School of Computer Sciences

CAT404 – Software Engineering Major Project

System Requirement and Design Document

Project Code: SE22230006

[Fam1st: Family Engagement System]

[Developer x Family]

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Academic Session

2022/2023

Declaration

"We declare that the following is our own work and does not contain any ***unacknowledged*** work from any other sources. This report was undertaken to fulfill the requirements of the Software Engineering Major Project for the Bachelor of Computer Science (Honours) program at Universiti Sains Malaysia".

Signature : ………………………………

Name : Tan Jia Hui

Date : 4/1/2023

Signature : ………………………………

Name : Tay Ming Shan

Date : 5/1/2023

Signature : ………………………………

Name : Ting Su Qi

Date : 5/1/2023

Abstract

In this advanced era today, a poor connection between family members has become increasingly common in our society. People's attention is focused on their employment. They are more inclined to use Facebook, Instagram, and TikTok when they have spare time. In addition to that, they would watch movies and play video games. All these hobbies take up their leisure time and hinder family contact. We all know that negligent parenting can make kids more likely to engage in antisocial behavior, be bullied by their peers, be open to substance use and even abuse in the future and have poor drive for academic success. We are saddened by the tragedies brought on by poor family relationships. Thus, we decided to develop a family engagement system to engage family.

The Family Engagement System consists of 3 subsystems: Contact and Appointment subsystem, Child Education Tracking subsystem and Finance Monitoring subsystem. Contact and Appointment subsystem aims to connect all the family members and manage appointments with each other. It could display all the family events and help to schedule as well as remind the family members about upcoming events. Child Education Tracking subsystem aims to keep track of children's study matters. Parents can see their children's daily activity schedule and monitor desired development and assist in children's important events. Besides, children's performance is recorded and displayed in charts. Finance Monitoring subsystem aims to track the finance in order to have better financial management in family which is to spend wisely and avoid wasteful spending. Besides tracking by recording the finance, this subsystem can also remind users to record expenses daily and when the expenses have exceeded a particular category's budget.

The objective of developing this project is to engage the relationship between family members as people can easily meet and discuss things with each other through this app. We expect users to stay in touch with each other and manage their family engagement activities by using the Contact and Appointment subsystem. We expect this user-friendly subsystem can be used easily by most of the parents to get involved in their children's education by using the Child Education Tracking Subsystem. Besides, we expect that users will have good finance management by using the Finance Monitoring Subsystem.

Acknowledgements

First and foremost, we would like to give whole-hearted appreciation to our supervisor, Dr. Lim Chia Yean, for giving us guidance and assistance in completing our project milestone one - SRD report. She has given her opinions and suggestions to this project so that we are on the right path. With her guidance, the project can be finished in a shorter period and in a more efficient way.

In addition, we would also like to express our sincere appreciation to our examiner panels, Dr. Azleena Mohd Kassim and Dr. Mohd Nadhir Ab Wahab for taking the time to give us their valuable feedback. They have pointed out the different ways to improve our project in the future.

Furthermore, we would like to express my sincere gratitude to our coordinators, Ts. Dr. Sharifah Mashita Syed Mohamad and Ts. Dr. Mohd Heikal Bin Husin for giving us guidance and briefing to work on this project.

We would also like to thank our school, School of Computer Science for giving us this excellent opportunity to work on the final year project. This final year project enables us to synthesise the knowledge we have acquired over the period of four years and show that we are competent by employing the knowledge in our final year project.

Besides, we appreciate everyone who took the time to answer to our questionnaires. Additionally, we would want to express our gratitude to Mrs. Lim Gok Leng and Mr. Joseph for taking the time to speak with us about our project. They have provided us with ideas about how to improve our system.

We would like to thank our family and friends for supporting us throughout this period of our lives. We appreciate all your love and kindness. Finally, a token of appreciation is given to our groupmates, Ting Su Qi, Tan Jia Hui, Tay Ming Shan. Our project can be finished on schedule with their full cooperation and constant messages of encouragement.

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1 Software Project Management Plan (SPMP)

1.1 Project background

It has been discussed how to improve family connections from the beginning of time to the present. Poor family interactions during childhood have long-term negative implications on mental health, according to prior study [1]. The Sustainable Development Goal 3 (SDG 3) supports healthy lives and well-being for all people of all ages, and this situation has breached it. We can infer that lack of parental involvement in children's development and bad family communication are the main causes of poor family connections. Lack of time is the main obstacle to engagement, with 54% of parents and guardians stating that their hectic schedules make it very difficult for them to get involved with their kids [2]. Negligent parenting can make kids more likely to engage in antisocial behavior, be bullied by their peers, be open to substance use and even abuse in the future and have poor drive for academic success. We are saddened by the tragedies brought on by poor family relationships. We believe that family relationships can be strengthened if parents can get involved in their children's growth and exchange thoughts with their children. Some parents wish to spend time with their children, but their jobs prevent them from doing so. When they look back, they will realize that it is such a long time since they communicated with their children. Various efforts are made for engaging families such as keeping the conversations short and to the point and inviting parents to be a part of classroom activities but no point if parents cannot attend these activities.

To avoid this condition, we propose to develop a mobile app that can help people who wish to reduce barriers to family engagement. This application consists of three subsystems including Contact and Appointment, Child Education Tracking and Finance Monitoring systems. By having Contact and Appointment subsystem, family members can make appointments with each other, notifications are sent to remind them about the appointments. This feature can avoid appointments being forgotten. Child Education Tracking subsystem helps parents to keep track of their children's education. Weak parts can be identified and strengthened with ease. While Finance Monitoring subsystem helps the family members to keep track of their expenses. By being aware of these expenses, wasteful expenses can be avoided and decrease the family burden on finance.

Apart from the project background, we will discuss organization background, system overview, team structure and roles, facilities and computer resources, project schedule and milestones in this chapter, Software Project Management Plan (SPMP).

1.2 Organization background

Our organization is a software company that focuses on developing software solutions for customers, which is also the owner of the system. Our software company has developed a few mobile applications before this, and we are confident that we can produce a valuable cross-platform mobile application that is useful to everyone. We wish to propose the system to people with family members, which means to most of the people in the world. Our aim is to ease the life of people handling family activities such as manage family engagement activities, keep track of children education issues and lastly to manage the family finances.

Our target users are the people who have family members of more than three people. The proposed system might improve communication between family members as the first subsystem, contact and appointment subsystem can let users to make appointments with each other. While the second subsystem, child education tracking subsystem can get parents involved in their children's education. Parents can check their children's daily activity schedule, keep track of their children's academic achievement, and be reminded of their children's important events. The third subsystem, finance monitoring subsystem helps parents to keep track of the expenses.

The suggested system is a brand-new app that has not yet been released on the market. Everyone has a hectic schedule that keeps them all busy. Therefore, we think people will pay for this application so they may interact with their families. The organization can make a profit from this application. The organization can also earn a reputation as this application promotes health and well-being. We know that poor family interactions during childhood have long-term negative implications on mental health. Since this application can ensure communication between family members and parental involvement in their children's education, we believe that children can develop a positive approach towards education and learning and be well behaved. Additionally, the company's developers will be proud of themselves because they get the chance to develop this important and meaningful application.

1.3 System Overview

1.3.1 System Description and Function

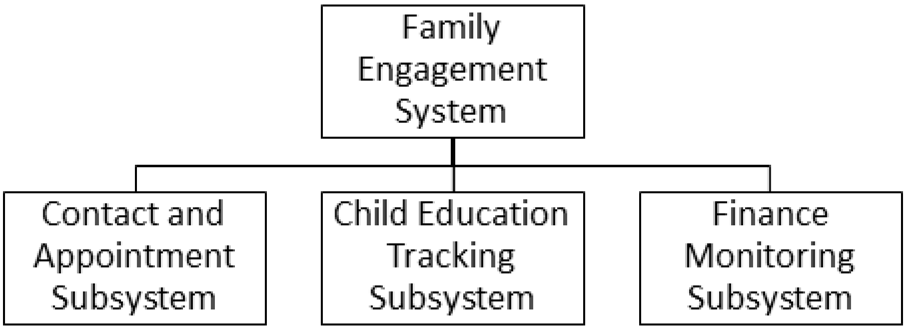


Figure 1: System Overview

The purpose of the entire system is to engage between the family members and benefits the family members at the same time. Contact and Appointment subsystem let the family members in a family can meet each other through appointment as the family members might be in different place and the elders can find their loves one's social media easily through this subsystem. Child Education Tracking subsystem helps parents to keep track of their children's education. Parents can check whether there is any improvement on a particular subject from their performance recording and do the schedule of tuitions and others. While Finance Monitoring subsystem helps the family members to keep track of their expenses. The family members can record their expenses through this subsystem. Wasteful expenses can be identified and eliminated by setting a budget on different categories.

This system is useful and save our time as it is a one stop portal to manage contact and appointment between family members, children's education tracking and finance monitoring. Managing events or activities and finance become easier as the activities or events' date can be recorded in this system with addition reminders are provided so that the important dates will not be missed. The data like past event dates, past performance history, activities, events' date, income and expenses record, receipts or invoices will be securely stored in database.

1.3.1.1 Contact and Appointment Subsystem

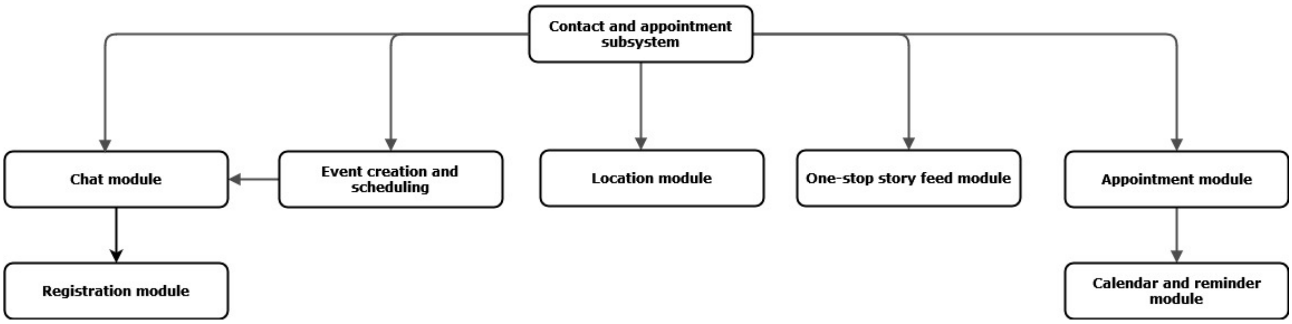


Figure 2:Overall modules of Contact and Appointment Subsystem

This subsystem consists of five modules which are **chat module, event creation and scheduling module, location module, one-stop story feed module,** and **appointment module.** This proposed subsystem could help family members to communicate with each other better through chat system and one-stop story feed system. It helps family members to manage and schedule their family activities. The application would send reminders to invited family members when the family activities are approaching.

In the **chat module**, user could register their family members information such as their contact information and relationship. This module includes login/registration module where user can input their relationship connections with the contacts. The chat module is open for each family registered. It aims to ease the daily communication between family members.

In the **event creation and scheduling module**, an event dashboard showing all the events created by the other family members will be included. User can create, update, and delete the event which is organized by him. Event location could be added under the event creation page. Family events such as family members birthday would be created automatically in the system. The system could give suggestions or alert to family member whether they would like to create any holiday or festival event. User can invite other family members to join the event. The invited family member can choose to accept or decline the invitation. Once the family member accepted the invitation, there will be a group chat formed for that particular event. Inside the chat module, user can discuss about the preparation of the activities together easily.

In the **location module**, GPS location access is requested from all registered user so that user can track other family members' location. User can label different GPS location as special places such as Home or School. User can confirm whether their family members had reached the places safely. Through this system, user can also know whether their family members are approaching the target places where the event is held. User can direct to the event destination through location navigation.

Under **one-stop story feed module**, all the posts and story from the social medias of all the family members registered in the system are directed to the platform. It is useful since user does not have to go to different social media to know their family member's current status. User may also post their social media posts through this module.

Under **appointment system**, user can see all the important events that they had accepted. User can also input their own personal activities in the personal calendar. Through the calendar system, user can see whether the accepted family events are clashed with their personal activities, and they can manage their time better. When the family engagement activities are approaching, reminders will be sent to the user to remind about the activity's occurrence.

1.3.1.2 Child Education Tracking Subsystem

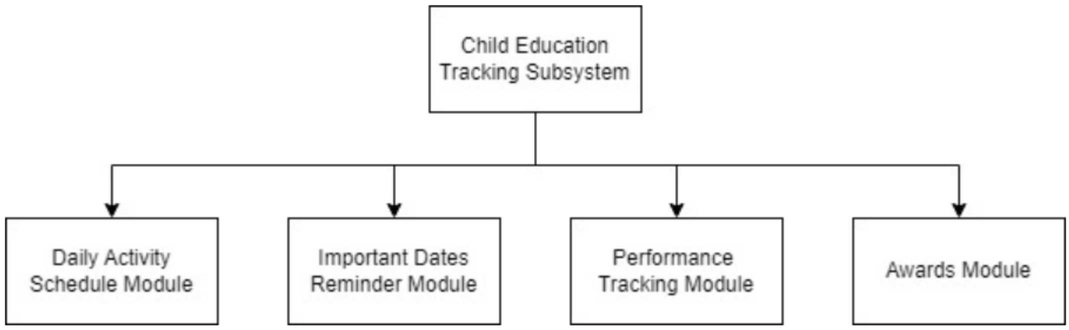


Figure 3:Overall modules of Child Education Tracking Subsystem

This subsystem is used to help parents to keep track of their children's academic performance. Parents can get involved in their children's education even with their hectic schedules. This subsystem consists of four modules which are daily activity schedule, important dates reminder, performance tracking and awards modules.

The Daily Activity Schedule module consists of three sub-modules which are schedule, summary report and weekly timetable planning. For schedule sub-module, children can enter their daily activities and tasks in the schedule. The schedules are visible for them and their parents. Time spent on each aspect such as tuition, sport, piano, art and entertainment is calculated and displayed in summary report sub-module. Appropriate changes can be made to the schedule to prevent overwhelming children and make sure it is a balance between academic and entertainment. For the weekly timetable planning sub-module, children can add what they want to do in the week, the system will create and suggest weekly timetable schedule to them.

Important Dates Reminder module consists of three sub-modules including label important activity, countdown and notifications. Under the Important Dates Reminder module, children can label the activity as important when adding new activity. Then the activity will be added to the countdown list. It will show the countdown to the important event dates and send reminder notifications to both parents and children when the event is approaching. These functions can remind parents of their children's important dates so that parents will not miss out on any important moment for their children.

Performance Tracking module consists of two sub-modules which are grade record, data analysis and data visualization and alert notifications. This module helps to keep track of academic achievement of children such as test and quiz scores, homework completion rates and behavior assessments. Children enter the results gotten from each category. Then, these results are analyzed and displayed in charts. This feature can also help to identify the strengths and weaknesses of each child. In this module, I do not include data from school since I do not think it is feasible to make teachers key in the results. They are busy with their work and need to handle several school matters. This will overwhelm them if they must type in each student’s results individually. Hence, children need to enter the grades by themselves. Parents will receive alert notifications if the children's performance keeps declining or gets worse over time.

Awards module consists of three sub-modules including awards record, awards bookmark and target and reward. This module helps parents to keep track of the honors their children have received and set target and rewards for children so that they are motivated. Parents and children can insert the children’s awards. They can also bookmark any award that they think is significant and useful for children’s future planning. Besides, in target and reward sub-module, parents can set targets and set rewards for their children. If they can accomplish the targets, rewards are given. These honors will make parents feel proud of their children and give children more self-worth and affirm them.

1.3.1.3 Finance Monitoring Subsystem

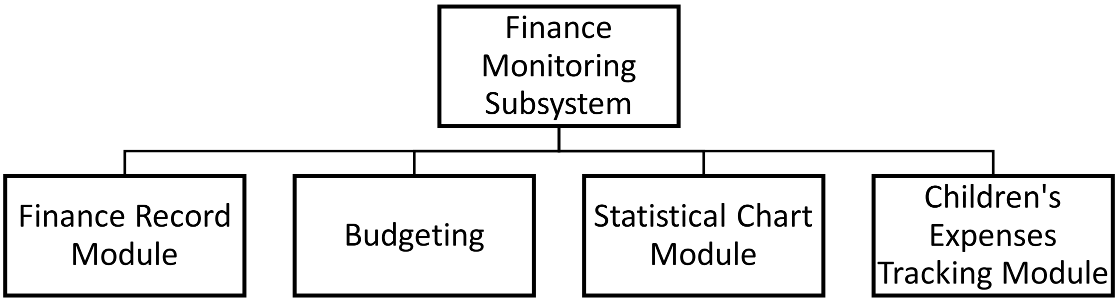


Figure 4:Finance Monitoring Subsystem Modules

Finance Monitoring Subsystem is used to help people to do a better financial management by tracking their spending and do budget for each spending category. When people track their expenses, they take complete control over their spendings or finances. Thus, people will know exactly how much money is sitting in the bank account, and how much they can spend. This subsystem will also educate the children to do good financial management from young. Each family will have one family account and each family member will have their own account. This means that a family member can see their own individual finance and family's finance. Thus, family members can monitor their own and family's finance.

In Finance Record module, each family member can record their incomes and expenses in their own account and family account. Parents or children that already have work can also put some of their income to family account. When family members are recording their expenses, they can either choose to record in their own individual account or in the family account. For the children that have not working, their income might be the pocket money get from parents. Parents can choose to hide family account from children. These features can help the user to track the finance flow and to identify and eliminate wasteful spending habits from the spending records. Besides, family members can also save their receipts/ invoices for record on what they have spent on to review later. This feature helps parents in financial claim such as income tax audit and company claim.

In Statistical Chart, family members can view the monthly statistic of outcomes to have a better figure on the expenses. This module shows the pattern analysis each spending category and will recommend how much to spend in each category.

In Budgeting module, user can set budget for each expense category, a reminder will be shown when the expenses of a particular category have exceeded 70% of the budget set earlier. Besides, a reminder to log in daily expenses will also be shown if the user does not key in any expenses. These features can help user to avoid overspend and avoid more debt.

Lastly, in Children Expenses Tracking module, parents can check their children’s total monthly spending so that parents can know whether they have overspending. However, there is an option which to not showing the total monthly expenses to their parents.

1.3.2 Software Process Approach

The software process that our group will use is agile as we will manage this project by breaking it into several phases. Agile is an iterative approach that suits software development as our group is a small team that consists of 3 members, and we can respond to changes of requirement while developing the software. Agile helps us to deliver the software with incremental and frequent delivery of small chunks of functionality. Besides, Agile emphasizes teamwork and communication which we will having discussion frequently to confirm that we are doing the right product and knowing progress of other members. Moreover, Agile is more reliable as we might have changes that are not predictable in the future. Agile is flexible for us to go through changes that are not predictable. The software life cycle model that we are using is Scrum and will be further discussed in the following section.

1.3.3 Software Life Cycle Model

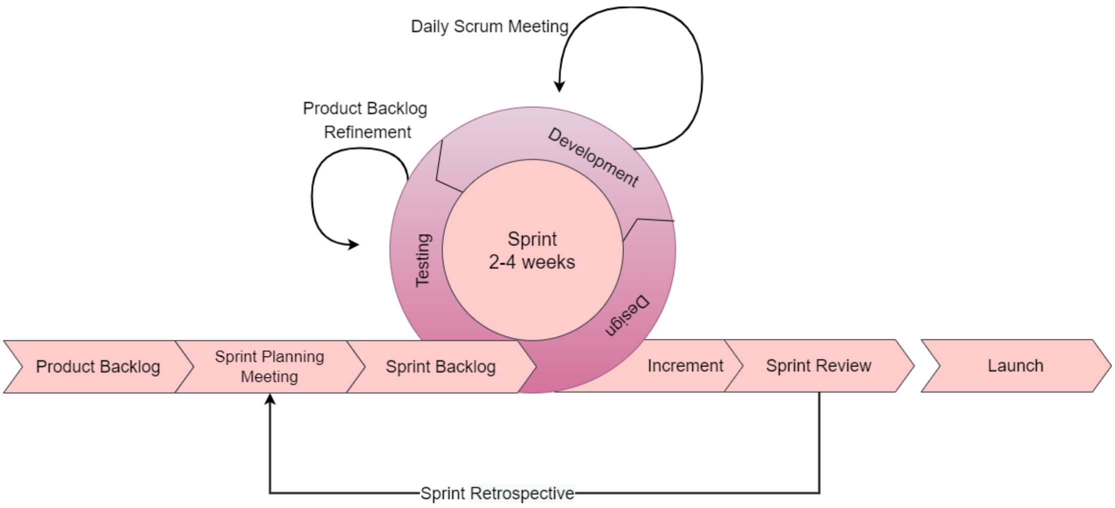


Figure 5:Agile Scrum Model

This project uses Scrum development lifecycle for the development planning and scheduling. In the first phrase, Product Backlog, we gather the requirements and list out all the features that we want to have on our system. We prioritize the features, and the most significant items are displayed at the top of the product backlog. During the Sprint Planning Meeting, we will meet to determine which backlog items will be done in the next sprint. In Sprint Backlog, we will list out all the items or features that we are going to complete during this sprint.

Then, we enter the sprint cycle. We will complete all the work we listed out in the sprint backlog within two to four weeks' time. In each sprint, we will carry out three phrases which are Design, Development and Testing phases. In the Design phrase, we create high-level design (HLD) and low-level design (LLD) including screen designs, prototypes, databases, and system interfaces. Requirements are used to create design specifications. After the designs are approved, we proceed to Development phrase. This phrase is a coding phrase. We start developing items by writing the program. Then, moving to the Testing phrase. Items are tested through verification and validation so that we create the right items, or we create items rightly. After that, we will test for bugs and defects. This phrase is to make sure our system runs in expected behavior. During these two to four weeks' time, we also carry out daily scrum meetings to update our progress, discuss problems faced and plan for the next day's work. In each sprint, we will also refine the product backlog so that we all can understand thoroughly the items that we are building. This process can avoid implementing wrong thing and wasting efforts.

During Increment, we compile all the completed items and produce the most recent system that is reliable and functional. After that, proceed to Sprint Review. During this phrase, we show what we have done during the sprint and get feedback from our stakeholders. In a sprint retrospective, we get together to talk about what worked well and what needs to be changed, with the goal of making the following sprint more efficient and productive than the previous one. Then, a new sprint begins with a sprint planning meeting. After all the items listed in the product backlog are completed, we can launch the system.

1.3.4 Modeling Notation

UML diagrams are the modeling notation that is used in this project. UML diagrams are helpful in planning and visualizing software development process. One of the UML diagrams that we plan to use is use case diagrams.

Use case diagrams can be used to define a system's scope and key features. Use case diagrams are used to explain and clarify the context and requirements of either the entire system or its essential parts [3]. System requirements may be easily documented using use case diagrams. One use-case diagram can depict a complex system, or numerous use-case diagrams can represent the system's various components. The use case diagram can simply be updated to include new features or needs. This suits the software process approach we decided to use, which is an agile model. Besides, it also demonstrates the interactions between the system and the users. We can get a lot of information by looking at the use case diagrams. Hence, it is not necessary to draw other diagrams such as data flow diagrams and state charts. Use case diagrams also can manage the complexity of the project by decomposing problems into major functions (use case).

Another UML diagram that we decided to use in this project is class diagrams. We can get a sense of orientation from class diagrams. They provide a thorough understanding of how our systems are set up. At the same time, they provide a brief description of the subsystems' interactions as well as their characteristics and connections [4]. Class diagrams are easy to read. We can understand the relationship between the subsystems by looking at the connectors. Through this diagram, unnecessary confusion can be avoided. It can also prevent extra documentation as this diagram can show overall software architecture.

Sequence diagrams are also used to model the logic of a complex process, function, or method. By using this diagram, we can observe how elements and things work together to complete a process and create a thorough functional plan for a current or hypothetical circumstance [5]. In addition to this, sequence diagram may also be used as a “requirements document” to indicate the conditions that must be met before a system implementation can take place. Analysts can advance use cases by proposing a more formal degree of refinement during the requirements phase of a specific project. This is when use cases are frequently honed into sequence diagrams.

1.3.5 Coding Standard

The programming language that we use is C#. The framework we use is Xamarin. We chose to use Xamarin because we want to develop a cross-platform mobile app which could be used in both Android and IOS platforms. Xamarin is one of the .NET ecosystems. We choose Xamarin due to its extensive support by providing many libraries and tools which makes mobile application development easier. In addition, Xamarin is open-source and free to use. This is one of the main reasons why we want to develop in Xamarin environment. It would not cost us any fee on licensing. Xamarin is a cross-platform framework that allows us to build Android and IOS applications from a single shared codebase. It would save our development time. We plan to use location API such as Google Map and social media API. Location API is required to check the exact location of the family members. Location API is also used to pin the family activity’s location in the map so that family members can navigate to the place for the event. Social media API is used for the one-stop story feed module so that family members can catch up with the daily life of other family members.

1.4 Team Structure and Roles

1.4.1 Role Assignments

Figure 6:Team Organization Chart

Every team member in the group is a developer for the project. Ting Su Qi is the Project Leader and the Requirement Analyst for the project. On the other hand, Tan Jia Hui is the Architect for the project. Lastly, Tay Ming Shan plays the role of Quality Assurance Analyst for the project. Everyone is leading in each of the developing phases of the project. The table below shows the details of the project team role assignments.

Table 1:Project Team Role Assignments

Role	Team Member
• Project Leader • Requirements Analyst • Developer	Ting Su Qi
• Architect • Developer	Tan Jia Hui
• Quality Assurance Analyst • Developer	Tay Ming Shan

1.4.2 Development Responsibilities

Subsystem 1 which is Contact and Appointment subsystem has been assigned to Tan Jia Hui. Subsystem 2, which is Child Education Tracking subsystem will be developed by Tay Ming Shan. Subsystem 3, which is Finance Monitoring has been assigned to Ting Su Qi. The common modules such as the login component would be built by every team member. The following table shows the distribution of the subsystem development responsibilities in this project.

Table 2:Subsystem Development Responsibilities

Subsystem Name	Team Member
Contact and Appointment	Tan Jia Hui
Child Education Tracking	Tay Ming Shan
Finance Monitoring	Ting Su Qi

1.5 Facilities and Computer Resources

1.5.1 Computer and other Hardware Resources

Computers that are used to develop this system include these specifications as shown in the table below.

Table 3:Computer Specifications

Developer	1	2	3
Manufacturer	Acer	Acer	Asus
Model	Aspire A514-52G	Aspire A315-55G-765G	Tuf A15 (FA506I)
System Type	64bit	64bit	64bit
Processor	Intel(R) Core (TM) i7-10510U CPU	Intel(R) Core (TM) i7-10510U CPU	AMD Ryzen 4600H
RAM	8GB	8GB	8GB

1.5.2 Software and Operating System Resource Specifications

The operating system that our team uses to develop the mobile application is Windows operating system. The development tools that we use are Visual Studio Community 2022 which is more compatible with the Xamarin development. We use Asana to manage and track the progress of our project. Since we are applying agile approaches in our project, Asana is suitable for us to track our work progress for each iteration. We could also store our project documentation inside Asana. GitHub is open source, and we are familiar with the flow of GitHub. GitHub can also track every version of our codes. It allows us to do code comparison and merge easily. Therefore, we opt to use GitHub to collaborate in coding development.

1.6 Project Schedule & Milestones

A phased project schedule is used for project development. There are three important milestones:

Milestone 1: System Requirement and Design

Milestone 2: Progress Review (Prototype development)

Milestone 3: Final Presentation (Final development)

Table 4: Sprint Planning/ Iteration for Family Engagement System

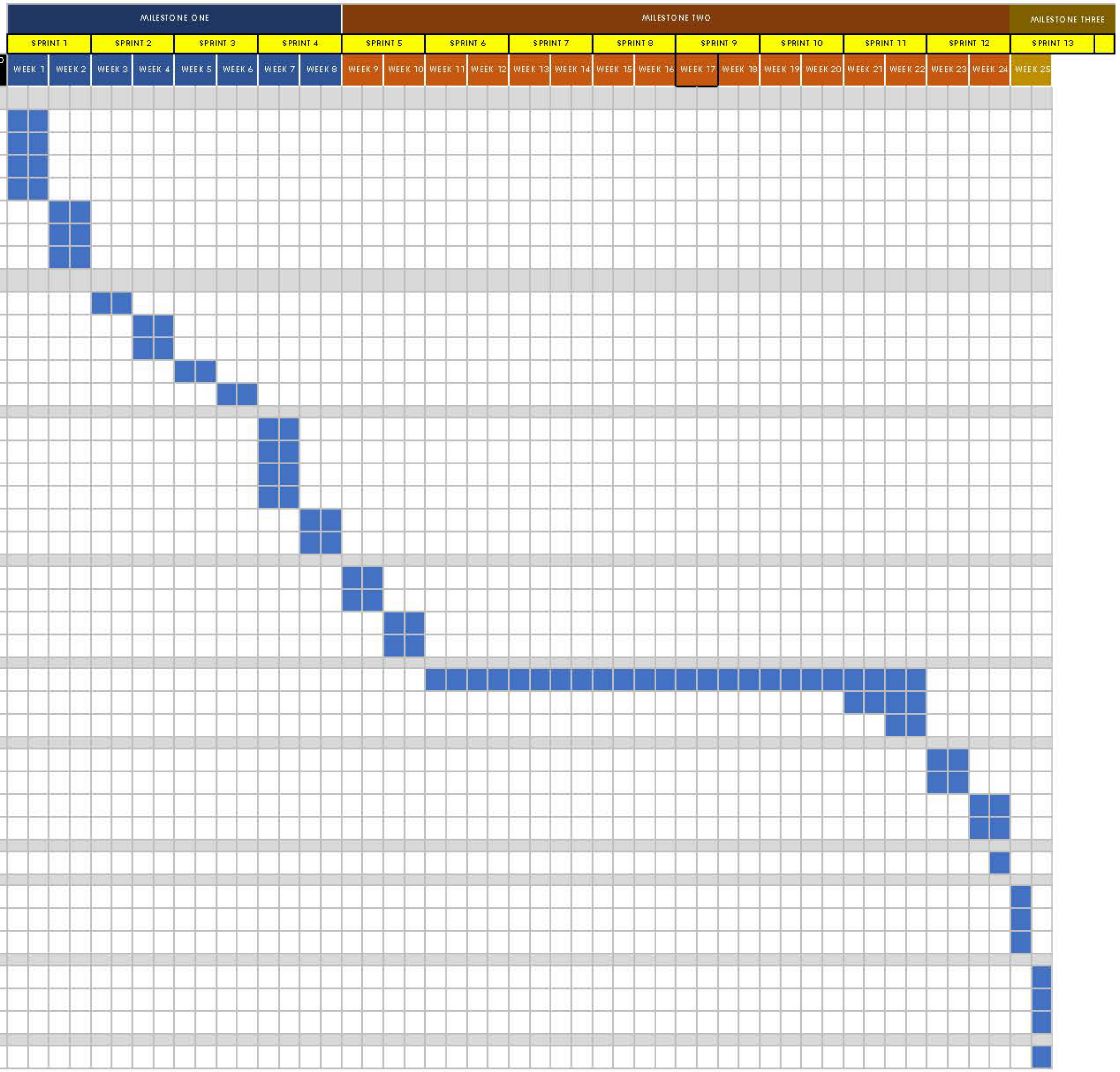
Sprint Planning / Iteration for Family Engagement System			
Milestone	Sprint	Time Estimate	Tasks assigned
1	1	2 weeks	Discover and understand the detail of all aspects of the problem
	2	2 weeks	Design the components of the solution to the problem (1)
	3	2 weeks	Design the components of the solution to the problem (2)
	4	2 weeks	Plan for testing activities
2	5	2 weeks	Building Layout
	6	2 weeks	Development (1)
	7	2 weeks	Development (2)
	8	2 weeks	Development (3)
	9	2 weeks	Development (4)

	10	2 weeks	Development (5)
	11	2 weeks	Development (6)
	12	2 weeks	Testing & Deployment
3	13	1 week	Final Review & Submission
	Total	25 weeks	

WORK BREAKDOWN STRUCTURE

PROJECT TITLE	FAMILY ENGAGEMENTSYSTEM
PROJECT LEADER	TING SU QI
PROJECT MEMBER	TAN JIA HUI, TAY MING SHAN
DATE	31/10/2022

WBS NUMBER	TASK TITLE	TASK OWNER	START DATE	DUE DATE	DURATION DAY
1.	Discover and understand the detail of all aspects of the problem				
1.1	Brainstorm on function/feature required by the system	Ting S., Tan J., Tay M.	31/10/2022	06/11/2022	6
1.2	Design initial modules for each of the subsystem	Ting S., Tan J., Tay M.	31/10/2022	06/11/2022	6
1.3	Research and observe on existing system	Ting S., Tan J., Tay M.	31/10/2022	06/11/2022	6
1.4	Identifying current problems faced from the society	Ting S., Tan J., Tay M.	31/10/2022	06/11/2022	6
1.5	Conduct survey and interview to gather requirement and information	Ting S., Tan J., Tay M.	07/11/2022	13/11/2022	6
1.6	Refine the module for each of the subsystem	Ting S., Tan J., Tay M.	07/11/2022	13/11/2022	6
1.7	Define and identifying use cases	Ting S., Tan J., Tay M.	07/11/2022	13/11/2022	6
2	Design the components of the solution to the problem				
2.1	Design system architecture and its environment (high-level)	Ting S., Tan J., Tay M.	14/11/2022	20/11/2022	6
2.2	Design low-level details of system design	Ting S., Tan J., Tay M.	21/11/2022	27/11/2022	6
2.3	Identify the non-functional requirements	Ting S., Tan J., Tay M.	21/11/2022	27/11/2022	6
2.4	Design database	Ting S., Tan J., Tay M.	28/11/2022	04/12/2022	6
2.5	Design the screen layout (storyboard)	Ting S., Tan J., Tay M.	05/12/2022	11/12/2022	6
3	Plan for testing activities				
3.1	Identify the scope of test cases	Ting S., Tan J., Tay M.	12/12/2022	18/12/2022	6
3.2	Identify the test item	Ting S., Tan J., Tay M.	12/12/2022	18/12/2022	6
3.3	Design test cases for system testing	Ting S., Tan J., Tay M.	12/12/2022	18/12/2022	6
3.4	Design test cases for acceptance testing	Ting S., Tan J., Tay M.	12/12/2022	18/12/2022	6
3.5	Identify the test approach/strategy	Ting S., Tan J., Tay M.	19/12/2022	23/12/2022	4
3.6	Identify the pass/fail criteria	Ting S., Tan J., Tay M.	19/12/2022	23/12/2022	4
4	Building Layout				
4.1	Build database	Ting S., Tan J., Tay M.	20/02/2023	26/02/2023	6
4.2	Build system layout	Ting S., Tan J., Tay M.	20/02/2023	26/02/2023	6
4.3	Build subsystem layout	Ting S., Tan J., Tay M.	27/02/2023	05/03/2023	6
4.4	Build module layout	Ting S., Tan J., Tay M.	27/02/2023	05/03/2023	6
5	Development				
5.1	Write program code for functionalities	Ting S., Tan J., Tay M.	06/03/2023	14/05/2023	69
5.2	Examine the outcome of each module	Ting S., Tan J., Tay M.	01/05/2023	14/05/2023	13
5.3	Modification on the system	Ting S., Tan J., Tay M.	08/05/2023	14/05/2023	6
6	Testing				
6.1	White Box Testing	Ting S., Tan J., Tay M.	15/05/2023	21/05/2023	6
6.2	Black Box Testing	Ting S., Tan J., Tay M.	15/05/2023	21/05/2023	6
6.3	Informal Review	Ting S., Tan J., Tay M.	22/05/2023	28/05/2023	6
6.4	Formal Review	Ting S., Tan J., Tay M.	22/05/2023	28/05/2023	6
7	Deployment				
7.1	Release stable version	Ting S., Tan J., Tay M.	27/05/2023	28/05/2023	1
8	Project Review				
8.1	Review on subsystem	Ting S., Tan J., Tay M.	29/05/2023	01/06/2023	3
8.2	Review on integrated system	Ting S., Tan J., Tay M.	29/05/2023	01/06/2023	3
8.3	Review on cost spent	Ting S., Tan J., Tay M.	29/05/2023	01/06/2023	3
9	Documentation Preparation				
9.1	Prepare slides	Ting S., Tan J., Tay M.	02/06/2023	05/06/2023	3
9.2	Prepare demo script	Ting S., Tan J., Tay M.	02/06/2023	05/06/2023	3
9.3	Present to panel	Ting S., Tan J., Tay M.	02/06/2023	05/06/2023	3
10	Project submission				
10.1	Project Submission	Ting S., Tan J., Tay M.	02/06/2023	05/06/2023	3



*All sprints will have sprint planning, sprint backlog creation, subtasks creation to refine the tasks to be done. Sprint review and restrospective will be done after a sprint has done.

Figure 7: GANTT Chart for the overall project schedule

1.6.1 Hierarchy Chart of Work Division

Figure 8: Hierarchy Chart of Work Division

1.6.2 Milestone 1: System Requirement and Design

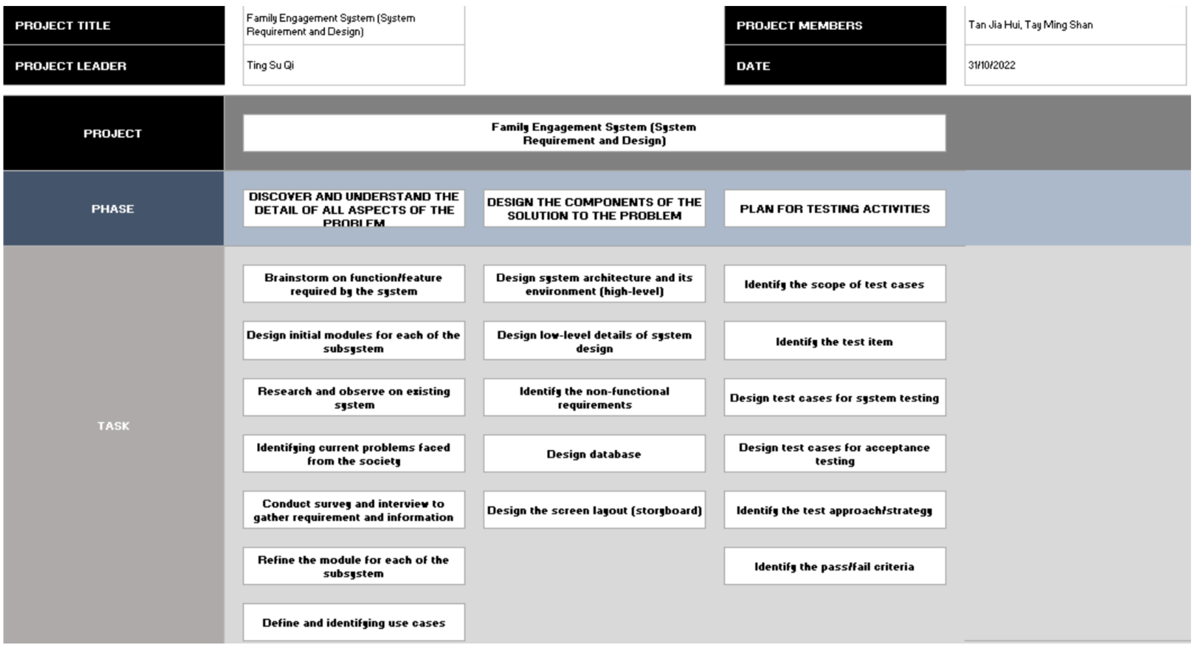


Figure 9: Work Breakdown Structure of Milestone 1

The following team members are responsible for the following tasks in Milestone 1:

Table 5: Milestone 1 Task Assignments

Task ID #	Tasks Name	Responsibility	Remarks
M1-1	Brainstorm on function or feature required by the system	All	Think about the features will be in the system.
M1-2	Design initial modules for each of the subsystem	All	Design initial modules for each of the subsystem according to the nature of features.
M1-3	Research and observe on existing system	All	Research and observe on existing system that already in the market.
M1-4	Identifying current problems faced from the society	All	Research on current problems faced from the society.
M1-5	Conduct survey and interview.	All	Conduct survey and interview to gather requirement and information
M1-6	Refine the module for each of the subsystem	All	Refine the module for each of the subsystem from the requirement and information obtained from survey and interview.
M1-7	Define and identifying use cases	All	Define and identifying use cases from the requirements.
M1-8	Design system architecture and its environment (high-level)	All	Design system architecture and its environment like use case diagram for understanding the system.
M1-9	Design low-level details of system design	All	Design low-level details of system design like class diagram and sequence diagram to

			understand the system more details.
M1-10	Identify the non-functional requirements	All	Identify the non-functional requirements like space and performance requirement.
M1-11	Design database	All	Design database of each subsystem of the system.
M1-12	Design the screen layout (storyboard)	All	Design the screen layout to have an overview how the system looks like,
M1-13	Identify the scope of test cases	All	Identify what scope to be tested.
M1-14	Identify the test item	All	List the test item.
M1-15	Design test cases for system testing	All	Design test cases for testing on each feature.
M1-16	Design test cases for acceptance testing	All	Design test cases for acceptance testing on each feature.
M1-17	Identify the test approach/strategy	All	Identify the test approach/strategy to test the test case.
M1-18	Identify the pass/fail criteria	All	Identify the pass/fail criteria to test the test case.

1.6.3 Milestone 2: Progress Review (Prototype development)

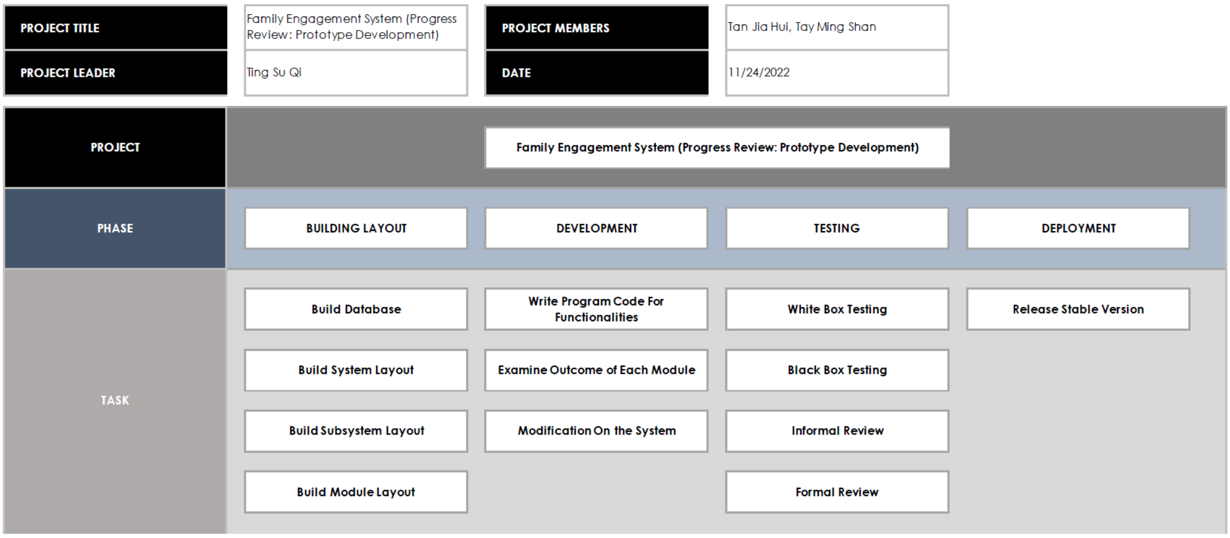


Figure 10: Work Breakdown Structure of Milestone 2

The following team members are responsible for the following tasks in Milestone 2:

Table 6:Milestone 2 Task Assignments

Task ID#	Task Name	Responsibility	Remarks
M2-1	Build Database	All	Gather data required to store in database, divide date into tables, specify primary keys
M2-2	Build System Layout	All	Design and develop the overall system layout
M2-3	Build Subsystem Layout	All	Design and develop respective subsystem layout
M2-4	Build Module Layout	All	Design and develop respective module layout
M2-5	Write Program Code for Functionalities	All	Write code for all the functionalities
M2-6	Examine Outcome of Each Module	All	Check whether we get the desired outcomes of each module's functionalities
M2-7	Modification on the system	All	Do some modifications or enhancements on the system
M2-8	White Box Testing	All	Test internal structures and workings of the overall system
M2-9	Black Box Testing	All	Examine the functionalities of the overall system

M2-10	Informal Review	All	Set up meeting for all the team members to discuss the system and detect errors
M2-11	Formal Review	All	Set up meeting with supervisor or examiners to discuss system, identify and correct errors
M2-12	Release Stable Version	Team Leader	Launch latest and stable version of the system

1.6.4 Milestone 3: Final Presentation (Final development)

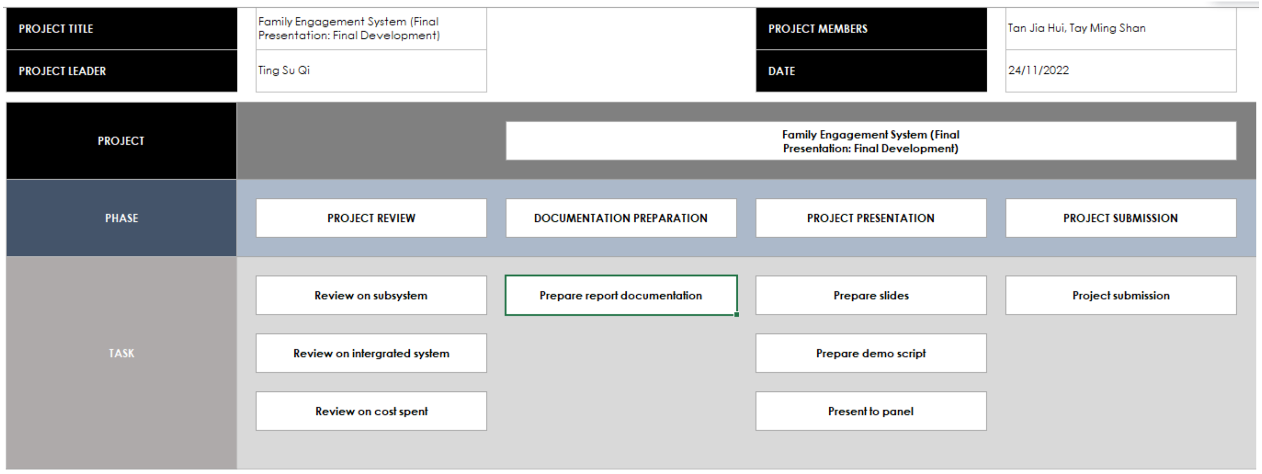


Figure 11:Work Breakdown Structure of Milestone 3

The following team members are responsible for the following tasks in Milestone 3:

Table 7:Milestone 3 Task Assignments

Task ID#	Task Name	Responsibility	Remarks
M3-1	Review on subsystem	All	Check whether all subsystem targets are achieved.
M3-2	Review on integrated system	All	Check whether the integrated system fulfilled the requirements.
M3-3	Review on cost spent	All	Check whether the development cost is overspent.
M3-4	Prepare report documentation	All	Prepare report to describe about the project.
M3-5	Prepare slides	All	Prepare slides for project presentation.
M3-6	Prepare demo script	All	Prepare scripts for project presentation.

M3-7	Present to panel	All	Present the project to the panels.
M3-8	Project submission	Team Leader	Submit the project to the judges.

2 Software Requirements Specifications (SRS)

2.1 Background & Related Work

2.1.1 Existing Systems & Algorithms/Theories

2.1.1.1 Contact and Appointment Subsystem

This proposed subsystem is a new idea which focuses on family activities scheduling. We had carried out existing system analysis for Contact and Appointment Subsystem through Play Store. The four existing systems that we chose to analyze are Setmore appointment scheduling, TimeTree-Shared Calendar, Scoot Family Calendar and Famio: Connect With Family.

One of the related works is Setmore appointment scheduling. This application allows user to schedule their appointments and host video meetings. It shows the added customer information in one place under a contact list. [6]

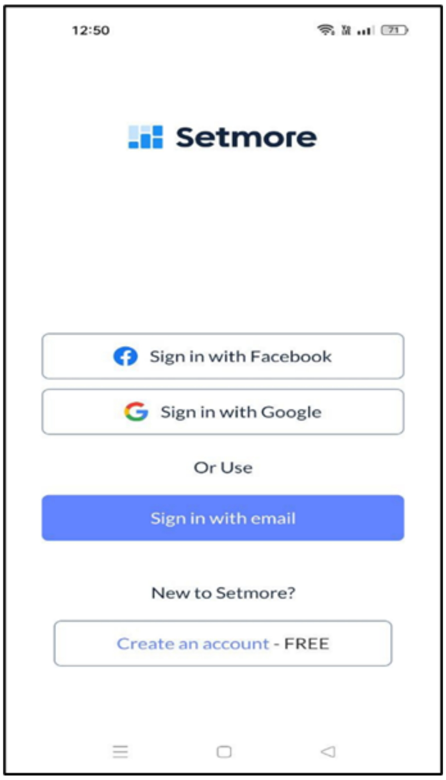


Figure 13: Enable Sign In with Facebook and Google

Source: Adapted from [6]

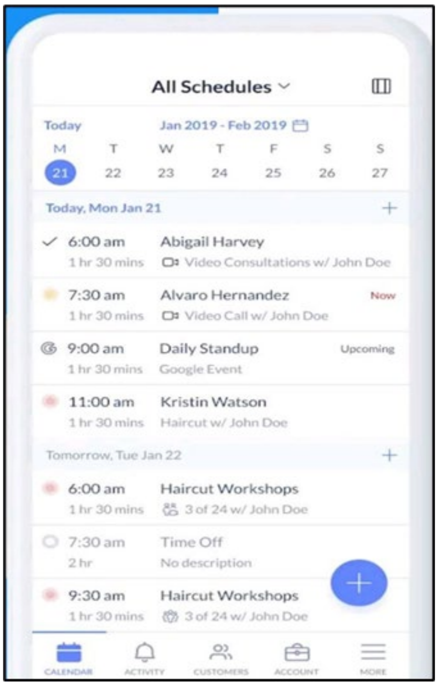


Figure 14:Daily activities scheduling

Source: Adapted from [6]

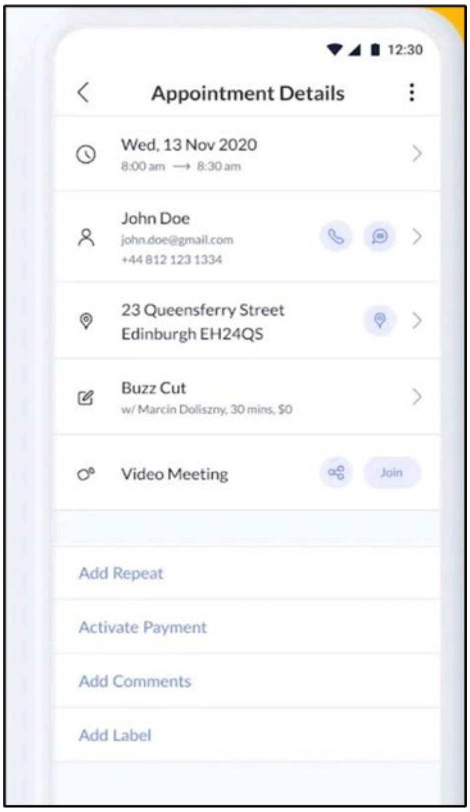


Figure 15:Appointment Details function

Source: Adapted from [6]

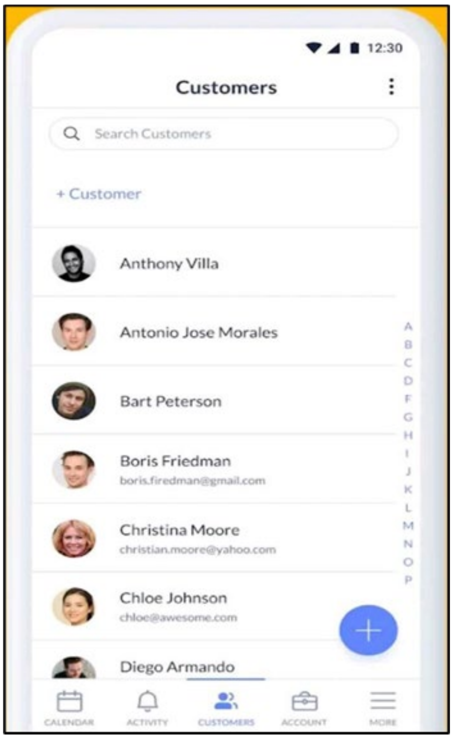


Figure 16: Contact List

Source: Adapted from [6]

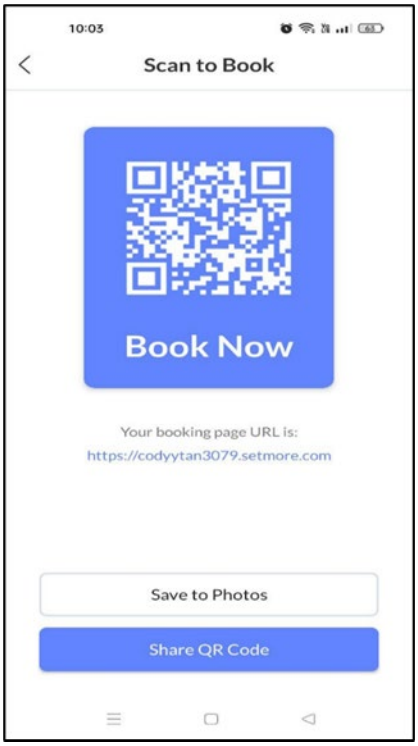


Figure 17:Share QR Code to Book Appointment

Source: Adapted from [6]

The next related work is TimeTree- Shared Calendar. It helps to schedule event calendar and add new events amongst personal use, family, friends, couples and co-workers. It creates group chat for each new event added. [7]

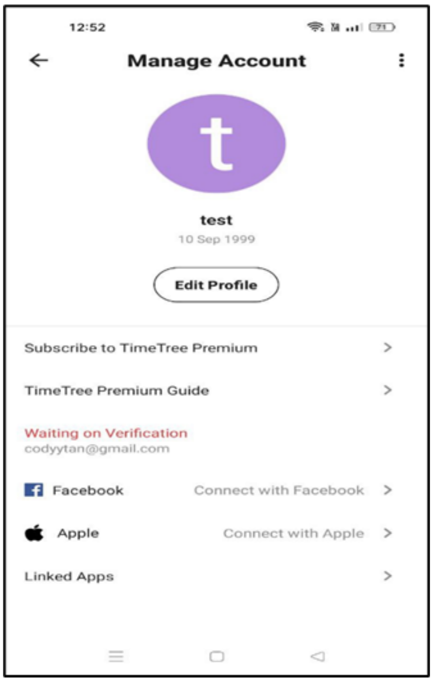


Figure 18:Enable Multiple Connection (Facebook and Apple)

Source: Adapted from [7]

Figure 19:Multiple Calendar with Different Purposes

Source: Adapted from [7]

Figure 20:Chat Room for Each Event

Source: Adapted from [7]

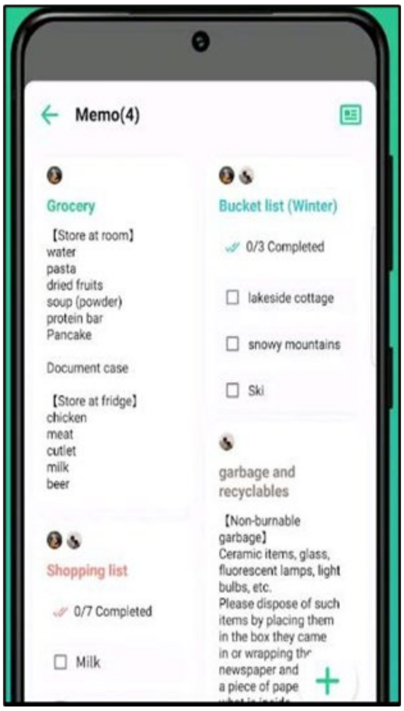


Figure 21:Share Notes

Source: Adapted from [7]

Figure 22:Widgets in Home Screen

Source: Adapted from [7]

Another similar existing system is Scoot Family Calendar. It is tailored for parents who are responsible for managing their family events and activities. It provides a shared family calendar which sends reminders to users about the family events or activities [8].

