ unfriend others, as well as build user interaction features such as CRUD operations to post, react, comment, and share other people's posts. New features such as messaging, live streaming, and group participation are also integrated to enhance user interaction. Finally, the system will be upgraded with system-wide search capabilities by implementing search functions based on keywords, hashtags, poster, and posting time. When this phase is completed, the product is considered complete and awaits testing.

Table 4. Testing phase

Task Name	Duration	Start	Finish
Testing	**15 days**	**Mon 29/07/24**	**Mon 12/08/24**
Web and mobile application testing by checking compatibility, basic functionality to ensure application stability and safety.	6 days	Mon 29/07/24	Sat 3/08/24
Conduct user acceptance testing by focusing on appeal and user experience to improve app interactivity and friendliness.	4 days	Sun 4/08/24	Wed 7/08/24
Conduct content management testing by reviewing the appropriateness of posted content for users and ensuring effective content management.	3 days	Thu 8/08/24	Sat 10/08/24
SEO (Search Engine Optimization) testing to ensure that the application is optimized to increase its searchability on search engines.	2 days	Sun 11/08/24	Mon 12/08/24

The project's **Testing** phase is implemented by following Social Testing principles including specific tasks to ensure the stability and safety of the application. This process includes the following steps: testing for compatibility, basic functionality, and security of the application, to ensure stability and safety for users. Testing tasks also focus on improving user experience and user experience user-friendliness of the application, through conducting user acceptance testing and effective content management. Finally, SEO testing is performed to ensure the application is optimized for increased searchability search on search engines.

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APPENDIX

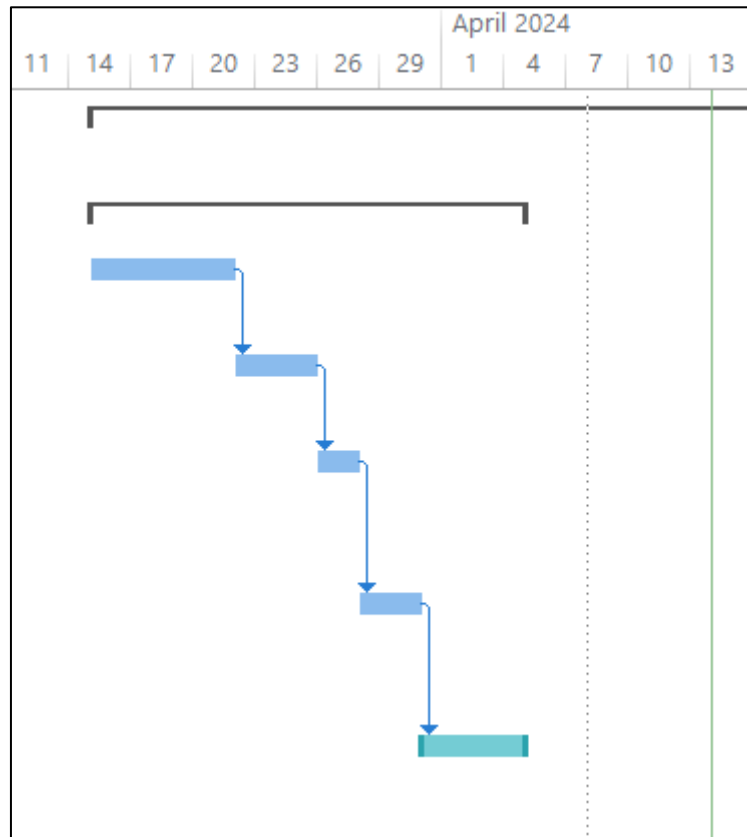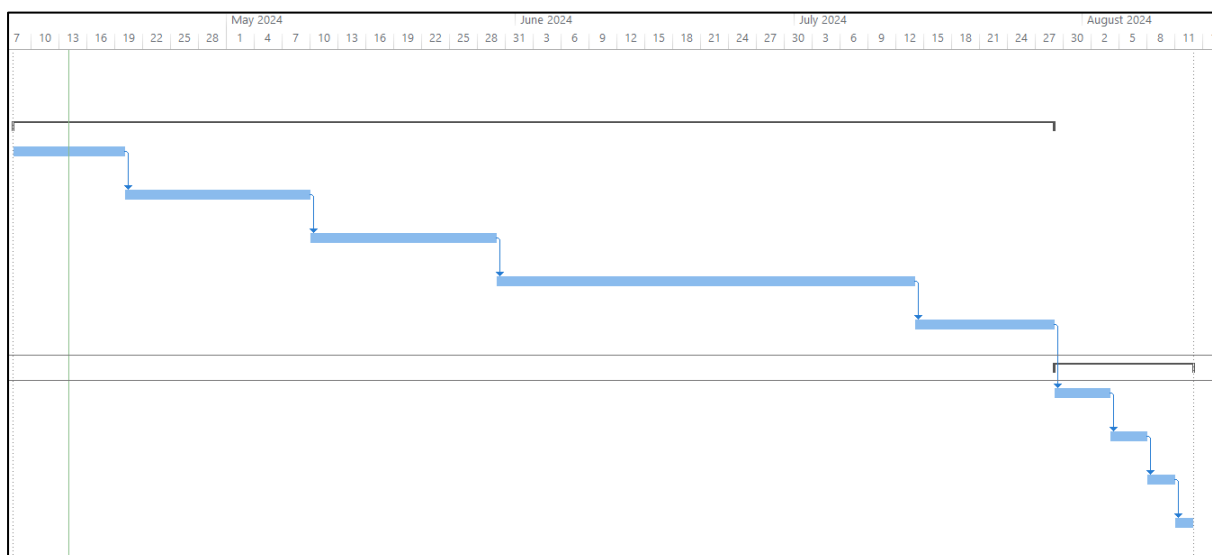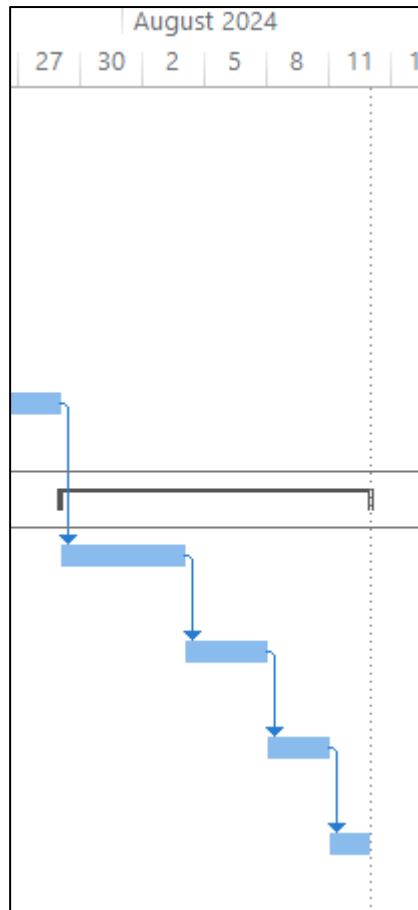*Figure 1. Gantt chart of Research & Analysis phase*

Figure 2. Gantt chart of Implementation phase

Figure 3. Gantt chart of Testing phase