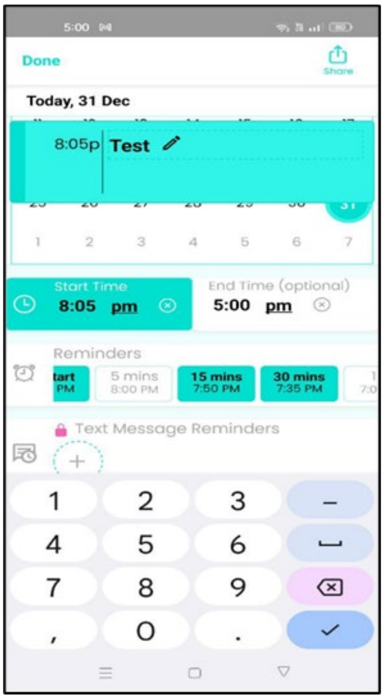


Figure 23:Event Calendar View with Text Message Reminder

Source: Adapted from [8]

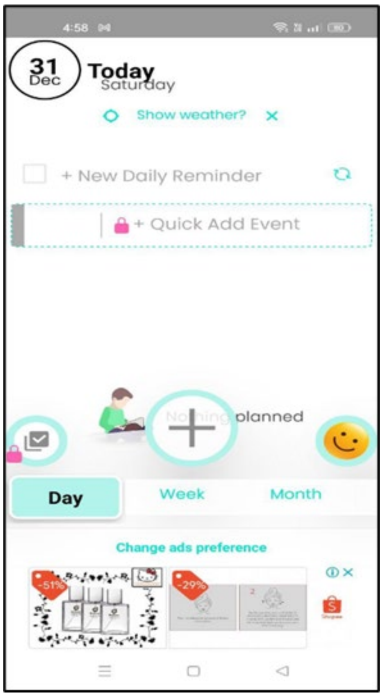


Figure 24: Event List and Reminders

Source: Adapted from [8]

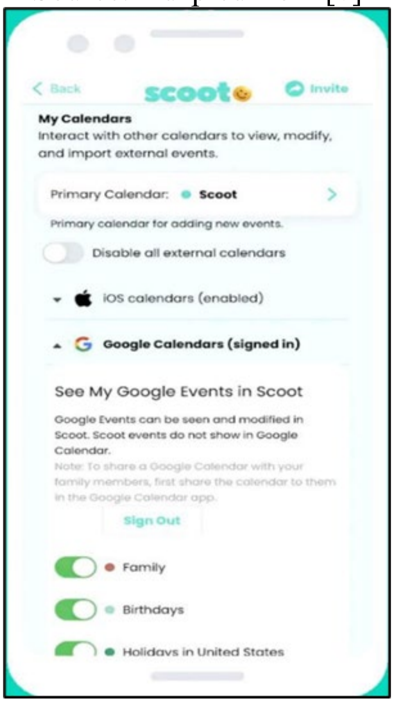


Figure 25:Synchronize with External Calendar App

Source: Adapted from [8]

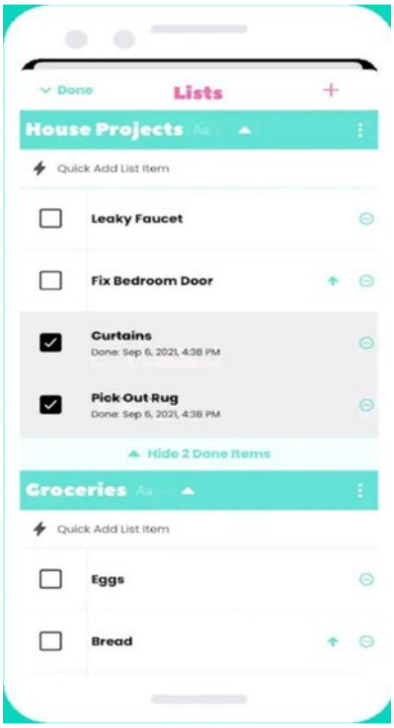


Figure 26: Shared Note List

Source: Adapted from [8]

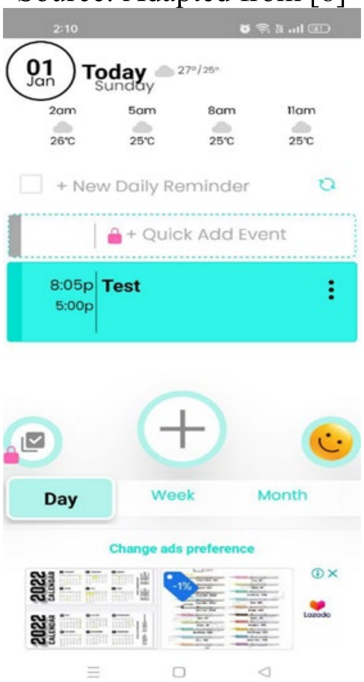


Figure 27:Weather Forecast

Source: Adapted from [8]

The next existing system is Famio: Connect With Family. It helps users to stay in touch with their family members by tracking their location. It aims to take care of the family's safety [9].

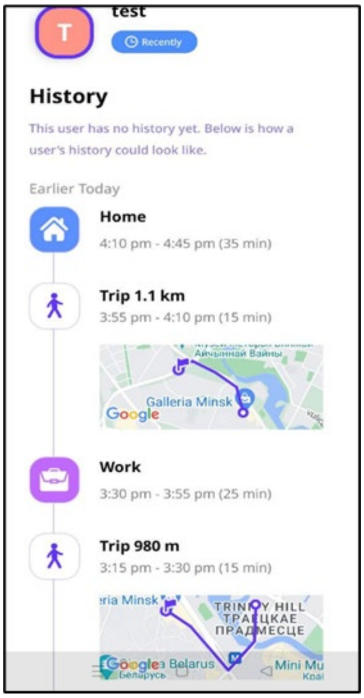


Figure 28: Location History

Source: Adapted from [9]

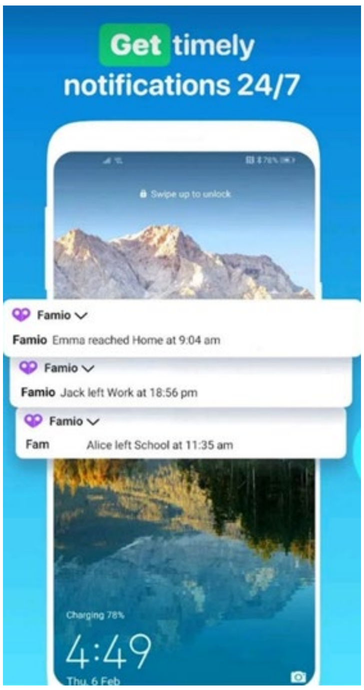


Figure 29: Get Timely Notification for Location Tracking

Source: Adapted from [9]

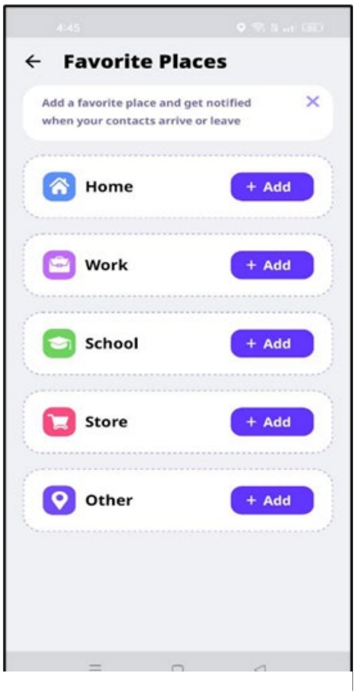


Figure 30:Places List

Source: Adapted from [9]

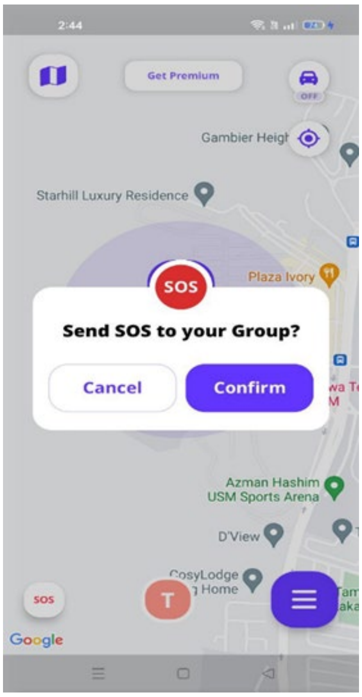


Figure 31:SOS Feature

Source: Adapted from [9]

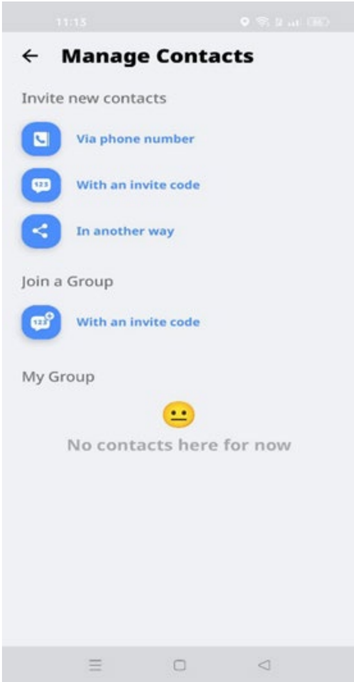


Figure 32:Contact List
Source: Adapted from [9]

The table below summarizes the functional requirements of existing systems for Contact and Appointments Subsystem.

Table 8: Table for Analyzed Existing Systems Functional Requirements (Contact and Appointments Subsystem)

No	Existing Systems	Not to have features	Must have features	Good to have features
1	Setmore Appointment Scheduling [6]	• Payment for services (irrelevant to family application) • Manage multiple staff calendar (not related to family application)	• Event calendar. • Schedule appointment. • Store contact details in contact list. • Automate reminders for event. • Get push notifications for new and edited appointments.	• Allow sign in using Facebook and Google. • Can share QR code to let others book appointment with user.

2	TimeTree- Shared Calendar [7]	• Multiple calendars for different purposes such as family, work, and relationship. (Too many calendars for family purpose)	• Shared calendar and scheduling • Invite new members via other applications such as WhatsApp, Messenger and more. • Send reminders for events.	• Can link to Facebook and Apple account. • Shared notes and lists. • Widgets in home screen. • Create chat room for each event.
3	Scoot Family Calendar [8]	• Ads features. (Disturbing while input item)	• Event calendar • Send reminders for events.	• Synchronize with external calendar app. • Shared note lists. • Weather forecast
4	Famio: Connect With Family [9]	• Find lost or stolen phone. (Not really related to family theme)	• Manage contact in contact list. • Can add places in places list. • Invite new members via phone number and links. • Location tracking on family members. • Get timely notifications.	• SOS feature. • Know when other family member's phone is run out of battery.

The table below summarizes the non- functional requirements of existing systems for Contact and Appointments Subsystem.

Table 9:Table for Analyzed Existing Systems Non-Functional Requirements (Contact and Appointments Subsystem)

No	Existing Systems	Usability	Reliability	Portability
1	Setmore Appointment Scheduling [6]	• User friendly • Easy to learn • Easy to use	The system is completely operational at least 98% of the time.	Supports Android, IOS system and Desktop.
2	TimeTree- Shared Calendar [7]	• User friendly • Easy to learn • Easy to use	The system is completely operational at least 98% of the time.	Works on PC and mobile.
3	Scoot Family Calendar [8]	• Not user friendly • Weird arrangement • Not responsive design • Ads block most of the space for input methods	The system is somehow operational at least 80% of the time.	Works on IOS and Android mobile.
4	Famio: Connect With Family [9]	• Easy to learn • Misleading interface, claimed that it is free, but user needs to pay for all functions to work properly.	The system has bugs and sometime not operational.	Only operate in Android mobile platform.

2.1.1.1.1 Existing API

The existing API used by these analyzed application are social media API, Location API, Calendar API, Weather API and Holidays API.

Setmore Appointment Scheduling and TimeTree- Shared Calendar are using social media API such as Facebook API to connect with user Facebook account for getting user information. Scoot Family Calendar uses Calendar API such as Google Calendar and Apple IOS Calendar to enable external connections to other calendars. Scoot Family Calendar uses Weather API for daily weather forecast in its application. The examples of existing Weather API are OpenWeather API and WeatherAPI.com. Holidays API such as AbstractAPI might be used in these applications to provide public holiday information in the event calendar.

2.1.1.1.2 Existing Algorithm

One of the algorithms that can be used for Contact and Appointment subsystem is the Common Neighbor Algorithm. Based on the existing research paper “Link Prediction Based on Common-Neighbours for Dynamic Social Network” by Lin Yao, Luning Wang, Lv Pan and Kai Yao, the Common Neighbor Algorithm is as stated below [10]

The terminologies in the algorithm:

- G is the graph
- v is the node
- $S_t(v_i, v_j)$ is the common neighbours set between v_i and v_j
- $f_t(v_i, v_j)$ is the similarity value between v_i and v_j at t
- $W_t(v_i, v_j)$ is the intimacy between the common neighbours of v_i and v_j at t
- $F(v_i, v_j)$ is the similarity value between v_i and v_j considered the period from 1 to T
- $N_T(v_i, v_j)$ is the set of v_i, v_j and their redefined common neighbours at T
- $W_t(v_m)$ is the node v_i’s change degree from 1 to t
- $W(t)$ is the time-varied weight at t

These are the steps that happens in Common Neighbour Algorithm for every pair of v_i and v_j in G.

Step 1: $S_t(v_i, v_j)$ is found for every snapshot at t.

Step 2: $W_t(v_i, v_j)$ is calculated among the nodes in the set of $S_t(v_i, v_j)$ in Equation (1).

$$\boxed{W_t(v_i, v_j) = ln(|N|)}$$

Equation 1:Equation(1)
Source: Adapted from [10]

Step 3: Equation (2) is used to calculate $W_t(v_m)$ of every common neighbour v_m in $S_t(v_i, v_j)$.

$$W_t(v_m) = \frac{1}{\sum_{t=2}^{T} d_{t-1,t} \Big/ \triangle T}$$

Equation 2: Equation (2)

Source: Adapted from [10]

Step 4: Equation(3) is used to calculate $f_t(v_i, v_j)$.

$$f_t(v_i, v_j) = W_t(v_i, v_j) \cdot \sum_{v_m \in S_t(v_i, v_j)} W_t(v_m)$$

Equation 3: Equation (3)

Source: Adapted from [10]

Step 5: $F(v_i, v_j)$ is calculated in Equation (4), considering the period from 1 to T.

$$F(v_i, v_j) = \sum_{t=1}^{T} W(t) \cdot f_t(v_i, v_j)$$

Equation 4: Equation (4)

Source: Adapted from [10]

Step 6: Based on F, the common neighbors between v_i and v_j is redefined. The node v_k is identified as the common neighbor between v_i and v_j, if $F(v, v)$ > 0 and $F(v_j, v_k) > 0$, and then $N_T(v_i, v_j)$ is discovered.

Step 7: Equation (5) calculates $P(v_i, v_j)$, where $F(v_x, v_y)$ is the edge weight between v_i, v_j and their newly redefined common neighbors. A higher $P(v_i, v_j)$ denotes a higher association probability between v_i and v_j.

$$P(v_i, v_j) = \sum_{v_x, v_y \in N_T(v_i, v_j)} F(v_x, v_y)$$

Equation 5: Equation (5)

Source: Adapted from [10]

The research approach takes into account the social networks' dynamic nature and presents three metrics: time-varying weight, common neighbour change degree, and common neighbour intimacy. The common neighbours within two hops are also redefined. The experimental findings demonstrate that the research strategy enhances link prediction performance.

The following figure shows the pseudocode for the algorithm [10]:

Algorithm 1 Link Prediction Based on CN for Dynamic Network

Input: $G = (G_1, G_2, ..., G_T), (v_i, v_j)$

Output: $P(v_i, v_j)$

function PREDICTION(v_i, v_j)
    for $t = 1 \rightarrow T$ **do**
        $S_t(v_i, v_j) \leftarrow \Gamma(v_i) \cap \Gamma(v_j)$
        $wi \leftarrow W_t(v_i, v_j)$
        $cnd \leftarrow \sum_{v_m \in S_t(v_i, v_j)} W_t(v_m)$
        $f_t(v_i, v_j) \leftarrow wi \cdot cnd$
    end for
    $F(v_i, v_j) \leftarrow \sum_{t=1}^{T} W(t) \cdot f_t(v_i, v_j)$
    $P(v_i, v_j) \leftarrow \sum_{v_x, v_y \in N_T(v_i, v_j)} F(v_x, v_y)$
end function

Figure 33: Link Prediction Based on Common Neighbour Algorithm

Source: Adapted from [10]

2.1.1.2 Child Education Tracking Subsystem

2.1.1.2.1 Existing Systems

The application that is similar to my proposed subsystem is My Study Life. This app allows users to enter their daily activity schedule to help users to organize their classes, homework, and exams [11]. Then, it will display the schedule with all their daily activities in the calendar. Besides, users will receive reminders for future courses, assignments, or tests as well as for unfinished work that is due soon.

Figure 34: Calendar (Week)

Source: Adapted from [11]

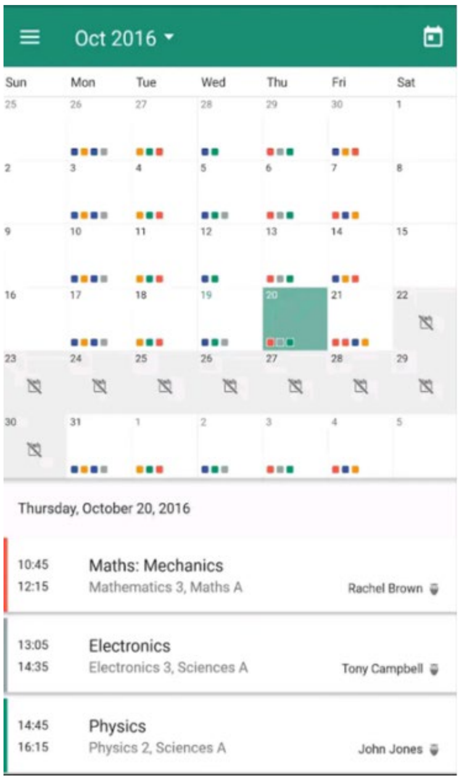


Figure 35: Calendar (Month)

Source: Adapted from [11]

Despite having all the required functionality, application nevertheless has certain drawbacks. For instance, the calendar, whether it is in month view or week view, only displays classes and tests. Tasks are not listed on the calendar. The calendar's absence of tasks deadlines runs counter to the calendar's intended use, which is to make everything clear at a glance.

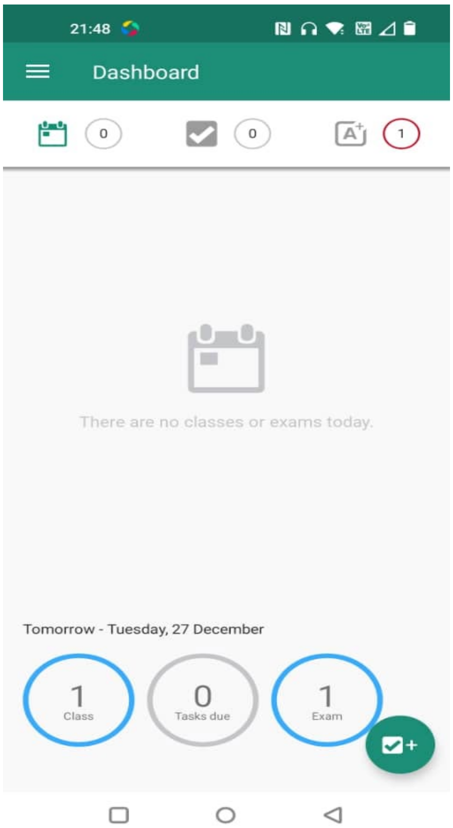


Figure 36: Dashboard

Source: Adapted from [11]

The icon designs used in this application were not created according to approved standards. They do not continue to employ analogies from everyday life that the majority of potential users can understand. For instance, I am unsure of what the "A" and tick icons in Figure above mean. In addition, I can only add a new task by clicking the add button. It is not very user-friendly. Users should be able to add new classes, examinations, and tasks as this dashboard displays all the assignments, tests, and assignments.

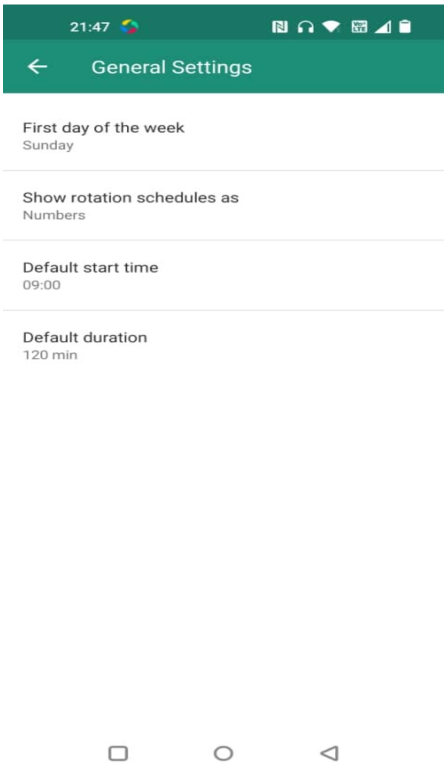


Figure 37: General Settings

Source: Adapted from [11]

The page shows the general settings. It is advantageous because users may customize the settings to suit their preferences. To its users, it does not, however, deliver clear messages. Only the first setting, first day of the week, which allows us to change the first day of the week, makes sense to me. I honestly have no idea what the second, third, and fourth settings mean, though. For instance, I am not sure what is the default start time.

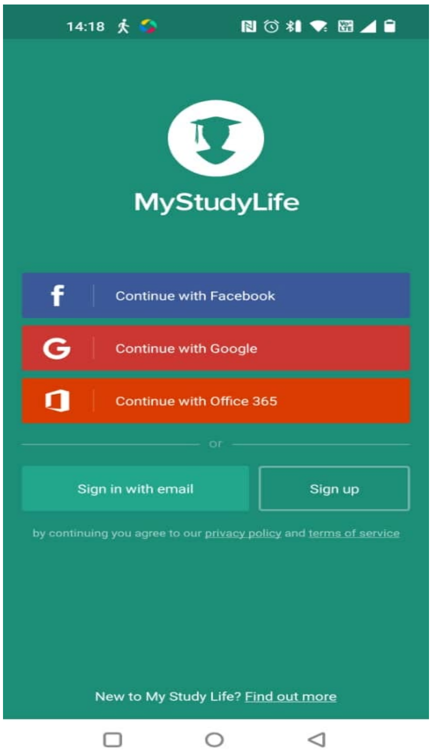


Figure 38: MyStudyLife Login Page

Source: Adapted from [11]

Other than signing up for a new account and signing in using the account, users can also sign in with Facebook, Google, and Office 365. To use these features, APIs are required to access third-party authentications. Hence, Google API, Facebook API and Office 365 API are used in this application. It is advised to sign in with Facebook or Google as they have a better, more secure authentication mechanism than the one the developers might develop.

I would say that this application is simple to use in a nutshell. Users often receive messages that are clear. I think users can do the duties easily and fast once they have been taught how to utilize the application. Even after a while of not using the application, they will remember how to utilize it. The application's designs and features have my full satisfaction.

Another application that looks like the proposed subsystem is Exam Countdown Lite. This app helps to keep track of exam dates. It will show the countdown to the exams and send reminder notifications to the users so that users can do some preparations before sitting for the exams and will not miss out on any exam [12]. It also serves as an exam timetable for users.

Figure 39: Countdown to the exam date (Overall View)

Source: Adapted from [12]

Figure above shows colorful interface. There are drawbacks to having a lot of colors in one interface, despite the fact that it might make it appear appealing and grab users' attention. A single visual composition with a lot of brilliant colors runs the danger of losing the emphasized components when they blend in with the background color. When viewing text on a smart phone device, vibrant colors may appear excessively contrasting and make individuals feel very uncomfortable. It is advised to utilize no more than four different colors on an interface.

Figure 40: Countdown to the exam date

Source: Adapted from [12]

By using the share features, users may share their countdowns to other people. The tests will be added to the people's countdown list as soon as they agree to countdown to the exams together. Users benefit from this since only one person needs to add a test to the countdown, and subsequent exam-takers can obtain the countdown from that person via an invitation link. This makes it convenient for their users.

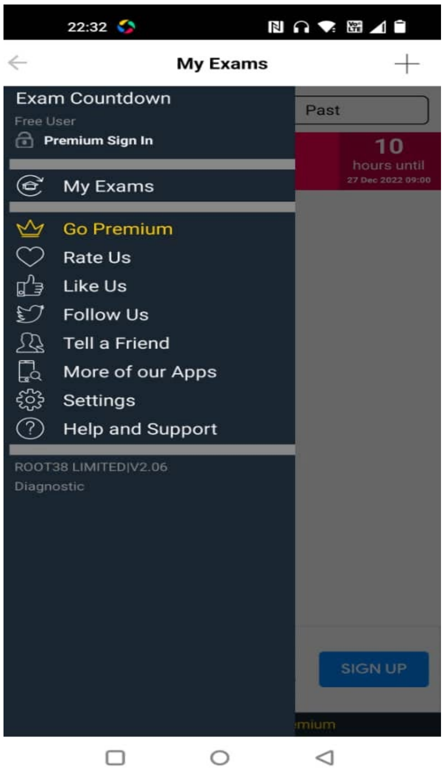


Figure 41: Navigation bar

Source: Adapted from [12]

This app offers various unique features like “Rate Us”, “Like Us”, and “Follow Us”. We will be sent to the play store to rate the app when we tap Rate Us. Like Us will bring us to their Facebook page while Follow Us will take us to Twitter. We can like their page or follow them through these features. Through these social media profiles, we can learn as much as we can about the app.

In a nutshell, this software is simple to use and understand. I don't need instructions from the user manual since I can understand how to use the application just by looking at the interfaces. This software is useful as a countdown to exams. Except for the colors utilized, the application has my full satisfaction. Overly many vibrant colors that could appear too contrasting are discouraged since they overstimulate the retinas and put strain on the eyes.

Child Reward is an application that has similar functions to my proposed solution. A star point system underlies the application process [13]. For children, the parent might add chores and prizes. The value of each distinct duty might vary. Children can get the prizes after they get the necessary amount of stars. The ability to create a panel for a child is the application's most crucial feature. The panel enables children to carry out regular tasks. A notification is sent to the parent right away when the task is finished. Parents may accept or reject the completion of child's tasks.

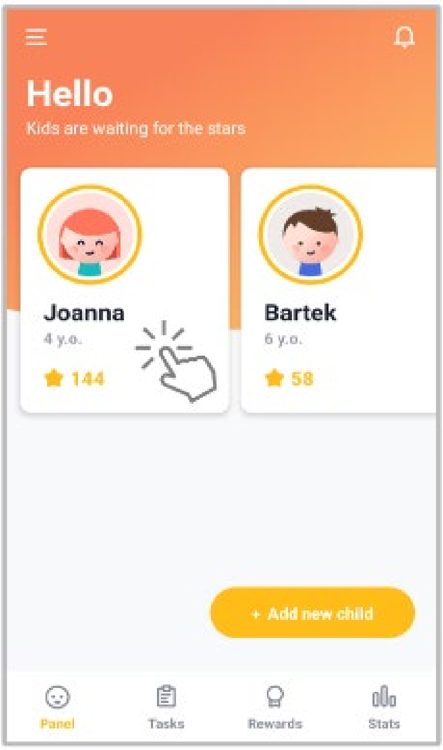


Figure 42: Dashboard that shows all the children

Source: Adapted from [13]

From Figure above, we can see that when adding a new kid, it is inserted horizontally, leaving an excessive amount of empty space below. An interface that has too much white space may be awkward and unattractive. It is advised, in my opinion, to keep some white space between design components. However, avoid leaving too much white space, which can cause users to lose interest.

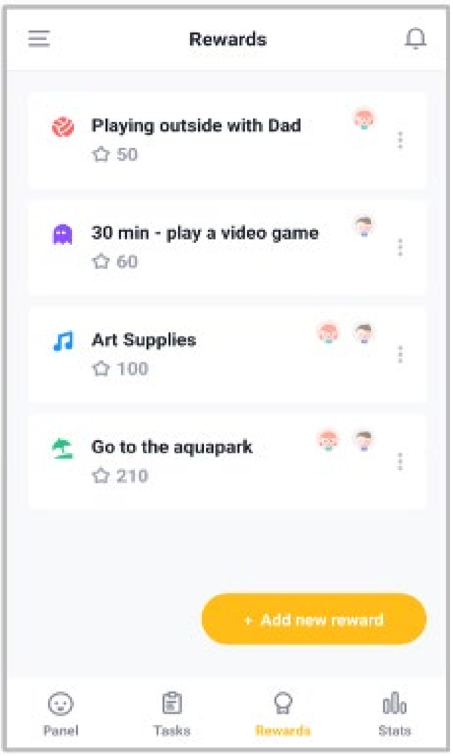


Figure 43: Reward List

Source: Adapted from [13]

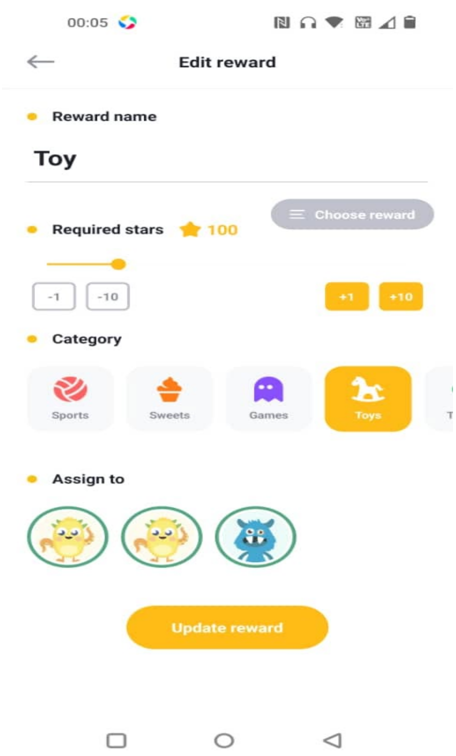


Figure 44: Edit Reward

Source: Adapted from [13]

The specifics of the reward are shown in the Edit Reward interface. Except for the assignment to input, everything is fine regardless of the design, inputs, and accuracy of the information. Parents can select which children will get the reward in this section. Each of the children is represented with their profile photo. Children who share profile pictures run into problems. Therefore, it is advised to add the children's names so that parents can distinguish between children who have similar profile pictures.

Figure 45: Visualization of stars obtained by each child

Source: Adapted from [13]

The charts allow you to see how many stars the children have collected over time. By quickly scanning the chart, we can determine the trend of their stars. If the graph is decreasing, this can be due to a lack of interest in the rewards or assigned to unachievable tasks. Tasks and rewards may both be changed appropriately so that the children will be motivated to work toward them.

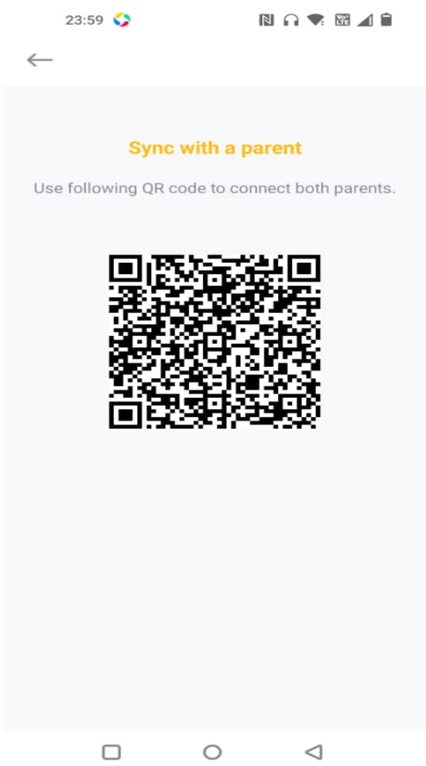


Figure 46: Data Synchronization

Source: Adapted from [13]

This application's unique feature is its ability to synchronize data with another user. By scanning this QR code, users may connect with one another and keep their accounts consistent. This feature is very important since it enables data synchronization between both parents when one of them adds tasks and rewards, update tasks and rewards, and validates that the targets have been completed. Having this functionality can prevent the problems of setting up repeatable tasks and rewards.

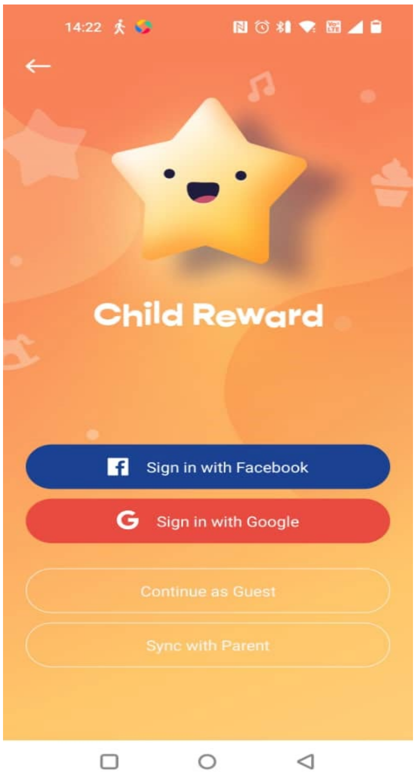


Figure 47: Child Reward Sign in Page

Source: Adapted from [13]

Users can sign in with Facebook or Google other than continue as guests. To integrate Google Sign-in into the app, Google API is used. Facebook API is required in order to integrate Facebook Sign-in into the app. By using Google Sign-in or Facebook Sign-in, the system is no longer required to manage secure credential recovery procedures or store login credentials. All of these would be handled for us by these third-party authentications, adding an extra degree of protection when we sign in.

This application is also simple to use. When they first see the designs, I think practically all users will be able to utilize the application. Learning it is also simple. In terms of the looks and functions, I am pleased with the application. However, the app' developers should pay attention to certain little details, including leaving a lot of white space in the user interface which should be avoided.

2.1.1.2.2 Existing Algorithm

One of the features of child education tracking subsystem is to plan a balanced schedule for children. To achieve this, event scheduling is suggested to be used. For fully automated and very efficient event scheduling, Neural Event Scheduling Assistant (NESA) which recognizes calendar contexts and learns user preferences from raw online calendars is proposed by Kim Donghyeon, Lee Jinhyuk, Choi Donghee, and Choi Jaehoon. NESA can be used for scheduling both personal events and multi-attendee events which conforms to my feature. Schedule planning aims to help children to schedule their events properly so that there are no activities clashing with each other. Children have their own personal events such as jogging, tuition classes and watching movies while they also involve in multi-attendee events such as sports and family day which requires both parents and children to attend. If children want to go somewhere else which requires parents to pick them up, this activity is also considered as multi-attendee event since parents need to bring them to the destination. Hence, parents' time slots need to be considered too when scheduling this kind of activity.

Neural Event Scheduling Assistant (NESA) is a deep neural model which uses user calendar data to train itself to arrange events on the calendar [14]. NESA is a completely automated event scheduling assistant that can recognize plain language in calendar scenarios and learn user preferences. NESA uses several deep neural networks, including Bidirectional Long Short-Term Memory (Bi-LSTM) and Convolutional Neural Network (CNN) to comprehend various sorts of information in calendars. The four layers in NESA including Title layer, Intention layer, Context layer, and Output layer are collectively taught to plan activities on a person's calendar. After training, NESA is used for scheduling personal events like homework and multi-attendee events which involve several attendees such as meetings.

In this paper, authors focus on five attributes such as title, start time, duration, registered time and user identifier which each calendar event has. By the week that each user's events begin, we aggregate all of their events together. Events for user A, for instance, that begin in the 16th week of 2019 will be classified under A_2019_16. Events are arranged inside each category according to the registered time. All K events during a certain week may be stated as follows for each user: E = e1, . . . , eK , and ei = (xi , ti , di , ui) for i = 1 to K, where xi is the start time, ti is the title, di is the duration, and ui is the user identification of ei.

When scheduling events, users' preferences and calendar contexts are taken into account to offer them with appropriate time slots. Personal event scheduling should take a user's preferences into account as well as the pre-registered events of the week (context) in which an event will be registered. Thus, given the pre-registered events (e1,..., ei-1) that make up the context of the week and given the title ti, duration di, and user ui characteristics of the i-th event, an event scheduling model predicts the start time yi of the i-th event ei. The title, length, user, and start time (xi) parameters are also included in each pre-registered event, making it challenging for any models to make use of all the available circumstances. Given the probability of target time slot yi of event ei, the optimal model parameters Θ∗ are as follows:

$$\Theta^* = \underset{\Theta}{\operatorname{argmax}}\, p(y_i | e_1, \ldots, e_{i-1}, t_i, d_i, u_i; \Theta) \qquad (1)$$

Equation 6: Equation for Personal Event Scheduling

Source: Adapted from [14]

Where Θ stands for a model's trainable parameters. It should be noted that K events might have scheduling issues in a week, even if there are no pre-registered events. To assess each model's comprehension of calendar contexts and user preferences, each event scheduling issue is approached separately [14].

Multi-attendee event scheduling takes numerous users' preferences and calendar circumstances into account. Given U users attending a certain event eμ with the ideal model parameter Θ∗, the best time slot y∗μ among potential time slots yˆμ is determined as follows:

$$y^*_\mu = \underset{\hat{y}_\mu}{\operatorname{argmax}} \sum_{j=1}^{U} p(\hat{y}_\mu | E^j_{1:\mu-1}, t_\mu, d_\mu, u_j; \Theta^*) \qquad (2)$$

Equation 7: Equation for Multi-Attendee Event Scheduling

Source: Adapted from [14]

where $E^j_{1:\mu-1}$ represents a collection of events that j-th users have pre-registered before the event eu. In this method, a time period that will satisfy as many people as possible is picked. Please be aware that each user may have a different amount of pre-registered events. Additionally, although each user is being assumed that will have the same impact on the scheduling of multi-attendee events, more complex aggregating methods, such multiplying a weighting factor for each user, are also feasible. However, the performance of each model trained on personal event scheduling data is examined using the most basic aggregation method [14].

NESA which is being proposed can handle many sorts of raw calendar attributes. It consists of four layers including Title layer, Intention layer, Context layer, and Output layer. Intention layer is focused here because intention layer uses the title, duration, and user representations in order to learn user preferences and recognize the purpose of events. This matches to my proposed feature which will use compulsory and pick me up those attributes to represent user identifier to learn user preferences.

When registering for an event, users have many objectives. Title ti, duration di, and user ui properties are included in the Intention layer to record each user's intention. The Intention layer considers user choices and the goals of events in this way. Authors utilise the Highway Network in particular, which contains certain skip-connections between levels. The output of the Highway Network Ii is as follows given a title representation t'i from a Title layer, duration di, and user ui:

$$x = [t'_i, d_i, e_u(u_i)]$$
$$q = \sigma(W_q x + b_q)$$
$$I_i = q \odot f(W_h x + b_h) + (1 - q) \odot x$$

Equation 8: Equation for Intention Layer

Source: Adapted from [14]

where each user's embedding mapping is represented as $e_u(\cdot) \in \mathbb{R}^U$. Wq and Wh ∈ R(T +U +1)×(T +U +1) are trainable parameters and f is a nonlinearity. The Intention layer can quickly learn both linear and nonlinear correlations between calendar features because of the skip-connection from x to Ii as well as the nonlinearity [14].

In conclusion, NESA is a good model that can be used on event scheduling. In addition to taking into account user preferences and calendar contexts, NESA learns how to schedule events straight from raw calendar data. NESA makes use of deep neural networks for event scheduling. On both the personal and multi-attendee event scheduling tasks, NESA outperforms the other baseline models.

2.1.1.3 Finance Monitoring Subsystem

2.1.1.3.1 Existing Systems

One of the applications that is similar to my proposed subsystem is Money Manager. This app allows users to record their income and expenses of different categories and calculate the total left (incomes – expenses). Users can view their finance record in daily view. Besides, this app also provides different view like calendar, weekly, monthly to let user see view the total incomes and expenses.

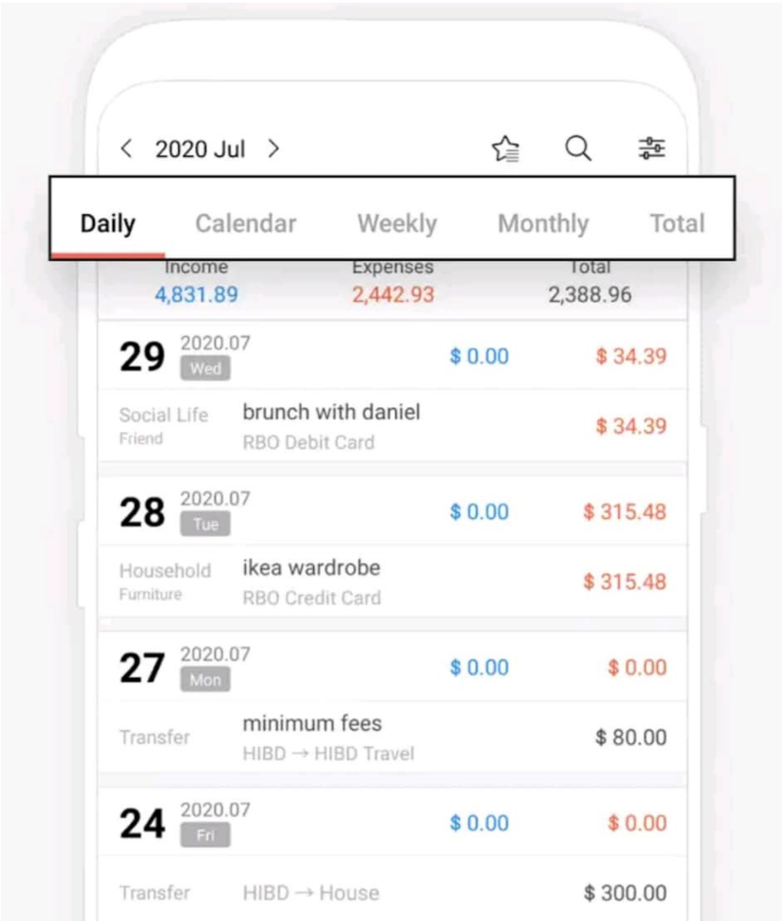


Figure 48: List of Expenses

Source: Adapted from [15]

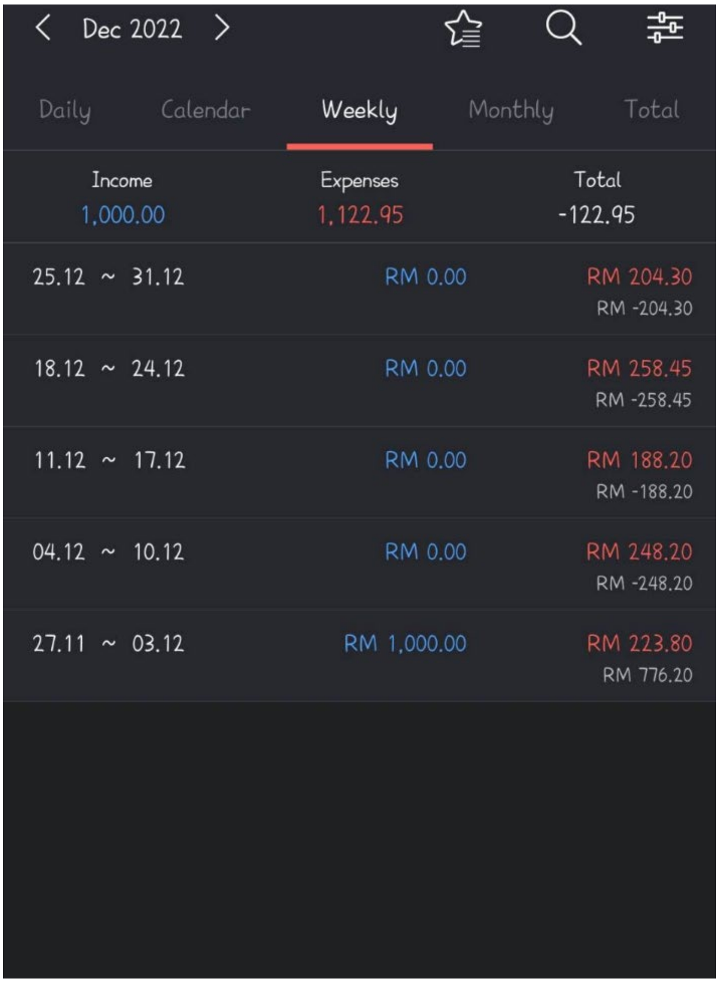


Figure 49: Total incomes and expenses based on week

Source: Adapted from [15]

When creating a new finance record (either income or expenses), users are also allowed to choose the date and time, choose category, amount and note. Besides, user can save the pictures of receipts/invoices while recording the expenses so that user can refer what they have spent on and this can help the user on income tax or any claim if needed. User can edit their records if needed. The drawback is the account option in creating finance record which are cash, accounts and card that is not useful.

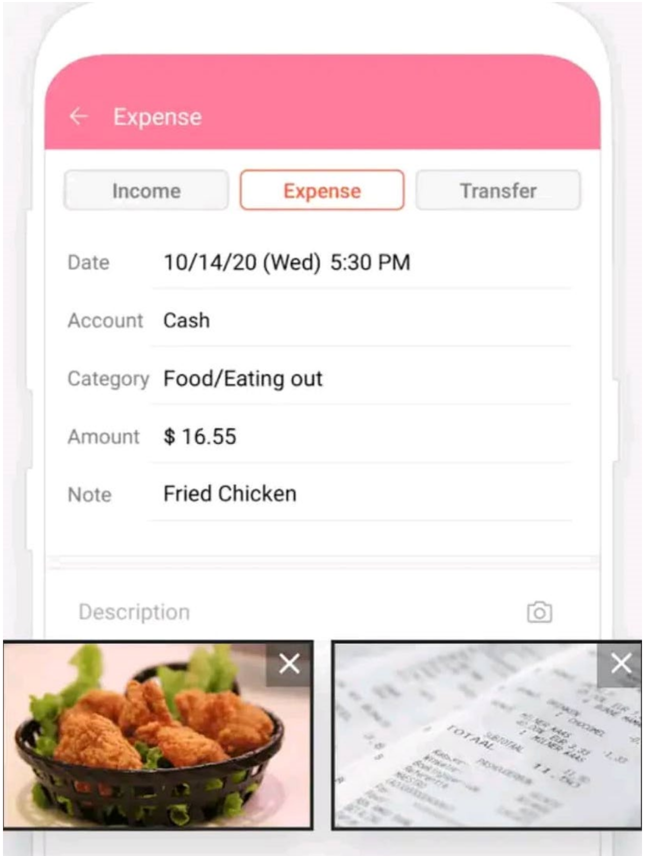


Figure 50: Record Expenses with Receipts Together.

Source: Adapted from [15]

Moreover, this also provide transfer record feature to record the money flow either from account to cash, cash to account, account to card and others which user can choose where money is from (cash, accounts, card) and transfer to (cash, accounts, card). In my opinion, this feature is not useful and most of the users will not utilize this function as it is troublesome to record every money transfer.

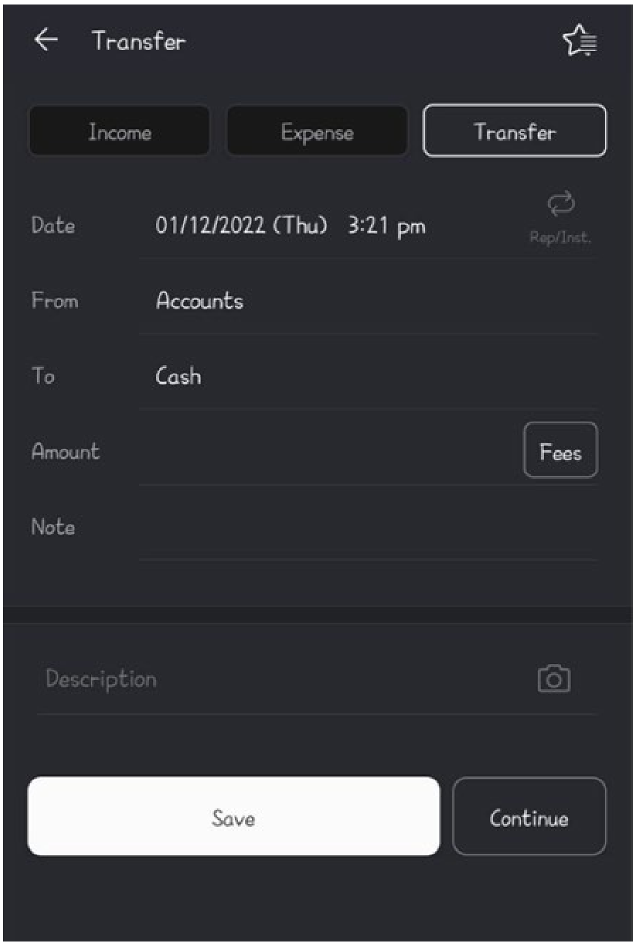


Figure 51: Money Transfer Record

Source: Adapted from [15]

Furthermore, Money Manager app also provides statistical chart for user to see their total expenses for each category. This feature helps user to know the pattern of their spending. Different category is represented by different colours and this ease the user to see different portion of expenses or incomes categories.

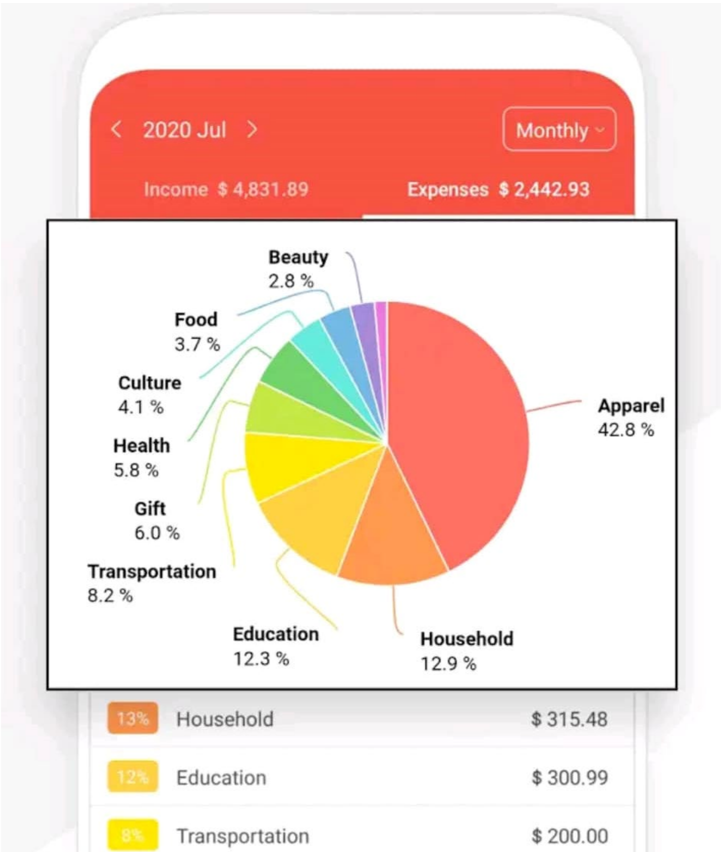


Figure 52: Pie Chart that Showing Expenses Categories' Percentage

Source: Adapted from [15]

This app also allow user to search for their finance record based on category, amount or note.

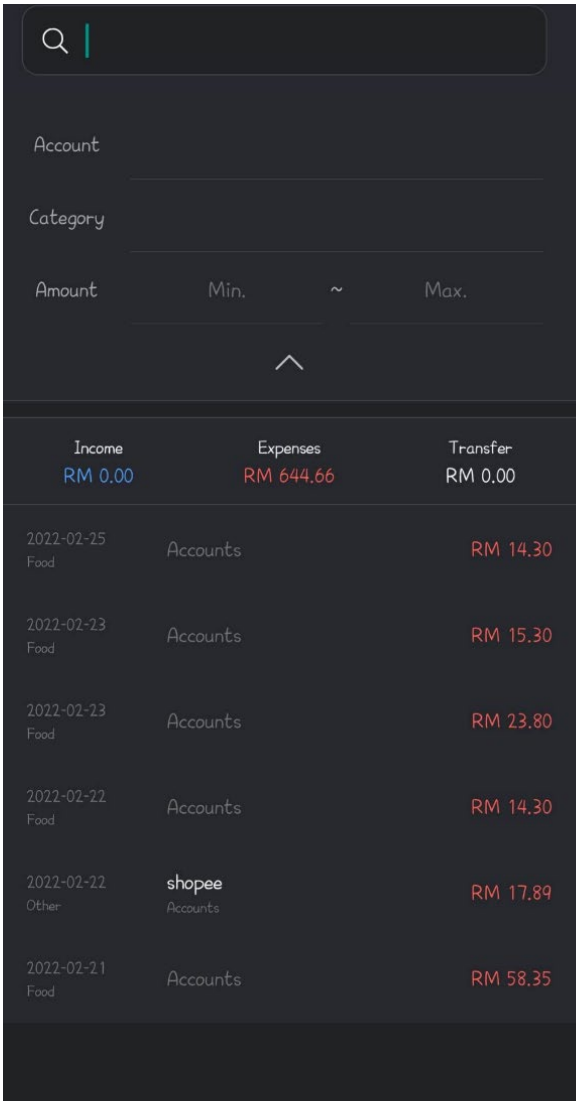


Figure 53: Search Finance Record

Source: Adapted from [15]

To conclude on this Money Manager app, this app is user friendly that the design of the app helps user to use this app easily without using user manual. This app helps user on transaction tracking which allows users to input their income, expenses, and provides a clear overview of their financial situation. In this app, there are option to choose types of account: accounts, cash and card which I think is unnecessary. The other feature that is not really useful is the transfer record feature which is transfer between account (cash, card accounts) as normally people will not record this in an financial monitoring app.

Another application is Budget App that have an extra feature which is budgeting. This feature allows users to set a budget for a particular month and will show the budget balance to the user. However, the budget set is for the total budget, not budget for certain category. This app also allows user to create finance record (incomes/expenses) like Money Manager app.

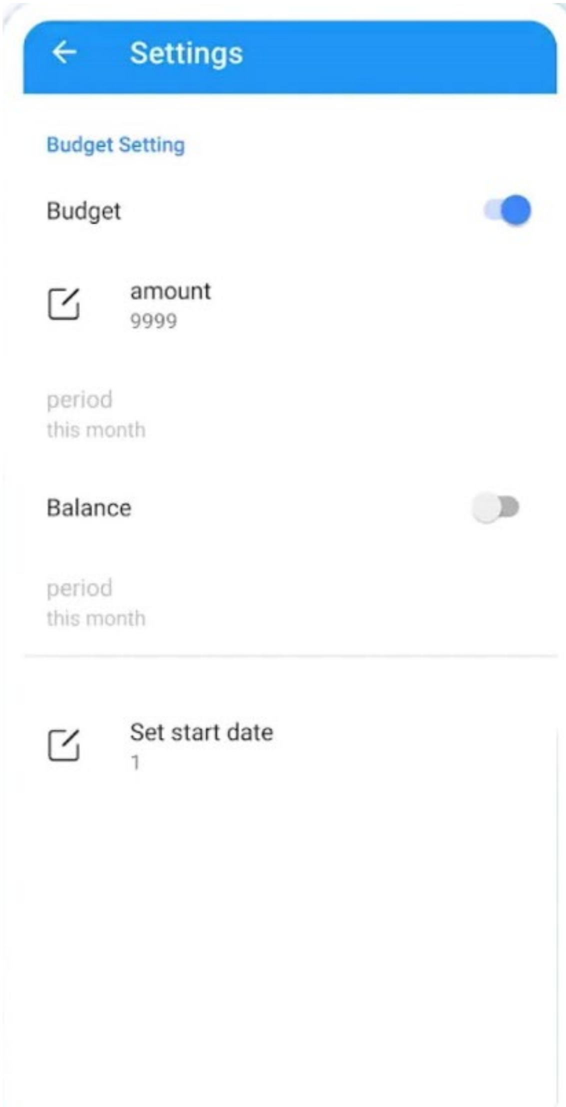


Figure 54:Budget Setting

Source: Adapted from [16]

When user chooses to add financial record, this app will navigate user to choose incomes/expenses category and proceed to fill in the details of financial record. User can have simple calculation here before saving the final amount The drawback of this feature is no photo saving for the financial record that user cannot store invoices/receipt for future review.

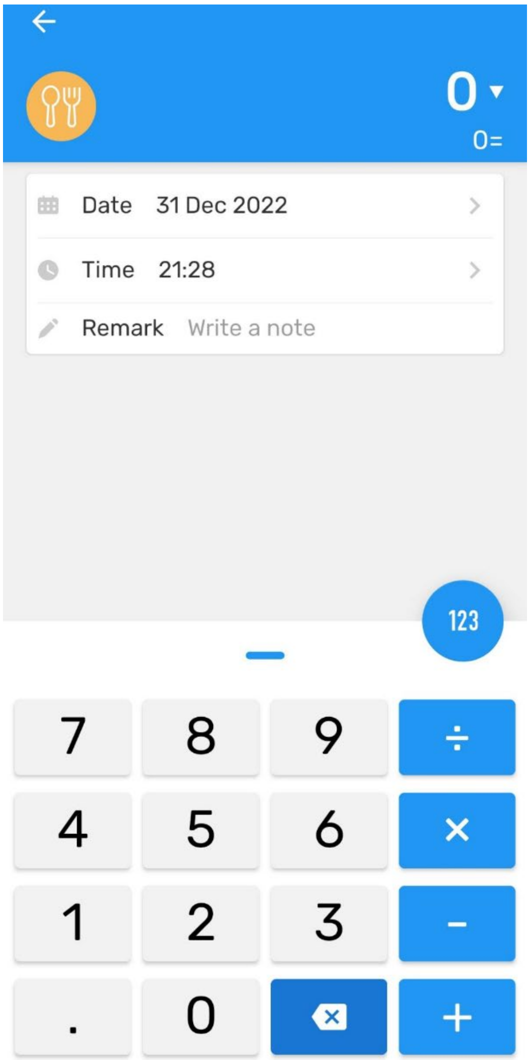


Figure 55: Create Financial Record

Source: Adapted from [16]

Besides, the listing of the finance record is showing all the records which include the previous month. The figure shown below showing both December and January financial record although the month is January. Besides, this app can only show the current month and user cannot navigate to other months. In other words, all financial record will be shown in this page no matter which month is it. Moreover, there is only 1 view which there is no weekly/monthly total income and expenses.

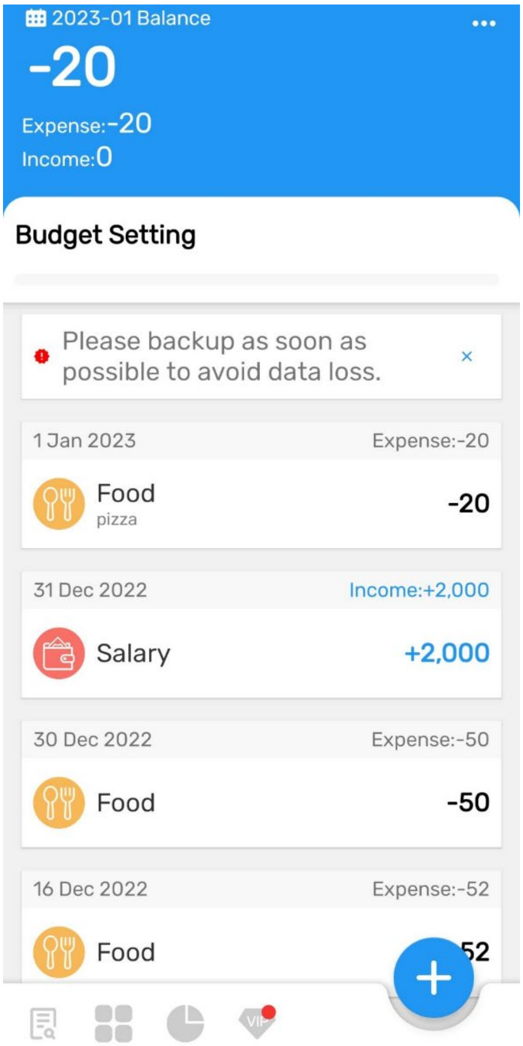


Figure 56: Financial Record

Source: Adapted from [16]

Moreover, user can edit or delete the income and expenses category by own preferences in the category setting.

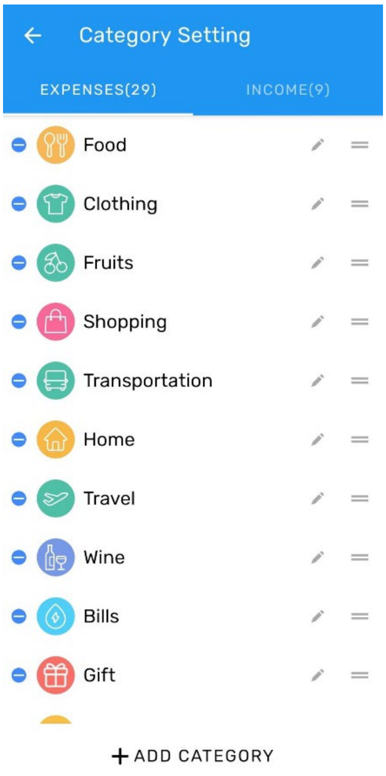


Figure 57: Expenses Category

Source: Adapted from [16]

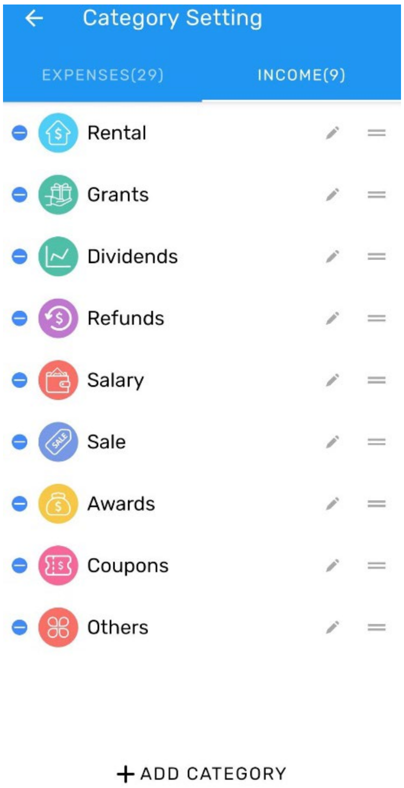


Figure 58: Expenses Category

Source: Adapted from [16]

The statistical chart is also provided in this app based on incomes and expenses which is the same as in Money Manager app.

As summary of this app, it is good for the user to have an additional budgeting function. This app is also easy to use. However, this app is not useful as the first app because there is the financial record listing is all in one view no matter which month is it and there are no weekly/monthly total incomes and expenses view. Besides, the budget is only for total budget which is not differentiate to different expense categories.

Below is the table to summarize what features can be taken from the existing applications.

Table 10: Features from existing applications

Features	Must Have	Good To Have	No need to have
Incomes record	/		
Expenses record	/		
Listing of financial record based on month	/		
Weekly total income and expenses		/	
Monthly total income and expenses		/	
Budgeting	/		
Customise income and expense categories		/	
Transfer record			/
Search finance record		/	
Edit/Delete finance record	/		
Statistical Chart	/		

2.1.1.3.2 Existing Algorithm

Some researches have been done on the existing algorithm in finance tracking app. The first existing algorithm is recommendation algorithm.

A recommendation algorithm is a type of algorithm that is used to make recommendations to users based on data about their preferences, behavior, and other factors. These algorithms are commonly used in a variety of applications, including online retail, music and video streaming, and social media. In the context of financial tracking apps, recommendation algorithms are used to recommend financial products or investments to users based on their past behavior and other factors.

There are several different approaches that recommendation algorithms can take to generate recommendations. For example, some algorithms may use collaborative filtering, which involves analyzing the past behavior of a group of users and making recommendations based on what similar users have done in the past. Other algorithms may use content-based filtering, which involves analyzing the characteristics of a financial product or investment and making recommendations based on the user's past preferences for similar products.

One of the formulas used in collaborative filtering for recommendation system is Pearson correlation. This formula is used to measure the linear correlation between two variables. In the context of collaborative filtering, it can be used to measure the similarity between two users based on their past behavior [17].

The formula for Pearson correlation is:

$$r = \Sigma(x - \bar{x})(y - \bar{y}) / \sqrt{[\Sigma(x - \bar{x})^2 \Sigma(y - \bar{y})^2]}$$

where x and y are the two variables being compared, $\bar{x}$ and $\bar{y}$ are the means of x and y, and Σ represents the sum over all of the data points.

In summary, recommendation algorithms can be a useful tool for helping users in finance, but it is important for users to carefully consider the recommendations made by these algorithms and to do their own research before making any financial decisions.

Besides, Fraud detection algorithms are used in finance apps to identify suspicious activity or fraudulent transactions. These algorithms work by analysing data about financial transactions and looking for patterns or anomalies that may indicate fraudulent activity.

There are several different approaches that fraud detection algorithms can take to identify fraudulent transactions. Some algorithms may use machine learning techniques to learn the patterns of normal behaviour and then flag transactions that deviate from these patterns as potentially fraudulent. Other algorithms may use rules-based systems, in which transactions are compared to a set of pre-defined rules or criteria and are flagged as potentially fraudulent if they match one or more of the rules. Fraud detection algorithms may also use a combination of machine learning and rules-based approaches or may incorporate other techniques such as network analysis or natural language processing.

There are many different algorithms and formulas that can be used in fraud detection systems and here are a few examples of algorithms and formulas that might be used in a fraud detection system for a finance tracking app:

Logistic regression: This is a type of machine learning algorithm that is used to predict a binary outcome (e.g., fraudulent vs. non-fraudulent transaction). The algorithm is trained using a set of labelled data (i.e., transactions that are known to be fraudulent or non-fraudulent) and uses a formula to calculate the probability that a new transaction is fraudulent [18].

The formula for logistic regression is:

$p = 1 / (1 + e^{-(b0 + b1x1 + b2x2 + ... + bnxn)})$

where p is the probability of the transaction being fraudulent, x1, x2, ..., xn are the input features (e.g., transaction amount, location, etc.), and b0, b1, b2, ..., bn are the coefficients that are learned by the algorithm.

Anomaly detection: This is a technique that involves identifying unusual or unexpected patterns in the data. Anomaly detection algorithms can be used to flag transactions that deviate significantly from the normal patterns of behaviour as potentially fraudulent. There are many different algorithms and formulas that can be used for anomaly detection, including density-based algorithms (e.g., Local Outlier Factor, One-class SVM), distance-based algorithms (e.g., KNN, LOF), and clustering algorithms (e.g., k-means, DBSCAN).

Rule-based systems: These systems use a set of pre-defined rules or criteria to flag transactions as potentially fraudulent. For example, a rule-based system might flag a transaction as potentially fraudulent if it exceeds a certain threshold amount, or if it is being made from an unusual location. The specific rules and criteria used in a rule-based system will depend on the specific requirements of the system and the characteristics of the data.

In a nutshell, fraud detection algorithms can be an effective tool for identifying fraudulent activity and helping to protect financial institutions and consumers from financial losses. However, it is important for these algorithms to be regularly updated and refined to keep up with the constantly changing tactics of fraudulent actors.

2.1.2 Strengths and Weaknesses of the Existing Systems

2.1.2.1 Contact and Appointment Subsystem

Table 11:Strengths and Weaknesses of Existing Systems (Contact and Appointment Subsystem)

Existing System	**Strengths**	**Weaknesses**
Setmore appointment scheduling [6]	• Manage and schedule appointments from mobile phones. • Share booking link with customers. • Automate reminders to reduce absence.	• The movement between pages is a bit lagging. • Need to download another application to meet virtually.
TimeTree- Shared Calendar [7]	• Can link to Facebook and Apple account. • Shared calendar and scheduling. • Send reminders for event.	• Cannot pick location from map for event creation.
Scoot Family Calendar [8]	• Event calendar • Send reminders for events. • Synchronize with external calendar app.	• Weird interface. • Not user friendly. • Disturbing ads which block input.
Famio: Connect With Family [9]	• Location tracking on family members. • Get timely notifications. • SOS feature.	• Misleading interface, claimed that it is free, but user needs to pay for all functions to work properly.

2.1.2.2 Child Education Tracking Subsystem

Table 12: Strengths and Weaknesses of Existing Systems of Child Education Tracking Subsystem

Existing System	Strengths	Weaknesses
My Study Life	• Provides convenience to their users as they no need to carry a planner everywhere they go.	• Has limited functions. It can only keep track of users' daily activities. There is no analysis on the data and automation

	• Allows users to keep their lessons, assignments, and tests in the cloud so that they are accessible from anywhere on any device. • Cross-platform application that can run in iOS, Android, Windows 8, Windows Phone, and the web. • Enables users to build customized timetables with various colors and fonts to aid in staying organized. • Provide secure authentication as third-party authentication is used.	recommendation features. There is not any report generated to conclude users' activities. This app also does not create and suggest weekly schedule for the users.
Exam Countdown Lite	• Remind users of the exam dates so that users can do some early preparations before sitting for the exams and will not miss out any exam. • Able to select favourite symbol and include any critical remarks to personalise each exam.	• Has limited functions and few restrictions. It helps to keep track of exam and test dates only. Other important events such as sports competition is not allowed to insert.
Child Reward	• Able to synchronise parent and children accounts by scanning the QR code. • Data analysis and visualization • Notifications are sent when there is task completed • Provide secure authentication as third-party authentication is used.	• Have several bugs such as children can mark future chores as completed • Lack of customization of the task list • Not user-friendly as the navigation is overcomplicated.

2.1.2.3 Finance Monitoring Subsystem

Table 13: Strengths and Weaknesses of Existing Systems of Finance Monitoring Subsystem

Existing System	Strengths	Weaknesses
Money Manager	• Allow user to record finance easily with different categories. • Can view the incomes and expenses in different mode like monthly listing of finance record, weekly/monthly total income and expenses. • Can store the record of incomes/expenses pictures. • Have statistical chart showing each category's total expenses. (Pie Chart) • Can navigate to different months to view previous finance record. • Can be used in both Android and IOS.	• Do not provide budget setting. • Do not have reminder on expenses input. • The statistical chart is not detail enough like showing line chart to show the pattern of total spending.
Budget App	• Can set budget for each month. • Have statistical chart showing each category's total expenses. (Pie Chart) • Allow to customize the finance categories. • Allow user to record finance easily with different categories.	• This app does not provide feature to store pictures. • The budget setting is only for monthly not categories. • Do not have overspend reminder. • Not applicable in IOS. • Do not have weekly/monthly total income and expenses. • Cannot navigate to other months all financial records is shown in one page, not based on month.

2.1.3 Problem Summary

2.1.3.1 Contact and Appointment Subsystem

There are four mobile applications which are similar to my proposed subsystem. They are Setmore Appointment Scheduling, TimeTree-Shared Calendar, Scoot Family Calendar and Famio: Connect With Family. These existing systems allow user to manage and schedule events, send reminders to remind users about the upcoming events, provide calendar view of the events, ensuring family member's security and allow communication between users.

After analyzing and researching on the existing systems, we had concluded the strengths and weaknesses of existing systems for Contact and Appointment Subsystem in section 2.1.2.1. We also carry out brainstorming sessions and conduct interviews and questionnaires to gather information for Contact and Appointment Subsystem. The results of the interviews and questionnaires are discussed in the Appendix. Based on the research, we learnt that the design is important to improve user experience and there are some important features that we must or should include in our system. We plan to develop a user-friendly designed system which utilizes API to provide better user experience in our systems. We realized that we need to develop a mobile application with high usability, high reliability and high portability from the research. Therefore, we plan to deliver an easy-to-use mobile application which can be used in both Android and IOS platform which is completely operational at least 98% of the time. We can conclude that the must have features that must be implemented in the Contact and Appointment Subsystem are:

- Event calendar and scheduling
- Location tracking features
- Location list to store favorite places
- Automate reminders for events
- Notifications for location features
- Manage contact in one contact list

We had decided to add these good to have features in our system too:

- Allow sign in using Facebook and Google

- Create chat room for each event
- SOS feature

My proposed solution will focus on family activities and covers all the must-have functions in the marketplace with some additional features such as auto family activities recommendation based on upcoming festivals or family members' birthday. In addition, my proposed solution also includes chat module which allows communication between family members, one-stop story feed module which allows family members to catch up with the other family members' life through social media posts and location module which allows user to track the other family member's movement for safety purposes and location navigation to ensure other family member's safety. The detail of my proposed solution is shown in the table below:

Table 14: Proposed solution for Contact and Appointment subsystem with all the modules and sub-modules

Module	**Sub-module**	**Description**
Event creation and scheduling	Event Dashboard	All the family events are visible in the dashboard. The creator of the event can choose to invite family members to the event. The creator also can manage the event details.
	Schedule event	User can input personal events into the calendar timeline to schedule the events.
	Auto recommend event	System auto recommends family events such as upcoming festivals or family members' birthday.
Chat module	Contact registration	The system will check the other existing users from user's device contact book. User can register contact information such as relationship between user and the contact into the system

		after choosing to add the chosen contact from the list. User can also group the contacts into a specific group such as father side or mother side relatives.
	Family chat	When the contacts are grouped, a family chat will be created for family daily communication.
	Event chat	A group chat will be created for the event participants when a family event is created. The chat will be deleted automatically after an event is deleted or passed for a very long time.
Location module	Tracking module	User can check in specific location such as school or home. User can track other family members' location to ensure their safety.
	SOS module	If danger happens or when user sees something wrong with the movement of other family members, they can use the SOS module to call the authorities.
One-stop story feed module	Post dashboard	All the social media posts by family members are shown here.
	Post creation	Users can post social media posts through this application.
Appointment module	Calendar module	The system allows user to view their appointments in calendar view based on days, weeks, months or year.
	Reminder module	Reminders are sent to remind users about the upcoming family events.
	Countdown module	User can view the countdown of the family events that they have joined.

2.1.3.1.1 **Possible API Used**

In Event Creation and Scheduling module, Holidays API such as AbstractAPI is used to provide Malaysia public holiday information for event auto suggestion system. AbstractAPI can provide information about religious, non-public, and public holidays for more than 200 nations throughout the world including Malaysia and for any given year. The figure below shows the plans available in AbstractAPI.

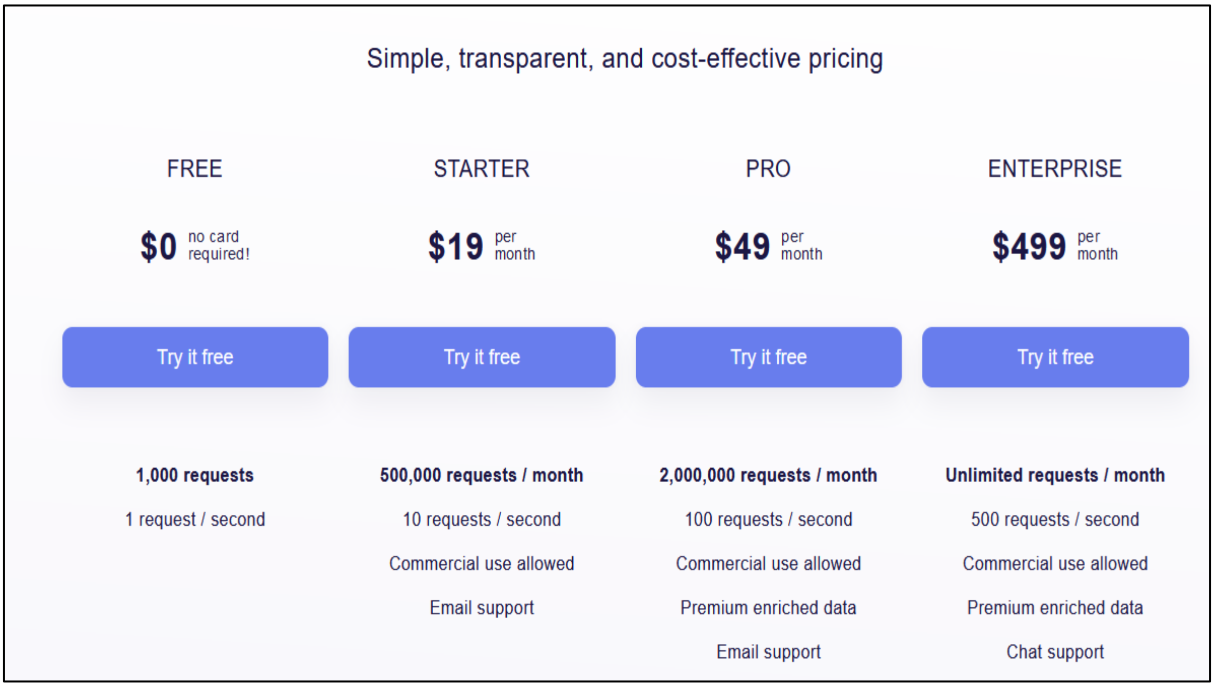


Figure 59: Plans for AbstractAPI

Source: Adapted from [19]

In Location module, Location API such as Google Map API is used to provide map information to allow location tracking features. Map Static API would be used to display static map for location picking. Directions API would help in providing directions between multiple locations for location navigation feature.

In One-stop story feed module, social media API such as Aryshare API is used to allow user to post to their social media accounts and to view other family members' social media accounts. The figure below shows the plans in Aryshare API.

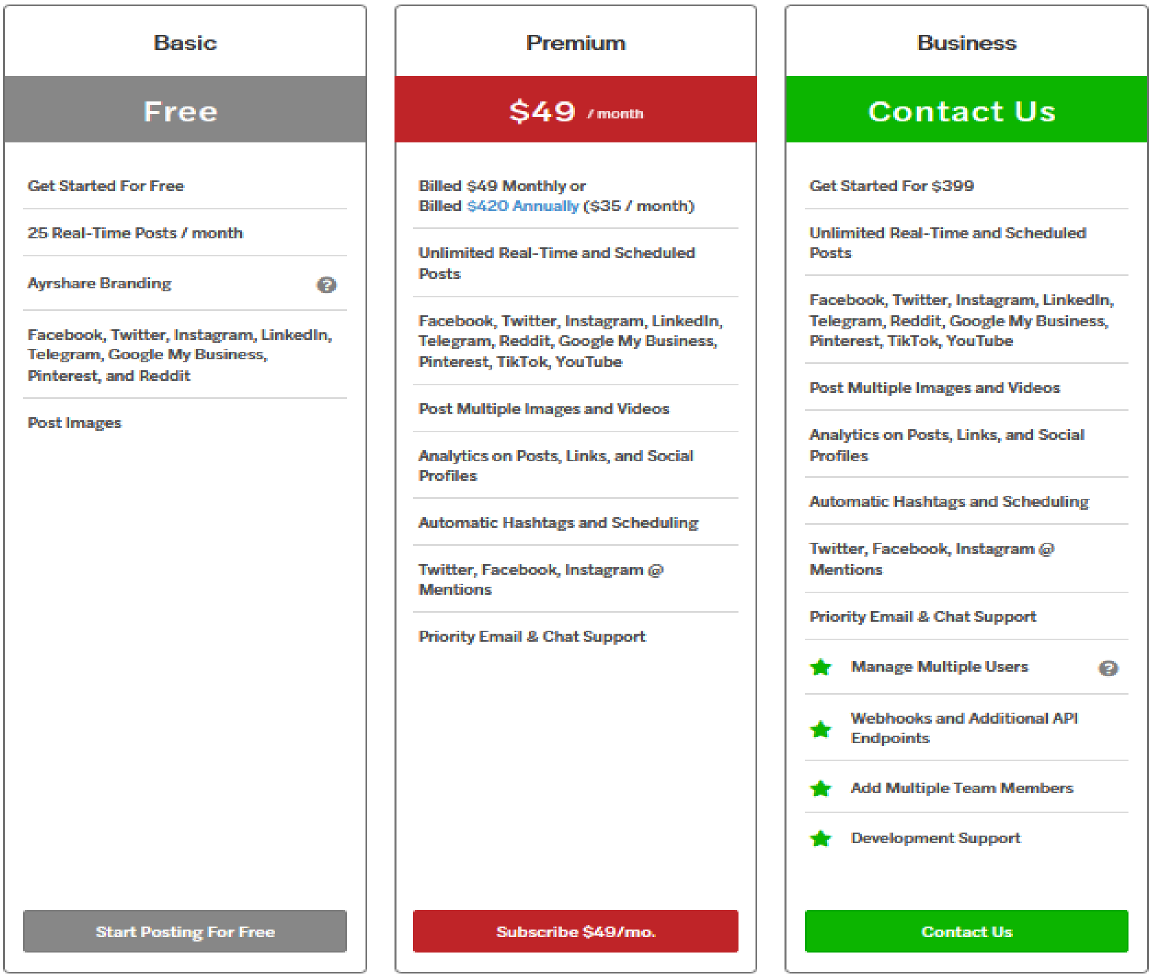
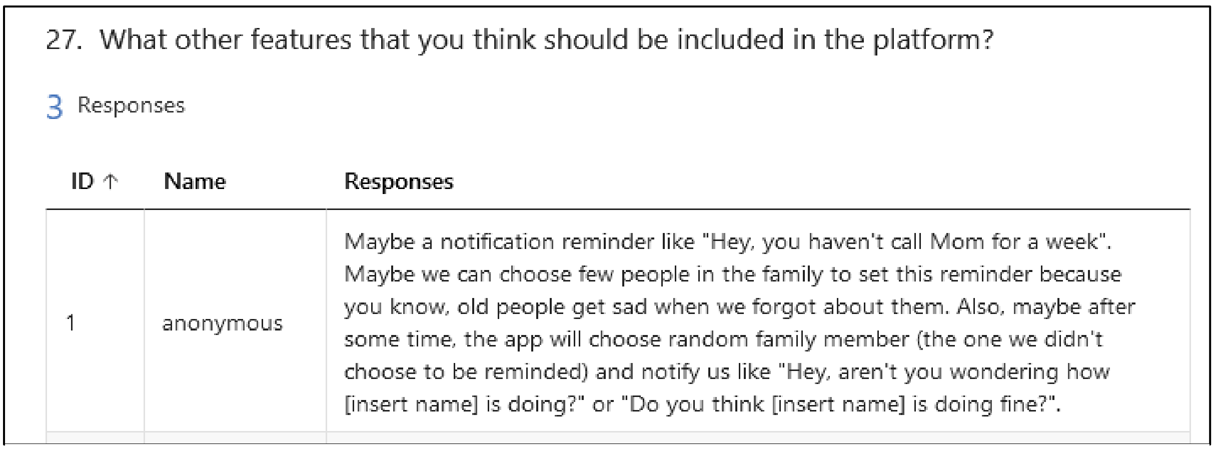


Figure 60: Plans in Aryshare API

Source: Adapted from [20]

2.1.3.1.2 *Possible Algorithms Used*



27. What other features that you think should be included in the platform?

3 Responses

ID ↑	Name	Responses
1	anonymous	Maybe a notification reminder like "Hey, you haven't call Mom for a week". Maybe we can choose few people in the family to set this reminder because you know, old people get sad when we forgot about them. Also, maybe after some time, the app will choose random family member (the one we didn't choose to be reminded) and notify us like "Hey, aren't you wondering how [insert name] is doing?" or "Do you think [insert name] is doing fine?".

Figure 61: Respondent Feedbacks on Possible Features

Based on the feedbacks given by the questionnaire's respondent, we plan to have a notification feature to remind user to constantly connect with the selected contact (family members). To perform this feature, we need to measure the relationship closeness between user and the other family members and send reminders to users when the closeness score decreases under a threshold value.

After researching on the research paper discussed in section 2.1.1, we try to adapt common neighbour algorithm in Contact and Appointment Subsystem to calculate the relationship closeness based on metrics such as duration spent in event together. Below is the pseudocode that we would implement to perform this feature:

1. Get the count of common interests for a pair of users (the event that they joined)
2. Retrieves the time spent together for a pair of users.
3. Calculate relationship score using score = commonInterests * 0.3 + timeSpentTogether * 0.7; (Make the relationship closeness score more sensitive to changes in the time spent together, while still taking into account the common interests shared by A and B.)
4. Compare the current relationship closeness score with the previous score
5. If the subtraction of previous score and relationship closeness score less than 0.2, send reminders to user.

2.1.3.2 Child Education Tracking Subsystem

Users may record examinations, tasks, and classes with the aid of My Study Life, which will subsequently show them on the calendar so that users can see their whole schedule at a glance. Users receive reminder notifications when examinations, classes, due dates of tasks are approaching. Users may register their exam dates and see a countdown to those days with the aid of Exam Countdown Lite. When the exam dates are nearing, reminder notifications are also sent. Child Reward enables parents to assign tasks and rewards to their kids so that they will be motivated to complete the tasks. It is undeniable that these existing systems are good systems that provide a lot of convenience to the users. Hence, all these features must have in my proposed solution.

Some of the applications use third-party authentication to secure the users' information. It is good to have this authentication in the proposed system since third-party like Google and Facebook must have better, more secured authentication mechanism than what we can develop. Another feature that I think it is good to have is synchronize data with other users. By having this feature, interference-free sharing of resources can be achieved between different users. Features that not to have is the "Rate Us", "Like Us" and "Follow Us" features. It is because customers today lack the patience to even follow up with the application's information, let alone rate apps. When users believe an application is useful and want to learn more about its features, they will actively like and follow the page and account.

We know from the current systems that we should refrain from employing vivid colours that could look too contrasted and put people at a highly uncomfortable place. Additionally, we should avoid leaving too much white spaces that could cause users to lose interest in our application. We would also utilise symbols that were made in accordance with accepted standards and that most people could understand. Besides, we should also make sure that we have conveyed clear messages to our users so that we would not make them frustrated. By keeping in mind these factors, I think users will continue to utilise our system over time, increasing in retention rate.

My proposed solution will include all the must have features of existing systems with some additional features such as generation of reports on time spent on various activities, weekly timetable planning. My proposed solution will also include performance tracking module that helps parents to keep track of their children's academic achievements such as test and result scores, homework completion rate and many more. Awards module is included too to record down the honors obtained by the children. My proposed solution is as shown as table below:

Table 15: Proposed solution of Child Education Tracking subsystem with all the modules and sub-modules

Module	Sub-module	Description
Daily Activity Schedule	Schedule	Children enter their daily activities and tasks here. The schedules are visible for them and their parents.
	Summary Report	Time spent on each aspect such as tuition, sport, piano, art, and entertainment is calculated and display in a summary report
	Weekly timetable planning	Children can add what they want to do in the week, the system will create and suggest weekly timetable schedule to them.
Important Dates Reminder	Label important event	While adding the new activity, children can label the activity as important so that the activity can be added into countdown list.
	Countdown	Shows the countdown to the date of the events
	Reminder Notifications	Reminder notifications are sent when the event date approaches
Performance Tracking	Grade record	Children can insert the results of various aspects
	Data Analysis and Data Visualization	Results will be analyzed and displayed in charts
	Alert Notifications	Parents will receive alert notifications if the children’s performance keeps declining or gets worse over time.
Awards	Awards Record	Users can insert the awards obtained
	Awards bookmark	Users can bookmark any award that they think it is significant

	Target and reward	Parents can set targets and rewards for their children. If they can accomplish the targets, rewards are given.

2.1.3.3 Finance Monitoring Subsystem

As for the time being, there a lot of budget planner software that are available online but some of this software fall short in helping users to create and stick to a budget. One of the drawbacks is the on-going maintenance, a lot of budget software offer the simplicity of integrating with all users' financial accounts and consolidating their activity into one dashboard. Due to the busy and hectic lifestyle people tend to overlook their budget and end up spending an excessive amount of money since they usually didn't plan their budget wisely.

The existing systems, Money Manager and Budget App helps user to track finance easily which they are used to record the incomes and expenses of users to keep track on their finance flow. Users can view the statistical chart to have an overview spending of each category. However, these two applications have their drawbacks, and it is only for personal used which made these applications not good enough.

The proposed subsystem – Finance Monitoring Subsystem will include the features from the existing systems with additional features. These subsystem helps user not only to track their own finance, but also the family finance flow. Reminder on expenses input and overspent on particular category will be added in this subsystem. Besides, this subsystem will also include pattern analysis each spending category and will recommend how much to spend in each category. Parents can check their children's total monthly spending so that parents can know whether they have overspending. However, there is an option which to not showing the total monthly expenses to their parents and parents can hide the family account.

Table 16: Proposed solution of Finance Monitoring subsystem with all the modules and sub-modules

Module	Sub-module	Description
Finance Record	Personal account and family account	Each family member will have their own personal account and family account. Personal account is the incomes and expenses for their own. Family account is to record the expenses for the whole family. The income for family account is from the family members.
	Record incomes and expenses	Family members can record incomes and expenses by input the date, account, category, amount, details and can store the picture of invoices/receipts.
	Expenses Input Reminder	Reminder will be sent if there are no daily expenses recorded.
Overspending Reminder	Set budget	Family members can set budget for each expenses category.
	Budget Balance	Budget balance will be automatically calculated when there's expenses.
	Overspend Reminder	Reminder will be sent if the expenses of the particular category has exceeded 70% of the budget set.
Statistical Chart	Statistical Chart	Family members can view the statistical chart of the incomes and expenses recorded in different categories.
	Recommendation	Recommendation on how much to spend in each category.
Children Expenses Tracking	Expenses View	Parents can view the monthly expenses of their children.

2.2 Requirements Gathering Techniques

Our team chooses to gather information using questionnaires and interviews methodology. We choose to use questionnaires and interviews because it is easy and cheap to collect responses from our target users. Our target respondents are everyone who has a family, ranging from 1 family member to above 8 family members. We conduct online questionnaires to collect a large number of responses from the participants. We use Microsoft Forms to design our questions and to collect feedback from the participants. There are four sections for our questionnaires. The first section is about the demographics of the respondent. The second section is for Child Education Tracking Subsystem. The third section is tailored for Contact and Appointments Subsystem. The last section is designed for Finance Monitoring Subsystem. There are open and closed questions in the survey forms. We conducted the online questionnaire through social media such as WhatsApp, Telegram and Facebook in order to collect more requirements for our project.

We conducted physical and online interviews with some respondents that suited the criteria. The online interview sessions are conducted through online conference such as WebEx or Zoom. On the other hand, the physical interviews are conducted in a closed room to avoid any interruption to the interview sessions. Each interview session takes at least 20 minutes and takes up to 1 hour. The interviews responses are all recorded and used exclusively for our own research.

2.3 Top Level Representation

Use Case diagram is used to model top level system representation. Our system, Family Engagement System consists of three subsystems including Contact and Appointment Subsystem, Child Education Tracking Subsystem and Finance Monitoring Subsystem. Hence, the use case diagram is divided into three sections. There are two primary actors, parent and children in our system. Social Media API, Google Map API and Holidays API are secondary actors of our system.

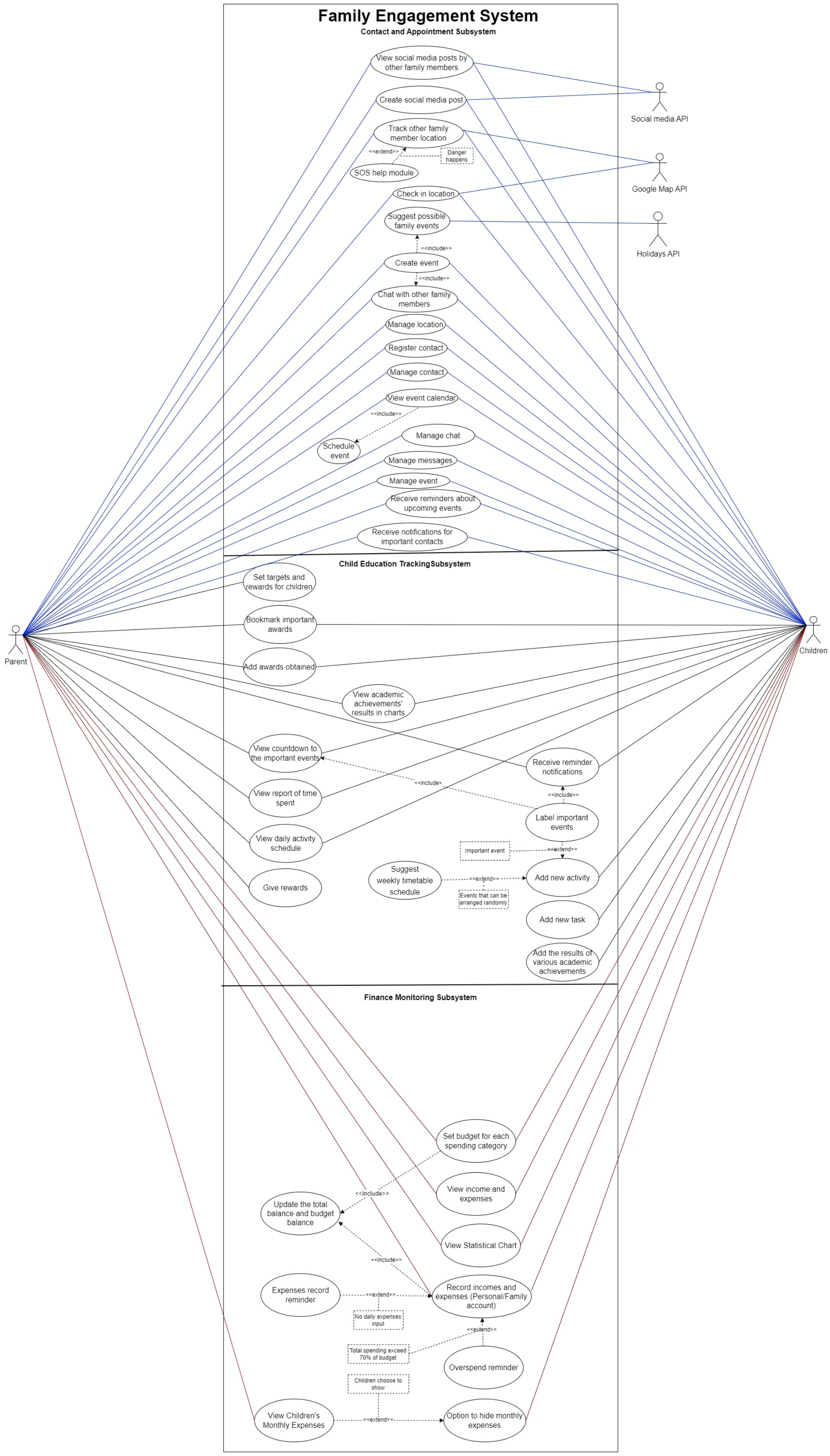


Figure 62: Overall Use Case Diagram for Family Engagement System

Class diagram provides a brief description of the subsystems' interactions as well as their characteristics and connections. The relationship between subsystems, modules and classes is demonstrated in the class diagram below. Meaningful descriptions for individually named data objects are shown in data dictionary below.

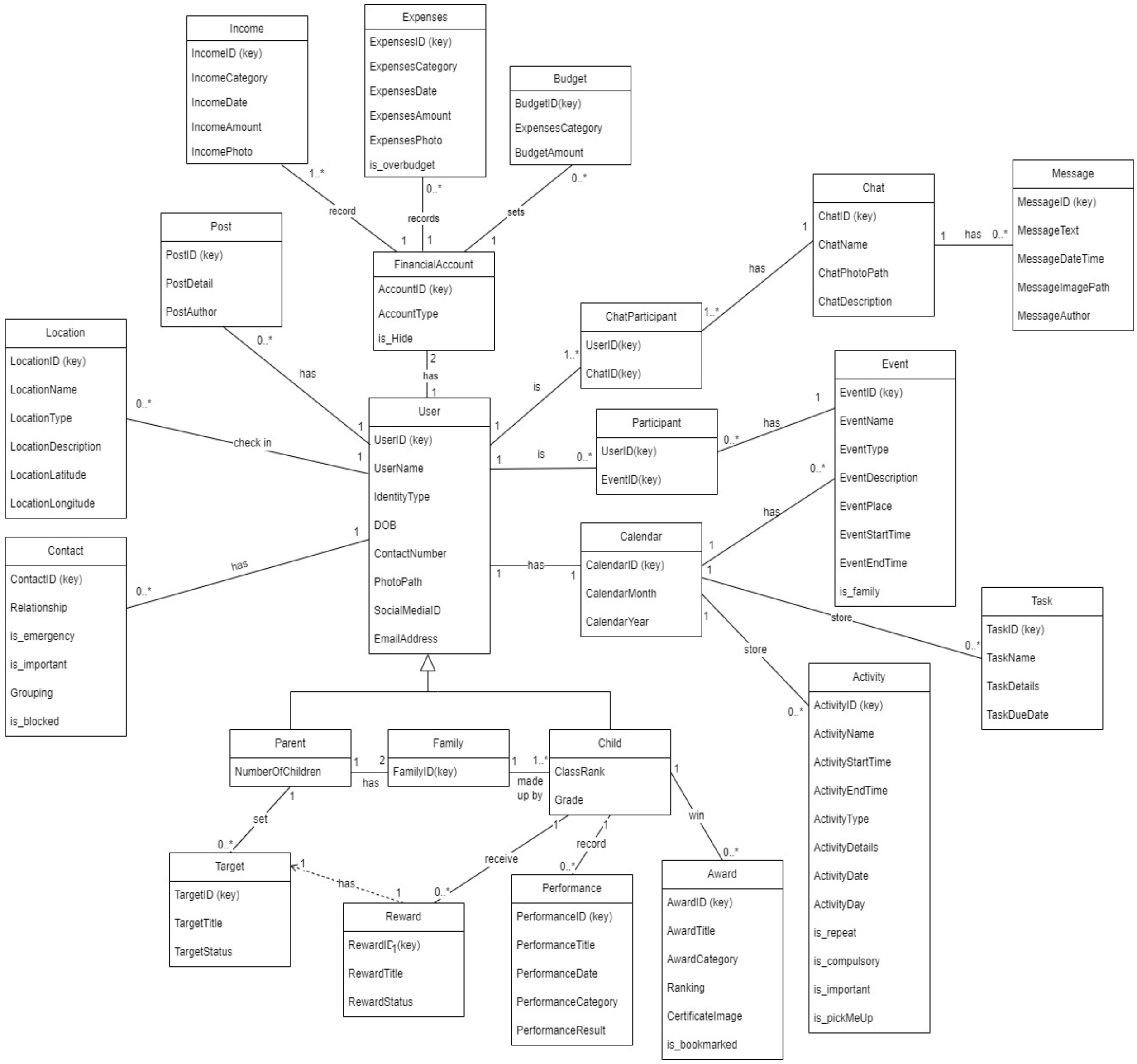


Figure 63:Overall Domain Model Class Diagram for Family Engagement System

Table 17:Data Dictionary

Table Name	**Attribute Name**	**Contents**	**Data Type**	**Format**	**Range**	**Required**	**PK or FK**
User	UserID	User ID	Integer (5)	#####	00000-99999	Yes	PK
	UserName	Username	Text (25)	xxxxxxxxx	NA	Yes	
	IdentityType	Role	Text (10)	xxxxxx	Parent or Child	Yes	
	DOB	Date of Birth	DateTime (10)	MM/dd/yyyy	NA	Yes	

	ContactNumber	Contact Number	Integer (15)	###########	NA	Yes	
	PhotoPath	Profile Picture	Text (100)	xxxxxxxxxxxx	NA	No	
	SocialMediaID	Social Media ID	Text (25)	xxxxxxxxxxxx	NA	Yes	
	EmailAddress	Email address	Text (50)	xxxxx@xxx	NA	Yes	
Parent	NumberOfChildren	Number of Children	Integer (2)	#	NA	No	
Child	ClassRank	Class Rank	Integer (3)	###	NA	No	
	Grade	Grade	Text (25)	xxxxxxxxxx	NA	No	
Calendar	CalendarID	Calendar ID	Text (6)	X#####	C00000-C99999	Yes	PK
	CalendarMonth	Month of Calendar	Integer (2)	##	1-12	Yes	
	CalendarYear	Year of Calendar	Integer (4)	####	NA	Yes	
Activity	ActivityID	Activity ID	Text (6)	X#####	A00000-A99999	Yes	PK
	ActivityName	Activity Name	Text (25)	xxxxxxxxxx	NA	Yes	
	ActivityStartTime	Activity Start Time	DateTime (10)	hh:mm tt	NA	Yes	
	ActivityEndTime	Activity End Time	DateTime (10)	hh:mm tt	NA	Yes	
	ActivityType	Type of Activity	Text (15)	xxxxxxxxxxxx	Academic, Sport, Art&Piano, Entertainment	Yes	
	ActivityDetails	Activity Details	Text (100)	xxxxxxxxxxxx	NA	No	
	Is_compulsory	Activity is Compulsory	Boolean	xxxxx	True or False	Yes	
	Is_important	Activity is Important	Boolean	xxxxx	True or False	Yes	
	Is_pickMeUp	Require to Pick Me Up	Boolean	xxxxx	True or False	Yes	
	Is_repeat	Activity is repeared	Boolean	xxxxx	True or False	Yes	
	ActivityDay	Day of activity	Text (10)	xxxxxxxxx	Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday	No	
	ActivityDate	Exact date of activity	DateTime (10)	MM/dd/yyyy	NA	No	
Task	TaskID	Task ID	Text (7)	XX#####	ST00000-ST99999	Yes	PK
	TaskName	Task Name	Text (25)	xxxxxxxxxx	NA	Yes	
	TaskDetails	Task Details	Text (100)	xxxxxxxxxx	NA	No	
	TaskDueDate	Due Date of the task	DateTime (20)	MM/dd/yyyy hh:mm tt	NA	Yes	
Performance	PerformanceID	Performance ID	Text (6)	X#####	P00000-P99999	Yes	PK
	PerformanceTitle	Performance Title	Text (25)	xxxxxxxxx	NA	Yes	

	PerformanceDate	Performance Date	DateTime (10)	MM/dd/yyyy	NA	Yes	
	Performance-Category	Category of Performance	Text (25)	xxxxxxxxxx	Test & Quiz, Homework Completion, Behavioral Assessment	Yes	
	PerformanceResult	Result of the performance	Text (3)	xxx	NA	Yes	
Award	AwardID	Award ID	Text (6)	XX#####	AW00001-AW99999	Yes	PK
	AwardTitle	Award Title	Text (50)	xxxxxxxxxx	NA	Yes	
	AwardCategory	Category of Award	Text (25)	xxxxxxx	Art, Piano, Academic, Sport	Yes	
	Ranking	Ranking of Award	Text (15)	xxxxxxxx	NA	Yes	
	CertificateImage	Image of Award Certificate	Text (100)	xxxxxxxx	NA	Yes	
	Is_bookmarked	Award is bookmarked	Boolean	xxxxx	True or False	Yes	
Target	TargetID	Target ID	Text (6)	X#####	T00000 – T99999	Yes	PK
	TargetTitle	Target Title	Text (25)	xxxxxxxx	NA	Yes	
	TargetStatus	Target Status	Text (15)	xxxxxxxx	Not Accepted, Accepted, Completed, Confirmed, Rejected	Yes	
Reward	RewardID	Reward ID	Text (6)	X#####	R00000 – R99999	Yes	PK
	RewardTitle	Reward Title	Text (25)	xxxxxxxx	NA	Yes	
	RewardStatus	Reward Status	Text (10)	xxxxxxxx	Not Given, Given	Yes	
Location	LocationID	Location ID	Text (6)	X#####	L00000-L99999	Yes	PK
	LocationName	Location Name	Text (25)	xxxxxxxxx	NA	Yes	
	LocationType	Location Type	Text (25)	xxxxxxxxx	Home, Work, Sport, School, Music, Shopping, Travel, Doctor, Hospital, Police, Restaurant, University, Bank, Market Park, Other	Yes	
	LocationDescription	Location Description	Text (100)	xxxxxxxxxxx	NA	No	
	LocationLatitude	Location Latitude	Decimal (8,6)	##.######	NA	Yes	
	LocationLongitude	Location Longitude	Decimal (9,6)	###.######	NA	Yes	
Contact	ContactID	Contact ID	Text(6)	XX####	CT00000-	Yes	PK

					CT99999		
	Relationship	Relationship with user	Text(25)	xxxxxxxxx	Aunty, Uncle, Mum, Dad, Sister, Brother, Cousins, Siblings, Grandparents, Others	Yes	
	is_emergency	Contact is emergency contact	Boolean	xxxxx	True or False	Yes	
	is_important	Contact is important	Boolean	xxxxx	True or False	Yes	
	Grouping	Contact grouping	Text(50)	xxxxxxxxxx	Mother's side, Father's side	Yes	
	is_blocked	Contact is blocked	Boolean	xxxxx	True or False	Yes	
Post	PostID	Social Media Post ID	Text(6)	X#####	S00000 – S99999	Yes	PK
	PostDetail	Social Media Post Detail	Text(100)	xxxxxxxxxx x	NA	Yes	
	PostAuthor	Social Media Post Author	Text(25)	xxxxxxxxx	NA	Yes	
Chat	ChatID	Chat ID	Text(6)	XX####	CC00000-CC99999	Yes	PK
	ChatName	Chat Name(Personal chat or Group chat)	Text(25)	xxxxxxxxx	NA	Yes	
	ChatPhotoPath	Chat Profile Picture	Text(100)	xxxxxxxxxx xx	NA	No	
	ChatDescription	Personal Chat or Group Chat Description	Text(150)	xxxxxxxxxx xxxxxx	NA	No	
Message	MessageID	Message ID	Text(6)	X#####	M00000-M99999	Yes	PK
	MessageText	Message Text	Text(100)	xxxxxxxxxx xx	NA	Yes	
	MessageDateTime	Time when user sends the message	Datetime	YYYY-MM-DD HH:MI:SS	NA	Yes	
	MessageImagePath	Message Image	Text(100)	xxxxxxxxxx xx	NA	No	
	MessageAuthor	Message Author	Text(25)	xxxxxxxxx	NA	Yes	
ChatParticipant	UserID	User ID	Integer (5)	#####	00000-99999	Yes	PK, FK
	ChatID	Chat ID	Text(6)	XX####	CC00000-CC99999	Yes	PK, FK
Event	EventID	Event ID	Text(6)	X#####	E00000-E99999	Yes	PK
	EventName	Event Name	Text(25)	xxxxxxxxx	NA	Yes	
	EventType	Event Type	Text(25)	xxxxxxxxx	Birthday, Festival, Gathering, Work, Meetings, Anniversary,	Yes	

					Parties Leisure, Others		
	EventDescription	Event Description	Text(100)	xxxxxxxxxxxx	NA	No	
	EventPlace	Event Place	Text(100)	xxxxxxxxxxxx	NA	Yes	
	EventStartTime	Event starting time	DateTime	YYYY-MM-DD HH:MI:SS	NA	Yes	
	EventEndTime	Event ending time	DateTime	YYYY-MM-DD HH:MI:SS	NA	Yes	
	is_family	Whether the event is a family event	Boolean	xxxxx	True or False	Yes	
Participant	UserID	User ID	Integer (5)	#####	00000-99999	Yes	PK,FK
	EventID	Event ID	Text(6)	X#####	E00000-E99999	Yes	PK,FK
FinancialAccount	AccountID	Account ID	Text(6)	X#####	A00000-A00001	Yes	PK
	AccountType	Account Type	Text(10)	xxxxxxxxxx	Personal, Family	Yes	
	is_Hide	Account is Hide	Bool	xxxxx	True, False	Yes	
Expenses	ExpensesID	Expenses ID	Text(6)	X#####	E00000-E00001	Yes	PK
	ExpensesCategory	Expenses Category	Text(15)	xxxxxxxxxx	All, Beauty, Food, Transportatio, Entertainment, Gift, Health, Social Life, Education, Other	Yes	
	ExpensesDate	Expenses Date	DateTime (20)	MM/dd/yyyy hh:mm tt	NA	Yes	
	ExpensesAmount	Expenses Amount	decimal(7,2)	#.##	0.00-9999999.99	Yes	
	ExpensesPhoto	Expenses Photo	Text (100)	xxxxxxxxxx	NA	Yes	
	is_overbudget	Expenses is overbudget	Boolean	xxxxx	True, False	Yes	
Income	IncomeID	Income ID	Text(6)	X#####	I00000-I00001	Yes	PK
	IncomeCategory	Income Category	Text(15)	xxxxxxxxxx	Salary, Allowance, Bonus, Pocket Money, Other	Yes	

	IncomeDate	Income Date	DateTime (20)	MM/dd/yyyy hh:mm tt	NA	Yes	
	IncomeAmount	Income Amount	decimal(7, 2)	#.##	0.00-9999999.99	Yes	
	IncomePhoto	Income Photo	Text (100)	xxxxxxxxxx	NA	Yes	
Budget	BudgetID	Budget ID	Text(6)	X#####	B00000-B00001	Yes	PK
	ExpensesCategory	Expenses Category	Text(15)	xxxxxxxxx	All, Beauty, Food, Transportation, Entertainment, Gift, Health, Social Life, Education, Other	Yes	
	BudgetAmount	Budget Amount	decimal(7, 2)	#.##	0.00-9999999.99	Yes	
Family	FamilyID	Family ID	Text(6)	X#####	F00000-F99999	Yes	

2.4 External Interfaces Requirements

2.4.1 Family Member List Interface [Parent & Children / Family Engagement System]

2.4.1.1 Identifier [REQ-0001]

2.4.1.2 Description

This interface enables users to view the family members with their role. Users can invite new members. Users can also remove member by clicking the remove member button from the more icon

2.4.1.3 Association

This interface associates with Home page Interface which enable users to invite new family members.

2.4.2 Home Page Interface [Parents & Children / Family Engagement System]

2.4.2.1 Identifier [REQ-0002]

2.4.2.2 Description

This interface is used to navigate the user to view family members, contact and appointment subsystem, child education tracking subsystem and finance monitoring subsystem.

2.4.2.3 Association

This interface is associated with the family member interface, contact and appointment subsystem, child education tracking subsystem and finance monitoring subsystem.

2.4.3 Setting Interface [Parents & Children / Family Engagement System]

2.4.3.1 Identifier [REQ-0003]

2.4.3.2 Description

This interface is used to navigate the user to edit profile. Users can change the various settings based on their preferences. Users can also logout on this interface.

2.4.3.3 Association

This interface is associate with the edit profile interface, and show the contact and appointment setting, child education tracking setting and finance monitoring setting.

2.4.4 Edit Profile Interface [Parents & Children / Family Engagement System]

2.4.4.1 Identifier [REQ-0004]

2.4.4.2 Description

User can edit personal information like username, birthday, gender, contact number and navigate to change password.

2.4.4.3 Association

This interface is associated with the family member list as the details will be change. This interface also associates with change password interface to change the user's password.

2.4.5 Change Password Interface [Parents & Children / Family Engagement System]

2.4.5.1 Identifier [REQ-0005]

2.4.5.2 Description

This interface is to change the password of the user.

2.4.5.3 Association

This interface is associated with the login interface to login to own account.

2.4.6 Sign Up Interface [Parents & Children / Family Engagement System]

2.4.6.1 Identifier [REQ-0006]

2.4.6.2 Description

This interface is to allow user to sign up. User can sign up an account by filling up details such as name, email address, social media ID, identity type, gender, birthday, password and password confirmation. User can also choose to sign up using google email or Facebook account.

2.4.6.3 Association

This interface is associated with the login interface to login to own account.

2.4.7 Login Interface [Parents & Children / Family Engagement System]

2.4.7.1 Identifier [REQ-0007]

2.4.7.2 Description

This interface allows user to login to their account. User can login using email address and password. If the user forget the password, user can press the forget password button which will send the change password request to user email to allow user to regain his or her access to the account.

2.4.7.3 Association

This interface is associated with the sign-up interface.

2.4.8 Record Contact Number Interface [Parents & Children / Family Engagement System]

2.4.8.1 Identifier [REQ-0008]

2.4.8.2 Description

This interface allows users to key their phone number. Then, verification code will be sent to users for verification

2.4.8.3 Association

This interface is associated with the sign-up interface.

Contact and Appointment Subsystem

2.4.9 Contact Registration Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.9.1 Identifier: [REQ-0009]

2.4.9.2 Description

This interface enables the roles such as parent and children to insert family member contact details such as relationship, and grouping. This interface accesses the user device's contact list. The system will check whether the contact is an existing user, and the system can access the other user information such as name, email address, contact number and birthday from the user profile. The details will be stored in the database and able to edit later.

2.4.9.3 Association

This interface will associate with the Contact List Interface where user can view all their existing contacts.

2.4.10 Contact List Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.10.1 Identifier: [REQ-0010]

2.4.10.2 Description

This interface shows all the existing contacts stored by the user. User can also search by using filter by name, by grouping and by contact number. User can also sort the contact list based on alphabetical order. User can select a contact to edit and delete the details.

2.4.10.3 Association

This interface will associate with the Contact Edit interface.

2.4.11 Contact Edit Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.11.1 Identifier: [REQ-0011]

2.4.11.2 Description

This interface shows the chosen contact's recorded details. User can choose to edit any contact information here. All the information will be updated in the system database.

2.4.11.3 Association

This interface will associate with the Contact List interface.

2.4.12 Chat List Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.12.1 Identifier: [REQ-0012]

2.4.12.2 Description

This interface shows the personal chat and group chat that a user has. User can choose to pin, delete a chat, or leave a chat group here. User can filter based on the chat title name and sort by name. The updated chat list will be updated in the system database.

2.4.12.3 Association

This interface will associate with the Chat History interface.

2.4.13 Chat History Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.13.1 Identifier: [REQ-0013]

2.4.13.2 Description

This interface shows the chat history with other users. User can chat here using text, pictures and share location here. User can choose and delete the chat history here. User can also start a call using this interface. User can search certain chat history here. The chat history will be stored in the database.

2.4.13.3 Association

This interface will associate with the Chat Details interface.

2.4.14 Chat Detail Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.14.1 Identifier: [REQ-0014]

2.4.14.2 Description

This interface shows the chat details with other users. User can view the chat information such as (if it is a group chat) the group name, the group members, and the group description, (if is it a chat with other user) it leads to contact profile interface.

2.4.14.3 Association

This interface will associate with the Contact Profile interface if it is a chat with another user.

2.4.15 Event Creation Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.15.1 Identifier: [REQ-0015]

2.4.15.2 Description

This interface allows user to create events by inserting information such as the event name, event type, event description, event place, event start time, event end time, event category (family event or personal event) and select the event participants from the contact list. User can attach the longitude and latitude of the event place under this interface. The creator of the event can send invitation to the ones he/she wants through this interface. The events' details will be stored in the database and able to edit later. Every family event will have a dedicated group chat created with all the family event's participants automatically. The system will suggest possible family event based on the user profile database and calendar database. For example, the system will suggest creating Christmas as a family event when the Christmas festival is approaching.

2.4.15.3 Association

This interface will associate with the Chat History Interface, Family Event List and Location Creation interface.

2.4.16 Family Event List Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.16.1 Identifier: [REQ-0016]

2.4.16.2 Description

This interface shows all the family events list created by user and other users. The owner of the family event can edit and delete the chosen event. The updated family events list will be shown here after the changes are made. User can sort and filter the family events based on the family event name, type, and time.

2.4.16.3 Association

This interface will associate with the Family Event Detail interface.

2.4.17 Family Event Detail Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.17.1 Identifier: [REQ-0017]

2.4.17.2 Description

This interface shows the details of the chosen family event. User can view the participants of the family events, family event name, family event type, family event place, and family event start time and family event end time. User can navigate to the family event place by accessing the family event place coordinates.

2.4.17.3 Association

This interface will associate with the Family Event Edit interface and Location Navigation interface.

2.4.18 Family Event Edit Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.18.1 Identifier: [REQ-0018]

2.4.18.2 Description

This interface shows the recorded details of the chosen family event. User can edit and modify the information of the family event here. User can also choose to delete the family event here. The updated family event information will be recorded in the database.

2.4.18.3 Association

This interface will associate with the Family Event Detail interface.

2.4.19 Calendar Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.19.1 Identifier: [REQ-0019]

2.4.19.2 Description

This interface shows a calendar view with all the family events accepted by the user. User can also add appointments or personal event in this view. User can reschedule the events in this view. User can view an overview of his or her events in a daily, weekly, monthly, and yearly view.

2.4.19.3 Association

This interface will associate with the Calendar Edit interface.

2.4.20 Calendar Edit Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.20.1 Identifier: [REQ-0020]

2.4.20.2 Description

This interface allows user to add and edit their personal events or appointments here. It allows user to insert participants of the personal events, personal event name, personal event type, personal event place, and personal event time. User can schedule their time in this interface. User can check whether their personal appointments or events clash with the family events. If there is a clash between them, user can choose to reschedule and manage his or her events better through this interface.

2.4.20.3 Association

This interface will associate with the Calendar interface.

2.4.21 Reminder Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.21.1 Identifier: [REQ-0021]

2.4.21.2 Description

This interface shows the countdown days for the upcoming events that the user has accepted to join. It will send push reminders to user about the upcoming events when the events are approaching.

2.4.21.3 Association

This interface will associate with the Calendar interface.

2.4.22 Location Creation Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.22.1 Identifier: [REQ-0022]

2.4.22.2 Description

This interface allows user to register current coordinates which is accessed from the device GPS as a new location. User can also choose the desired location from the map interface. User can insert location name and location type in this interface. All the location information is stored in database and could be edited later.

2.4.22.3 Association

This interface will associate with the Family Event List interface and Location List Interface.

2.4.23 Location List Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.23.1 Identifier: [REQ-0023]

2.4.23.2 Description

This interface shows all the recorded location in the system. User can view, filter, and sort the location based on the location name and type such as home, tuition center, park and many more. User can choose to edit and delete the chosen location here. The updated location list will be shown here after the changes are made.

2.4.23.3 Association

This interface will associate with the Location Edit interface.

2.4.24 Location Edit Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.24.1 Identifier: [REQ-0024]

2.4.24.2 Description

This interface allows user to edit the chosen location details here. The updated location list will be shown here after the changes are made.

2.4.24.3 Association

This interface will associate with the Location List interface.

2.4.25 Location Navigation Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.25.1 Identifier: [REQ-0025]

2.4.25.2 Description

This interface enables user to navigate to other user location or navigation to the family event place based on the location coordinates. The system shows the navigation route from user current location to the destination. This interface will use Location API.

2.4.25.3 Association

This interface will associate with the Family Event Detail and SOS interface.

2.4.26 Location View Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.26.1 Identifier: [REQ-0026]

2.4.26.2 Description

This interface enables user to track other family members' location in a map view. The registered location from the location list will be pinpointed in the map view. Notifications will be sent to user if the selected family member leave and reach the destination. This interface will use Location API.

2.4.26.3 Association

This interface will associate with the Location List interface.

2.4.27 SOS Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.27.1 Identifier: [REQ-0027]

2.4.27.2 Description

This interface enables user to select contacts to become the emergency contacts. When user faces any danger or any problem, press on the SOS button to call the emergency contacts. Emergency reminders will be sent to emergency contacts so that user could be saved. The emergency contacts will receive the user last location and could navigate to user place. User can change the emergency contact in the SOS edit interface. This interface will use Location API. The emergency contact information will be recorded in the database and can be edit later.

2.4.27.3 Association

This interface will associate with the Location Navigation and SOS Edit interface.

2.4.28 SOS Edit Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.28.1 Identifier: [REQ-0028]

2.4.28.2 Description

This interface enables user to choose other contacts to become the emergency contacts. It shows the previous emergency contact details as default. The updated information will be stored in database.

2.4.28.3 Association

This interface will associate with the Location Navigation interface.

2.4.29 Media Post Creation Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.29.1 Identifier: [REQ-0029]

2.4.29.2 Description

This interface allows user to insert post information such as post description and post pictures into the social media wall such as Facebook and Instagram. The post information will be updated in the Media Post Wall interface. This interface will use social media API.

2.4.29.3 Association

This interface will associate with the Media Post Wall interface.

2.4.30 Media Post Wall Interface [Parent and Children / Contact and Appointment Subsystem]

2.4.30.1 Identifier: [REQ-0030]

2.4.30.2 Description

This interface shows the social media posts that are posted by the family members from Facebook and Instagram. User can filter the post based on the post author. User can be directed to the real social media to view at the post too. This interface will use social media API.

2.4.30.3 Association

This interface will associate with the Media Post Creation interface.

Child Education Tracking

2.4.31 Children Panel Interface [Parent / Child Education Tracking Subsystem]

2.4.31.1 Identifier [REQ-0031]

2.4.31.2 Description

This interface shows all the existing children added by parent. Parent can choose a child to see their personal profiles.

2.4.31.3 Association

This interface will associate with Children Profile Interface.

2.4.32 Children Profile Interface [Parent & Children / Child Education Tracking Subsystem]

2.4.32.1 Identifier [REQ-0032]

2.4.32.2 Description

This interface shows the personal details of the children such as name, age, grade and class rank. The details will be stored in a database and can be edited by children only. Besides, users which refer to both parents and children can also see the children's study matters such as daily activity schedule, countdown, academic performance and awards obtained through the navigation.

2.4.32.3 Association

This interface will associate with Edit Children Profile interface, Daily Activity Schedule interface, Countdown interface, Performance Visualization interface and Award List interface.

2.4.33 Edit Children Profile Interface [Children / Child Education Tracking Subsystem]

2.4.33.1 Identifier [REQ-0033]

2.4.33.2 Description

This interface enables the users with children role to edit their personal details

2.4.33.3 Association

This interface will associate with Children Profile interface.

2.4.34 Daily Activity Schedule Interface [Parent & Children / Child Education Tracking Subsystem]

2.4.34.1 Identifier [REQ-0034]

2.4.34.2 Description

This interface is directed when the schedule on children profile is selected. This interface shows the daily activity schedule stored by children. All activities and tasks of the day will be displayed when the day is chosen. Parents can search the activities or tasks by using the filters. This interface also consists of navigation control to summary report of time spent and schedule planning.

2.4.34.3 Association

This interface will associate with Add Daily Activity interface, Activity List interface, List of Summary Report of Time Spent interface and Schedule Planning interface.

2.4.35 Activity List Interface [Parent & Children / Child Education Tracking Subsystem]

2.4.35.1 Identifier [REQ-0035]

2.4.35.2 Description

This interface shows all of the activities with their details when the day is chosen. Only children can edit the details of activities and delete the activity. Sorting of the activities are available here.

2.4.35.3 Association

This interface will associate with Edit Activity interface and task list interface

2.4.36 Add New Activity Interface [Children / Child Education Tracking Subsystem]

2.4.36.1 Identifier [REQ-0036]

2.4.36.2 Description

This interface enables children to add their daily activity details such as activity name, date, activity type, activity start time, activity end time, activity details, is compulsory, is repeat or is important or needs parents to pick them up or not. If the activity is repeated, instead of date, day is required to be filled in. All this information is stored in the database.

2.4.36.3 Association

This interface will associate with the Daily Activity Schedule interface.

2.4.37 Edit Activity Interface [Children / Child Education Tracking Subsystem]

2.4.37.1 Identifier [REQ-0037]

2.4.37.2 Description

Children can edit the details of the activities here.

2.4.37.3 Association

This interface will associate with the Activity List interface.

2.4.38 Task List Interface [Parent & Children / Child Education Tracking Subsystem]

2.4.38.1 Identifier [REQ-0038]

2.4.38.2 Description

This interface is directed when task tab instead of activity tab is selected. This interface shows all of the tasks that will be due on the chosen day. Only children can edit the details of tasks and delete them. Sorting of the tasks are available here.

2.4.38.3 Association

This interface will associate with Edit Task interface.

2.4.39 Add New Task Interface [Children / Child Education Tracking Subsystem]

2.4.39.1 Identifier [REQ-0039]

2.4.39.2 Description

This interface enables children to add their task details such as task name, task due date and task details. All this information is stored in the database.

2.4.39.3 Association

This interface will associate with the Daily Activity Schedule interface.

2.4.40 Edit Task Interface [Children / Child Education Tracking Subsystem]

2.4.40.1 Identifier [REQ-0040]

2.4.40.2 Description

Children can edit the details of the tasks here.

2.4.40.3 Association

This interface will associate with Task List interface.

2.4.41 List of Summary Report of Time Spent Interface [Parent & Children / Child Education Tracking Subsystem]

2.4.41.1 Identifier [REQ-0041]

2.4.41.2 Description

This interface enables parents and children to view all the existing children's weekly report of time spent on various activities. Users can view the details by clicking the report. Sorting of report is available here.

2.4.41.3 Association

This interface associates with Details of Time Spent Report interface.

2.4.42 Details of Time Spent Report Interface [Parent & Children / Child Education Tracking Subsystem]

2.4.42.1 Identifier [REQ-0042]

2.4.42.2 Descriptio4

This interface enables parent and children to view the details of children's weekly time spent report.

2.4.42.3 Association

This interface associates with List of Summary Report of Time Spent interface

2.4.43 Schedule Planning Interface [Children / Child Education Tracking Subsystem]

2.4.43.1 Identifier [REQ-0043]

2.4.43.2 Description

This interface will suggest children with the weekly timetable schedule. This function helps children to plan optional activities which do not need to be attended on time such as playing badminton to achieve a balanced schedule.

2.4.43.3 Association

This interface associates with Daily Activity Schedule interface

2.4.44 Countdown Interface [Parent & Children / Child Education Tracking Subsystem]

2.4.44.1 Identifier [REQ-0044]

2.4.44.2 Description

This interface is directed when countdown on children profile is selected. This interface will show all the countdown to the important dates. Both parents and children can search the activities by using filter and sort the list in ascending order and descending order.

2.4.44.3 Association

This interface associates with Children Profile interface

2.4.45 Performance Visualization Interface [Parent & Children / Child Education Tracking Subsystem]

2.4.45.1 Identifier [REQ-0045]

2.4.45.2 Description

This interface is directed when performance on children profile is selected. This interface will show all the results obtained from various aspects in charts. This interface will direct to Result List interface when the chart is clicked. Both parents and children can search the charts by using the filter.

2.4.45.3 Association

This interface associates with Add Results interface and Result List interface

2.4.46 Add Results Interface [Children / Child Education Tracking Subsystem]

2.4.46.1 Identifier [REQ-0046]

2.4.46.2 Description

This interface enables children to insert the details of the performance such as category, performance title, date and results obtained.

2.4.46.3 Association

This interface associates with Performance Visualization interface.

2.4.47 Results List [Parent & Children / Child Education Tracking Subsystem]

2.4.47.1 Identifier [REQ-0047]

2.4.47.2 Description

This interface enables parents and children to view all the results and their details inserted by the children within the category. For example, if users click the chart that displays children's English test scores, the result list will show all the English test scores obtained by the children. Children can edit and delete the results. Sorting is available here.

2.4.47.3 Association

This interface associates with Edit Results interface

2.4.48 Edit Results Interface [Children / Child Education Tracking Subsystem]

2.4.48.1 Identifier [REQ-0048]

2.4.48.2 Description

This interface enables children to edit the details of the result.

2.4.48.3 Association

This interface associates with Result List interface.

2.4.49 Add Awards Interface [Parent & Children / Child Education Tracking Subsystem]

2.4.49.1 Identifier [REQ-0049]

2.4.49.2 Description

This interface enables parents and children to insert awards' details such as award title, category, certificate image and ranking.

2.4.49.3 Association

This interface associates with Award List interface.

2.4.50 Award List Interface [Parent & Children / Child Education Tracking Subsystem]

2.4.50.1 Identifier [REQ-0050]

2.4.50.2 Description

This interface is directed when award on children profile is selected. This interface shows all the awards recorded by the users. Consists of navigation control to other interfaces. Both parent and children can edit and bookmark the awards. They can also search awards using filter and sort the award list.

2.4.50.3 Association

This interface associates with Edit Awards interface, Bookmarked Award List interface and Target and Reward List interface.

2.4.51 Edit Awards Interface [Parent & Children / Child Education Tracking Subsystem]

2.4.51.1 Identifier [REQ-0051]

2.4.51.2 Description

This interface enables both parents and children to edit the details of the award.

2.4.51.3 Association

This interface associates with Award List interface.

2.4.52 Bookmarked Award List Interface [Parent & Children / Child Education Tracking Subsystem]

2.4.52.1 Identifier [REQ-0052]

2.4.52.2 Description

This interface shows all the bookmarked awards. Users can also search bookmarked awards using filter and sort the list.

2.4.52.3 Association

This interface associates with Award List interface.

2.4.53 Target and Reward List Interface [Parent & Children / Child Education Tracking Subsystem]

2.4.53.1 Identifier [REQ-0053]

2.4.53.2 Description

This interface shows all the targets and rewards set by parents. There are labels showing the target status and reward status. By long press one of the targets, give out button is displayed to the parents. If children long press one of the targets, accept or complete button will be displayed to the children. Only parent can add and edit target and reward. Both parents and children can search targets using filter. Sorting of the targets are available for both parents and children too.

2.4.53.3 Association

This interface associates with Add Target and Reward Interface, Edit Target and Reward interface and Confirmation or Rejection of Targets interface.

2.4.54 Add Target and Reward Interface [Parent / Child Education Tracking Subsystem]

2.4.54.1 Identifier [REQ-0054]

2.4.54.2 Description

This interface enables parents to add the target details such as target title and reward details such as reward title.

2.4.54.3 Association

This interface associates with Target and Reward List interface.

2.4.55 Edit Target and Reward Interface [Parent / Child Education Tracking Subsystem]

2.4.55.1 Identifier [REQ-0055]

2.4.55.2 Description

This interface enables parents to edit the details of the target and reward.

2.4.55.3 Association

This interface associates with Target and Reward List interface.

2.4.56 Confirmation or Rejection of Targets Interface [Parent / Child Education Tracking Subsystem]

2.4.56.1 Identifier [REQ-0056]

2.4.56.2 Description

This interface enables parents to confirm or reject the completion of the targets. Parents can also search notifications using filter.

2.4.56.3 Association

This interface associates with Target and Reward List interface.

Finance Monitoring Subsystem

2.4.57 Personal Daily Finance Record Interface [Parents / Children]

2.4.57.1 Identifier: [REQ-0057]

2.4.57.2 Description

This interface shows the daily incomes and expenses and enables the roles such as parent and children to insert the incomes and daily expenses of different categories. User can see the total incomes, expenses, and the total left (income - expenses) of current month. Finance details will be stored in the database and able to edit.

2.4.57.3 Association

This interface associates with add/edit finance record. The budget available will also the updated when expenses are inserted/removed.

2.4.58 Personal/Family Monthly Finance Record Interface [Parents / Children]

2.4.58.1 Identifier: [REQ-0058]

2.4.58.2 Description

This interface shows the list of total the total incomes, expenses, and the total left (income - expenses) of each month that user recorded.

2.4.58.3 Association

This interface associates with add/edit finance record interface.

2.4.59 Search Finance Record Interface [Parents / Children]

2.4.59.1 Identifier: [REQ-0059]

2.4.59.2 Description

This interface shows the search result based on the note inserted in the finance record.

2.4.59.3 Association

This interface associates with Personal Daily Finance Record interface.

2.4.60 Budget Allocation Interface [Parents / Children]

2.4.60.1 Identifier: [REQ-0060]

2.4.60.2 Description

This interface shows the total budget and the budget used. This interface also shows the budget assigned for each category like food, entertainment, beauty and so on.

2.4.60.3 Association

This interface associates with add/edit budget details interface. The budget available will also the updated when the budget is edited/removed.

2.4.61 Finance Record Add Interface [Parents / Children]

2.4.61.1 Identifier: [REQ-0061]

2.4.61.2 Description

This interface is to insert the details of incomes/expenses like date, account, category, amount, note, add picture and the description of picture.

2.4.61.3 Association

This interface is associate with finance record daily and monthly interface. The details will be shown in the daily finance record interface. The total incomes, expenses and the total left (income - expenses) in daily/ monthly finance record will be updated based on the record inserted by the user.

2.4.62 Finance Record Edit Interface [Parents / Children]

2.4.62.1 Identifier: [REQ-0062]

2.4.62.2 Description

This interface is to edit the details of incomes/expenses like date, account, category, amount, note, add picture and the description of picture.

2.4.62.3 Association

This interface is associate with finance record daily and monthly interface.

2.4.63 Budget Record Add Interface [Parents / Children]

2.4.63.1 Identifier: [REQ-0063]

2.4.63.2 Description

This interface is to insert the details of budget like category and amount.

2.4.63.3 Association

This interface is associate with budget allocation interface. The details will be shown in the budget allocation interface. The total budget, budget of particular category and the budget left will be updated based on the record inserted by the user.

2.4.64 Budget Record Edit Interface [Parents / Children]

2.4.64.1 Identifier: [REQ-0064]

2.4.64.2 Description

This interface is to edit the details of budget like category and amount.

2.4.64.3 Association

This interface is associate with budget allocation interface.

2.4.65 Family Daily Finance Record Interface [Parents / Children]

2.4.65.1 Identifier: [REQ-0065]

2.4.65.2 Description

This interface shows the daily incomes and expenses of family account and enables the roles such as parent and children to insert the incomes and daily expenses of different categories. User can see the total incomes, expenses, and the total left (income - expenses) of current month. Finance details will be stored in the database and able to edit.

2.4.65.3 Association

This interface associates with add/edit finance record. The budget available will also the updated when expenses are inserted/removed.

2.4.66 Expenses Statistical Chart Interface [Parents / Children]

2.4.66.1 Identifier: [REQ-0066]

2.4.66.2 Description

This interface let user to view the monthly expenses statistical chart (Pie Chart). User can see the percentage and total amount of income/expenses of different category. In expenses statistical chart, will also show how much budget available for each budget category.

2.4.66.3 Association

This interface is associate with finance record interface and budget allocation interface. The chart will change based on the finance record inserted by user. The budget available shown will also change when there are expenses, or the budget has changed.

2.4.67 Income Statistical Chart Interface [Parents / Children]

2.4.67.1 Identifier: [REQ-00067]

2.4.67.2 Description

This interface let user to view the monthly income statistical chart (Pie Chart).

2.4.67.3 Association

This interface is associate with finance record interface. The chart will change based on the finance record inserted by user.

2.4.68 Children Expenses Tracking Interface [Parents]

2.4.68.1 Identifier: [REQ-0068]

2.4.68.2 Description

This interface let parents to view the children's monthly expenses. This interface also gives a hiding option to parents whether to hide family account from children.

2.4.68.3 Association

This interface is associate with children's view of children expenses tracking interface. If children choose to hide their monthly expenses, parents will not see it. This interface also associates with family finance record from children's side. When parents choose to hide family account, children will not see the family account from their side.

2.4.69 Children Expenses Tracking Interface [Children]

2.4.69.1 Identifier: [REQ-0069]

2.4.69.2 Description

This interface gives a hiding option to children whether to hide monthly expenses from parents.

2.4.69.3 Association

This interface is associate with parents' view of children expenses tracking interface. If children choose to hide their monthly expenses, parents will not see it.

2.5 Internal Interfaces Requirements

Contact and Appointment Subsystem Internal Interface

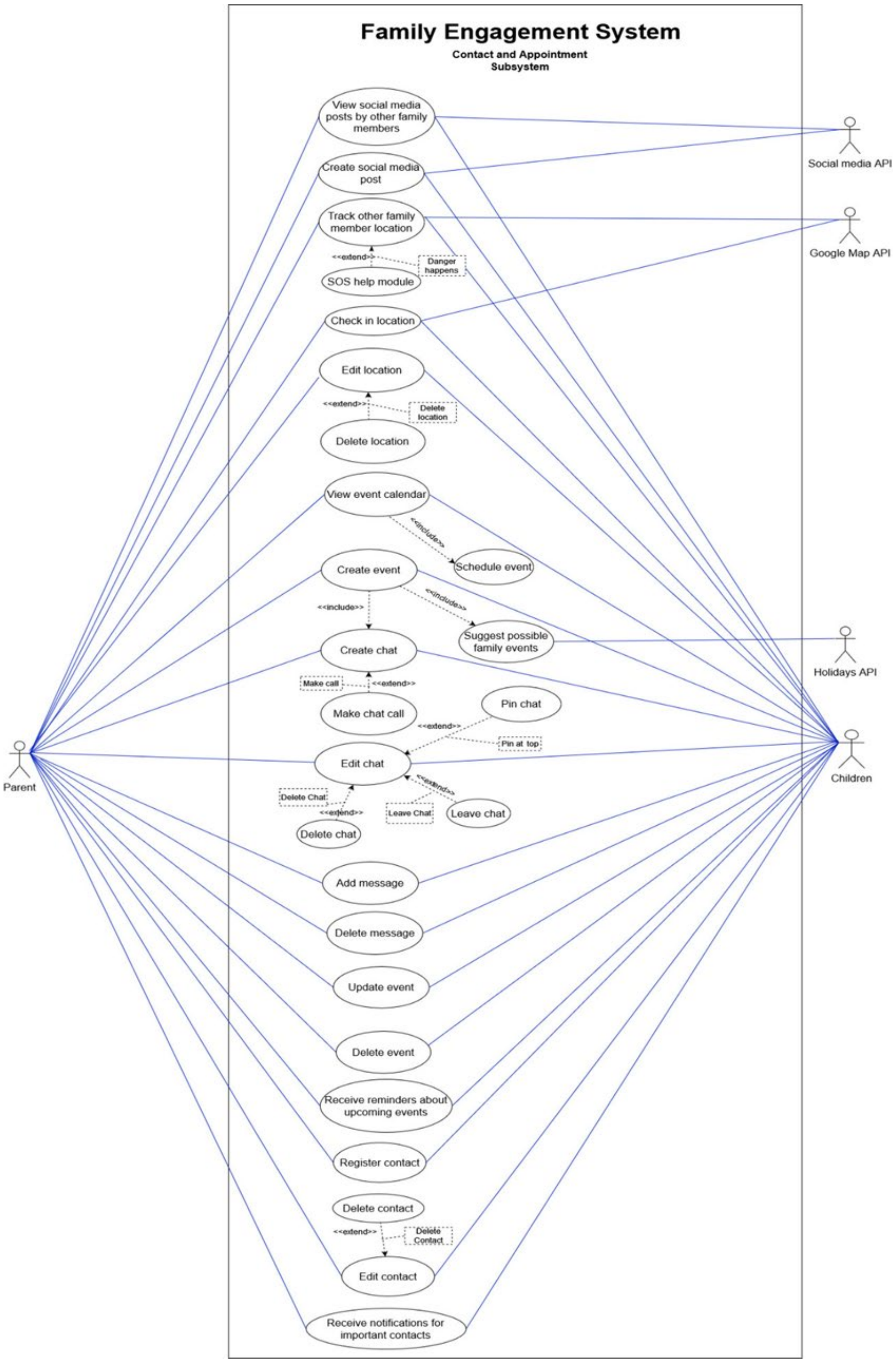


Figure 64: Use Case Diagram for Contact and Appointment Subsystem

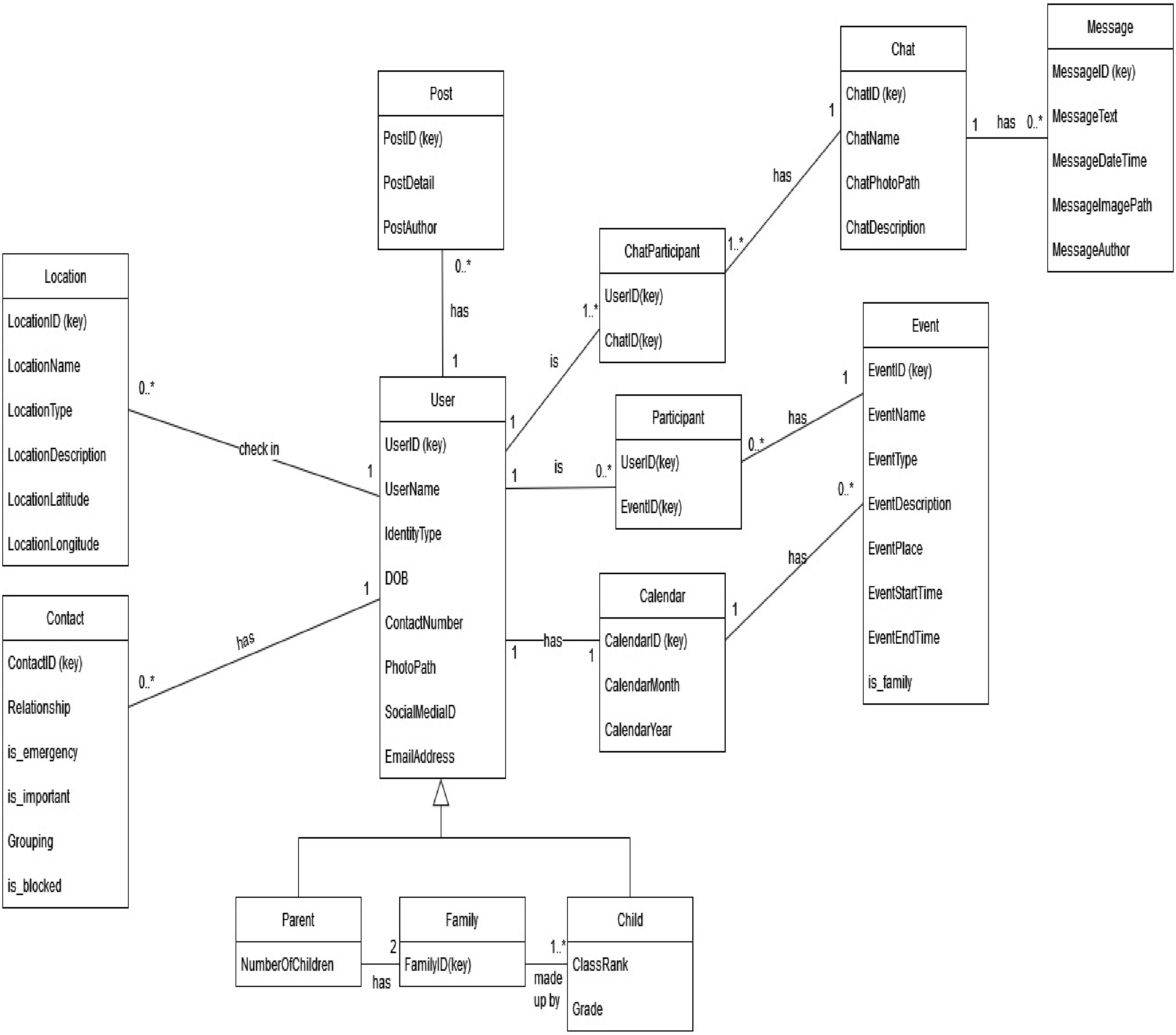


Figure 65:Domain Class Diagram for Contact and Appointment Subsystem

Child Education Tracking Subsystem Internal Interface

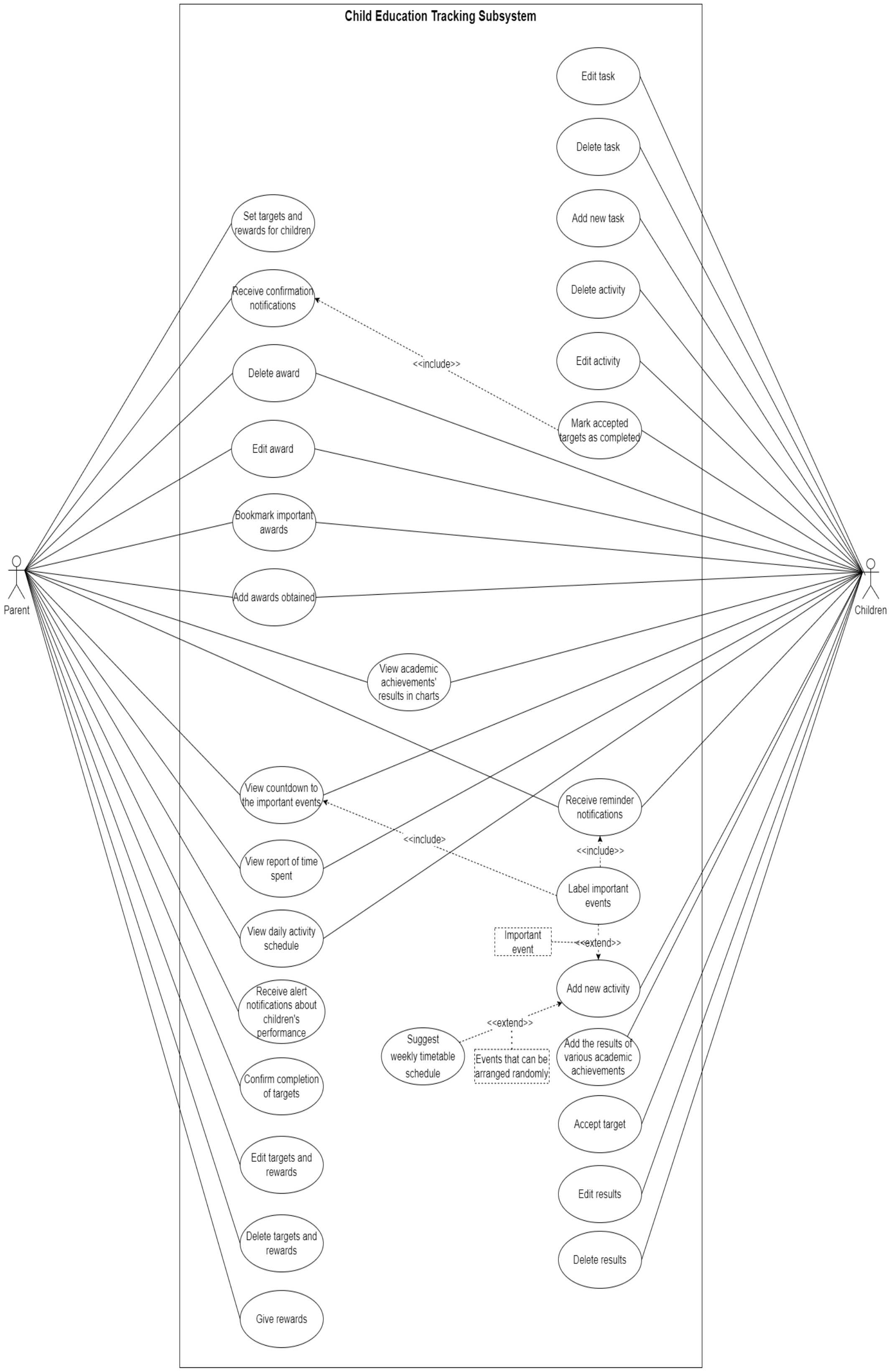


Figure 66:Use Case Diagram for Child Education Tracking Subsystem

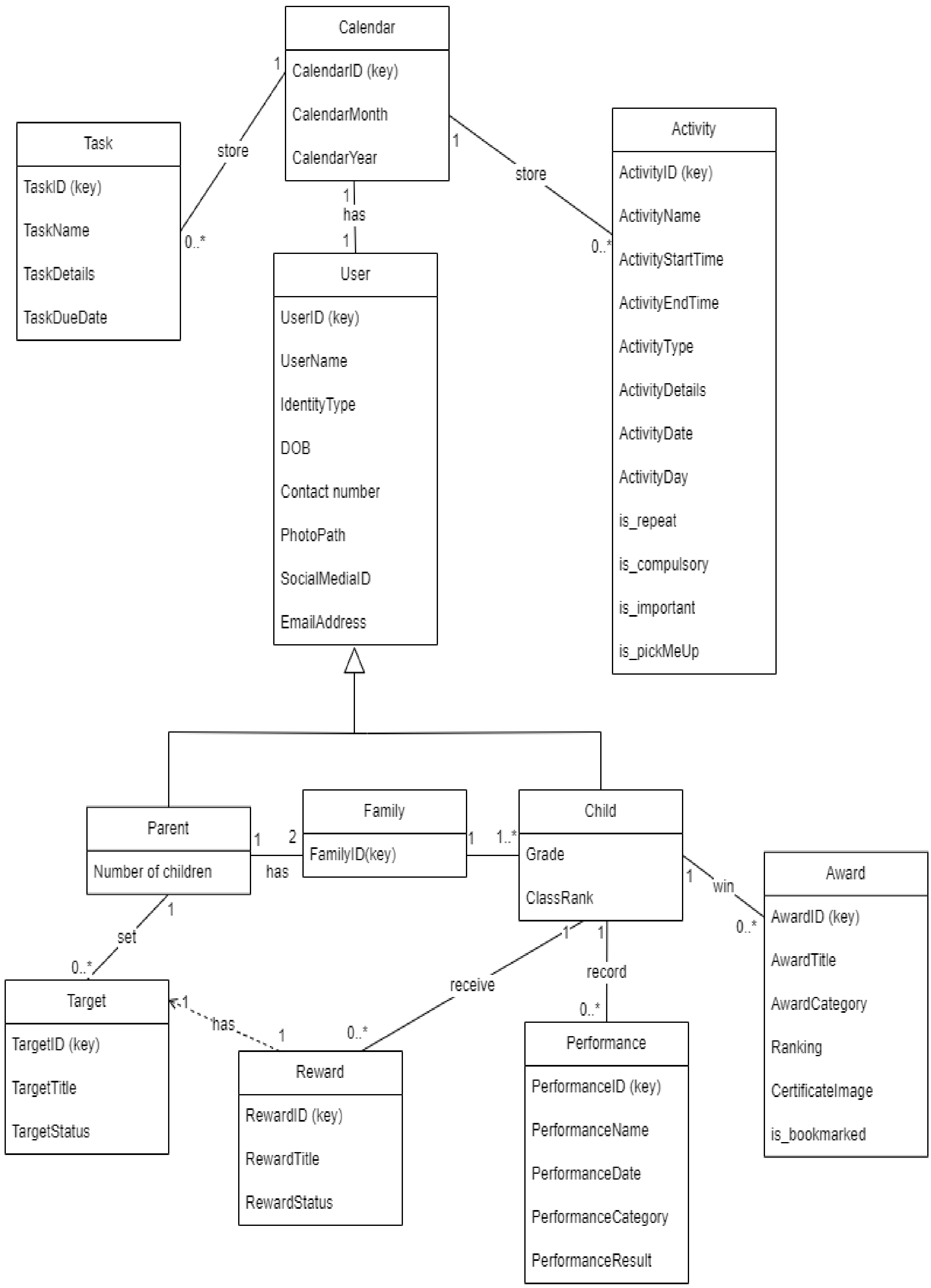


Figure 67:Domain Class Diagram for Child Education Tracking Subsystem

Finance Monitoring Subsystem Internal Interface

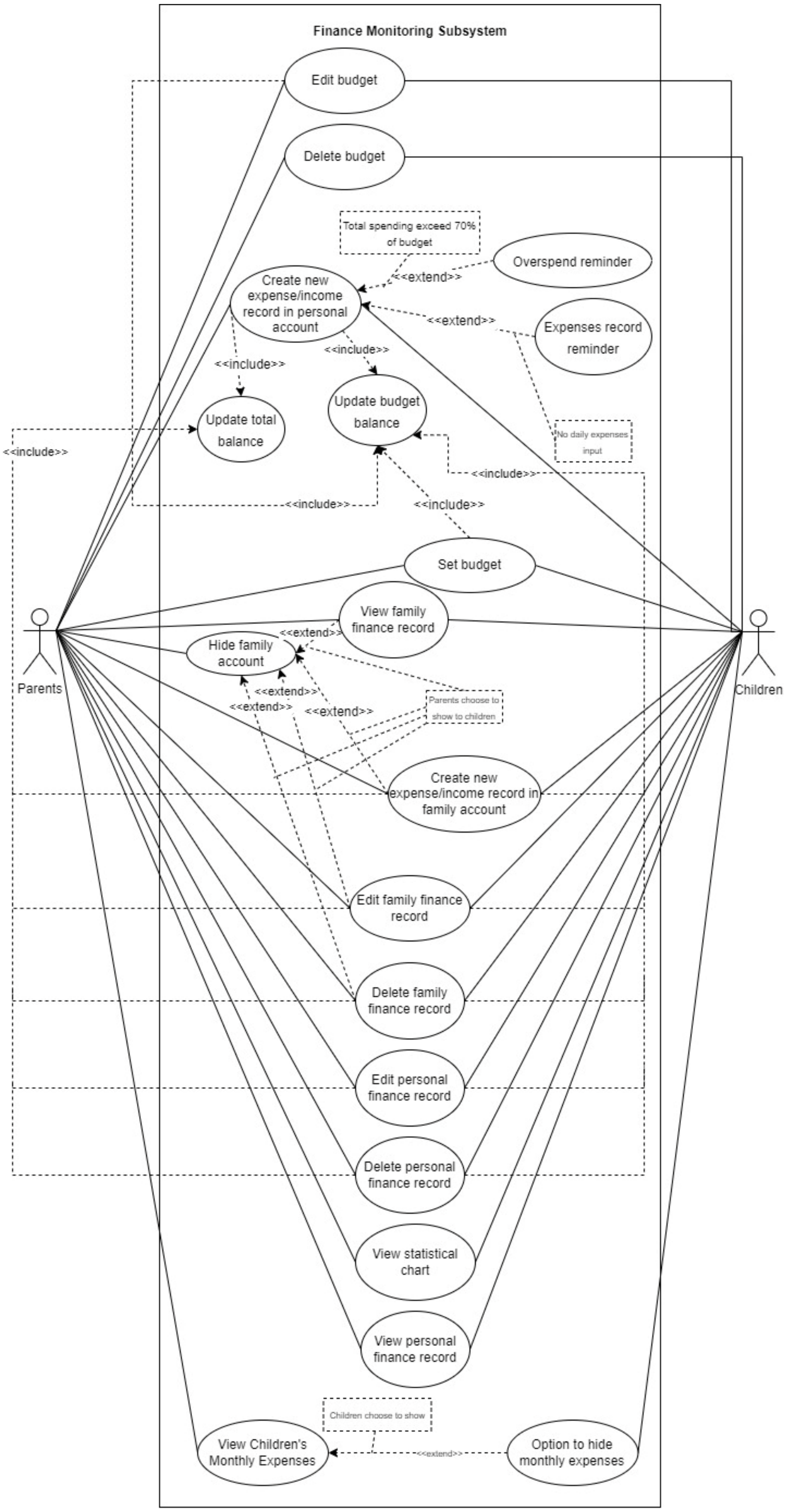


Figure 68: Use Case Diagram for Finance Monitoring Subsystem

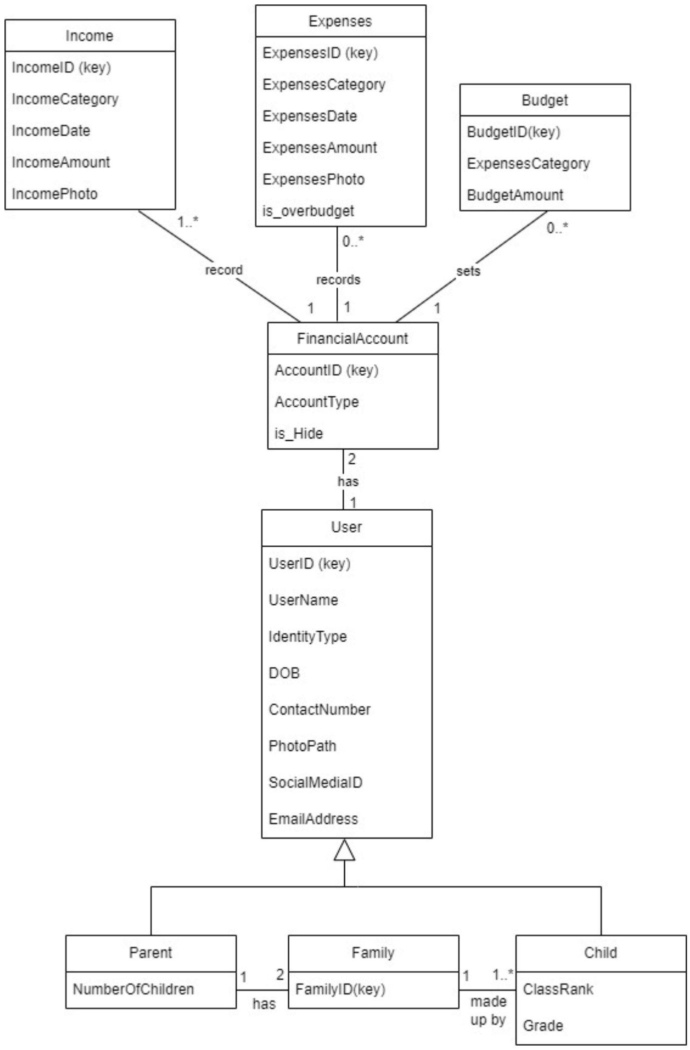


Figure 69: Domain Class Diagram for Order-Entry Sub system

Contact and Appointment

2.5.1 Use Case: Register Contact

2.5.1.1 Identifier: [SRS-0001]

2.5.1.2 Use Case Description

The *Register Contact* use case has 2 normal flows, 1 optional flow and 1 exception flow as shown in the following table.

Table 18: Use Case Description for Register Contact Scenario

Use Case Name:	Register Contact	
Scenario:	Register new Contact	
Triggering Event:	User wants to add new contact into the contact list.	
Brief Description:	When user navigates to the contact list, the system displays all the recorded contact list. User can filter and sort the contact list by name, by grouping and by contact number. User needs to input contact information such as name, relationship, contact number, address, and grouping. The system will add the new contact to the contact list and record in the database.	
Actors:	Parent and Children	
Related Use Cases:	-	
Stakeholders:	Families (Parent and Children)	
Preconditions:	Newly added contact does not exist in the existing contact list before the addition action.	
Postconditions:	New contact must be added to the contact list.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0001-N1]	1. User navigates to the contact list.	1.1 Displays all the recorded contacts.
[SRS-0001-O2]	2. User can filter and sort the contact list by Name, by Grouping, by Contact Number and by Area.	2.1 Displays the filtered list based on filter and sort options.
[SRS-0001-N3]	3. When user chooses to create new contact and chooses the new contact in the unadded contact list, user needs to input additional contact information such as relationship and grouping.	3.1 Create a new contact with the additional contact information and necessary information such as name, contact number, birthday, email address and social media ID from the chosen contact's user profile database. 3.2 Add the new contact to the contact list and record in the database.

Exception Flow: **[SRS-0001-E3.1]**	3.1 If the contact that user wants to add is already existed in the database, then the system pauses this use case and prompt an error message.

2.5.1.3 System Sequence Diagram

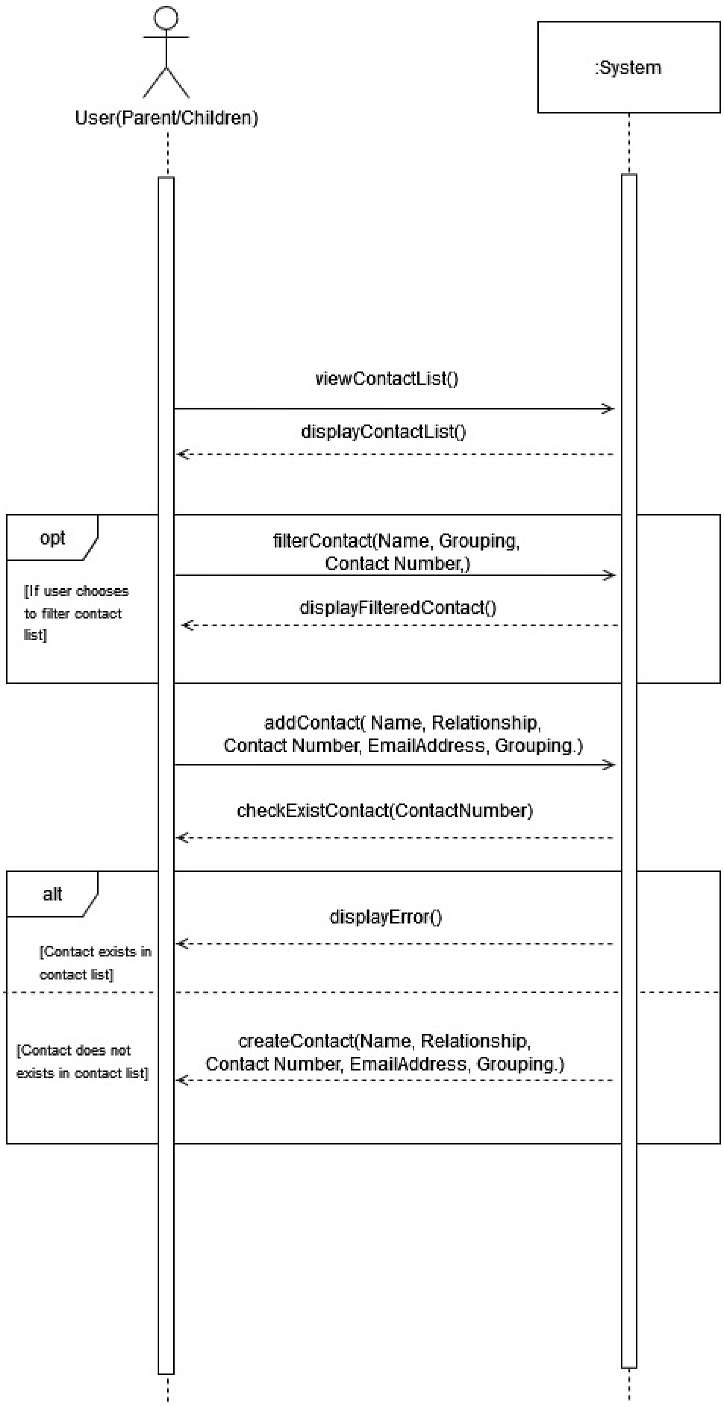


Figure 70: Sequence Diagram for Register Contact use case

2.5.2 Use Case: Edit Contact

2.5.2.1 Identifier: [SRS-0002]

2.5.2.2 Use Case Description

The *Edit Contact* use case has 2 normal flows and 1 exception flow as shown in the following table.

Table 19:Use Case Description for Edit Contact Scenario

Use Case Name:	Edit Contact	
Scenario:	User updates the contact details such as relationship and grouping.	
Triggering Event:	User wants to edit the contact details such as relationship and grouping.	
Brief Description:	When user navigates to the contact detail, the system displays all the recorded contact details. When user chooses to edit the contact detail, user can edit the contact details and the changes will be updated in the database.	
Actors:	Parent and Children	
Related Use Cases:	Extends: *Delete Contact*	
Stakeholders:	Families (Parent and Children)	
Preconditions:	The chosen contact must exist.	
Postconditions:	The changes made to chosen contact details must be updated to the database.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0002-N1]	1. User navigates to the contact detail page.	1.1 Displays all the recorded contact details.
[SRS-0002-N2]	2. If user chooses to edit the contact detail, user can change the contact details such as the relationship and grouping.	2.1 Update the latest changes on contact details in the database.

Exception Flow: **[SRS-0002-E2.1]**	2.1 If the chosen contact does not exist, then the system pauses this use case and show error message.

2.5.2.3 System Sequence Diagram

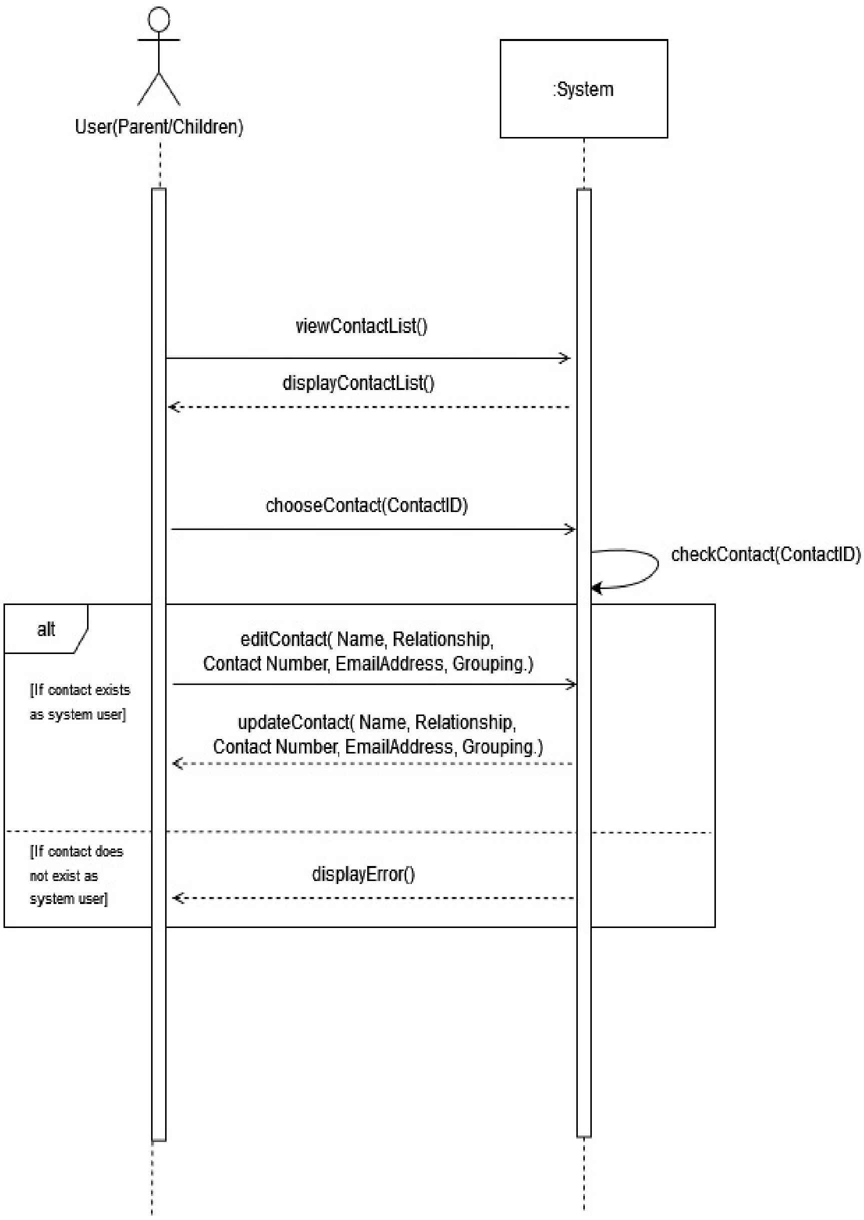


Figure 71: Sequence Diagram for Edit Contact use case

2.5.3 Use Case: Delete Contact

2.5.3.1 Identifier: [SRS-0003]

2.5.3.2 Use Case Description

The *Delete Contact* use case has 2 normal flows and 1 exception flow as shown in the following table.

Table 20:Use Case Description for Delete Contact Scenario

Use Case Name:	Delete Contact	
Scenario:	User chooses to delete the selected contact from the contact list.	
Triggering Event:	User wants to delete the chosen contact from the contact list.	
Brief Description:	When user navigates to the contact list, the system displays all the recorded contact list. When user chooses to delete the chosen contact, the system will delete the contact from the system database.	
Actors:	Parent and Children	
Related Use Cases:	Extended by: *Edit Contact*	
Stakeholders:	Families (Parent and Children)	
Preconditions:	The chosen contact must exist.	
Postconditions:	The chosen contact must be deleted from the database.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0003-N1]	1. User navigates to the contact list.	1.1 Displays all the recorded contact list.
[SRS-0003-N2]	2. User chooses to delete a selected contact.	2.1 Delete the chosen contact from the database. 2.2 Display the latest contact list.

Exception Flow: **[SRS-0003-E2.1]**	1.1 If the chosen contact does not exist, then the system pauses this use case.

2.5.3.3 System Sequence Diagram

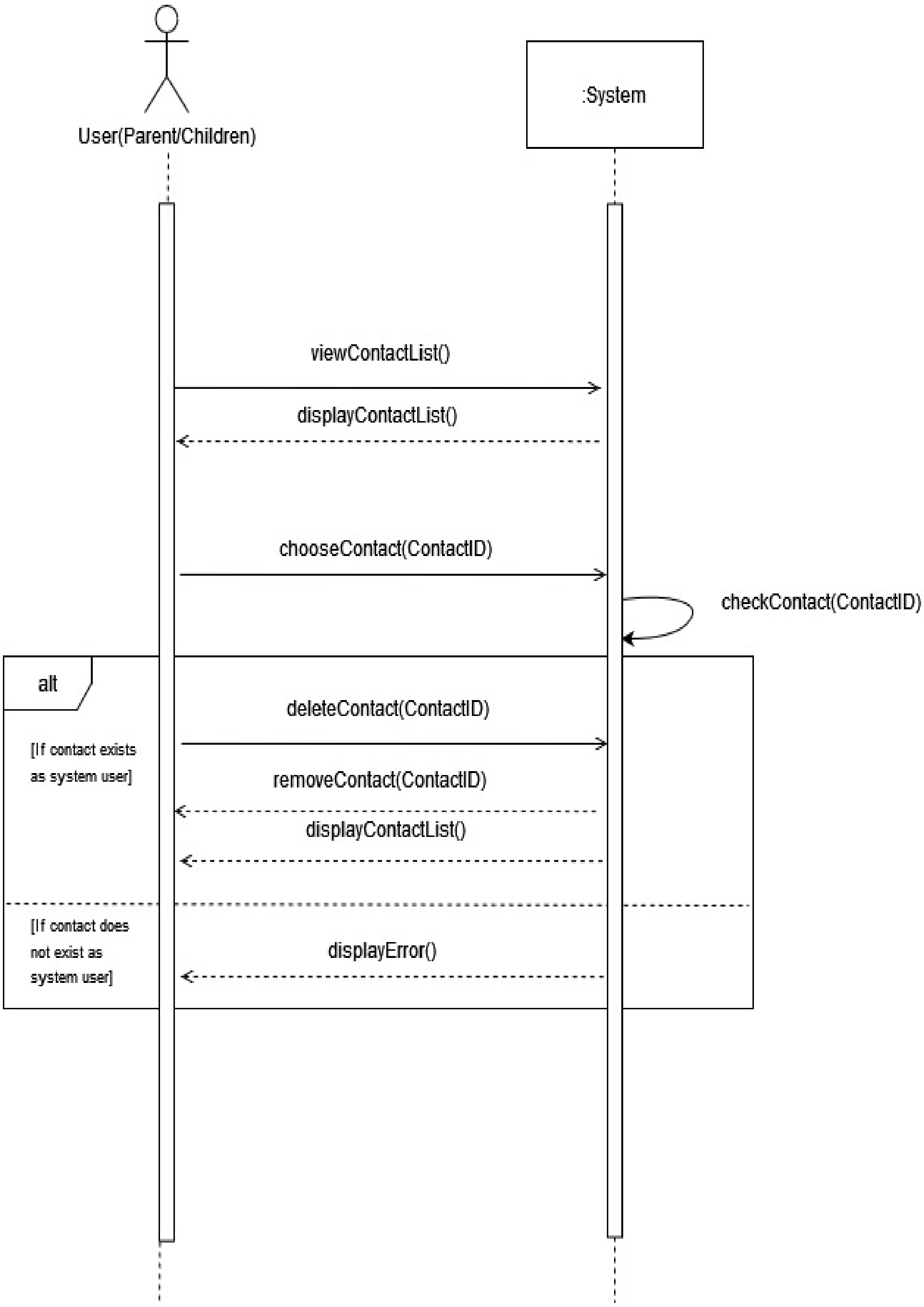


Figure 72:Sequence Diagram for Delete Contact use case

2.5.4 Use Case: Create Event

2.5.4.1 Identifier: [SRS-0004]

2.5.4.2 Use Case Description

The *Create Event* use case has 2 normal flows and 1 exception flow as shown in the following table.

Table 21:Use Case Description for Create Event Scenario

Use Case Name:	Create Event	
Scenario:	Create family or personal event.	
Triggering Event:	User chooses to create family or personal event.	
Brief Description:	When user navigates to the event list, the system displays all the recorded family and personal events. When user chooses to create new event, user inputs event information such as event name, event type, event description, event place, event start time, event end time, event category (family event or personal event) and select the event participants from the contact list. The system will add the new event to the event list and record in the database. Every family event creation will also create a group chat for the newly created family event.	
Actors:	Parent and Children	
Related Use Cases:	Includes: *Create Chat, Suggest possible family events*	
Stakeholders:	Families (Parent and Children)	
Preconditions:	Newly added event does not exist in the existing event list before the addition.	
Postconditions:	New event must be created after user confirms to create new event.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0004-N1]	1. User navigates to the event list.	1.1 Displays all the recorded family and personal events
[SRS-0004-N2]	2. If user chooses to create new event, user inputs event information such as event	2.1 Create a new event.

	name, event type, event description, event place, event start time, event end time, event category (family event or personal event) and select the event participants from the contact list.	2.2 Create a new group chat for the family event (*Create Chat* use case).
Exception Flow: **[SRS-0004-E2.1]**	2.1 If the event that user wants to add is already existed in the database, then the system pauses this use case and prompt an error message.	

2.5.4.3 System Sequence Diagram

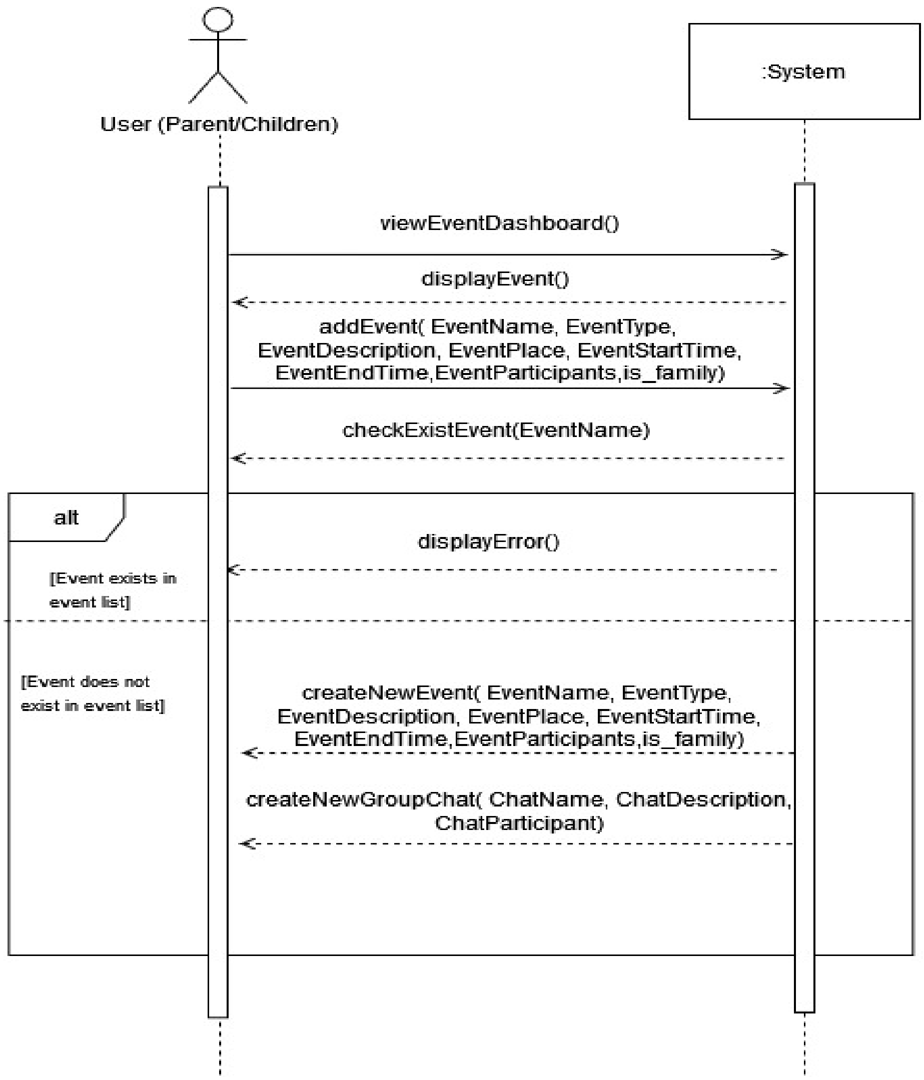


Figure 73: Sequence Diagram for Create Event use case

2.5.5 Use Case: Suggest Possible Family Events

2.5.5.1 Identifier: [SRS-0005]

2.5.5.2 Use Case Description

The *Suggest Possible Family Events* use case has 2 normal flows,2 alternate flows and 1 exception flow as shown in the following table.

Table 22: Use Case Description for Suggest Possible Family Events Scenario

Use Case Name:	Suggest Possible Family Events	
Scenario:	User looks at the possible family events suggested by the system.	
Triggering Event:	User wants to see the possible family events suggested by the system.	
Brief Description:	When user navigates to the family event creation page, the system will suggest possible family event based on the user profile database and calendar database such as suggest creating birthday event for a family member. User can choose to accept or reject the suggestion.	
Actors:	Holidays API, Parent and Children	
Related Use Cases:	Included by: *Create Event*	
Stakeholders:	Families (Parent and Children)	
Preconditions:	Public holiday information should exist.	
Postconditions:	Suggestion on possible family events should be given to user.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0005-N1]	1. User navigates to the family event creation page.	
[SRS-0005-N2]	2. Holidays API provides public holiday information.	2.1 Suggest possible family event based on the user profile database and public holiday information.
[SRS-0005-A3]	3. User accepts the suggestion.	3.1Create a new family event based on the suggestion.
[SRS-0005-A4]	4. User rejects the suggestion.	

		4.1 Redirect to the event list page.
Exception Flow: **[SRS-0003-E2.1]**	2.1 If the public holiday information does not exist, the system prompts an error message.	

2.5.5.3 System Sequence Diagram

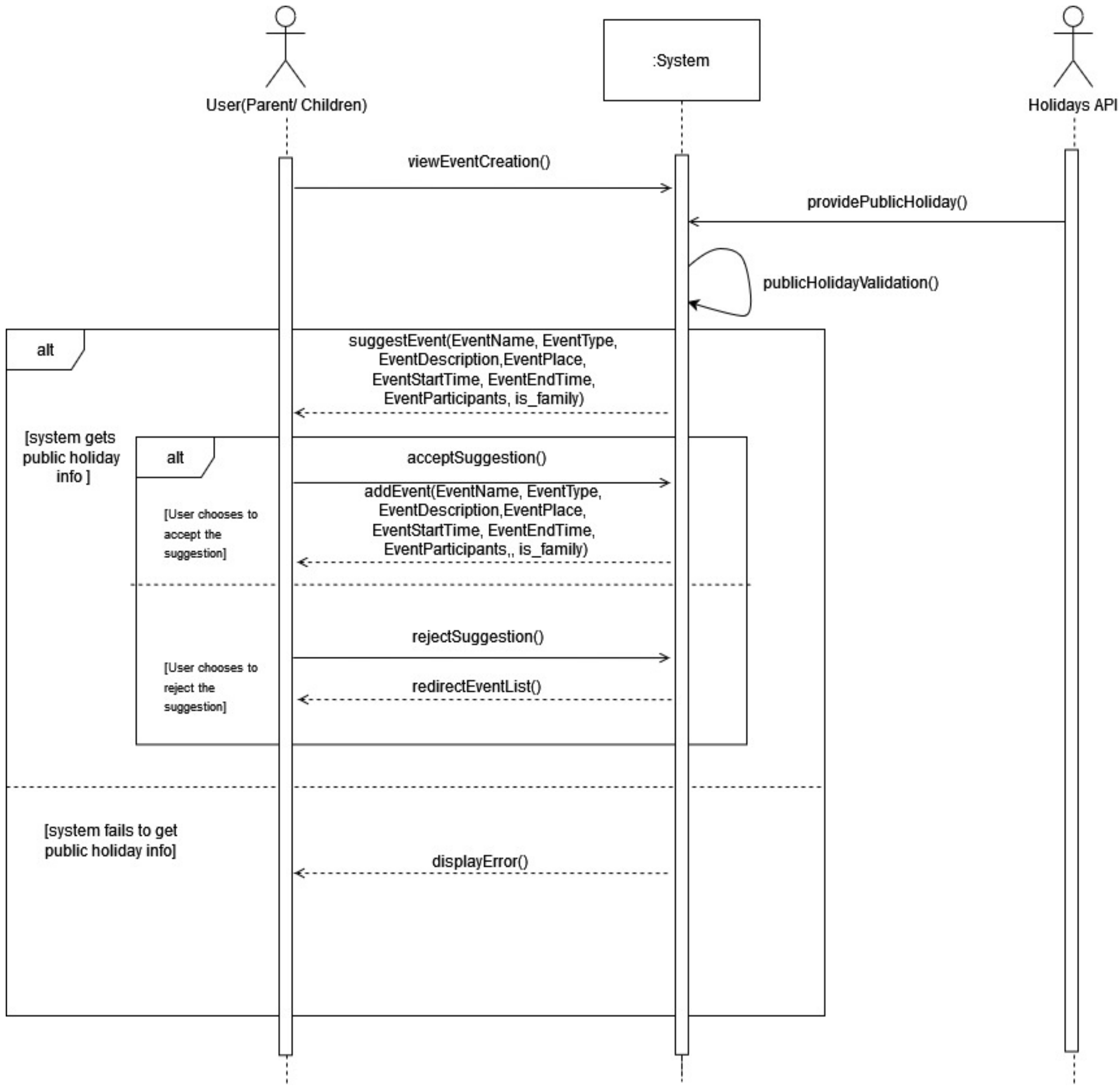


Figure 74: Sequence Diagram for Suggest Possible Family Events use case

2.5.6 Use Case: View Event Calendar

2.5.6.1 Identifier: [SRS-0006]

2.5.6.2 Use Case Description

The *View Event Calendar* use case has 1 normal flow,1 optional flow and 1 exception flow as shown in the following table.

Table 23: Use Case Description for View Event Calendar Scenario

Use Case Name:	View Event Calendar	
Scenario:	View personal events and family events in calendar view.	
Triggering Event:	User wants to view events in calendar view.	
Brief Description:	When user navigates to the calendar, the system displays all the recorded family events and personal events in the calendar. User can view an overview of his or her events in a daily, weekly, monthly, and yearly view.	
Actors:	Parent and Children	
Related Use Cases:	Includes: *Schedule Event*	
Stakeholders:	Families (Parent and Children)	
Preconditions:	Calendar view should exist.	
Postconditions:	The system must show user's correct family events and personal events in the calendar.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0006-N1]	1. User navigates to the calendar view.	1.1 Displays user's recorded family events and personal events.
[SRS-0006-O2]	2. User chooses to view in daily, weekly, monthly, or yearly view.	2.1 Display user's recorded events based on user duration option.

Exception Flow: **[SRS-0006-E1.1]**	1.1 If calendar view does not exist, then the system pauses this use case.

2.5.6.3 System Sequence Diagram

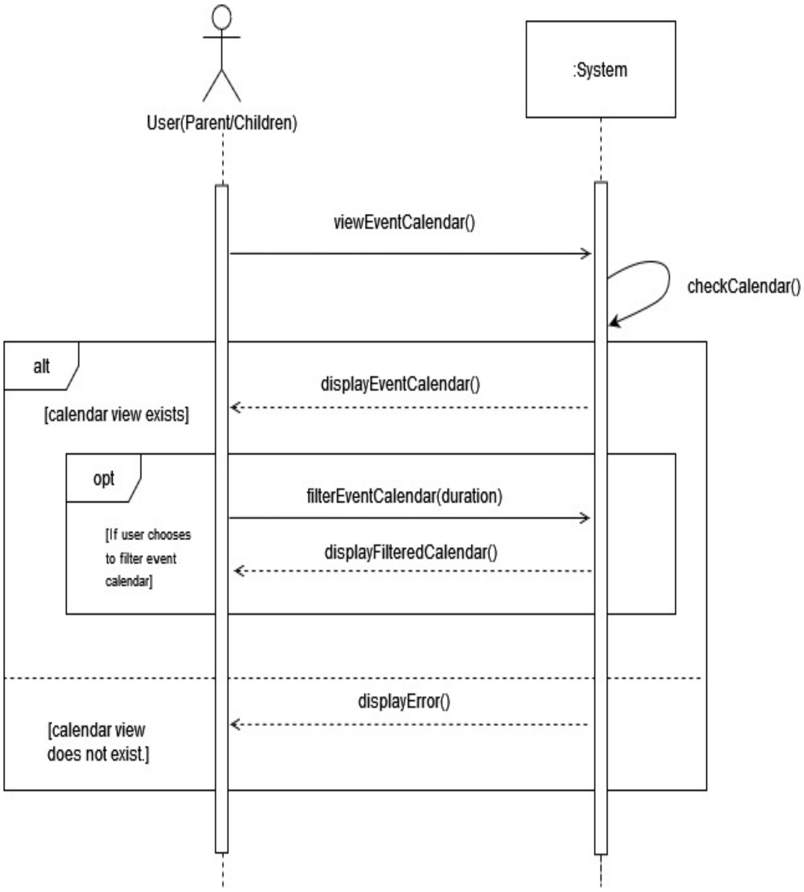


Figure 75: Sequence Diagram for View Event Calendar use case

2.5.7 Use Case: Schedule Event

2.5.7.1 Identifier: [SRS-0007]

2.5.7.2 Use Case Description

The *Schedule Event* use case has 2 normal flows and 1 exception flow as shown in the following table.

Table 24: Use Case Description for Schedule Event Scenario

Use Case Name:	Schedule Event	
Scenario:	Schedule personal and family events.	
Triggering Event:	User wants to schedule personal and family events.	
Brief Description:	User can schedule their time in the events list and calendar list. User can check whether their personal appointments or events clash with the family events. If there is a clash between them, user can choose to reschedule and manage his or her events.	
Actors:	Parent and Children	
Related Use Cases:	Included by: *View Event Calendar*	
Stakeholders:	Families (Parent and Children)	
Preconditions:	The chosen event to be rescheduled must exist.	
Postconditions:	User should be able to schedule and reschedule the events. The rescheduled events should be displayed correctly.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0007-N1]	1. User navigates to the event list.	1.1 Displays all the recorded events.
[SRS-0007-N2]	2. User schedule and reschedule their events based on the free time available.	2.1 Reschedule the chosen events and record in the database.
Exception Flow: **[SRS-0007-E2.1]**	2.1 If the chosen event does not exist, the system pauses this use case and prompts an error message.	

2.5.7.3 System Sequence Diagram

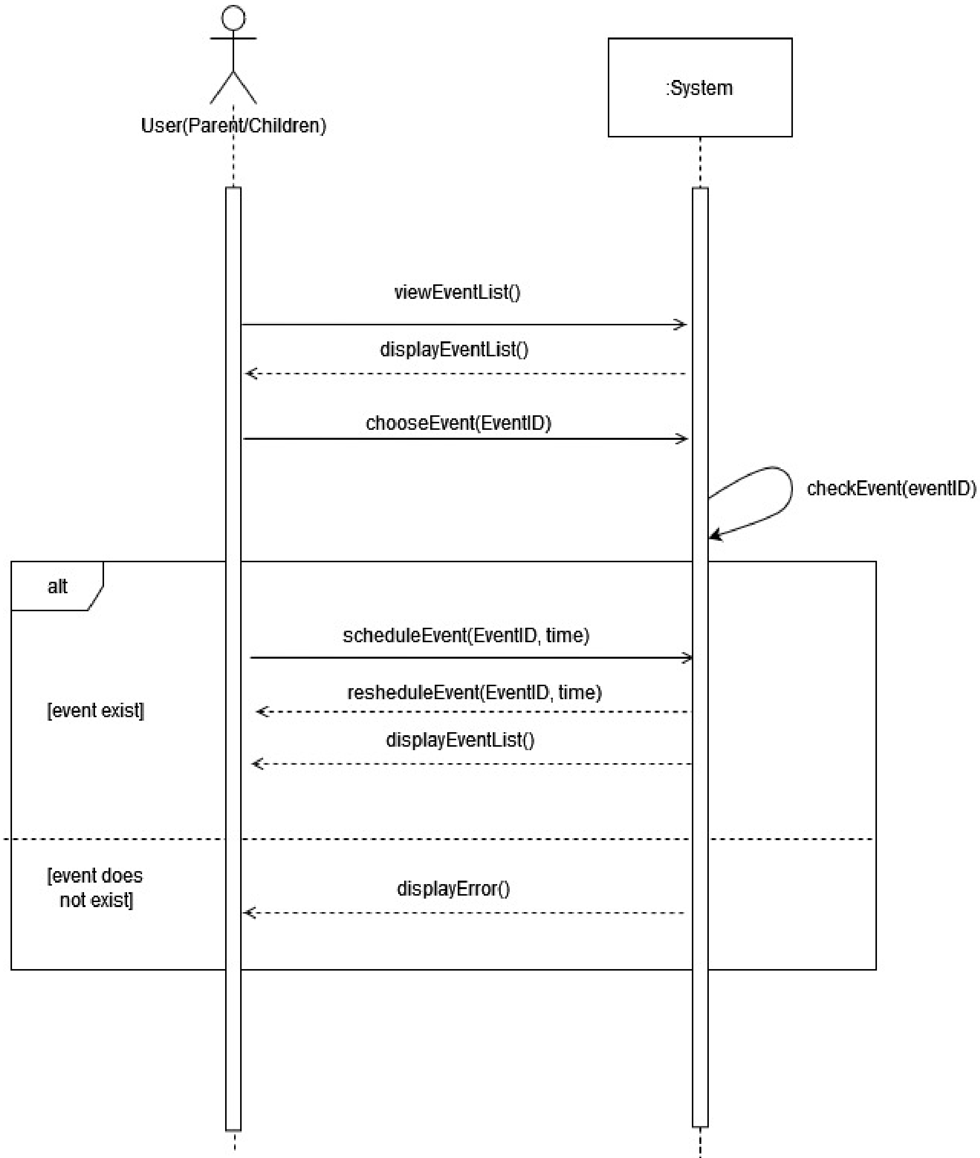


Figure 76: Sequence Diagram for Schedule Event use case

2.5.8 Use Case: Update Event

2.5.8.1 Identifier: [SRS-0008]

2.5.8.2 Use Case Description

The *Update Event* use case has 2 alternate flows and 1 exception flow as shown in the following table.

Table 25:Use Case Description for Update Event Scenario

Use Case Name:	Update Event	
Scenario:	Edit personal and family events.	
Triggering Event:	User wants to edit personal and family events' detail.	
Brief Description:	When user chooses to edit a chosen event, the system will display the recorded family or personal event information. User can edit any information and then the changes will be recorded to the system.	
Actors:	Parent and Children	
Related Use Cases:	-	
Stakeholders:	Families (Parent and Children)	
Preconditions:	Family event or personal event items must exist for if it is chosen.	
Postconditions:	Chosen family event or personal event detail must be updated after user made changes to the details.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0008-N1]	1. User navigates to event list.	1.1 Display all the recorded event list.
[SRS-0008-N2]	2. User chooses to edit a chosen event (either personal event or family event), user can edit any information.	2.1 Display the recorded event (either personal event or family event) information. 2.2 Record changes to the database.
Exception Flow: **[SRS-0008-E2.1]**	2.1 If the chosen event does not exist, the system pauses this use case and prompts an error message.	

2.5.8.3 System Sequence Diagram

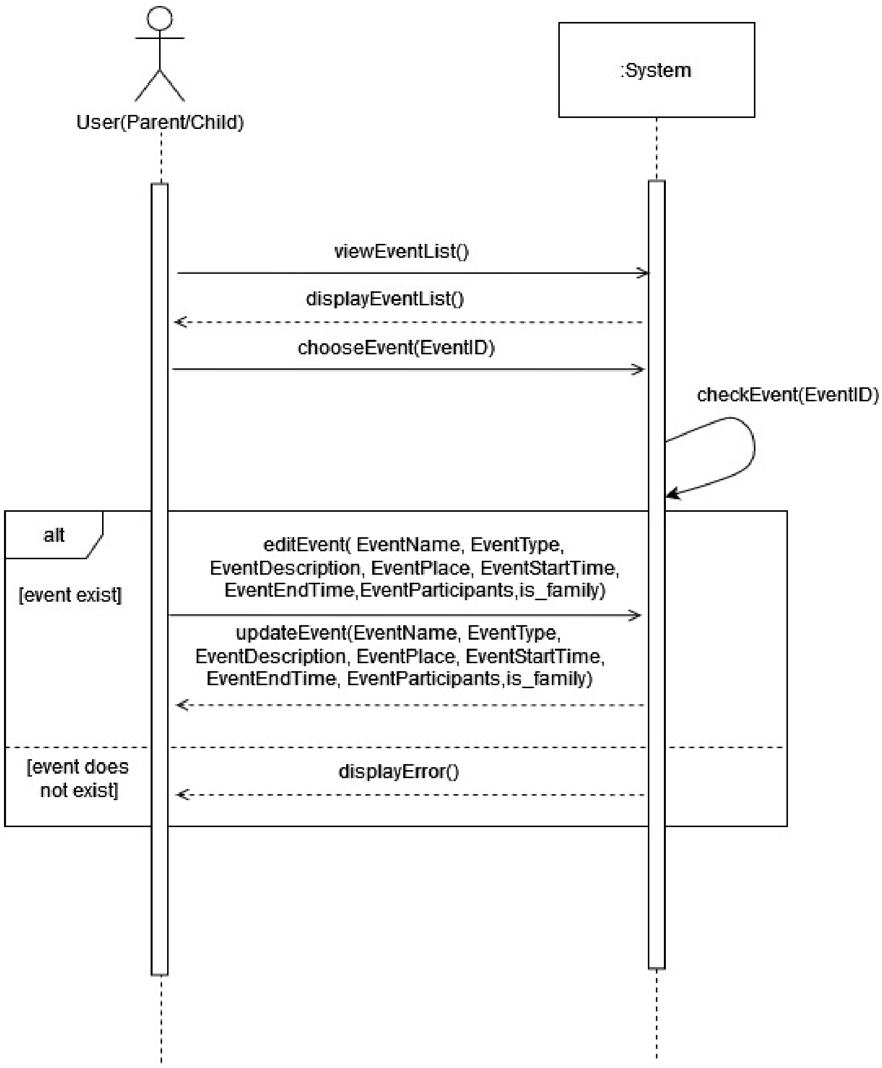


Figure 77: Sequence Diagram for Update Event use case

2.5.9 Use Case: Delete Event

2.5.9.1 Identifier: [SRS-0009]

2.5.9.2 Use Case Description

The *Delete Event* use case has 2 normal flows and 1 exception flow as shown in the following table.

Table 26: Use Case Description for Delete Event Scenario

Use Case Name:	Delete Event	
Scenario:	Delete personal and family events.	
Triggering Event:	User wants to delete personal and family events.	
Brief Description:	When user chooses to delete a chosen personal event or family event, the system will ask for confirmation and delete the chosen event from the event list if user clicks on the delete confirmation button.	
Actors:	Parent and Children	
Related Use Cases:	-	
Stakeholders:	Families (Parent and Children)	
Preconditions:	Family event or personal event items must exist for if it is chosen.	
Postconditions:	Chosen family event or personal event detail must be deleted and the latest event list should be updated after user delete the chosen event.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0009-N1] **[SRS-0009-N2]**	1. User chooses to delete a chosen event 2. User clicks on the delete confirmation button.	1.1 Ask for delete confirmation 2.1 Check whether the chosen event exists. 2.2 Delete the chosen event
Exception Flow: **[SRS-0009-E2.1]**	2.1 If the chosen event does not exist, the system pauses this use case and prompts an error message.	

2.5.9.3 System Sequence Diagram

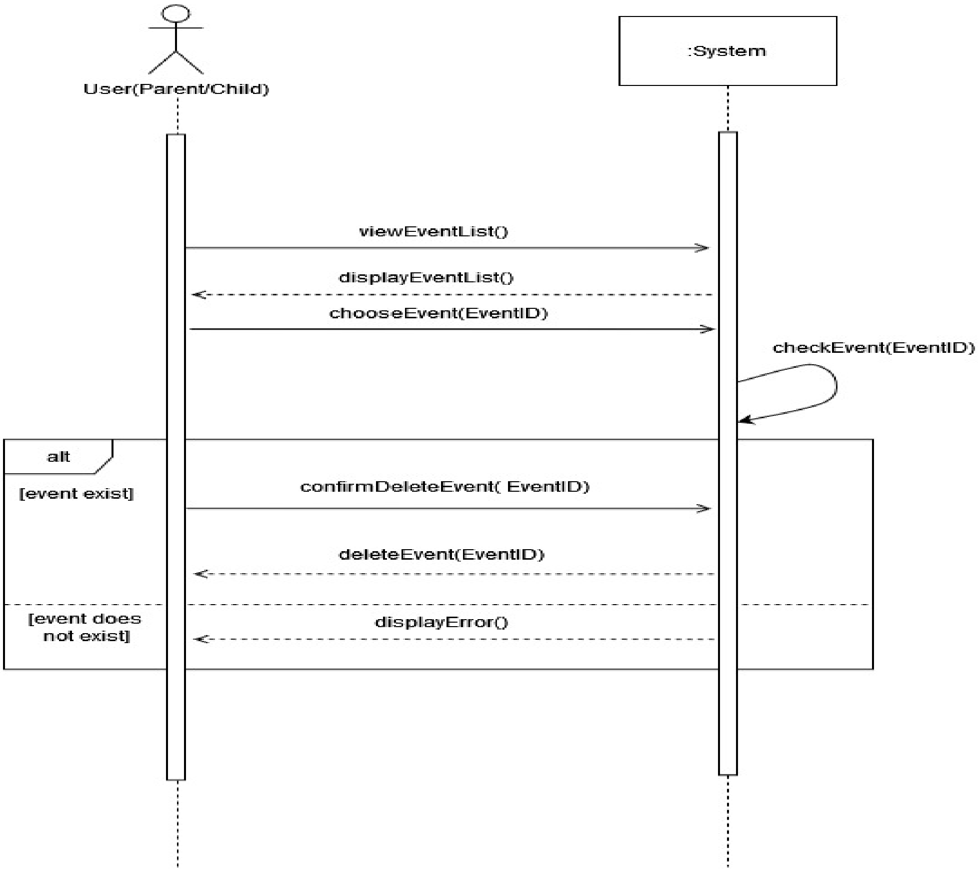


Figure 78: Sequence Diagram for Delete Event use case

2.5.10.1 Identifier: [SRS-0010]

2.5.10.2 Use Case Description

The *Receive Reminders About Upcoming Events* use case has 2 normal flows, 1 optional flow and 1 exception flow as shown in the following table.

Table 27: Use Case Description for Receive Reminders About Upcoming Events Scenario

Use Case Name:	Receive Reminders About Upcoming Events
Scenario:	User receives reminders about the upcoming events.
Triggering Event:	The upcoming events are approaching.

Brief Description:	When the upcoming events are approaching such as one week to go, five days to go, three days to go and one day to go, the system will send reminders to user to remind about the events. On the day of the events, the system will remind in every two hours and in the last 30 minutes until the event occurrence. User can turn the notifications silent after he or she is well acknowledged about the events. The system will show countdown to the events too.	
Actors:	Parent and Children	
Related Use Cases:	-	
Stakeholders:	Families (Parent and Children)	
Preconditions:	The chosen event must exist.	
Postconditions:	User receives reminders about the upcoming events.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0010-N1]	1. User navigates to event list.	1.1 Displays all recorded event list.
[SRS-0010-N2]	2. User accepted to join a family event.	2.1 Send reminders to user one week to go, five days to go, three days to go and one day to go. 2.2 Send reminders in every two hours and in the last 30 minutes until the event occurrence. 2.3 Show countdown to the events.
[SRS-0010-O3]	3. User turns the notifications silent	3.1 Stop sending reminders about the approaching event to user.
Exception Flow: **[SRS-0010-E2.1]**	2.1 If the event does not exist, the system pauses this use case and prompts an error message.	

2.5.10.3 System Sequence Diagram

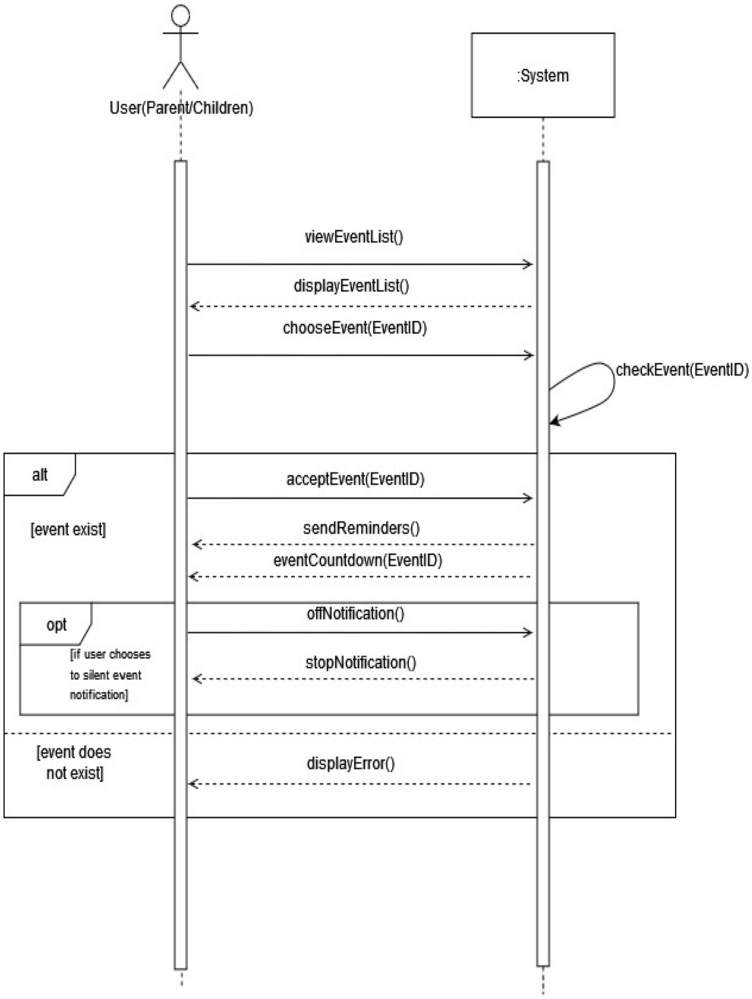


Figure 79:Sequence Diagram for Receive Reminders About Upcoming Events use case

2.5.11 Use Case: Check In Location

2.5.11.1 Identifier: [SRS-0011]

2.5.11.2 Use Case Description

The *Check In Location* use case has 1 normal flow, 2 alternate flows and 1 exception flows as shown in the following table.

Table 28: Use Case Description for Check In Location Scenario

Use Case Name:	Check In Location	
Scenario:	User check in location as special place.	
Triggering Event:	User wants to check in and set a location as special place.	
Brief Description:	User can check in current coordinates which is accessed from the device GPS as a new location. User can also choose the desired location from the map interface provided by Google Map. User can insert location name and location type for the special place. For example, set school as a special place. The system records all the location information.	
Actors:	Google Map API, Parent and Children	
Related Use Cases:	-	
Stakeholders:	Families (Parent and Children)	
Preconditions:	User should grant location access for this feature.	
Postconditions:	New location is created and stored in database.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0011-N1]	1. User checks in his or her current location.	1.1 Get consent from user to access user's location.
[SRS-0011-A2]	2. User agrees to give location access.	2.1 Get user's current longitude and latitude. 2.2 Prompt user whether wants to create a new location.
	3. User clicks to create a new location and input the necessary location details.	3.1 Save and record the user's current location with the location details. 3.2 Display the location list.
[SRS-0011-A4]	4. Google Map API displays map interface. 4.1 User chooses the desired location from the map interface provided by Google Map API.	4.2 Record the chosen coordinates. 4.3 Prompt user whether wants to create a new location.

	5. User clicks to create a new location based on the chosen location and input the necessary location details.	5.1 Save and record the user's chosen location with the location details. 5.2 Display the location list.
Exception Flow: **[SRS-0011-E2.1]**	2.1 If the location access is not granted, the system paused this use case and prompts user to: a. Choose from map interface. b. Grant the system location access.	

2.5.11.3 System Sequence Diagram

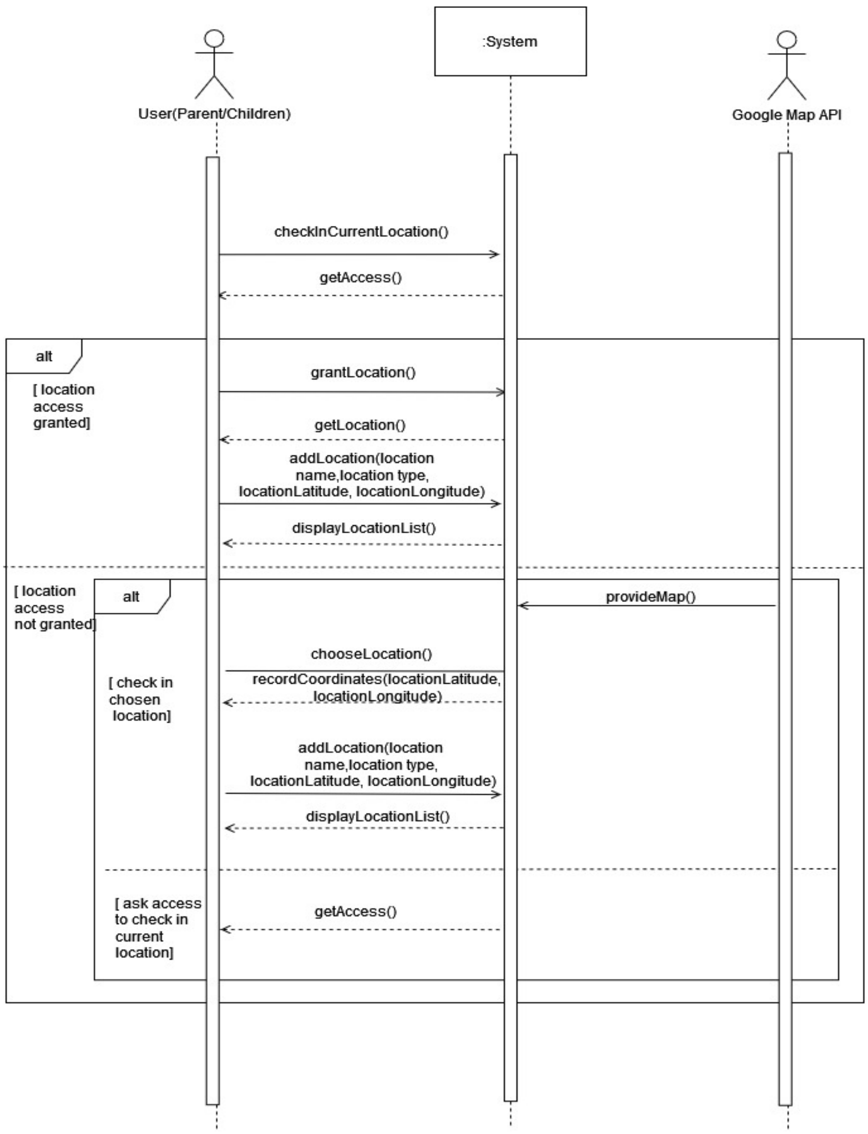


Figure 80:Sequence Diagram for Check In Location use case

2.5.12 Use Case: Track Other Family Member Location

2.5.12.1 Identifier: [SRS-0012]

2.5.12.2 Use Case Description

The *Track Other Family Member Location* use case has 2 normal flows and 2 exception flows as shown in the following table.

Table 29: Use Case Description for Track Other Family Member Location Scenario

Use Case Name:	Track Other Family Member Location	
Scenario:	User tracks other family member location.	
Triggering Event:	User wants to track other family member location.	
Brief Description:	User can see other family members location from the map interface provided by Google Map. The other family member's location will be pinpointed in the map interface. The registered special location from the location list will be pinpointed in the map view. The system will send notifications to user if the selected family member leave and reach the destination.	
Actors:	Google Map API, Parent and Children	
Related Use Cases:	Excludes: *SOS Help Module*	
Stakeholders:	Families (Parent and Children)	
Preconditions:	Chosen family member must exist as other user in the system. The other user should grant location access for this feature.	
Postconditions:	User can track the location of other family member, from the beginning to the destination.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0012-N1]	1. User chooses the contact that he or she wants to track.	1.1 Displays all contact lists.

[SRS-0012-N2]	2. Google Map API displays the selected family member's location in the map interface. The registered special location from the location list will also be pinpointed in the map view. 2.1 Google Map API shows the contact movement in the map.	2.2 Send notifications to user if the selected family member leave and reach the destination.
Exception Flow: **[SRS-0012-E1.1]**	1.1 If chosen family member does not exist as the system user, then the system pauses this use case and display error message.	
[SRS-0012-E2.1]	2.1 If the chosen family member does not grant location access to the system, the system sends notification to the chosen family member to grant the location access to enable this feature.	

2.5.12.3 System Sequence Diagram

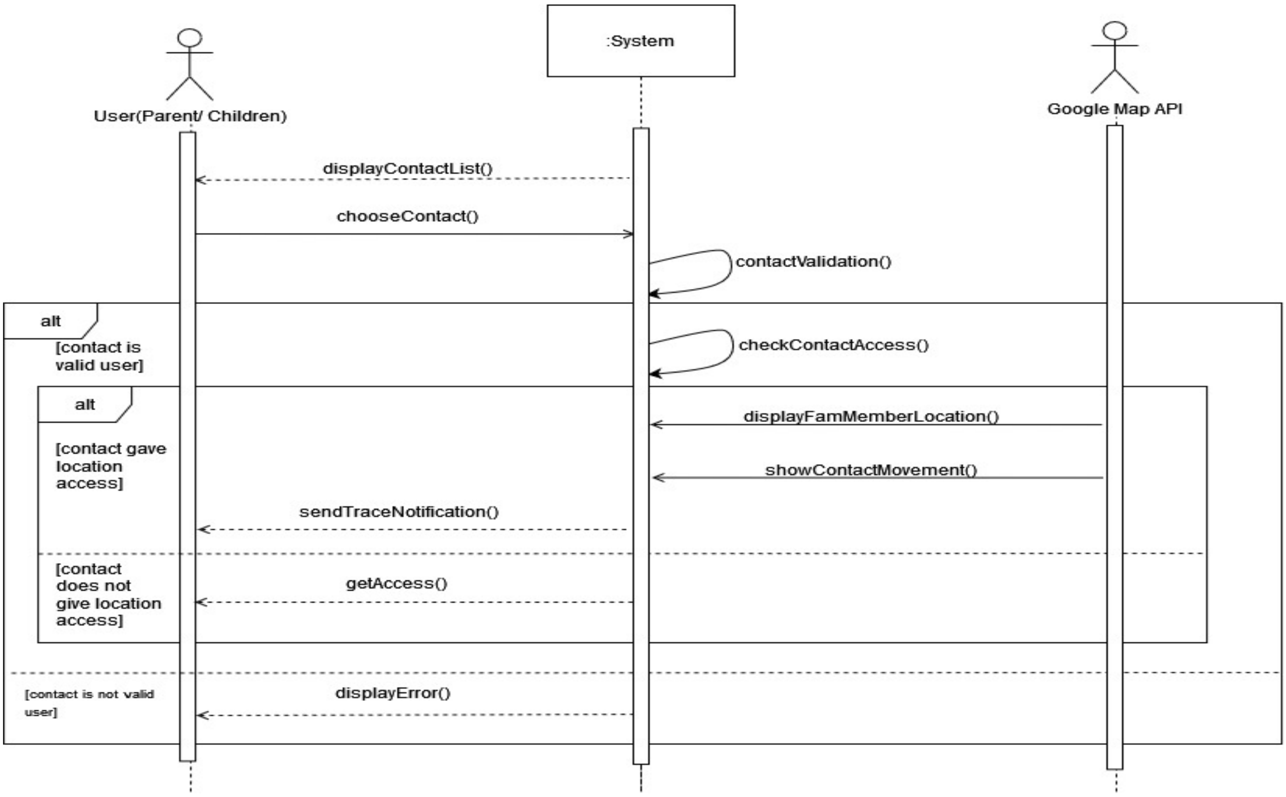


Figure 81:Sequence Diagram for Track Other Family Member Location use case

2.5.13 Use Case: SOS Help Module

2.5.13.1 Identifier: [SRS-00013]

2.5.13.2 Use Case Description

The *SOS Help Module* use case has 3 alternate flows and 2 exception flows as shown in the following table.

Table 30: Use Case Description for SOS Help Module Scenario

Use Case Name:	SOS Help Module
Scenario:	User uses SOS Help Module when they feel dangerous.
Triggering Event:	When user feel that they are in danger.

Brief Description:	User can select contacts to become the emergency contacts. When user faces any danger or any problem, user can press on the SOS button to call the emergency contacts. The system will send emergency reminders to emergency contacts so that user could be saved. The system will send the user last location to the emergency contacts. User can change the emergency contact in the SOS edit interface.	
Actors:	Google Map API, Parent and Children	
Related Use Cases:	Excluded by: *Track Other Family Member Location*	
Stakeholders:	Families (Parent and Children)	
Preconditions:	Chosen emergency contacts must exist as other user in the system. User should grant location access for this feature.	
Postconditions:	User can ask for help using the SOS feature.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0013-A1]	1 User chooses the emergency contact from the contact list.	1.1 Displays all contact lists.
[SRS-0013-A2]	2 When user faces danger, press on SOS button.	2.1 Send emergency reminders to the emergency contacts to save user. 2.2 Call the emergency contacts.
	3 Google Map API pinpoints the user last location.	3.1 Send the user last location to the emergency contacts. 3.2 Make calls to the selected contacts.
[SRS-0013-A4]	4 User changes the emergency contact by choosing other contact from the contact list	4.1 Update the latest emergency contacts and save to database.

Exception Flow:	
[SRS-0013-E1.1]	1.1 If chosen emergency contacts does not exist as the system user, then the system pauses this use case and display error.
[SRS-0013-E2.1]	2.1 If user does not grant location access to the system, the system sends notification to the user to grant the location access to enable this feature.

2.5.13.3 System Sequence Diagram

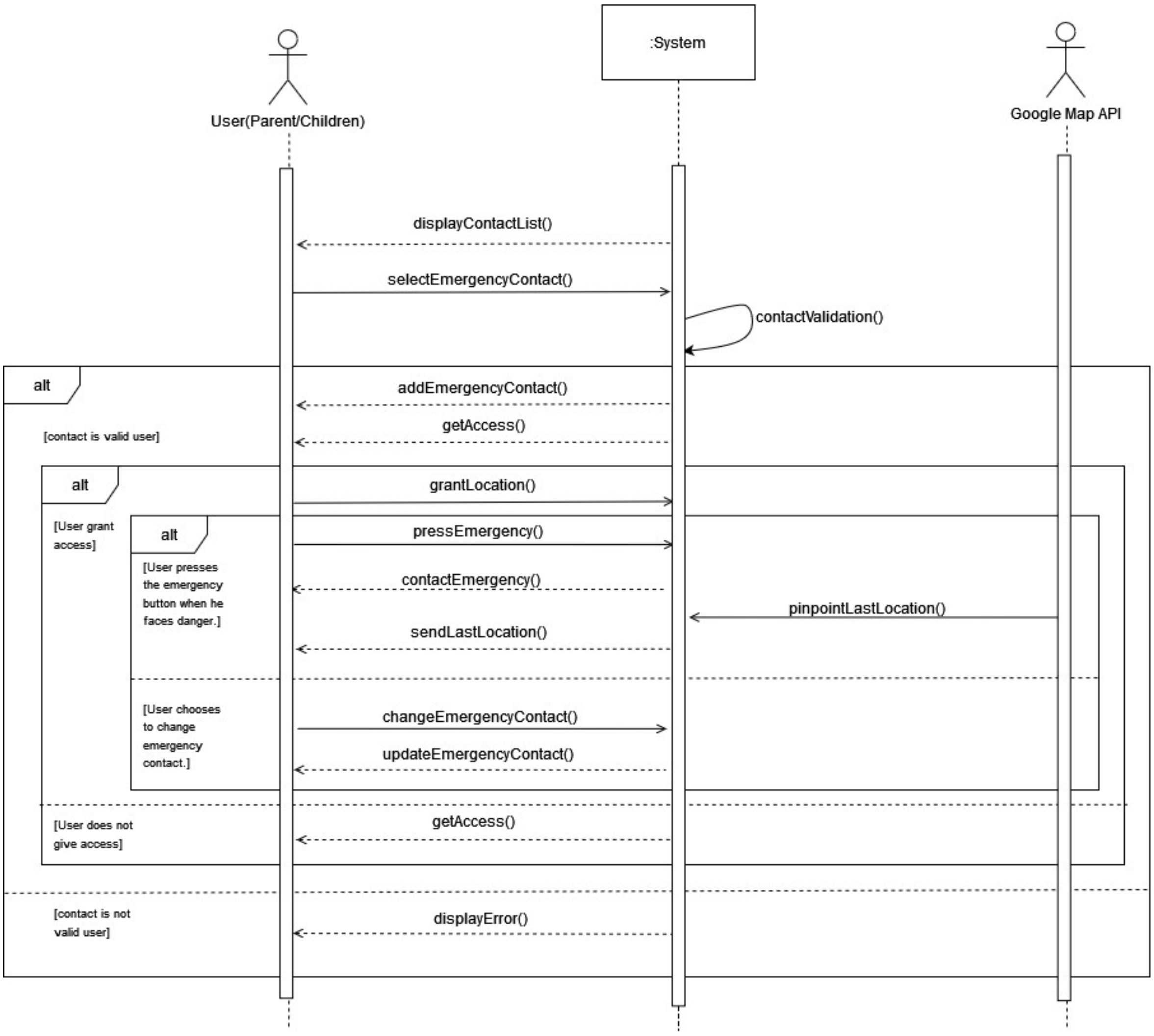


Figure 82: Sequence Diagram for SOS Help Module use case

2.5.14 Use Case: Create Social Media Post

2.5.14.1 Identifier: [SRS-0014]

2.5.14.2 Use Case Description

The *Create Social Media Post* use case has 3 normal flows and 1 exception flow as shown in the following table.

Table 31: Use Case Description for Create Social Media Post Scenario

Use Case Name:	Create Social Media Post	
Scenario:	User creates social media post in the system.	
Triggering Event:	User wants to create and post the social media post to the social media and add to the system social media wall.	
Brief Description:	User inserts post information such as post description and post pictures into the social media wall such as Facebook and Instagram. The system will update the post in the media post wall.	
Actors:	Social Media API, Parent and Children	
Related Use Cases:	-	
Stakeholders:	Families (Parent and Children)	
Preconditions:	User must have social media accounts to enable this feature.	
Postconditions:	User can create new post to his or her social media accounts.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0014-N1]	1 Get user social media account ID.	
[SRS-0014-N2]	2 User inserts post information.	
[SRS-0014-N3]	3 Social Media API posts the newly created post to the user's social media accounts.	3.1 Add the newly created post to the social media wall.

Exception Flow: **[SRS-0014-E1.1]**	1.1 If user does not have social media accounts, then the system pauses this use case and prompts an error message

2.5.14.3 System Sequence Diagram

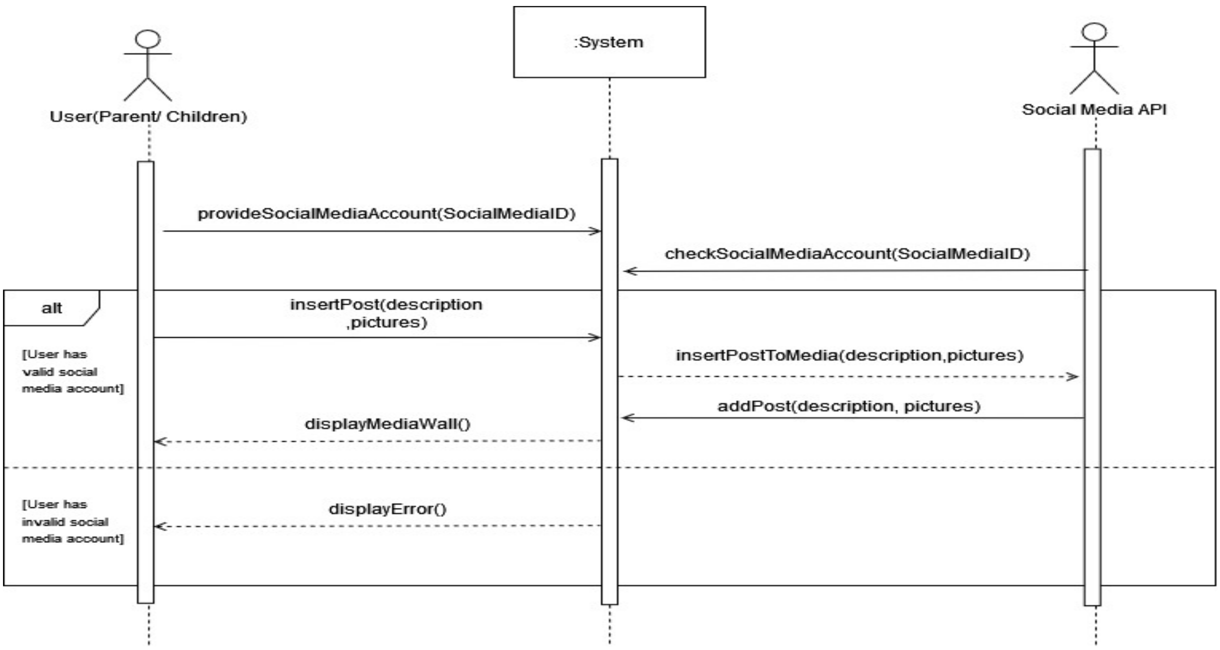


Figure 83: Sequence Diagram for Create Social Media Post use case

2.5.15 Use Case: View Social Media Posts By Other Family Members

2.5.15.1 Identifier: [SRS-0015]

2.5.15.2 Use Case Description

The *View Social Media Posts By Other Family Members* use case has 3 normal flows, 1 optional flow and 1 exception flow as shown in the following table.

Table 32: Use Case Description for View Social Media Posts By Other Family Members Scenario

Use Case Name:	View Social Media Posts By Other Family Members	
Scenario:	User views the social media posts which are posted by other family members through the social media wall in the system.	
Triggering Event:	User wants to view the social media posts which are posted by other family members through the social media wall in the system.	
Brief Description:	User can view the social media posts that are posted by the family members from Facebook and Instagram. User can filter the post based on the post author. User can be directed to the real social media to view at the post too.	
Actors:	Social Media API, Parent and Children	
Related Use Cases:	-	
Stakeholders:	Families (Parent and Children)	
Preconditions:	Other family member must have social media accounts to enable this feature.	
Postconditions:	User can view posts by other family members from Facebook and Instagram.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0015-N1]	1 User navigates to the social media wall.	
[SRS-0015-N2]	2 Social Media API shows the social media posts from other family members' social media accounts.	2.1 Displays all the social media posts
[SRS-0015-O3]	3 User filters the post based on post author.	3.1 Displays the filtered list based on filter options.
[SRS-0015-N4]	4 User presses the post to see the post details.	4.1 Redirect user to the real social media application.

Exception Flow: **[SRS-0015-E4.1]**	4.1 If system fails to redirect to the post in real social media application, then the system pauses this use case and prompts an error message	

2.5.15.3 System Sequence Diagram

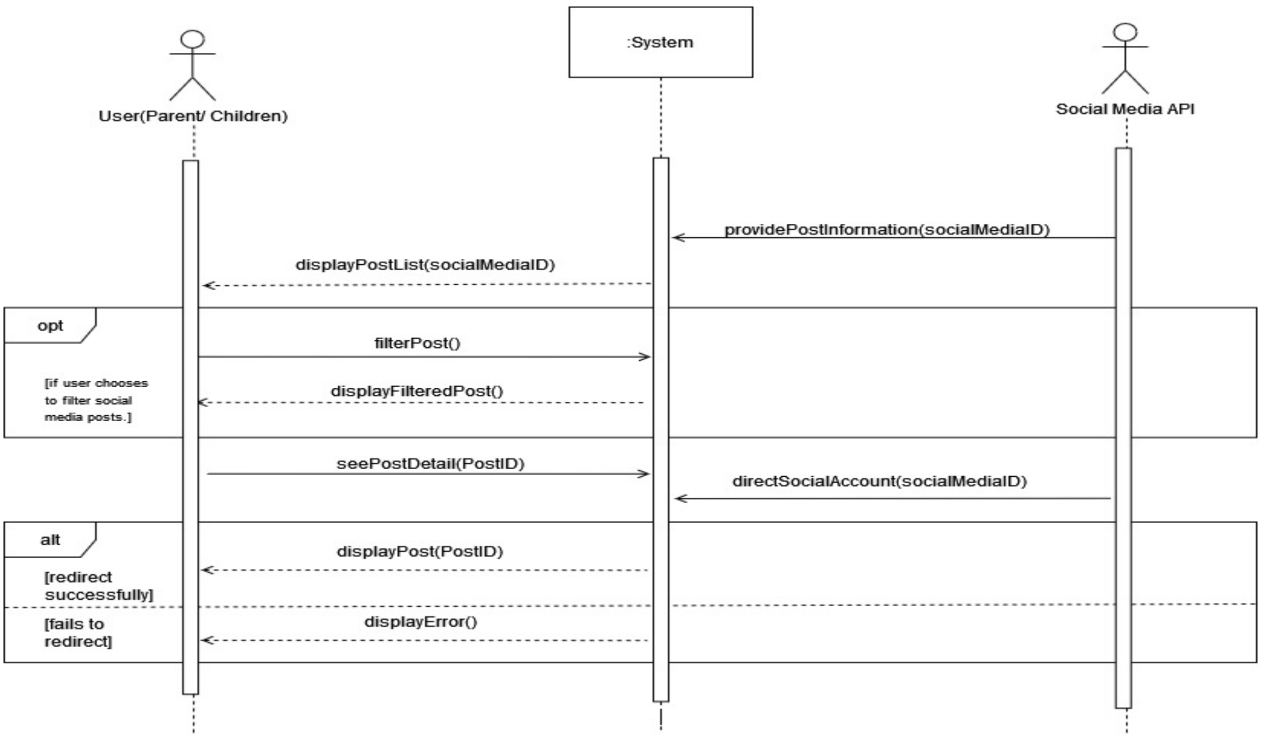


Figure 84 : Sequence Diagram for View Social Media Posts By Other Family Members Use Case

2.5.16 Use Case: Create Chat

2.5.16.1 Identifier: [SRS-0016]

2.5.16.2 Use Case Description

The *Create Chat* use case has 2 normal flows, 1 optional flow and 1 exception flow as shown in the following table.

Table 33: Use Case Description for Create Chat Scenario

Use Case Name:	Create Chat	
Scenario:	User chats with other family members using the chat feature.	
Triggering Event:	User wants to chat with other family members using the chat feature.	
Brief Description:	When user navigates to the chat list, the system displays all the recorded chat list with personal chat and group chat. User can choose to create a new personal chat here. Family event group chat will be created along with the creation of the family event. All chats are recorded in the database. User can filter and sort the chat list by chat title.	
Actors:	Parent and Children	
Related Use Cases:	Included by: *Create Event,* Extends: *Make Chat Call*	
Stakeholders:	Families (Parent and Children)	
Preconditions:	The newly added chat should not exist in the existing chat list before the addition.	
Postconditions:	New chat must be created and added in the chat list after user creates a new chat.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0016-N1]	1. User navigates to the chat list.	1.1 Displays all the recorded chat list.
[SRS-0016-O2]	2. User filters based on the chat title name and sort by name.	2.1 Displays the filtered list based on filter and sort options.
[SRS-0016-N3]	3. User creates new chat.	3.1 Create a new chat in the chat list page. 3.2 Record the changes in database.

Exception Flow:	
[SRS-0016-E3.1]	3.1 If the chat that user wants to add is already existed in the database, then the system pauses this use case and prompt an error message.

2.5.16.3 System Sequence Diagram

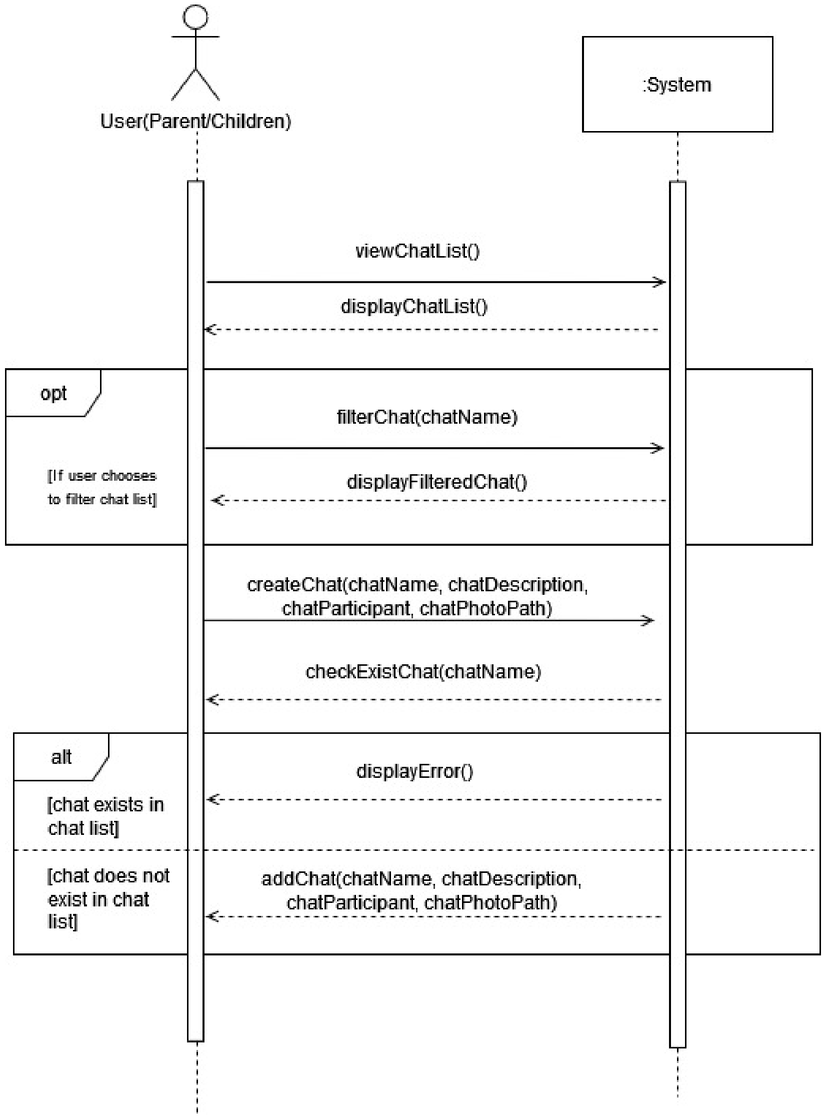


Figure 85: Sequence Diagram for Create Chat use case

2.5.17 Use Case: Make Chat Call

2.5.17.1 Identifier: [SRS-0017]

2.5.17.2 Use Case Description

The *Make Chat Call* use case has 1 normal flow and 2 exception flows as shown in the following table.

Table 34: Use Case Description for Make Chat Call Scenario

Use Case Name:	Make Chat Call	
Scenario:	User communicates with other chat participants using chat call.	
Triggering Event:	User wants to perform chat call with other family members.	
Brief Description:	User can start a chat call using the chat call feature.	
Actors:	Parent and Children	
Related Use Cases:	Extended by: *Create Chat*	
Stakeholders:	Families (Parent and Children)	
Preconditions:	Chat participants must exist.	
Postconditions:	Chat call should be functionable.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0017-N1]	1. User starts a chat call.	1.1 Check whether chat participants exist. 1.2 Make calls to the chat participants. 1.3 Show call interface.
Exception Flow: **[SRS-0017-E1.1]**	1.1 If chat participants do not exist, then the system pauses this use case and prompts an error message.	
[SRS-0017-E1.2]	1.2 If the chat call fails, the system prompts an error message.	

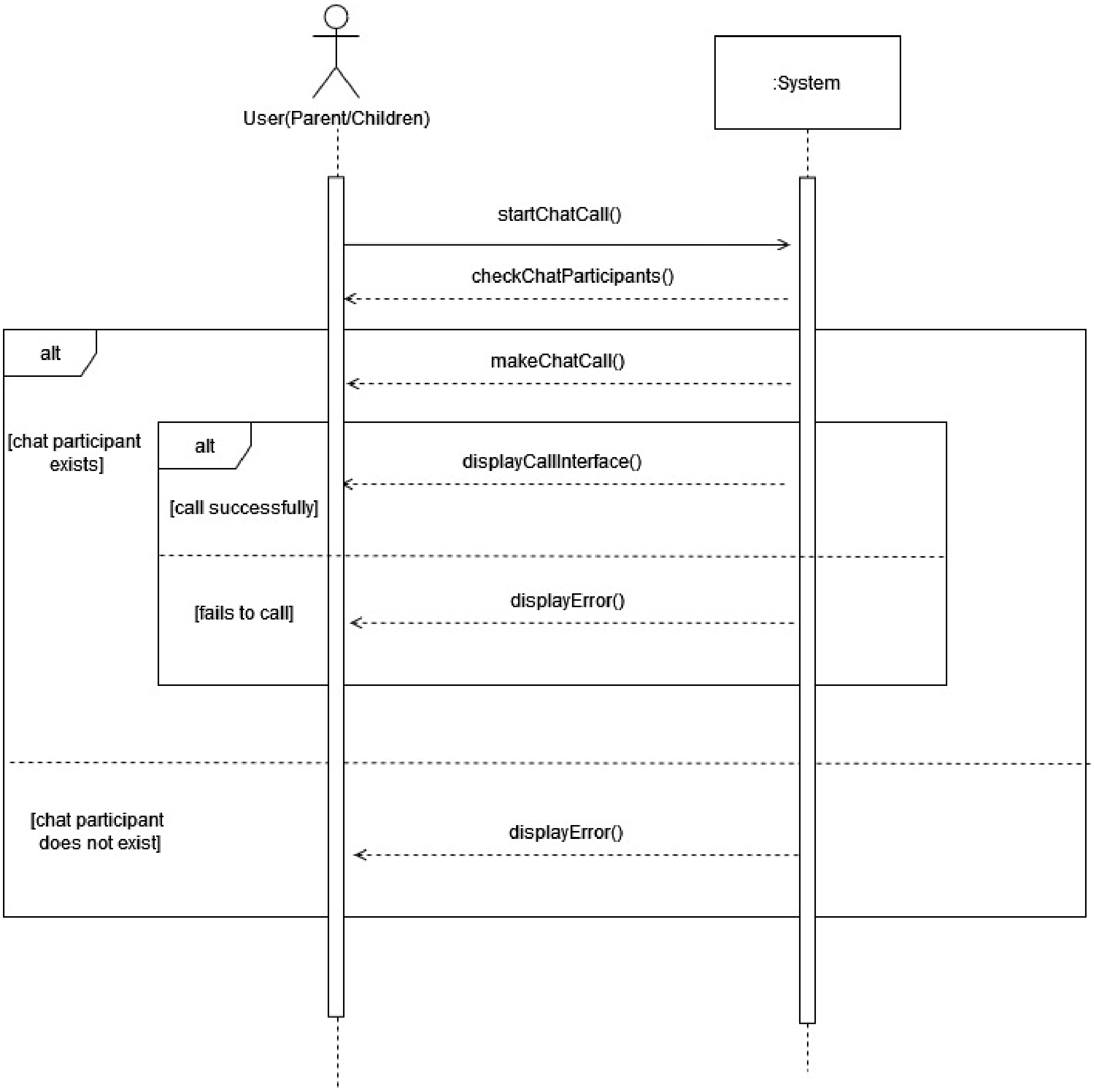


Figure 86: Sequence Diagram for Make Chat Call use case

2.5.17.3 System Sequence Diagram

2.5.18 Use Case: Edit Chat

2.5.18.1 Identifier: [SRS-0018]

2.5.18.2 Use Case Description

The *Edit Chat* use case has 2 normal flows and 2 exception flows as shown in the following table.

Table 35: Use Case Description for Create Chat Scenario

Use Case Name:	Edit Chat	
Scenario:	User updates the chat details such as chat name, chat description and chat participants.	
Triggering Event:	User wants to edit the chat details.	
Brief Description:	When user presses on the chat name, user can see the recorded chat details. If user is the owner of the chat, user can update the chat details such as the chat name, chat description and the chat participants. All the changes are recorded in the system database.	
Actors:	Parent and Children	
Related Use Cases:	Extends: *Pin Chat, Leave Chat, Delete Chat*	
Stakeholders:	Families (Parent and Children)	
Preconditions:	The chosen chat must exist. User should be the chat owner.	
Postconditions:	The latest changes to the chat details should be updated in the system database.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0018-N1] **[SRS-0018-N2]**	1. User navigates to the chat details. 2.0 User chooses to a chat to update the chat details. 2.1 If user is the chat owner, user can edit the chat details such as the chat name, chat description and the chat participants.	1.1 Displays all the recorded chat details. 2.2 Record changes to the database.
Exception Flow: **[SRS-0018-E2.0]** **[SRS-0018-E2.1]**	2.0 If chat does not exist, then the system pauses this use case and show error message. 2.1 If user is not the chat owner, the system pauses this use case and show error message.	

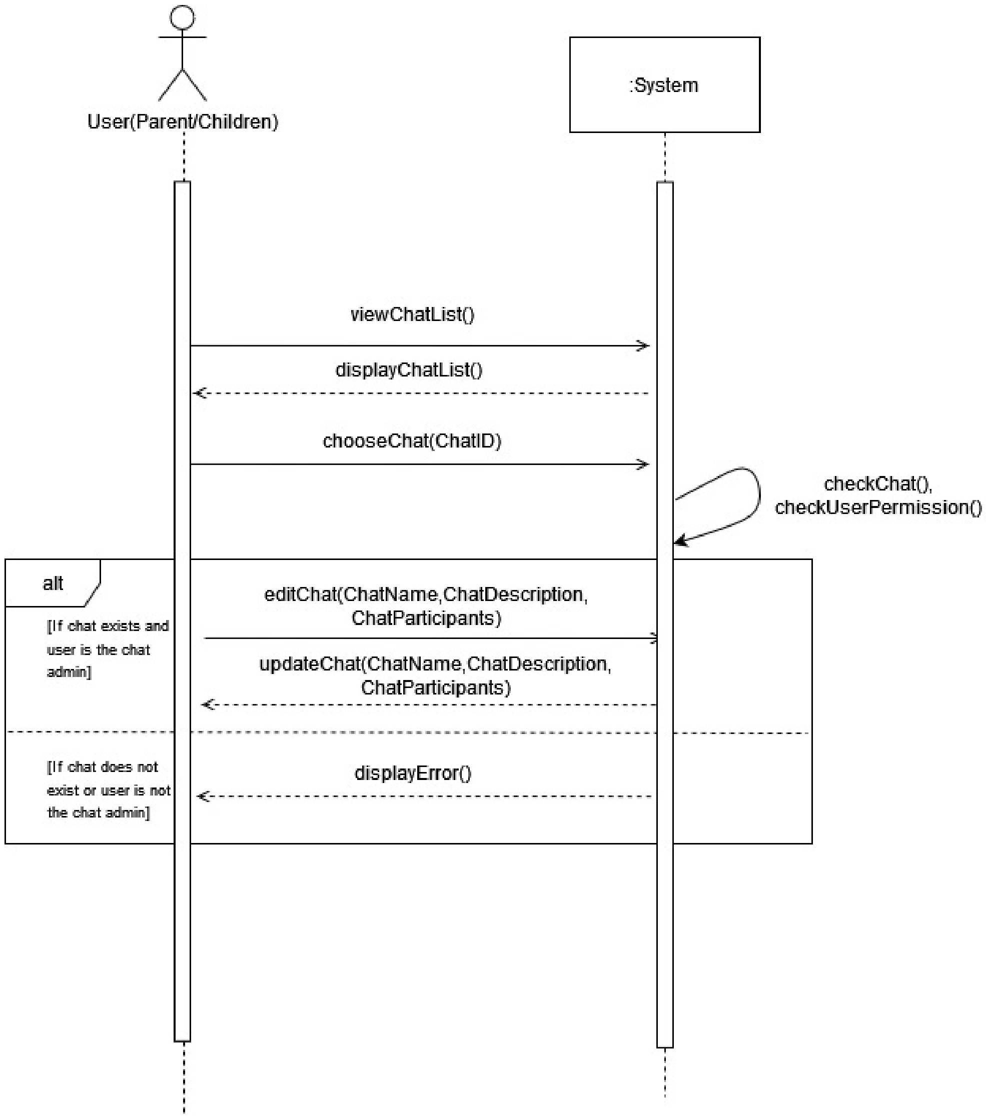


Figure 87: Sequence Diagram for Edit Chat use case

2.5.18.3 System Sequence Diagram

2.5.19 Use Case: Pin Chat

2.5.19.1 Identifier: [SRS-0019]

2.5.19.2 Use Case Description

The *Pin Chat* use case has 2 normal flows and 1 exception flow as shown in the following table.

Table 36: Use Case Description for Pin Chat Scenario

Use Case Name:	Pin Chat	
Scenario:	User pins the chosen chat to the top of the chat list.	
Triggering Event:	User wants to pin the chosen chat at the top of the chat list.	
Brief Description:	When user navigates to the chat list, the system displays all the recorded chat list with personal chat and group chat. User can choose to pin the selected chats at the top of the chat list.	
Actors:	Parent and Children	
Related Use Cases:	Extended by: *Edit Chat*	
Stakeholders:	Families (Parent and Children)	
Preconditions:	The chosen chat must exist.	
Postconditions:	The chosen chat must be pin to the top of the chat list.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0019-N1]	1. User navigates to the chat list.	1.1 Displays all the recorded chat list.
[SRS-0019-N2]	2. User chooses a chat to pin at the top of the chat list.	2.1 Pin the selected chat at the top of the chat list.
Exception Flow: **[SRS-0019-E2.1]**	2.1 If chat does not exist, then the system pauses this use case and show error message.	

2.5.19.3 System Sequence Diagram

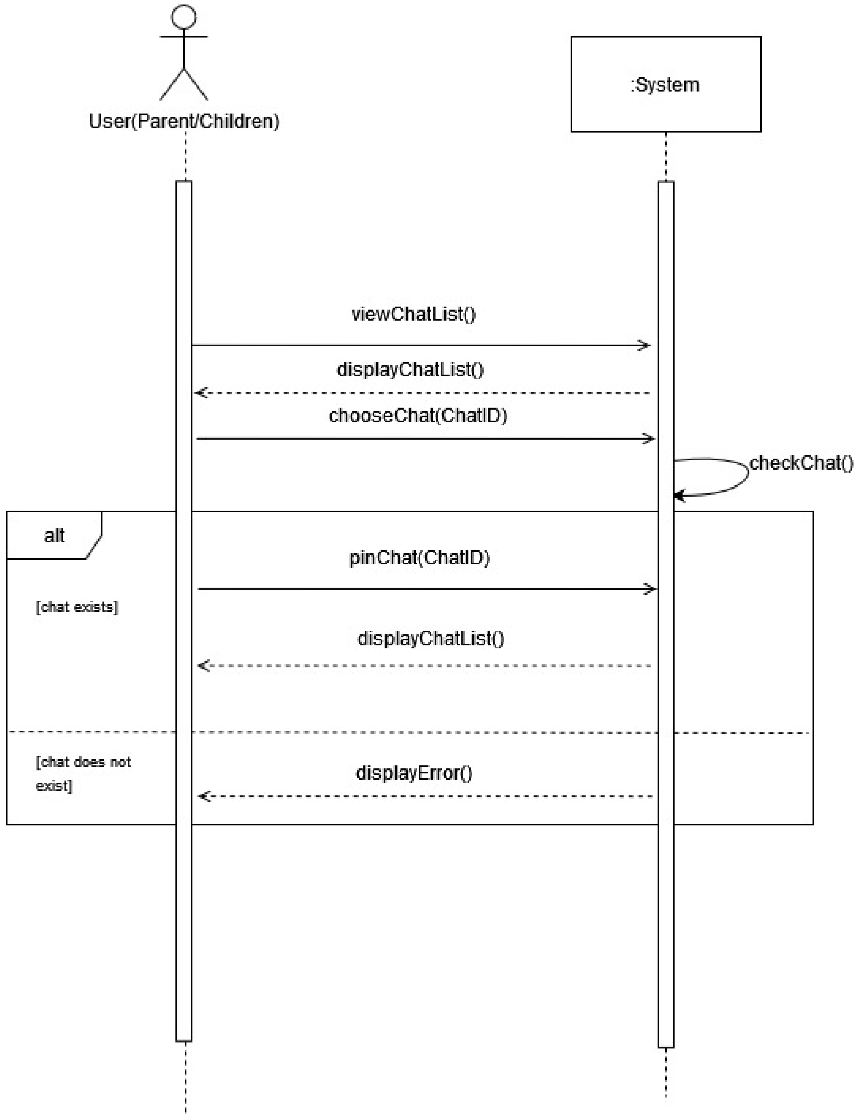


Figure 88: Sequence Diagram for Pin Chat use case

2.5.20 Use Case: Leave Chat

2.5.20.1 Identifier: [SRS-0020]

2.5.20.2 Use Case Description

The *Leave Chat* use case has 2 normal flows and 1 exception flow as shown in the following table.

Table 37: Use Case Description for Leave Chat Scenario

Use Case Name:	Leave Chat	
Scenario:	User leaves the group chat.	
Triggering Event:	User wants to leave the group chat that he is participated in.	
Brief Description:	User chooses a group chat. User wants to leave the group chat. After user confirm the leaving action, user leaves the chosen group chat.	
Actors:	Parent and Children	
Related Use Cases:	Extended by: *Edit Event*	
Stakeholders:	Families (Parent and Children)	
Preconditions:	The chosen group chat must exist.	
Postconditions:	User should be removed from the group chat participants.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0020-N1]	1. User navigates to the chat list.	1.1 Displays all the recorded chat list.
[SRS-0020-N2]	2. User chooses a group chat and chooses to leave the group chat.	2.1 Remove user from the group chat. 2.2 Delete the group chat from the chat list.
Exception Flow: **[SRS-0020-E2.1]**	2.1 If chat does not exist, then the system pauses this use case and show error message.	

2.5.20.3 System Sequence Diagram

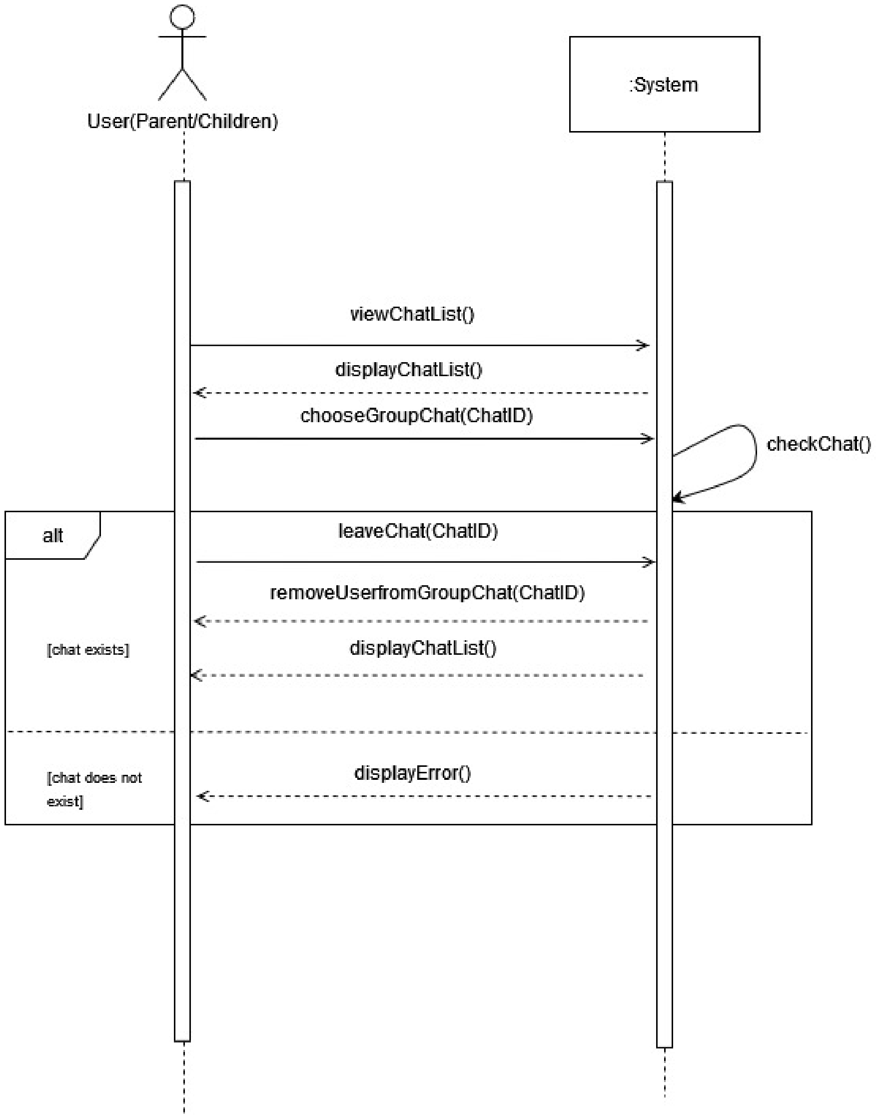


Figure 89: Sequence Diagram for Leave Chat use case

2.5.21 Use Case: Delete Chat

2.5.21.1 Identifier: [SRS-0021]

2.5.21.2 Use Case Description

The *Delete Chat* use case has 2 normal flows and 1 exception flow as shown in the following table.

Table 38: Use Case Description for Delete Chat Scenario

Use Case Name:	Delete Chat	
Scenario:	User chooses to delete the chosen chat.	
Triggering Event:	User wants to delete the chosen chat.	
Brief Description:	When user navigates to the chat list, the system displays all the recorded chat list with personal chat and group chat. User can choose to delete a chosen chat here.	
Actors:	Parent and Children	
Related Use Cases:	Extended by: *Edit Event*	
Stakeholders:	Families (Parent and Children)	
Preconditions:	The chosen chat must exist.	
Postconditions:	The selected chat must be deleted after user's deletion.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0021-N1]	1. User navigates to the chat list.	1.1 Displays all the recorded chat list.
[SRS-0021-N2]	2. User chooses to delete the chosen chat from the chat list.	2.1 Delete the chosen chat from the chat list.
Exception Flow: **[SRS-0021-E2.1]**	2.1 If chat does not exist, then the system pauses this use case and show error message.	

2.5.21.3 System Sequence Diagram

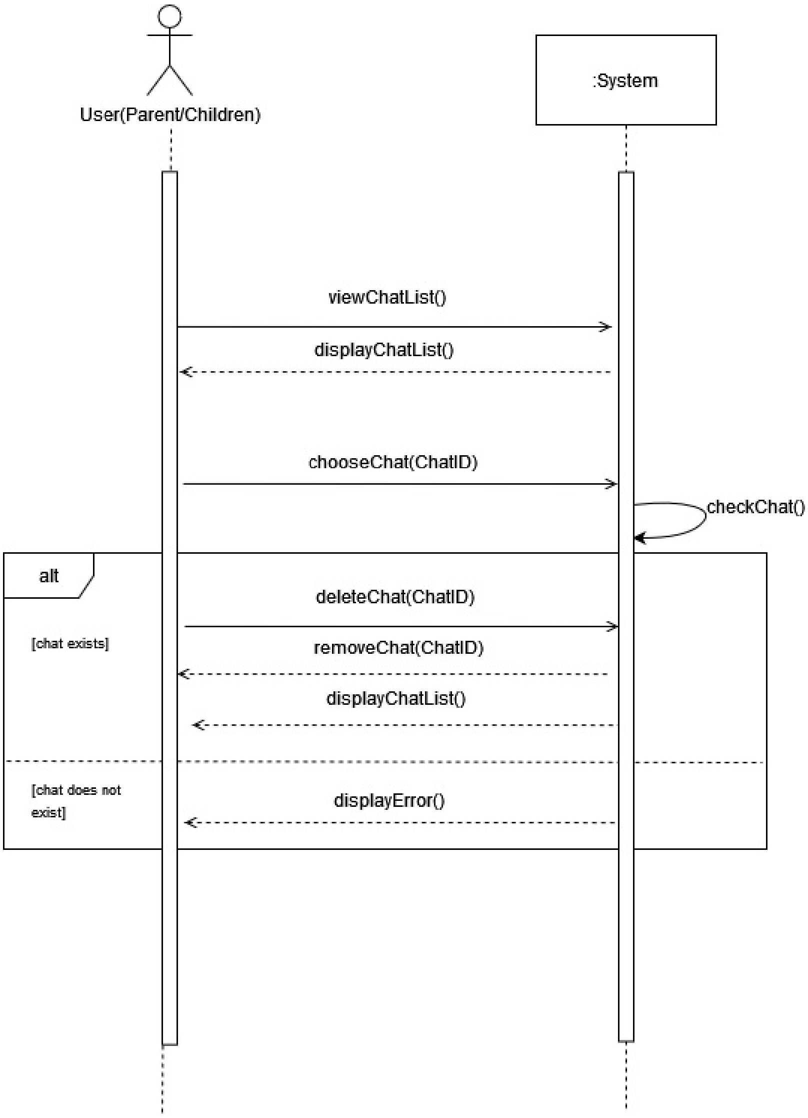


Figure 90: Sequence Diagram for Delete Chat use case

2.5.22 Use Case: Add Message

2.5.22.1 Identifier: [SRS-0022]

2.5.22.2 Use Case Description

The *Add Message* use case has 3 normal flows, 1 optional flow and 1 exception flow as shown in the following table.

Table 39: Use Case Description for Add Message Scenario

Use Case Name:	Add Message	
Scenario:	User chooses to add new message to the chat history page.	
Triggering Event:	User wants to add new message to the chat history page.	
Brief Description:	When user navigates to the chat history page, the system displays all the recorded message list. User can filter and sort the message list by message text. User can chat using text, pictures and share location. All the messages are recorded in the system database.	
Actors:	Parent and Children	
Related Use Cases:	-	
Stakeholders:	Families (Parent and Children)	
Preconditions:	Chat must exist.	
Postconditions:	The newly added message should be added to the chat.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0022-N1]	1. User chooses to navigate to a chat.	
[SRS-0022-N2]	2. User navigates to the message list in the chat history.	2.1 Displays all the recorded message list.
[SRS-0022-O3]	3. User filters based on the chat text.	3.1 Displays the filtered list based on filter.
[SRS-0022-N4]	4. User creates new message.	4.1 Create a new message in the chat history page. 4.2 Record the newly added message in database.
Exception Flow: **[SRS-0022-E1.0]**	1.0 If the chat does not exist, then the system pauses this use case and prompts error message.	

2.5.22.3 System Sequence Diagram

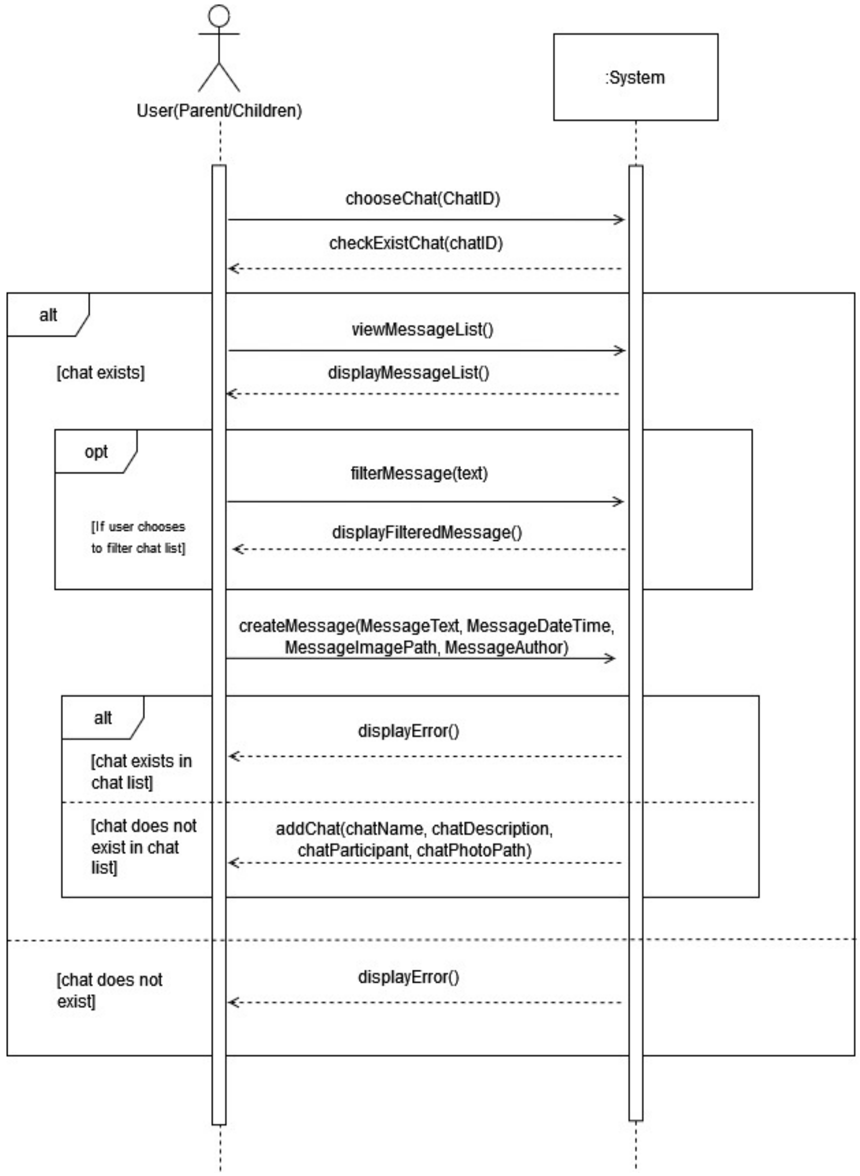


Figure 91: Sequence Diagram for Add Message use case

2.5.23 Use Case: Delete Message

2.5.23.1 Identifier: [SRS-0023]

2.5.23.2 Use Case Description

The *Delete Message* use case has 1 normal flow, 1 alternate flow and 1 exception flow as shown in the following table.

Table 40: Use Case Description for Delete Message Scenario

Use Case Name:	Delete Message	
Scenario:	User chooses to delete the selected contact from the contact list.	
Triggering Event:	User wants to delete the chosen contact from the contact list.	
Brief Description:	When user navigates to the message list, the system displays all the recorded message list. When user chooses to delete the chosen message, the system will delete the message from the system database.	
Actors:	Parent and Children	
Related Use Cases:	-	
Stakeholders:	Families (Parent and Children)	
Preconditions:	The chosen message must exist.	
Postconditions:	The chosen message must be deleted from the database.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0023-N1]	1. User navigates to the message list.	1.1 Displays all the recorded message list.
[SRS-0023-A2]	2. User chooses to delete the chosen message from the message list.	2.1 Delete the chosen message from the message list.
Exception Flow: **[SRS-0023-E2.1]**	1.1 If the chosen message does not exist, then the system pauses this use case and display error.	

2.5.23.3 System Sequence Diagram

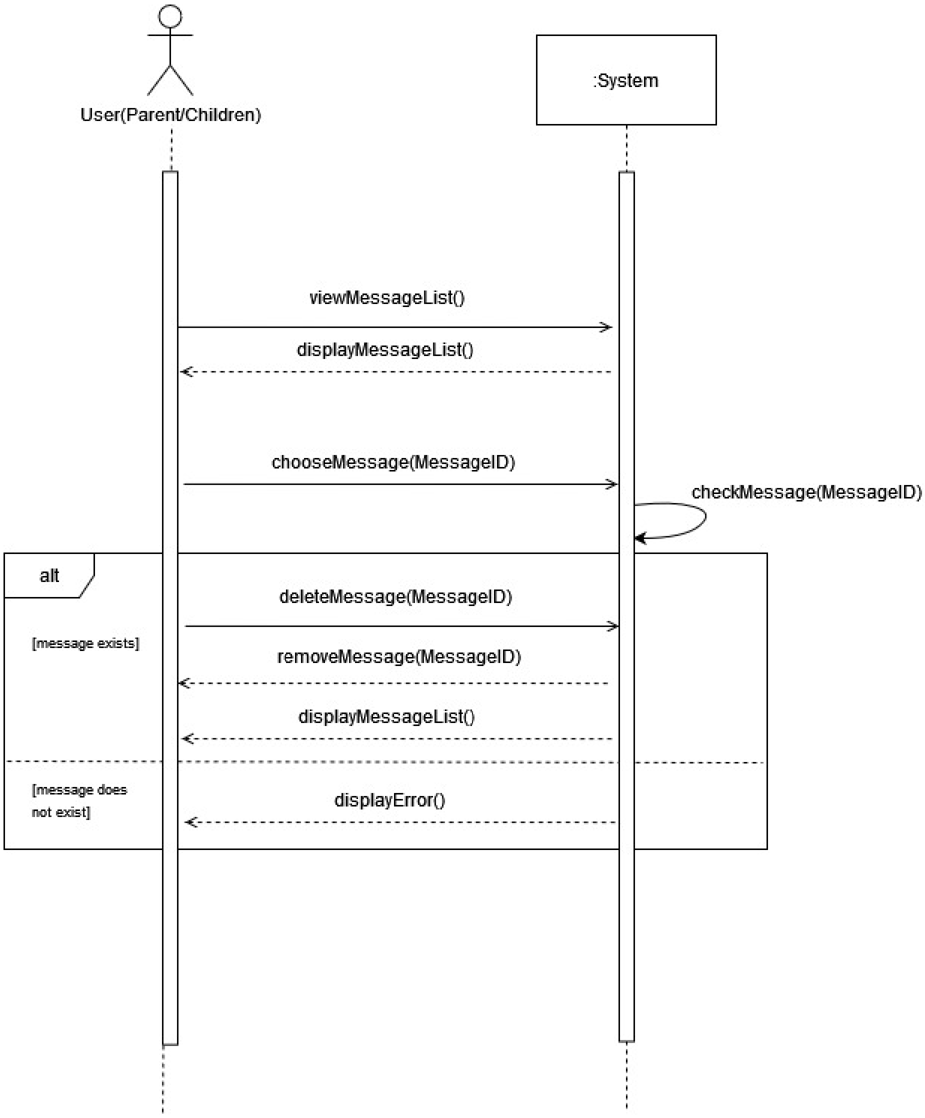


Figure 92: Sequence Diagram for Delete Message use case

2.5.24 Use Case: Delete Location

2.5.24.1 Identifier: [SRS-0024]

2.5.24.2 Use Case Description

The *Delete Location* use case has 2 normal flows and 1 exception flow as shown in the following table.

Table 41: Use Case Description for Delete Location Scenario

Use Case Name:	Delete Location	
Scenario:	User chooses to delete the selected location from the location list.	
Triggering Event:	User wants to delete the chosen location from the location list.	
Brief Description:	When user navigates to the location list, the system displays all the recorded location list. When user chooses to delete the chosen location, the system will delete the contact from the system database.	
Actors:	Parent and Children	
Related Use Cases:	Extended by: *Edit Location*	
Stakeholders:	Families (Parent and Children)	
Preconditions:	The chosen location must exist.	
Postconditions:	The chosen location must be deleted from the database.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0024-N1]	1. User navigates to the location list.	1.1 Displays all the recorded location list.
[SRS-0024-N2]	2. User chooses to delete a selected location.	2.1 Delete the chosen location from the database.
Exception Flow: **[SRS-0024-E2.1]**	2.1 If the chosen location does not exist, then the system pauses this use case and displays error message.	

2.5.24.3 System Sequence Diagram

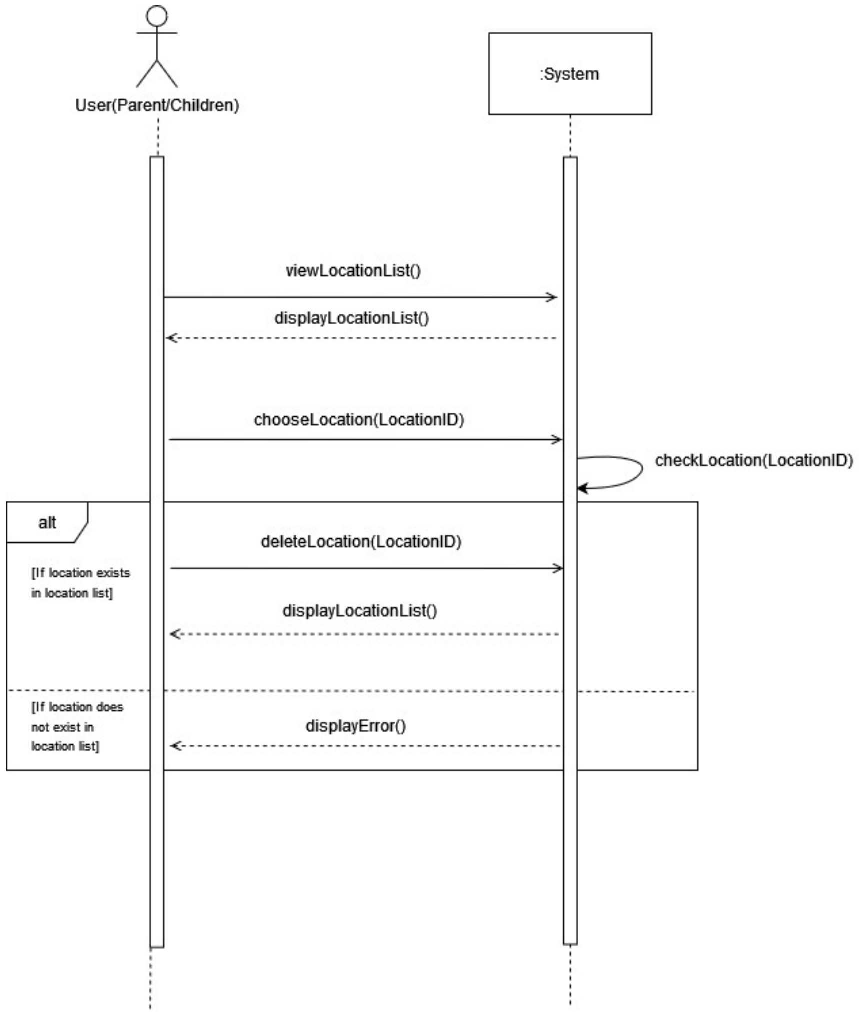


Figure 93: Sequence Diagram for Delete Location use case

2.5.25 Use Case: Edit Location

2.5.25.1 Identifier: [SRS-0025]

2.5.25.2 Use Case Description

The *Edit Location* use case has 3 normal flows and 1 exception flow as shown in the following table.

Table 42: Use Case Description for Edit Location Scenario

Use Case Name:	Edit Location	
Scenario:	User chooses to edit the selected location.	
Triggering Event:	User wants to edit the chosen location's details.	
Brief Description:	When user navigates to the chosen location detail, the system displays all the recorded location details. When user chooses to edit the location detail, user can update the location details and the changes will be updated in the database.	
Actors:	Parent and Children	
Related Use Cases:	Extends: *Delete Location*	
Stakeholders:	Families (Parent and Children)	
Preconditions:	The chosen location must exist.	
Postconditions:	The changes made to chosen location details must be updated to the database.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0025-N1]	1. User navigates to location list.	1.1 Displays all the recorded location list.
[SRS-0025-N2]	2. User navigates to the location detail page.	2.1 Displays all the recorded location details.
[SRS-0025-N3]	3. If user chooses to edit the location detail, user can change the location details such as the location name, location description, location type and location latitude and longitude.	3.1 Update the latest changes on location details in the database. 3.2 Display latest location detail
Exception Flow: **[SRS-0025-E2.1]**	2.1 If the chosen location does not exist, then the system pauses this use case and display error.	

2.5.25.3 System Sequence Diagram

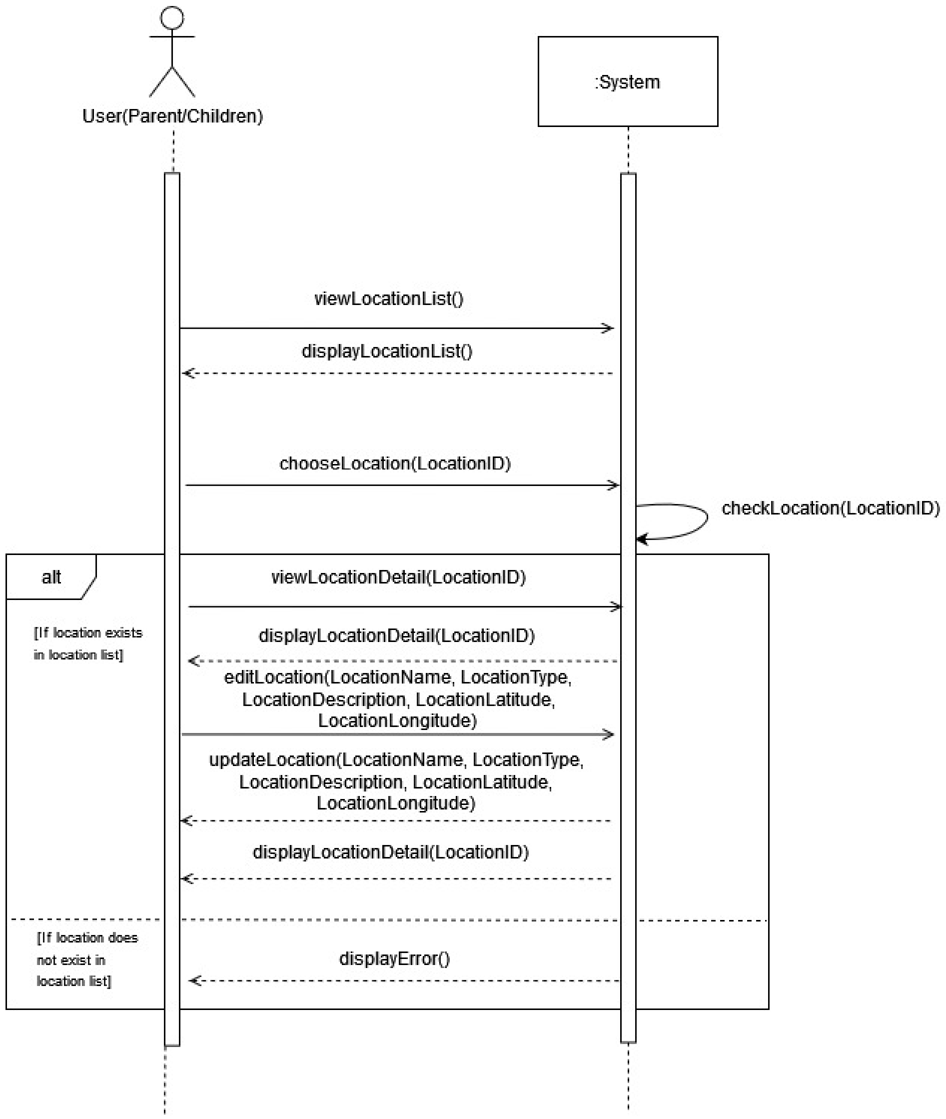


Figure 94: Sequence Diagram for Update Location use case

2.5.26 Use Case: Receive Notifications for Important Contacts

2.5.26.1 Identifier: [SRS-0026]

2.5.26.2 Use Case Description

The *Receive Notifications for Important Contacts* use case has 2 normal flows, 2 optional flow and 1 exception flow as shown in the following table.

Table 43: Use Case Description for Receive Notifications for Important Contacts Scenario

Use Case Name:	Receive Notifications for Important Contacts	
Scenario:	User chooses to turn on notifications for important contacts.	
Triggering Event:	User does not connect with important contacts for a long time.	
Brief Description:	When user does not connect with important contacts for a long time (does not join event together with the contacts), the system will send notification to user to remind them to stay connected.	
Actors:	Parent and Children	
Related Use Cases:	-	
Stakeholders:	Families (Parent and Children)	
Preconditions:	The chosen contact must exist.	
Postconditions:	User receives notifications when he or she rarely connects with the important contacts.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0026-N1]	1. User navigates to contact profile page.	1.1 Displays all the recorded contact details.
[SRS-0026-N2]	2. User turns on the notification.	2.1 Tracks the relationship closeness between user and the chosen contact.
[SRS-0026-O3]		3. Sends notifications when the relationship closeness reduces.

[SRS-0026-O4]	4. User turns the notifications silent	4.1 Stop sending reminders about the relationship closeness to user.
Exception Flow: **[SRS-0026-E1.1]**	1.1 If the chosen contact does not exist, then the system pauses this use case and display error.	

2.5.26.3 System Sequence Diagram

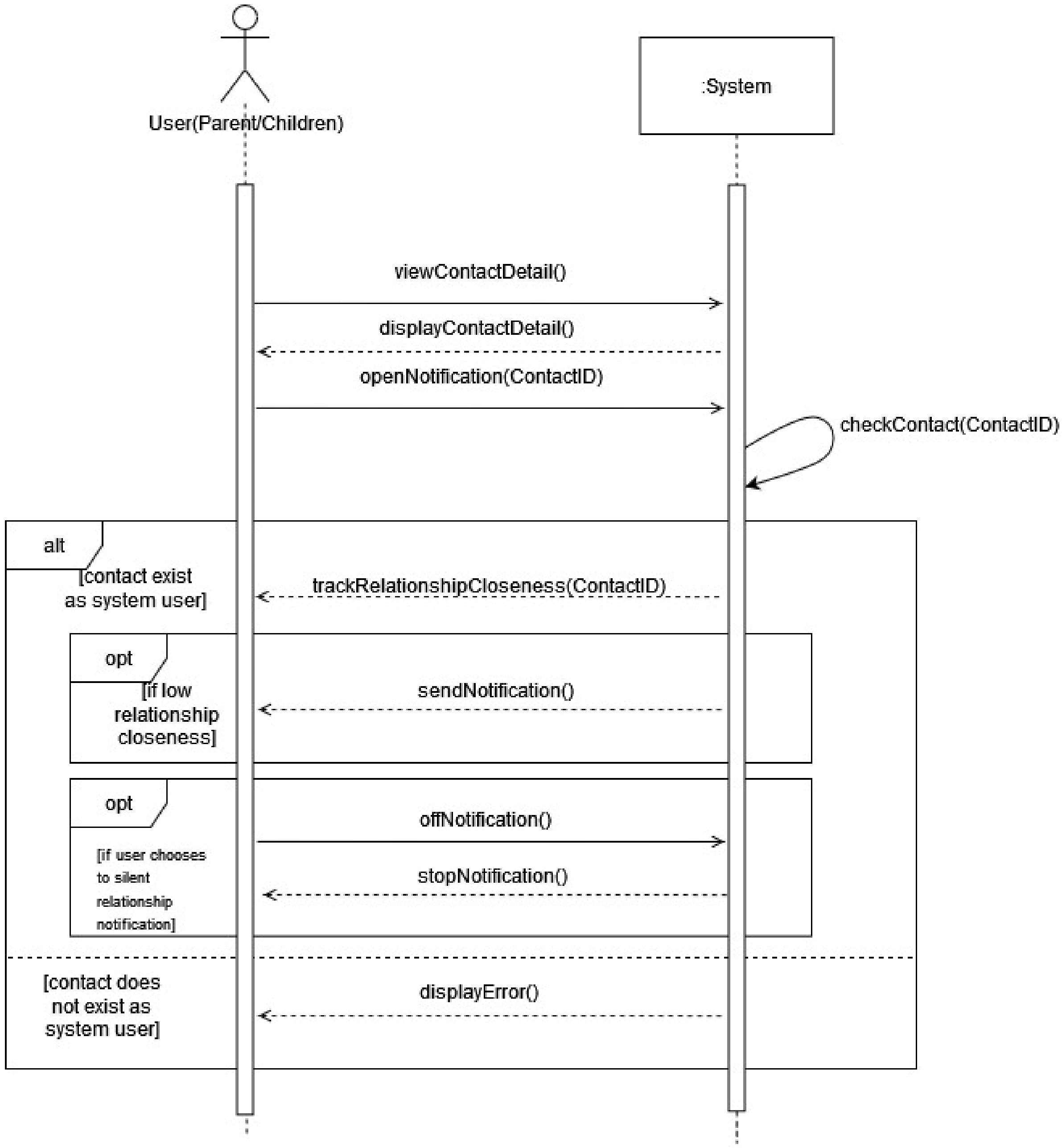


Figure 95: Sequence Diagram for Receive Notifications for Important Contacts Use Case

Child Education Tracking

2.5.27 Use Case: Add New Activity

2.5.27.1 Identifier: [SRS-0027]

2.5.27.2 Use Case Description

Table 44: Use Case Description for Add New Activity

Use Case Name:	Add New Activity	
Scenario:	Add new activity to the schedule	
Triggering Event:	Children want to record their daily activities in the schedule	
Brief Description:	When children click the add new activity button in the daily activity schedule interface, the interface direct to add new activity interface. Children need to fill out all the fields in order to save the activity.	
Actors:	Children	
Related Use Cases:	Extends: *Suggest Weekly Timetable, Label Important Events*	
Stakeholders:	Families	
Preconditions:	Activity must exist. The details of the activity must be known and correct	
Postconditions:	The activity should be added to the schedule. The activity must be related (associated) to children.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0027-N1]	1. Click the add new activity button 2. Fill out all the fields	1.1 Direct to add new activity interface
[SRS-0027-N3]	3. Click save button	3.1 Validate the information 3.2 The activity is saved successfully. The interface goes back to the daily activity schedule interface
Exception Flow: **[SRS-0027-E3.1]**	3.1 If the information is not validated, then an alert message is displayed to notify children about the error.	

2.5.27.3 System Sequence Diagram

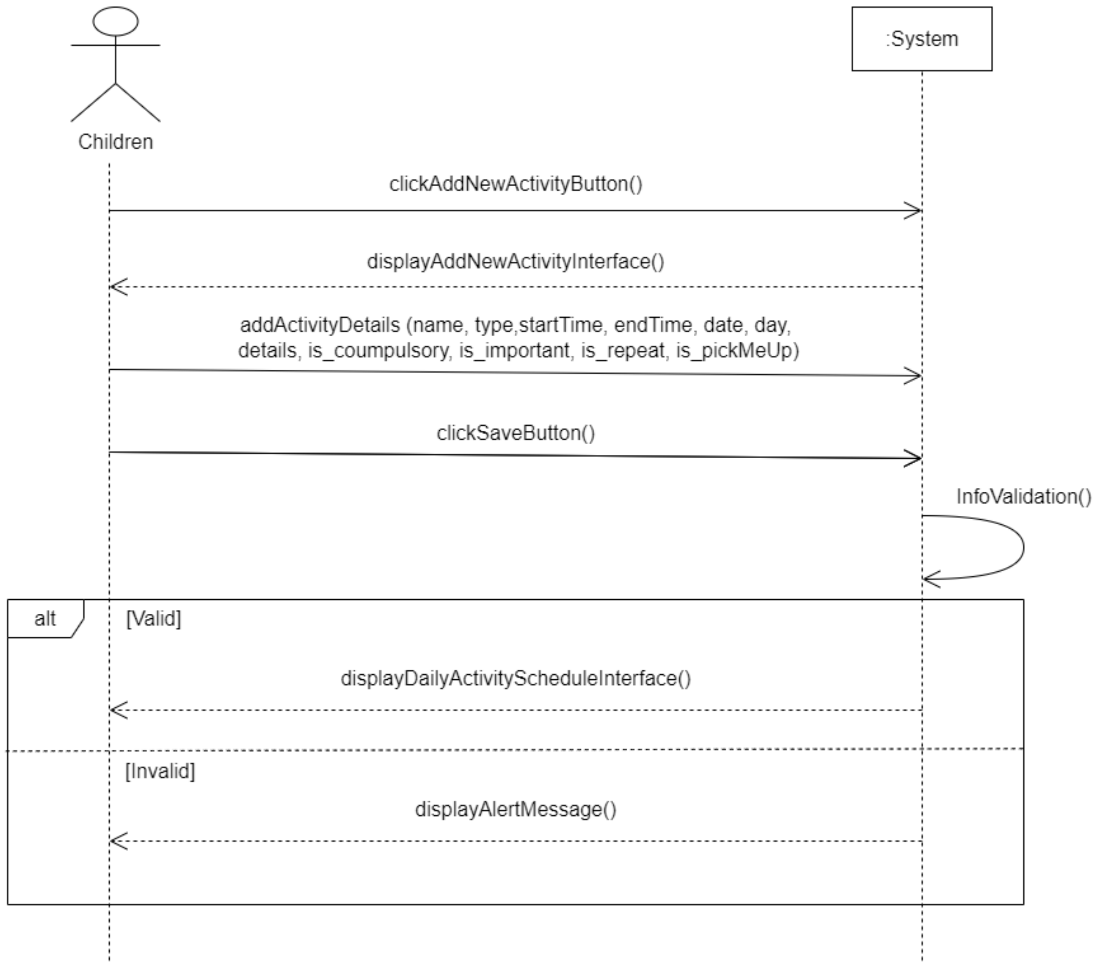


Figure 97:Sequence Diagram for Add New Activity

2.5.28 Use Case: Edit Activity

2.5.28.1 Identifier: [SRS-0028]

2.5.28.2 Use Case Description

Table 45: Use Case Description for Edit Activity

Use Case Name:	Edit Activity
Scenario:	Edit the details of the activity that has been recorded down and displayed in schedule
Triggering Event:	Children want to change the information of the activity.
Brief Description:	When children key in wrong details of the activity and want to amend the information, they can edit the activity by clicking the edit icon that located beside the activity in activity list.

Actors:	Children	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Details of the activities change Activities' details are keyed in incorrectly.	
Postconditions:	Activities with correct details are recorded down	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0028-N1] **[SRS-0028-N2]** **[SRS-0028-N4]**	1. Choose a day from the calendar. 2. Click the edit icon located beside the activity 3. Edit the details 4. Click Save button	1.1 Display activity list interface 2.1 Display edit activity interface with the details of the activity. 4.1 Validate the information. 4.2 The activity is updated successfully. The interface goes back to the activity list interface.
Exception Flow: **[SRS-0028-E4.1]**	4.1 If the information is not validated, then an alert message is displayed to notify children about the error.	

2.5.28.3 System Sequence Diagram

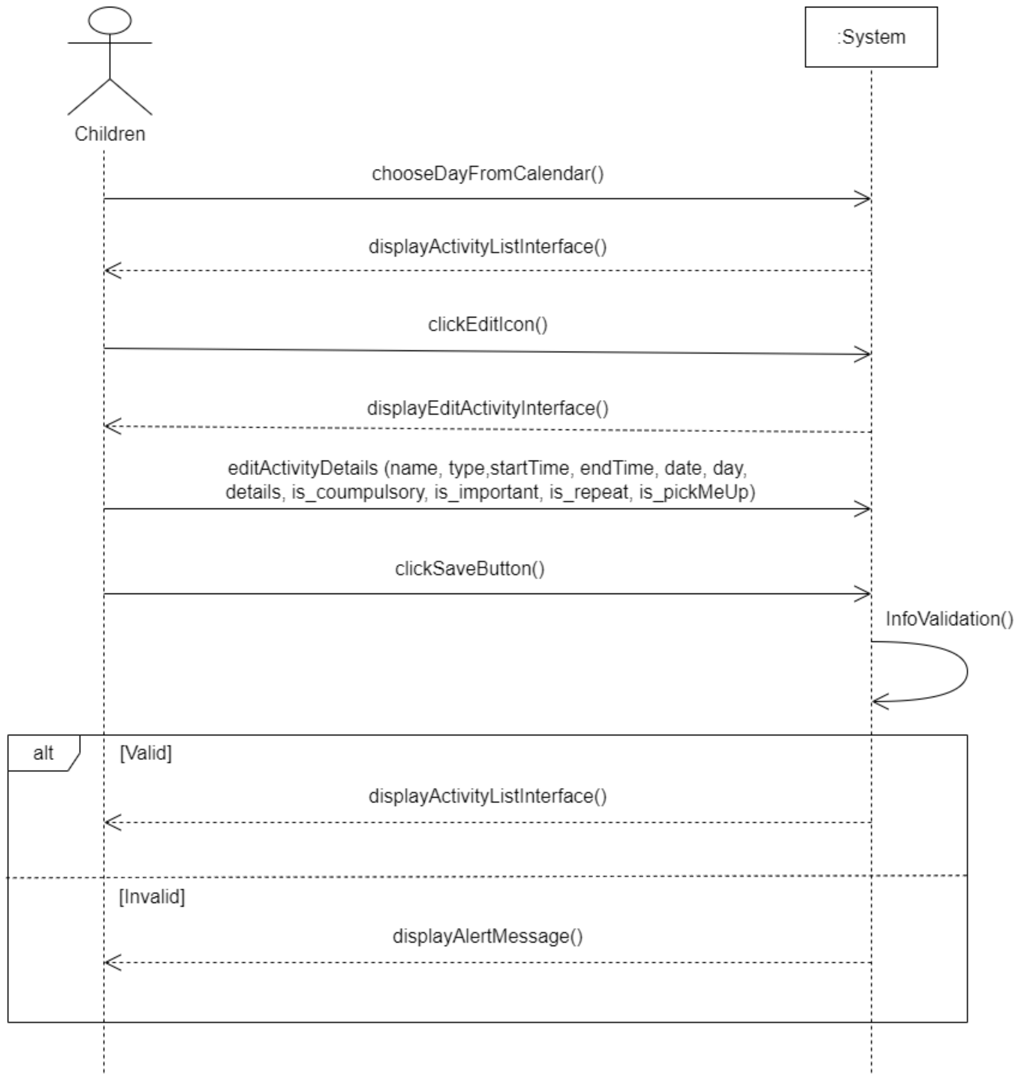


Figure 98:Sequence Diagram for Edit Activity

2.5.29 Use Case: Delete Activity

2.5.29.1 Identifier: [SRS-0029]

2.5.29.2 Use Case Description

Table 46:Use Case Description for Delete Activity

Use Case Name:	Delete Activity
Scenario:	Delete cancelled activity from the schedule
Triggering Event:	Activity is cancelled

Brief Description:	When the activity is cancelled or children have changed their mind for not joining in the activity, they can delete the activity from the schedule and calendar.	
Actors:	Children	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Activity is cancelled. Children change their mind.	
Postconditions:	Children can arrange another activity on this time slot. The activity and its details are deleted from the database.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0029-N1]	1. Choose a day from the calendar.	1.1 Display activity list interface
[SRS-0029-N2]	2. Click the delete icon located beside the activity	2.1 Display delete confirmation dialog
[SRS-0029-N3]	3. Click Yes button on the dialog	3.1 Delete the activity from the activity list and daily activity schedule.
Exception Flow: **[SRS-0029-E3.1]**	3.1 If children click the No button, then nothing happens.	

2.5.29.3 System Sequence Diagram

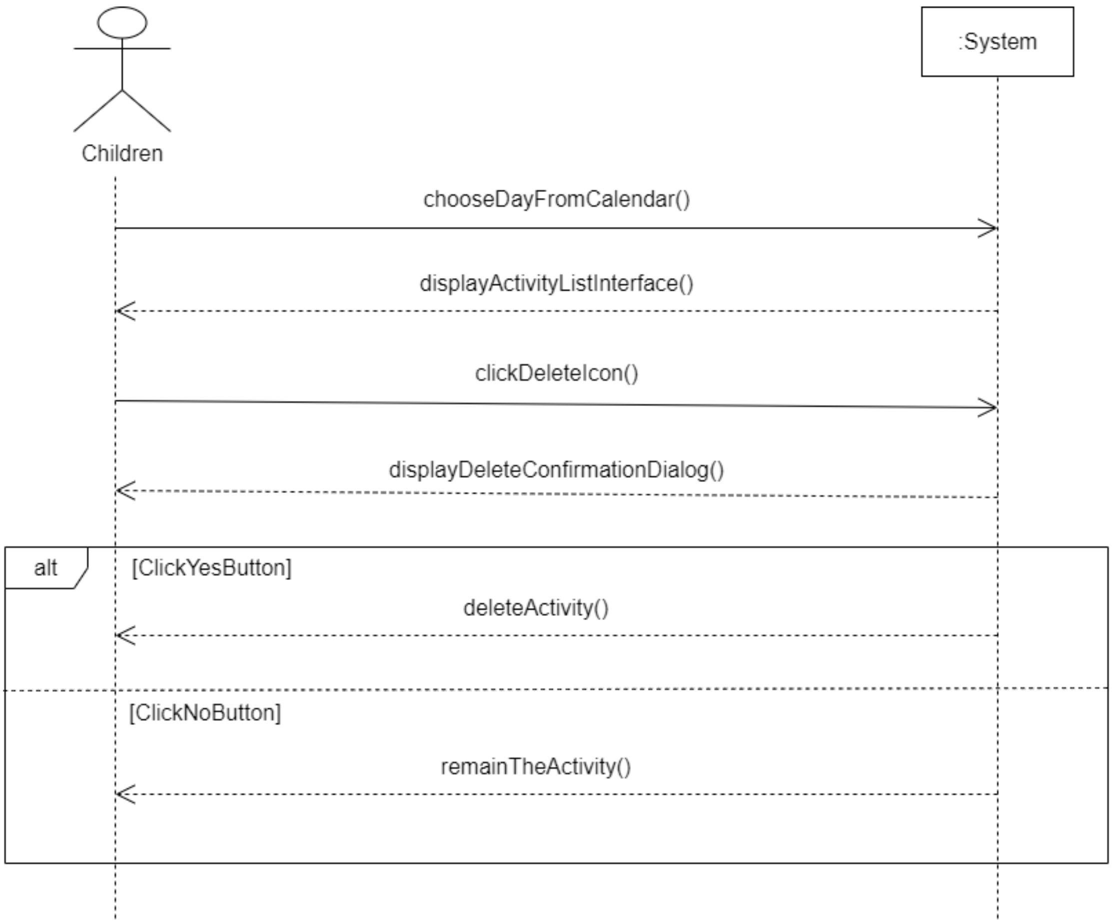


Figure 99: Sequence Diagram for Delete Activity

2.5.30 Use Case: Add New Task

2.5.30.1 Identifier: [SRS-0030]

2.5.30.2 Use Case Description

Table 47: Use Case Description for Add New Task

Use Case Name:	Add New Task
Scenario:	Add new task to the schedule
Triggering Event:	Children want to record their tasks in the schedule
Brief Description:	When children click the add new task button in the daily activity schedule interface, the interface direct to add new task interface. Children need to fill out all the fields in order to save the task.
Actors:	Children

Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Task must exist The details of the task must be known and correct	
Postconditions:	Tasks are added into the schedule	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0030-N1] **[SRS-0030-N3]**	1. Click the add new task button. 2. Fill out all the fields 3. Click Save button	1.1 Direct to add new task interface 3.1 Validate the information 3.2 The task is saved successfully. The interface goes back to the daily activity schedule interface.
Exception Flow: **[SRS-0030-E3.1]**	3.1 If the information is not validated, then an alert message is displayed to notify children about the error.	

2.5.30.3 System Sequence Diagram

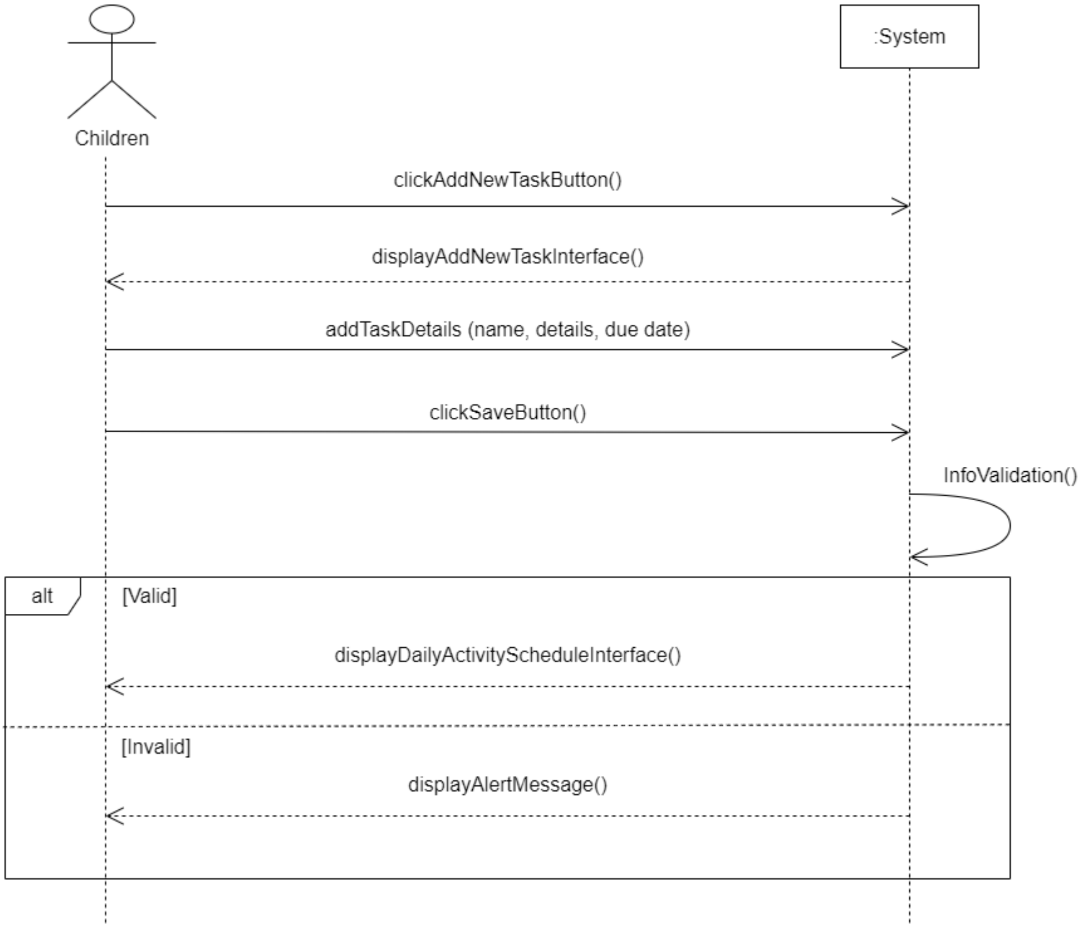


Figure 100: Sequence Diagram for Add New Task

2.5.31 Use Case: Edit Task

2.5.31.1 Identifier: [SRS-0031]

2.5.31.2 Use Case Description

Table 48: Use Case Description for Edit Task

Use Case Name:	Edit Task
Scenario:	Edit the details of the task that has been recorded down and displayed in schedule
Triggering Event:	Children want to change the information of task.
Brief Description:	When children key in wrong details of the task and want to amend the information, they can edit the task by clicking the edit icon that located beside the task in task list

Actors:	Children	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Details of the tasks change Tasks' details are keyed in incorrectly.	
Postconditions:	Tasks with correct details are recorded down.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0031-N1]	1. Choose a day from the calendar.	1.1 Display activity list interface
[SRS-0031-N2]	2. Select Task tab	2.1 Display task list interface
[SRS-0031-N3]	3. Click the edit icon located beside the task	3.1 Display edit task interface with the details of the task.
	4. Edit the details	
[SRS-0031-N5]	5. Click Save button	5.1 Validate the information 5.2 The task is updated successfully. The interface goes back to the task list interface.
Exception Flow: **[SRS-0032-E5.1]**	5.1 If the information is not validated, then an alert message is displayed to notify children about the error.	

2.5.31.3 System Sequence Diagram

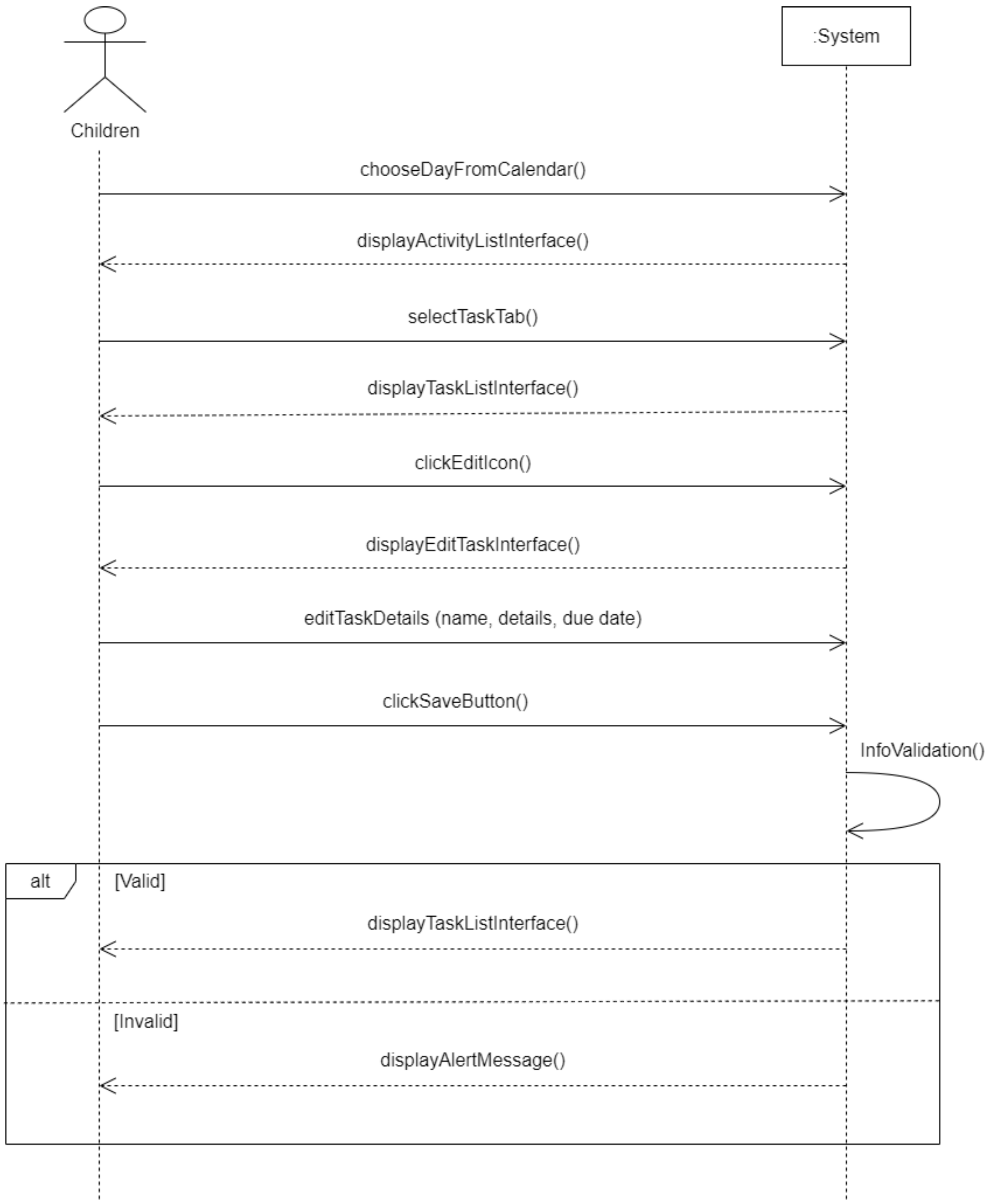


Figure 101: Sequence Diagram for Edit Task

2.5.32 Use Case: Delete Task

2.5.32.1 Identifier: [SRS-0032]

2.5.32.2 Use Case Description

Table 49: Use Case Description for Delete Task

Use Case Name:	Delete Task

Scenario:	Delete task from the schedule	
Triggering Event:	Task is cancelled	
Brief Description:	When the task is cancelled, they can delete the task from the schedule and calendar.	
Actors:	Children	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Task is cancelled.	
Postconditions:	The task and its details are deleted from the database.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0032-N1]	1. Choose a day from the calendar.	1.1 Display activity list interface
[SRS-0032-N2]	2. Select Task tab	2.1 Display task list interface
[SRS-0032-N3]	3. Click the delete icon located beside the task	3.1 Display delete confirmation dialog
[SRS-0032-N4]	4. Click Yes button on the dialog	4.1 Delete the task from the task list and daily activity schedule.
Exception Flow: **[SRS-0032-E4.1]**	4.1 If children click the No button, then nothing happens.	

2.5.32.3 System Sequence Diagram

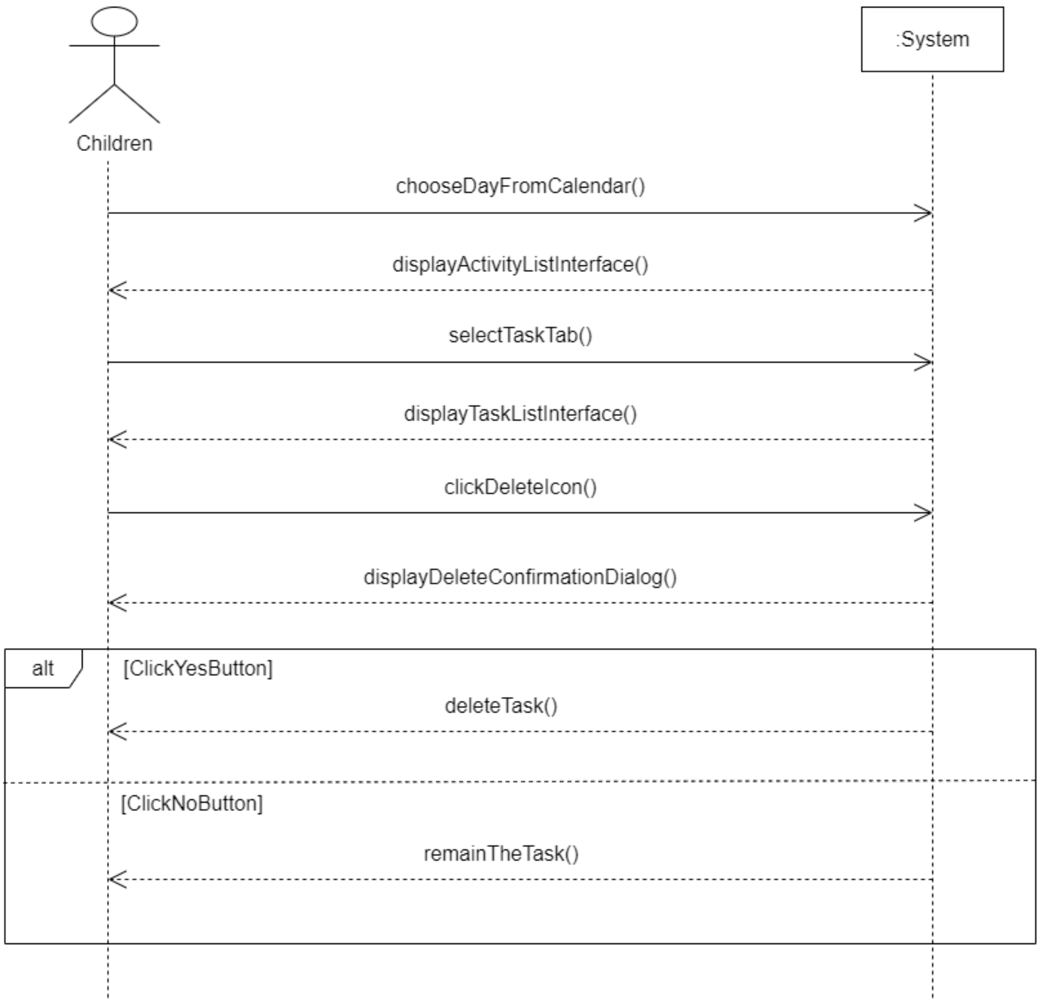


Figure 102: Sequence Diagram for Delete Task

2.5.33 Use Case: Suggest Weekly Timetable Schedule

2.5.33.1 Identifier: [SRS-0033]

2.5.33.2 Use Case Description

Table 50: Use Case Description for Suggest Weekly Timetable Schedule

Use Case Name:	Suggest Weekly Timetable Schedule
Scenario:	Suggest and plan weekly timetable schedule to children
Triggering Event:	There are optional activities that can be arranged randomly in the schedule

Brief Description:	When children click this function, a weekly timetable schedule is planned and suggested to children. If children click to accept the planned schedule, the schedule will replace the existing schedule which arranged by the children.	
Actors:	Children	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Optional activities that can be arranged randomly must exist	
Postconditions:	Balanced schedule is created The planned schedule replaces the existing schedule.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0033-N1] **[SRS-0033-N2]**	1. Use the weekly schedule planning feature. 2. Children accepts the suggested weekly schedule	1.1 Balanced schedule is created and displayed to children. 2.1 Replace existing schedule
Exception Flow: **[SRS-0033-E1.1]** **[SRS-0033-E2.1]**	1.1 If there is no activity to be arranged, then a message showing "There is no activity added into the schedule, this feature is unavailable now" displays. 2.1 If children reject the suggested weekly schedule, then they can a. use weekly schedule planning feature again and get another suggested weekly schedule b. use back the existing schedule which arranged by themselves	

2.5.33.3 System Sequence Diagram

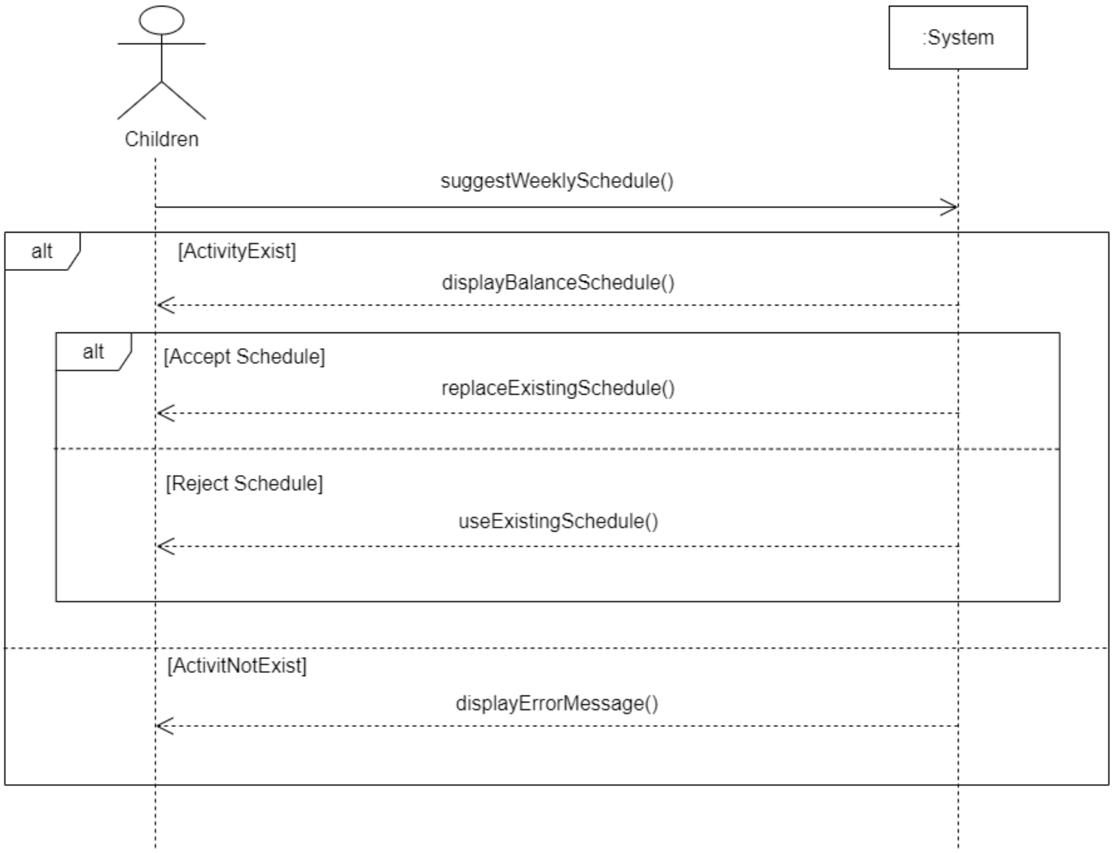


Figure 103: Sequence Diagram for Suggest Weekly Timetable Schedule

2.5.34 Use Case: Label important events

2.5.34.1 Identifier [SRS-0034]

2.5.34.2 Use Case Description

Table 51: Use Case Description for Label Important Events

Use Case Name:	Label Important Events
Scenario:	Label important events that you want to notify parents
Triggering Event:	When there are important events that children want their parents to take note of
Brief Description:	When children want to make the system countdown to the event date and send reminder notifications to parents and themselves, they will label the events as important.
Actors:	Children

Related Use Cases:	*Includes: Receive Reminder Notifications, View countdown to the important events*	
Stakeholders:	Families	
Preconditions:	Activity must exist	
Postconditions:	The system shows the countdown to the event date and send reminder notifications to parent and children before the event date or on the event date	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0034-N1] **[SRS-0034-N4]**	1. Click the add new activity button 2. Fill out all the fields 3. Label the activity as important 4. Click save button	1.1 Direct to add new activity interface 4.1 Validate the information The activity is saved successfully. The interface goes back to the daily activity schedule interface 4.2 Add this activity to the countdown list
Exception Flow: **[SRS-0034-E4.1]**	If the information is not validated, then an alert message is displayed to notify children about the error.	

2.5.34.3 System Sequence Diagram

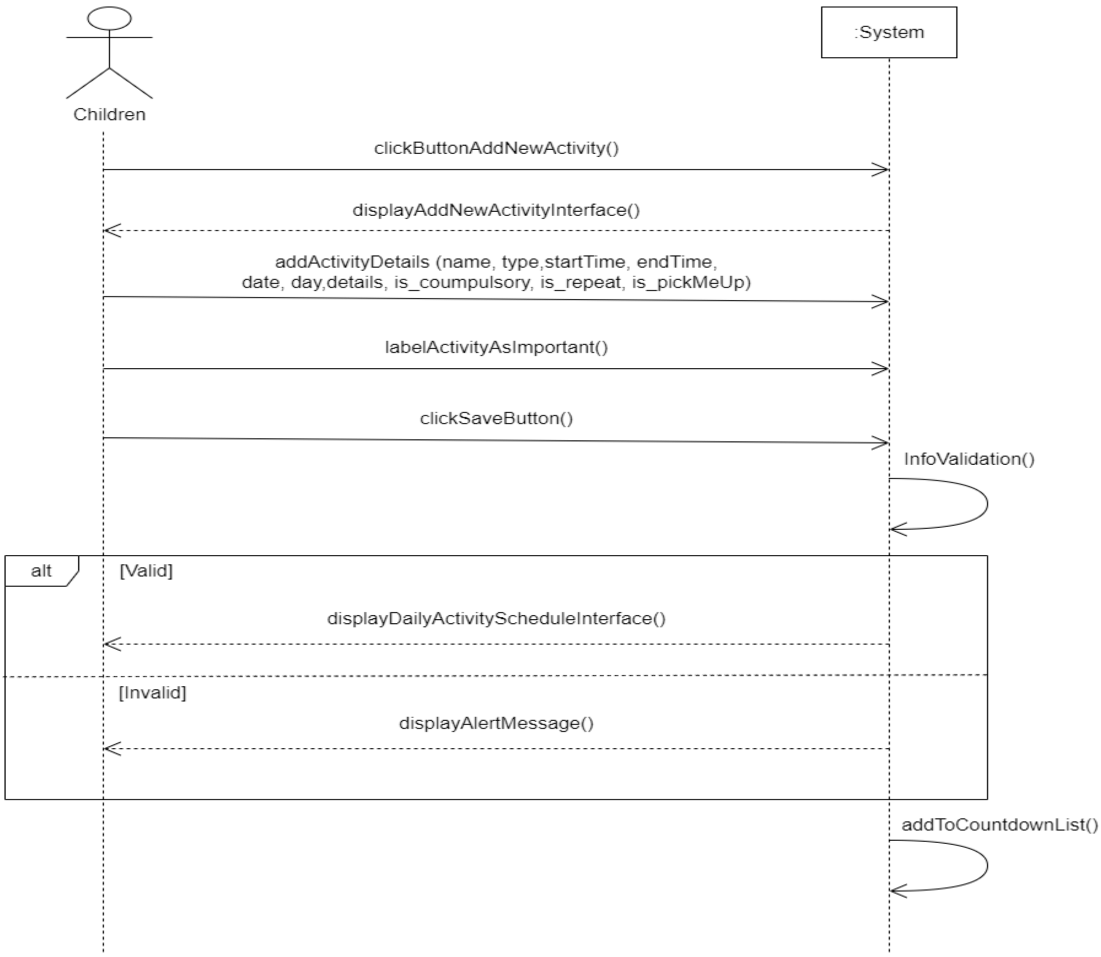


Figure 104: Sequence Diagram for Label Important Events

2.5.35 Use Case: View countdown to the important events

2.5.35.1 Identifier [SRS-0035]

2.5.35.2 Use Case Description

Table 52: Use Case Description for View Countdown to the Important Events

Use Case Name:	View Countdown to the Important Events
Scenario:	View the countdown list to the important events
Triggering Event:	Users want to know number of days left to the important event date so that they can make early preparation.
Brief Description:	Users can see all the countdown to the important events' dates
Actors:	Parent, Children
Related Use Cases:	-

Stakeholders:	Families	
Preconditions:	There are events that are labelled as important	
Postconditions:	Number of days left to the important event date is known	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0035-N1]	1. View the countdown to the important events	1.1 Display countdown to the important events dates
Exception Flow:	-	

2.5.35.3 System Sequence Diagram

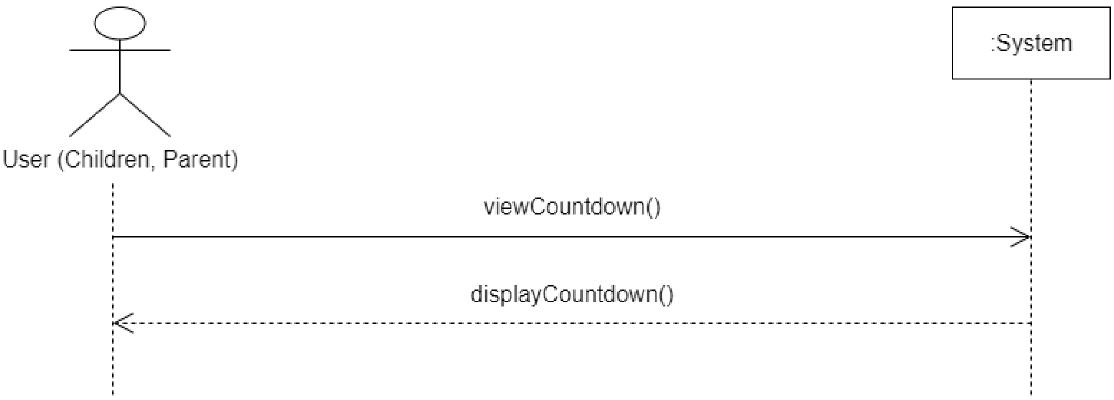


Figure 105: Sequence Diagram for View Countdown to the Important Events

2.5.36 Use Case: Receive reminder notifications

2.5.36.1 Identifier [SRS-0036]

2.5.36.2 Use Case Description

Table 53: Use Case Description for Receive Reminder Notifications

Use Case Name:	Receive Reminder Notifications
Scenario:	Receive reminder notifications about the approaching important events
Triggering Event:	Important events are around the corner
Brief Description:	When important events are around the corner, reminder notifications will be sent to parent and children to remind them about this event.
Actors:	Parent, Children
Related Use Cases:	-
Stakeholders:	Families

Preconditions:	There are events labeled as important by children App notifications is turned on	
Postconditions:	Reminder notifications are sent to the users.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0036-N1]	1. Turn on the app notifications setting	1.1 Send reminder notifications about the approaching important event to the users
Exception Flow:	-	

2.5.36.3 System Sequence Diagram

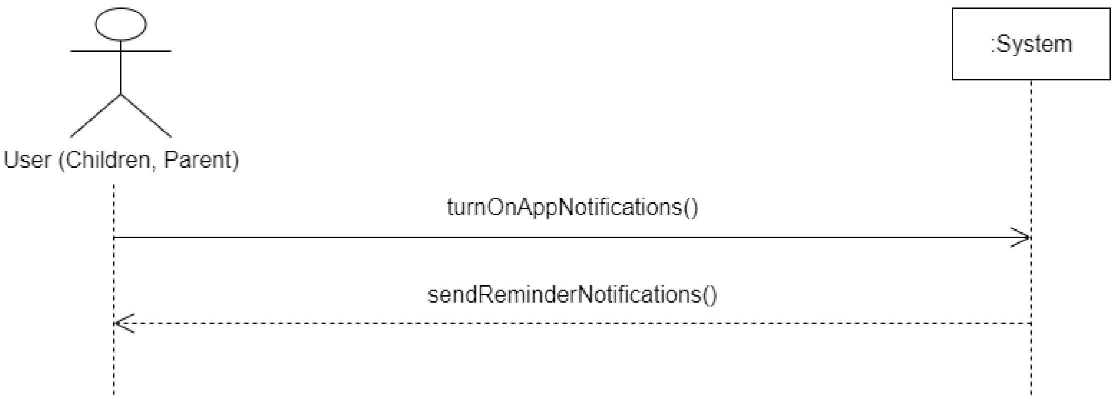


Figure 106: Sequence Diagram for Receive Reminder Notifications

2.5.37 Use Case: View report of time spent

2.5.37.1 Identifier [SRS-0037]

2.5.37.2 Use Case Description

Table 54: Use Case Description for View Report of Time Spent

Use Case Name:	View Report of Time Spent
Scenario:	View report of time spent on various activities by children
Triggering Event:	Users want to know whether the children's schedule is balance or not
Brief Description:	When users want to check whether the children's schedule is balance or not, they can view this summary report of time spent on various activities.
Actors:	Parent, Children

Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Children have added their daily activities for a week	
Postconditions:	Time spent on various activities is known	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0037-N1]	1. View the report of time spent on various activities	1.1 Calculate time spent on various activities 1.2 Generate summary report which concludes the time spent 1.3 Display report
Exception Flow:	-	

2.5.37.3 System Sequence Diagram

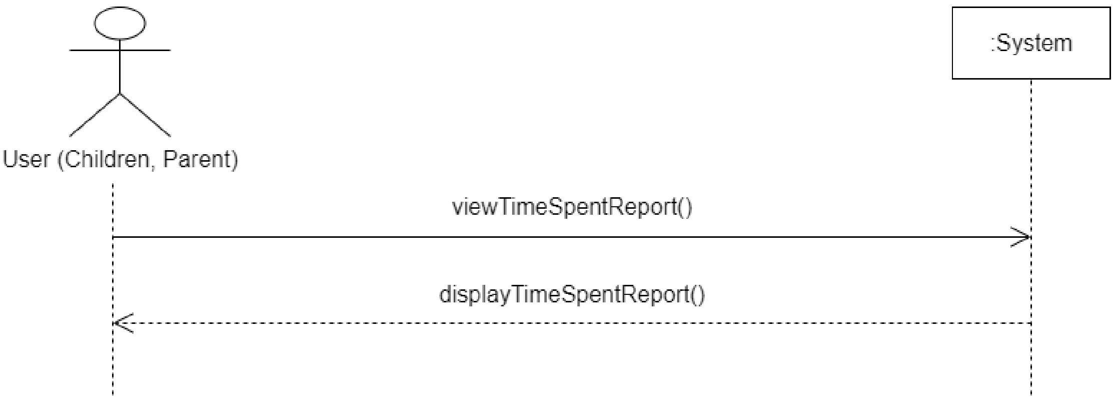


Figure 107: Sequence Diagram for View Report of Time Spent

2.5.38 Use Case: View daily activity schedule

2.5.38.1 Identifier [SRS-0038]

2.5.38.2 Use Case Description

Table 55: Use Case Description for View Daily Activity Schedule

Use Case Name:	View Daily Activity Schedule
Scenario:	View children's daily activity schedule
Triggering Event:	Users want to know what they have to do in a week

Brief Description:	When users want to know their schedule, they can view this daily activity schedule	
Actors:	Parent, Children	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Children have added their daily activities.	
Postconditions:	Children's schedule is known Children attend activities on time	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0038-N1]	1. View daily activity schedule	1.1 Display the daily activity schedule
Exception Flow:	-	

2.5.38.3 System Sequence Diagram

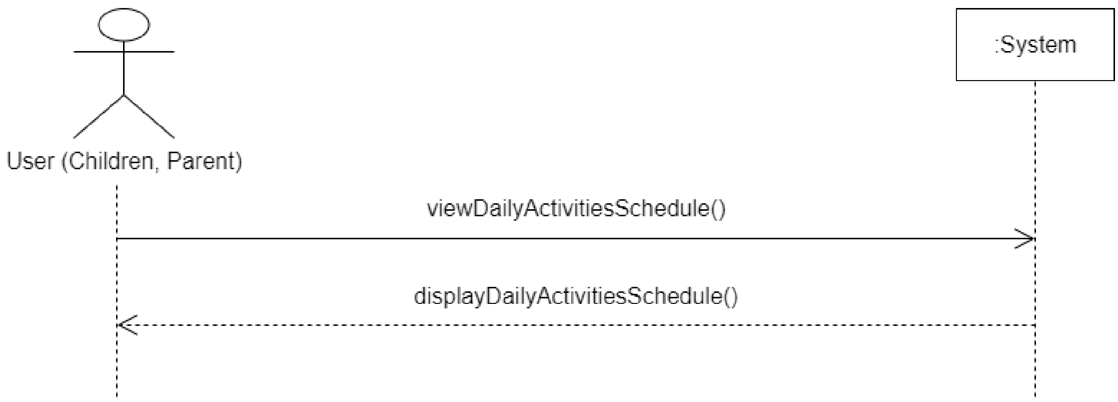


Figure 108: Sequence Diagram for View Daily Activity Schedule

2.5.39 Use Case: Add the results of various academic achievements

2.5.39.1 Identifier [SRS-0039]

2.5.39.2 Use Case Description

Table 56: Use Case Description for Add the Results of Various Academic Achievements

Use Case Name:	Add the Results of Various Academic Achievements
Scenario:	Add the results of test and quiz, homework completion rate and behavioral assessments.

Triggering Event:	Results are released.	
Brief Description:	When results are released, children have to add the results so that the results will be recorded down, and the performance can be tracked.	
Actors:	Children	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Results are released Results released are what parents want to keep track of	
Postconditions:	Can keep track of children's performance using data visualization feature. Appropriate actions can be taken based on children's performance	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0039-N1] **[SRS-0039-N3]**	1. Click the add results button 2. Fill out all the fields 3. Click save button	1.1 Direct to add results interface 3.1 Validate the information 3.2 Result is saved successfully 3.3 The interface goes back to the performance visualization interface
Exception Flow: **[SRS-0039-E3.1]**	3.1 If the information is not validated, then an alert message is displayed to notify children about the error.	

2.5.39.3 System Sequence Diagram

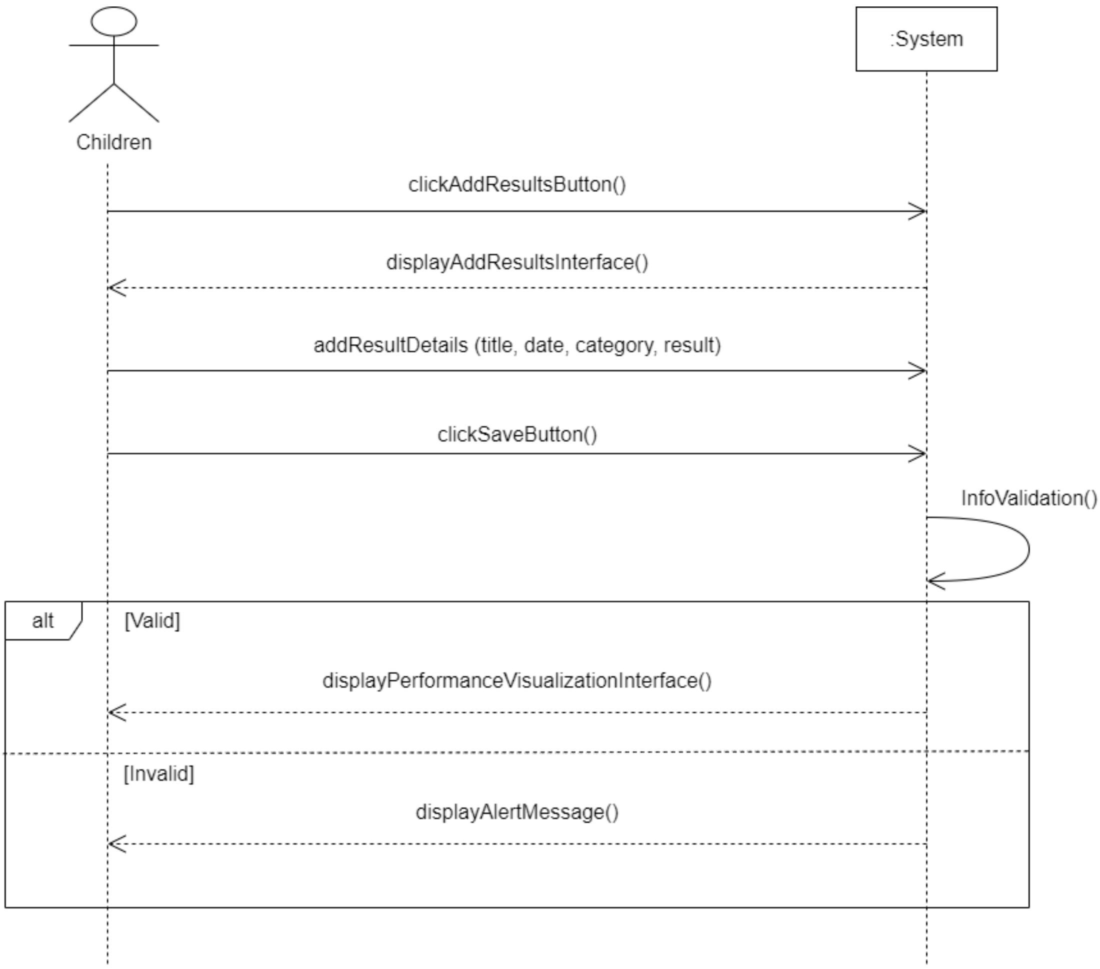


Figure 109: Sequence Diagram for Add the Results of Various Academic Achievements

2.5.40 Use Case: Edit Results

2.5.40.1 Identifier: [SRS-0040]

2.5.40.2 Use Case Description

Table 57: Use Case Description for Edit Results

Use Case Name:	Edit Results
Scenario:	Edit the results obtained on test and quiz, homework completion rate and behavioral assessments.
Triggering Event:	Children want to change the details of the results

Brief Description:	When children key in wrong results' details and want to amend the information, they can edit the results by clicking on the edit icon that located beside the result in result list.	
Actors:	Children	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Results change Details are keyed in incorrectly.	
Postconditions:	Results with correct details are recorded down	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0040-N1]	1. Choose a chart from the performance visualization interface	1.1 Display the result list interface
[SRS-0040-N2]	2. Click the edit icon located beside the result 3. Edit the result	2.1 Display edit result interface with the results' details
[SRS-0040-N4]	4. Click Save button	4.1 Validate the information 4.2 The result is updated successfully. The interface goes back to the result list interface
Exception Flow: **[SRS-0040-E4.1]**	4.1 If the information is not validated, then alert message is displayed to notify children about the error.	

2.5.40.3 System Sequence Diagram

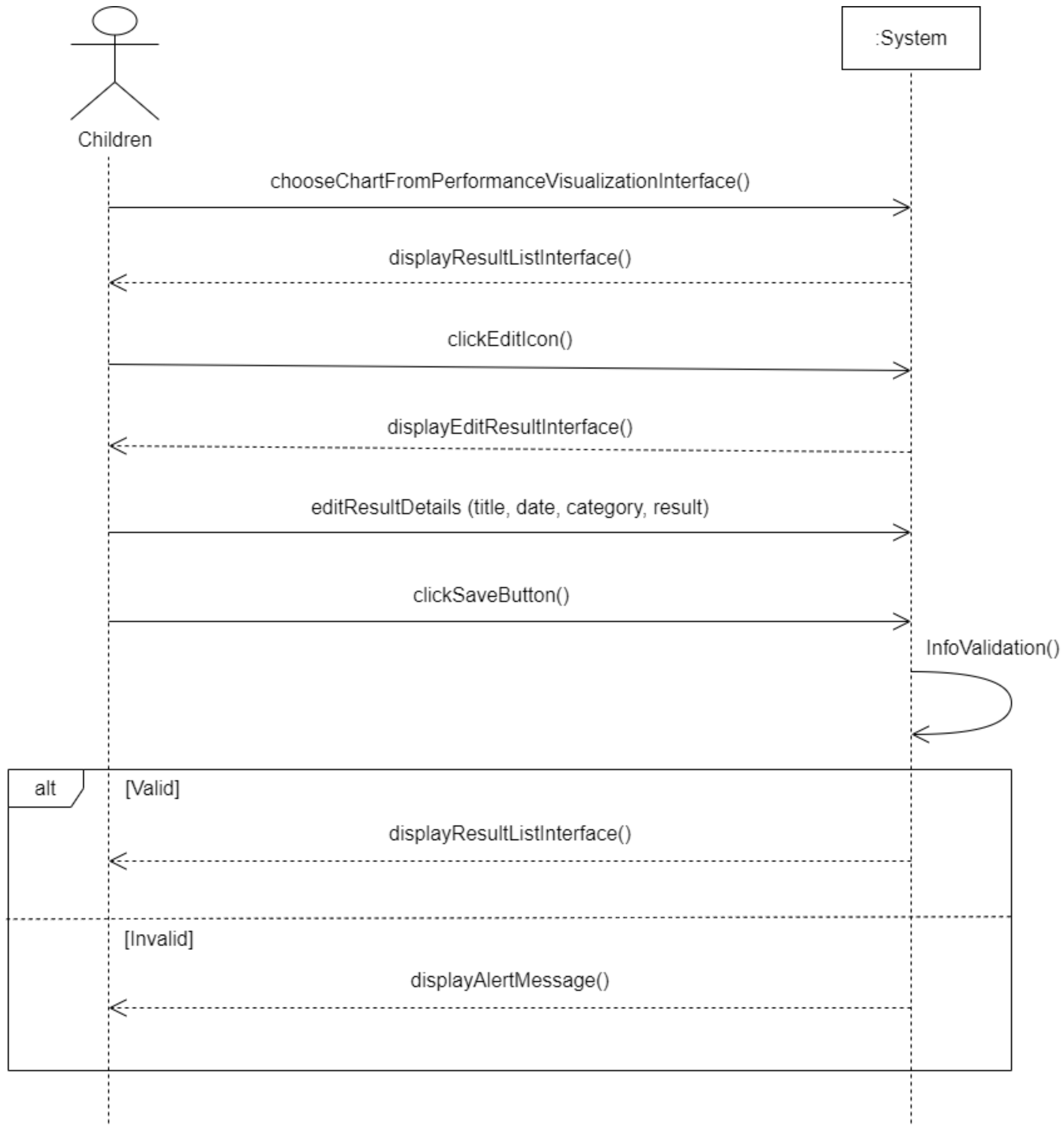


Figure 110: Sequence Diagram for Edit Results

2.5.41 Use Case: Delete Results

2.5.41.1 Identifier: [SRS-0041]

2.5.41.2 Use Case Description

Table 58: Use Case Description for Delete Results

Use Case Name:	Delete Results
Scenario:	Delete record of result from performance table.

Triggering Event:	The type of results is not what parents want to keep track of	
Brief Description:	When children key in results that parents don't want to keep track of, they can delete the results from the database.	
Actors:	Children	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	The type of results is not what parents want to keep track of	
Postconditions:	The result is deleted from the database	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0041-N1]	1. Choose a chart from the performance visualization interface	1.1 Display the result list interface of the selected chart
[SRS-0041-N2]	2. Click the delete icon located beside the result	2.1 Display delete confirmation dialog
[SRS-0041-N3]	3. Click Yes button on the dialog	3.1 Delete the result from the result list
Exception Flow: **[SRS-0041-E3.1]**	3.1 If children click the No button, then nothing happens	

2.5.41.3 System Sequence Diagram

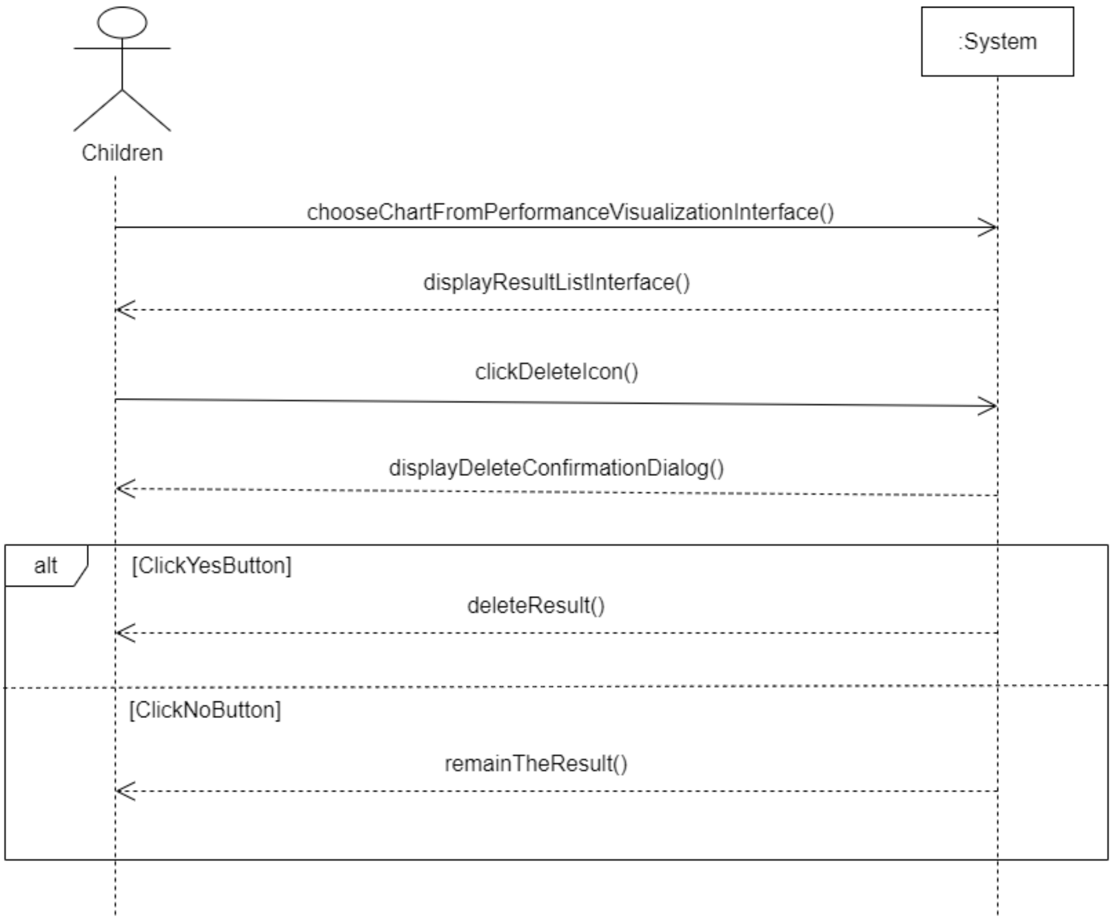


Figure 111: Sequence Diagram for Delete Results

2.5.42 Use Case: View Academic Achievements' Results In Charts

2.5.42.1 Identifier [SRS-0042]

2.5.42.2 Use Case Description

Table 59:Use Case Description for View Academic Achievements' Results in Charts

Use Case Name:	View Academic Achievements' Results in Charts
Scenario:	Charts are used to visualize the trend of children's results
Triggering Event:	Users want to know the children's results trend
Brief Description:	When users want to know the performance of the children from a time to another time, they can use this feature to visualize the trend of children's results.

Actors:	Parent, Children	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Results are released Results are added and recorded down by the system	
Postconditions:	The academic performance of children is known easily. Appropriate actions can be taken based on children's performance	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0042-N1]	1. View the academic results in charts	1.1 Display results in charts
Exception Flow:	-	

2.5.42.3 System Sequence Diagram

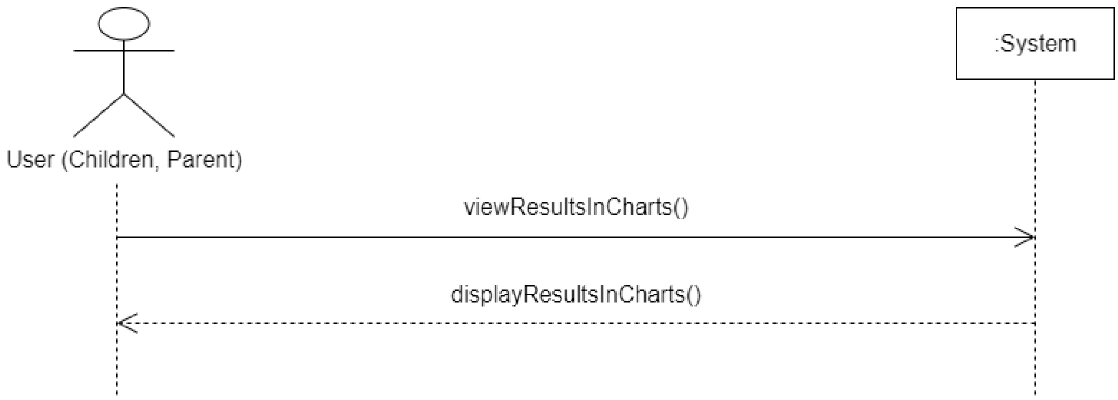


Figure 112:Sequence Diagram for View Academic Achievements' Results in Charts

2.5.43 Use Case: Receive Alert Notifications

2.5.43.1 Identifier: [SRS-0043]

2.5.43.2 Use Case Description

Table 60:Use Case Description for Receive Alert Notifications

Use Case Name:	Receive Alert Notifications
Scenario:	Receive alert notifications
Triggering Event:	Children's performance keeps declining or gets worse over time

Brief Description:	When children's performance keeps declining or gets worse over time, alert notifications will be sent to parents so that they can give attention on their children's performance.	
Actors:	Parents	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Children's performance keeps declining or gets worse over time	
Postconditions:	Children's performance can be improved	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0043-N1]	1. Turn on the app notifications setting	1.1 Send alert notifications on the children's performance to the parents
Exception Flow:	-	

2.5.43.3 System Sequence Diagram

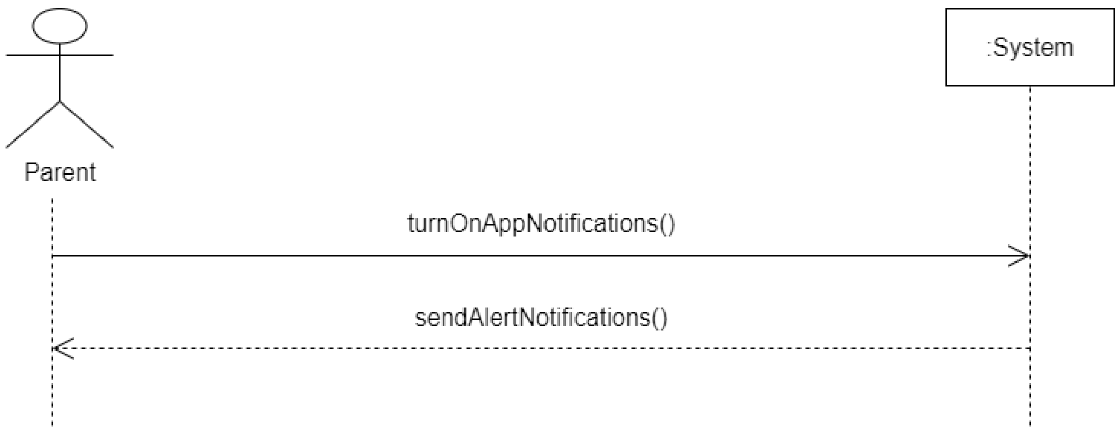


Figure 113:Sequence Diagram for Receive Alert Notifications

2.5.44 Use Case: Add awards obtained

2.5.44.1 Identifier [SRS-0044]

2.5.44.2 Use Case Description

Table 61:Use Case Description for Add Awards Obtained

Use Case Name:	Add Awards Obtained	
Scenario:	Record down awards obtained by children	
Triggering Event:	Children win an award	
Brief Description:	When children win awards, users want to record down the honors obtained by the children.	
Actors:	Parent, Children	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Children win awards The award is important for future planning	
Postconditions:	Honors obtained by children are recorded down	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0044-N1] **[SRS-0044-N3]**	1. Click the add awards button 2. Fill out all the fields 3. Click save button	1. Direct to add awards interface 3.1 Validate the information 3.2 Award is saved successfully The interface goes back to the award list interface
Exception Flow: **[SRS-0044-E3.1]**	3.1 If the information is not validated, then alert message is displayed to notify users about the error.	

2.5.44.3 System Sequence Diagram

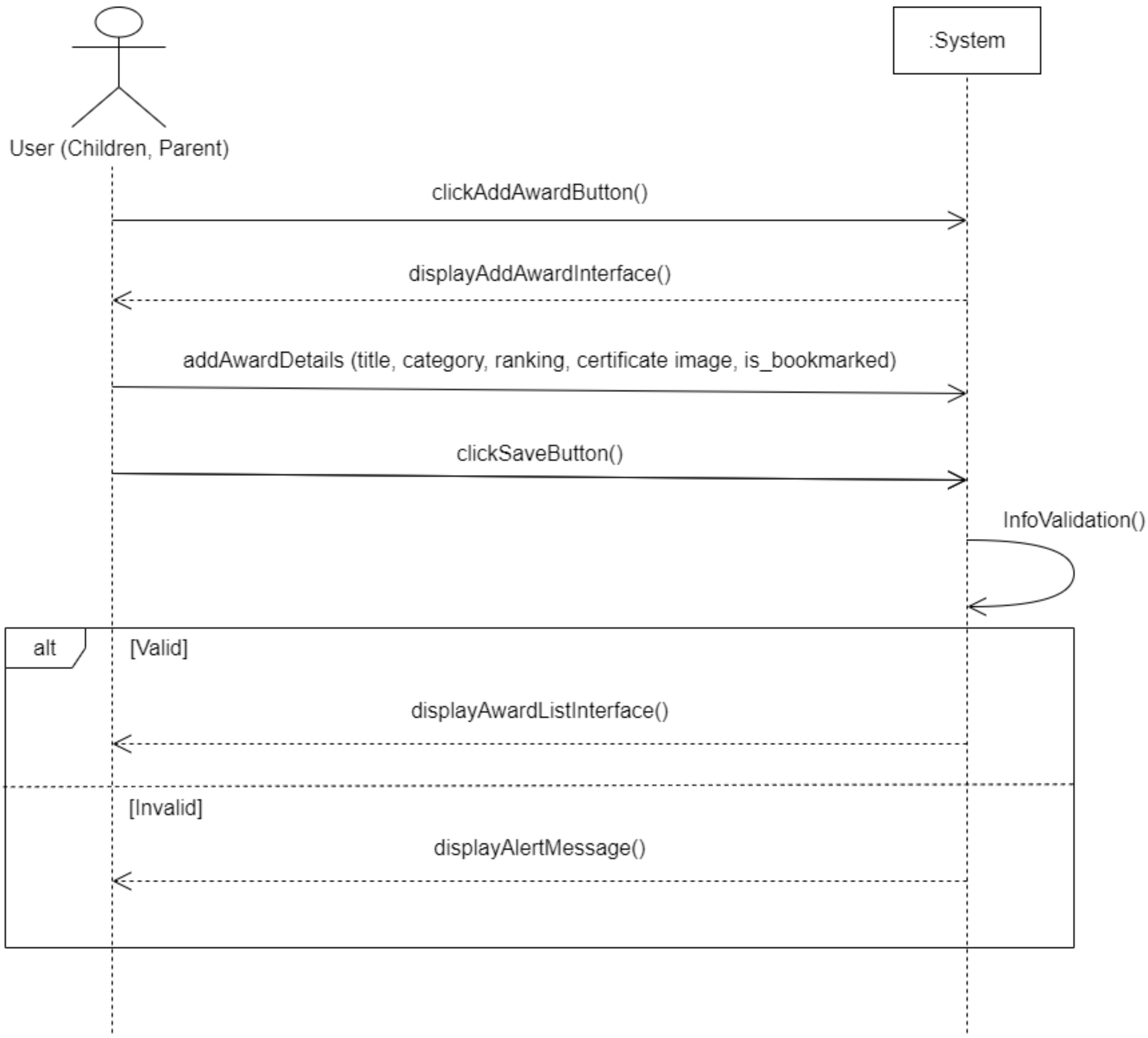


Figure 114:Sequence Diagram for Add Awards Obtained

2.5.45 Use Case: Edit Award

2.5.45.1 Identifier: [SRS-0045]

2.5.45.2 Use Case Description

Table 62: Use Case Description for Edit Award

Use Case Name:	Edit Award
Scenario:	Edit the details of award that has been recorded down and displayed in award list
Triggering Event:	Users key in wrong details of the award.

Brief Description:	When users key in wrong details of the award and want to amend the information, they can edit the award by clicking the edit icon that located beside the award in award list or bookmarked award list.	
Actors:	Parent, Children	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Award details are keyed in incorrectly.	
Postconditions:	Award with correct details is recorded down.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0045-N1]	1. Click the edit icon located beside the award 2. Edit the details	1.1 Display edit award interface with the details of the selected award.
[SRS-0045-N3]	3. Click Save button	3.1 Validate the information. 3.2 The award details are updated. The interface goes back to the award list interface.
Exception Flow: **[SRS-0045-E3.1]**	3.1 If the information is not validated, then an alert message is displayed to notify users about the error.	

2.5.45.3 System Sequence Diagram

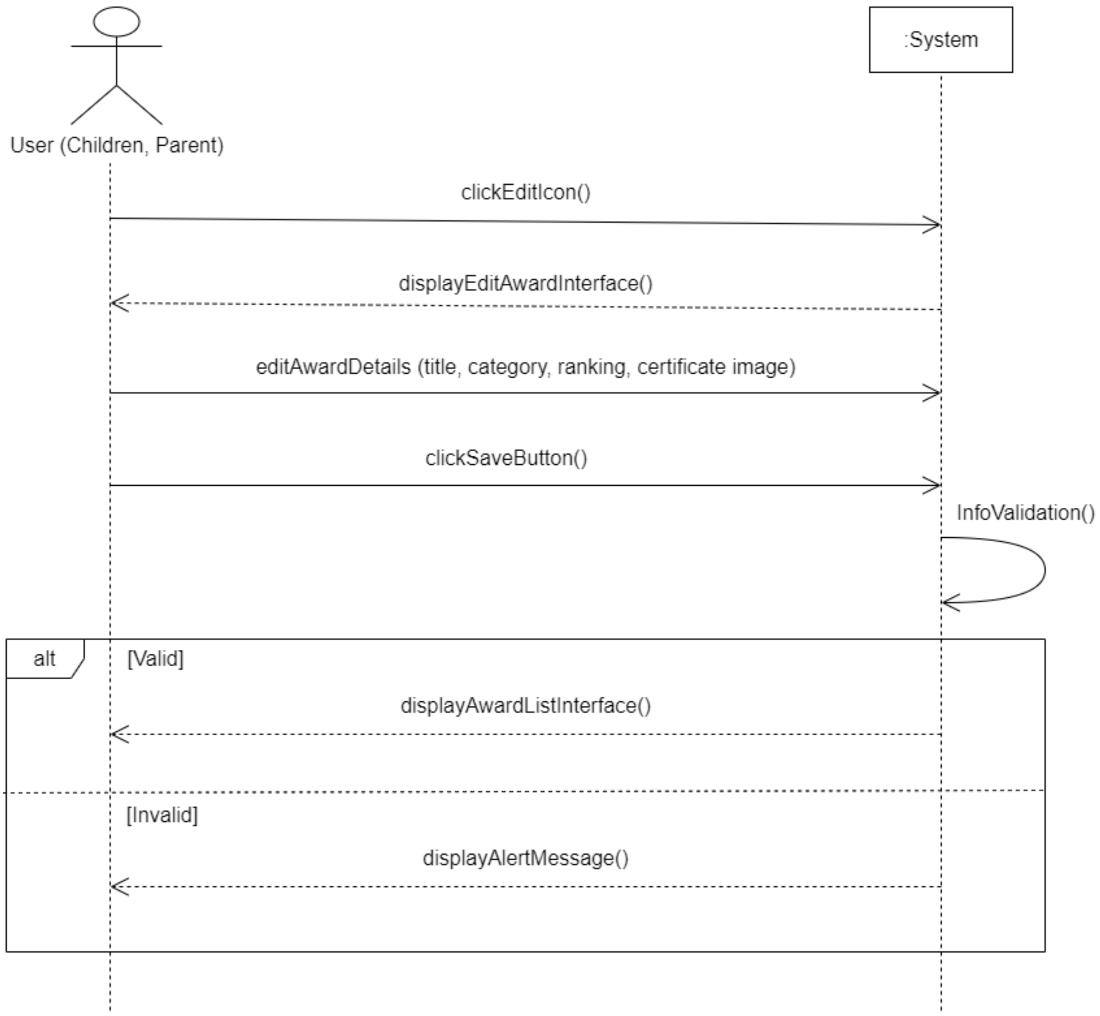


Figure 115: Sequence Diagram for Edit Award

2.5.46 Use Case: Delete Award

2.5.46.1 Identifier: [SRS-0046]

2.5.46.2 Use Case Description

Table 63:Use Case Description for Delete Award

Use Case Name:	Delete Award
Scenario:	Delete award record from the database
Triggering Event:	The award is useless for future planning.
Brief Description:	When the award is useless for future planning or the award is not significant to be recorded down, users can delete the award from the database.

Actors:	Parent, Children	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Award is useless for future planning Award is not significant to be recorded down	
Postconditions:	Award and its details are deleted from the database.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0046-N1] **[SRS-0046-N2]**	1. Click the delete icon located beside the award 2. Click Yes button on the dialog	1.1 Display delete confirmation dialog 2.1 Delete the award from the award list
Exception Flow: **[SRS-0046-E2.1]**	2.1 If users click on the No button, then nothing happens	

2.5.46.3 System Sequence Diagram

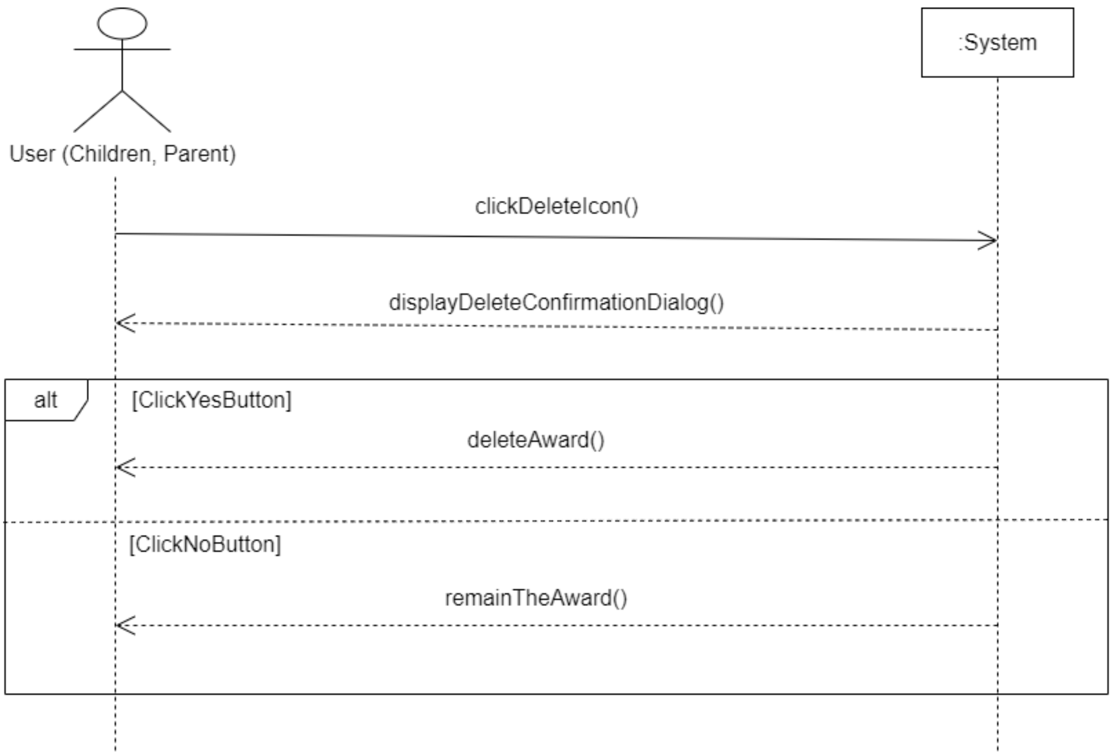


Figure 116:Sequence Diagram for Delete Award

2.5.47 Use Case: Bookmark Important Awards

2.5.47.1 Identifier [SRS-0047]

2.5.47.2 Use Case Description

Table 64: Use Case Description for Bookmark Important Awards

Use Case Name:	Bookmark Important Awards	
Scenario:	Bookmark important and significant awards	
Triggering Event:	Awards that are very important that need to be bookmarked	
Brief Description:	When children win awards that are very important for future use, other than add them into the award list, users can bookmark the awards.	
Actors:	Parent, Children	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Award is added	
Postconditions:	Can view the important and significant awards in bookmarked award list.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0047-N1] **[SRS-0047-N2]**	1. View the award list 2. Bookmark the important awards from award list	1.1 Display award list 2.1 Awards that are being bookmarked is added into the bookmarked award list
Exception Flow:	-	

2.5.47.3 System Sequence Diagram

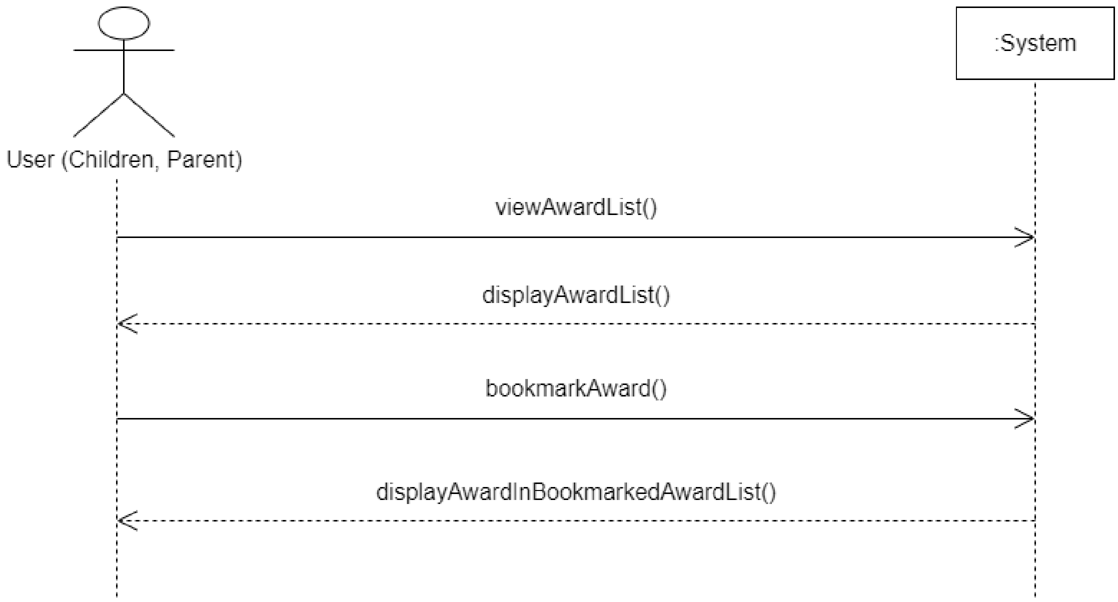


Figure 117:Sequence Diagram for Bookmark Important Awards

2.5.48 Use Case: Set Targets and Rewards for Children

2.5.48.1 Identifier [SRS-0048]

2.5.48.2 Use Case Description

Table 65: Use Case Description for Set Targets and Rewards for Children

Use Case Name:	Set Targets and Rewards for Children	
Scenario:	Set targets and rewards for children	
Triggering Event:	Parent wish that their children can accomplish some targets	
Brief Description:	When parent wish their children can accomplish some targets, they would set the targets and rewards for their children so that they can be motivated to accomplish.	
Actors:	Parent	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Parents want their children to accomplish something	
Postconditions:	Children are motivated to work hard to accomplish the targets	
Normal/Alternate Flow:	**Actor**	**System**

[SRS-0048-N1] **[SRS-0048-N3]**	1. Click the set targets and rewards button 2. Fill out all the fields including targets and rewards 3. Click Save button	1.1 Direct to set targets and rewards interface 3.1 Validate the information 3.2 Target and reward are saved successfully 3.3 Goes back to the target and reward list interface
Exception Flow: **[SRS-0048-E3.1]**	3.1 If the information is not validated, then alert message is displayed to notify parents about the error.	

2.5.48.3 System Sequence Diagram

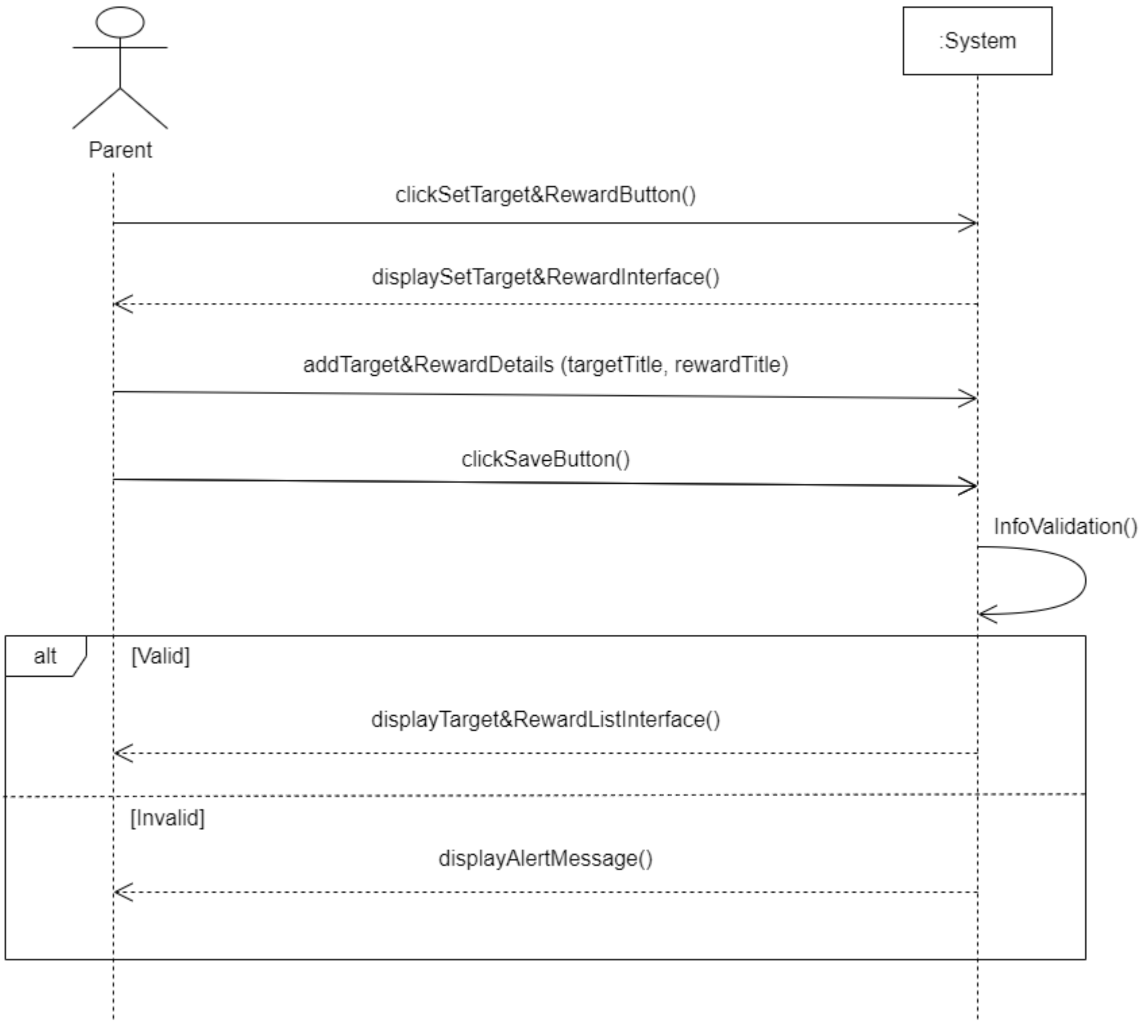


Figure 118:Sequence Diagram for Set Targets and Rewards For Children

2.5.49 Use Case: Edit Targets and Rewards

2.5.49.1 Identifier: [SRS-0049]

2.5.49.2 Use Case Description

Table 66:Use Case Description for Edit Targets and Rewards

Use Case Name:	Edit targets and rewards
Scenario:	Edit targets and rewards that have been set before.
Triggering Event:	Parents want to change the target or reward
Brief Description:	When parents want to change the target or reward, they can edit them by clicking the edit icon.
Actors:	Parents

Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Parents want to change the target or reward	
Postconditions:	More appropriate target is set, and compatible reward is given if children can accomplish the target.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0049-N1] **[SRS-0049-N3]**	1. Click the edit icon located beside the target and reward 2. Edit the details 3. Click Save button	1.1 Display edit target interface 3.1 Validate the information. 3.2 The target is updated successfully. The interface goes back to the target and reward list interface.
Exception Flow: **[SRS-0049-E3.1]**	3.1 If the information is not validated, then alert message is displayed to notify parents about the error.	

2.5.49.3 System Sequence Diagram

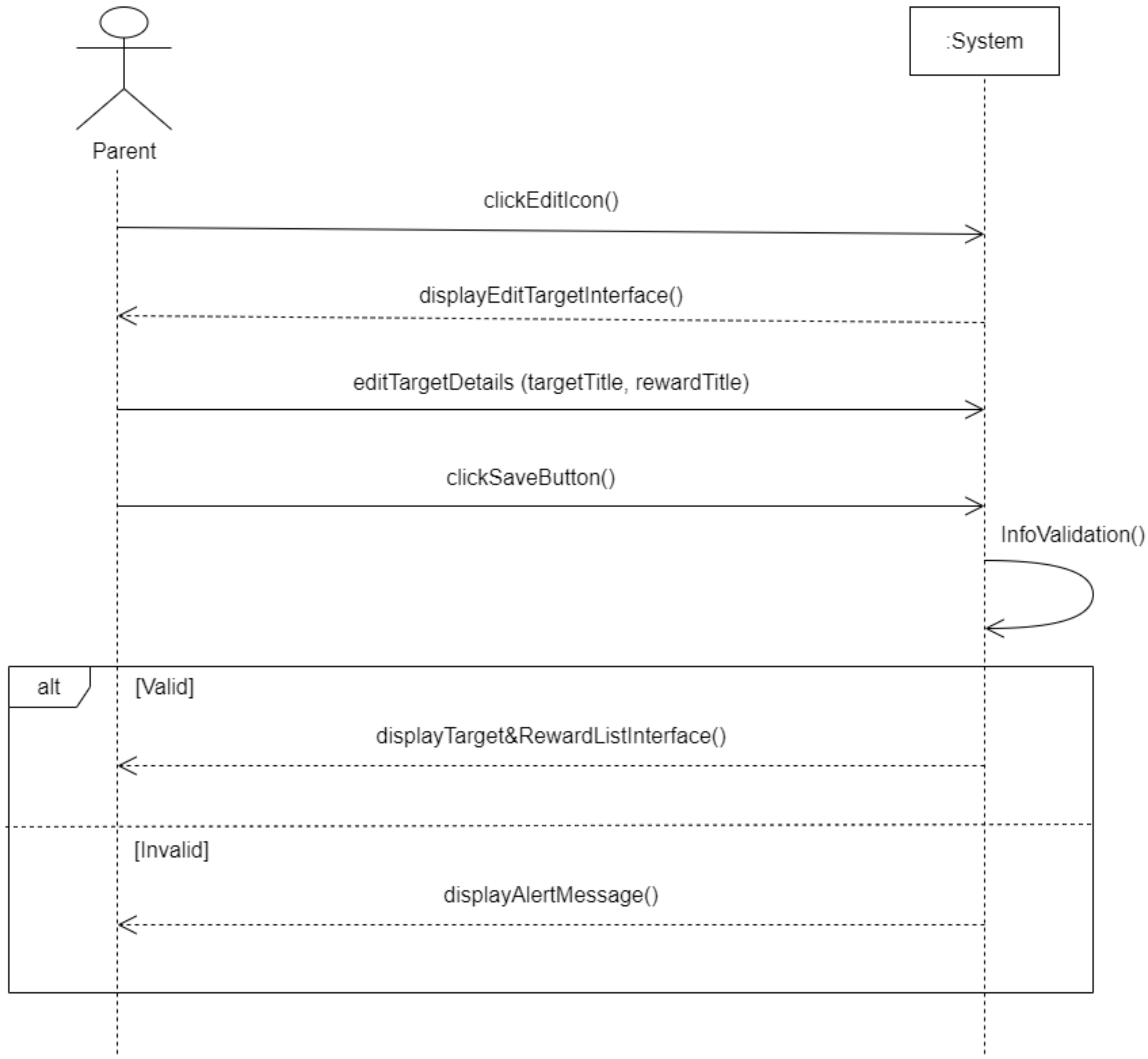


Figure 119:Sequence Diagram for Edit Targets and Rewards

2.5.50 Use Case: Delete Targets and Rewards

2.5.50.1 Identifier: [SRS-0050]

2.5.50.2 Use Case Description

Table 67: Use Case Description for Delete Targets and Rewards

Use Case Name:	Delete Targets and Rewards
Scenario:	Delete targets and rewards from the list
Triggering Event:	The targets are not realistic enough for children to accomplish them.

Brief Description:	When the targets are not realistic for children to accomplish, parents can delete the targets from the list	
Actors:	Parents	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Children cannot accomplish the target	
Postconditions:	Targets and rewards are deleted from the database	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0050-N1] **[SRS-0050-N2]**	1. Click the delete icon located beside the target 2. Click Yes button on the dialog	1.1 Display delete confirmation dialog 2.1 Delete the target and reward from the list and database.
Exception Flow: **[SRS-0050-E2.1]**	2.1 If parents click the No button, then nothing happens.	

2.5.50.3 System Sequence Diagram

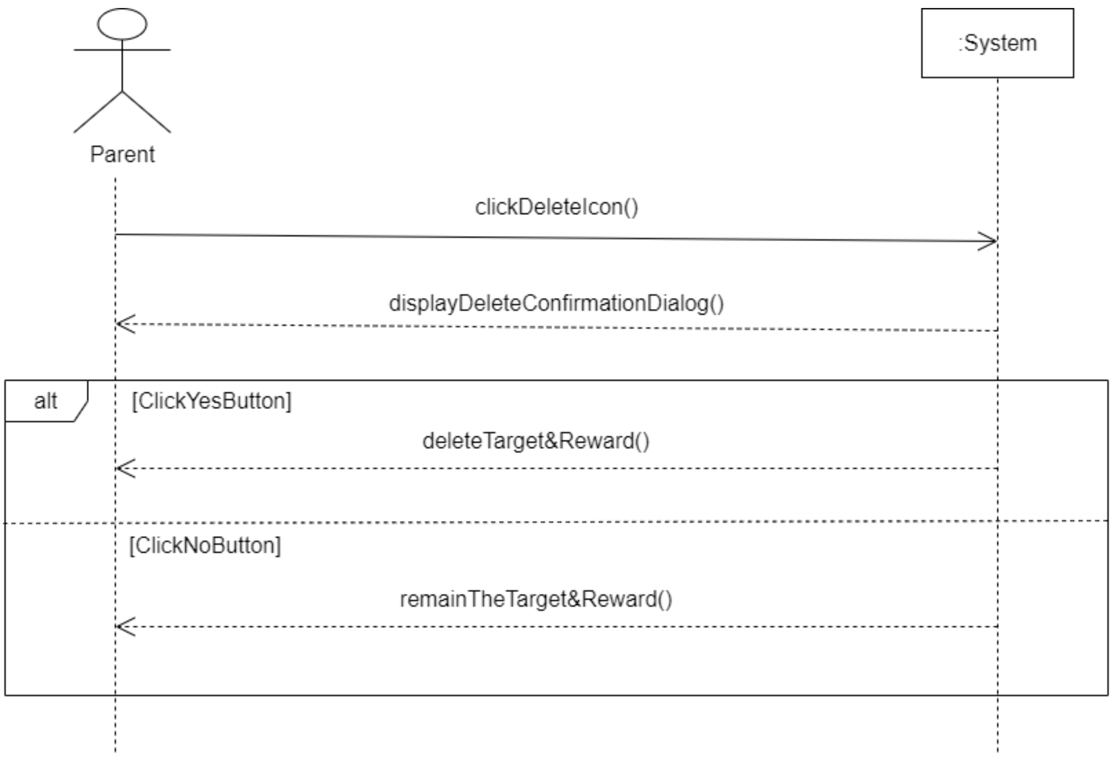


Figure 120:Sequence Diagram for Delete Targets and Rewards

2.5.51 Use Case: Accept Target

2.5.51.1 Identifier: [SRS-0051]

2.5.51.2 Use Case Description

Table 68:Use Case Description for Accept Target

Use Case Name:	Accept Target	
Scenario:	Accept target that children wish to accomplish	
Triggering Event:	Children want to get the reward from parents	
Brief Description:	Children who want a reward or present from their parents will accept the target and put out great effort to achieve the target to receive the reward.	
Actors:	Children	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Target must exist	
Postconditions:	Children can receive rewards from parents	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0051-N1] **[SRS-0051-N2]**	1. Children long press the target that they want to accept 2. Click Accept button	1.1 Display the Accept button in the interface's upper right corner. 2.1 Change the status of target to accepted
Exception Flow: **[SRS-0051-E2.1]**	2.1 If children are clicking outside, then the Accept button disappears and status of the target remain unchanged as not accepted	

2.5.51.3 System Sequence Diagram

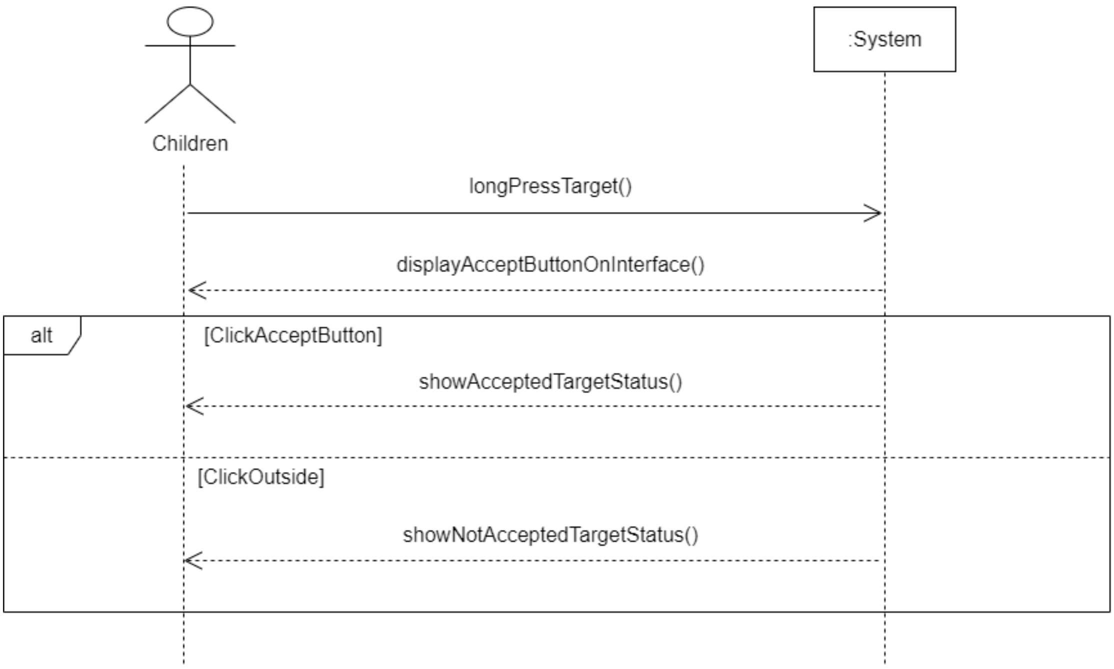


Figure 121 : Sequence Diagram for Accept Target

2.5.52 Use Case: Mark Accepted Targets as Completed

2.5.52.1 Identifier: [SRS-0052]

2.5.52.2 Use Case Description

Table 69: Use Case Description for Mark Accepted Targets As Completed

Use Case Name:	Mark Accepted Targets as Completed
Scenario:	Mark accepted targets as completed to change the status of target to completed
Triggering Event:	Children have accomplished the accepted target.
Brief Description:	When children have accomplished the accepted target, they can mark accepted targets as completed.
Actors:	Children
Related Use Cases:	*Includes: Receive Confirmation Notifications*
Stakeholders:	Families
Preconditions:	Accepted target is accomplished
Postconditions:	Notify parents about the completion of target Ask for confirmation from parents

Normal/Alternate Flow:	Actor	System
[SRS-0052-N1] [SRS-0052-N2]	1. Children long press the target that they want to mark as completed 2. Click Complete button	1.1 Display the Complete button in the interface's upper right corner. 2.1 Change the status of target to completed
Exception Flow: [SRS-0052-E2.1]	2.1 If children are clicking outside, then the Complete button disappears, and status of the target remain unchanged as accepted.	

2.5.52.3 System Sequence Diagram

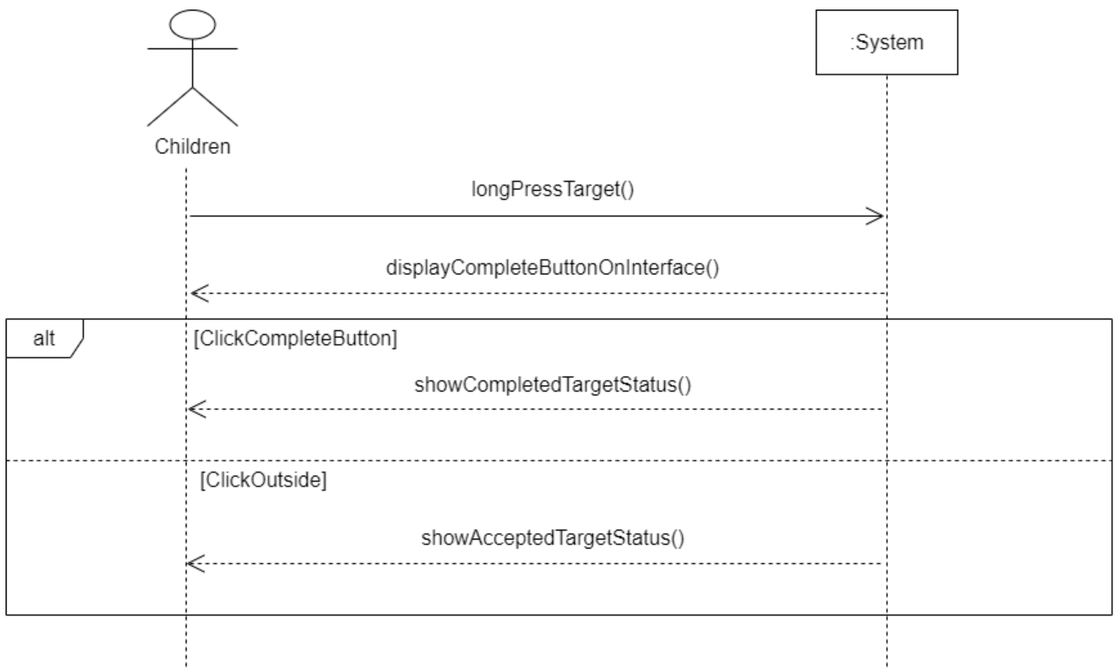


Figure 122:Sequence Diagram for Mark Accepted Targets As Completed

2.5.53 Use Case: Receive Confirmation Notifications

2.5.53.1 Identifier: [SRS-0053]

2.5.53.2 Use Case Description

Table 70: Use Case Description for Receive Confirmation Notifications

Use Case Name:	Receive Confirmation Notifications

Scenario:	Receive confirmation notifications that notify parents about the completion of target	
Triggering Event:	Children have accomplished the accepted target and marked the target as completed.	
Brief Description:	When children have accomplished the accepted target and marked the target as completed, confirmation notifications will be sent to parents for their confirmation.	
Actors:	Parent	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Children have marked the target as completed	
Postconditions:	Completion of targets can be confirmed or rejected	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0053-N1]	1. Turn on the app notifications setting	1.1 Send confirmation notifications to parents when children have completed the targets.
Exception Flow:	-	

2.5.53.3 System Sequence Diagram

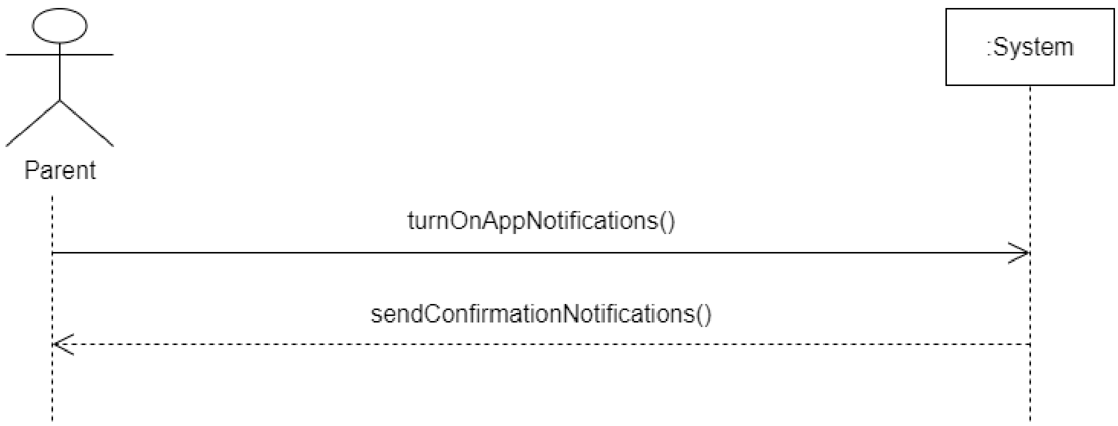


Figure 123: Sequence Diagram for Receive Confirmation Notifications

2.5.54 Use Case: Confirm Completion of Targets

2.5.54.1 Identifier: [SRS-0054]

2.5.54.2 Use Case Description

Table 71:Use Case Description for Confirm Completion of Targets

Use Case Name:	Confirm Completion of Targets	
Scenario:	Confirm if the children truly did achieve their targets.	
Triggering Event:	Children have accomplished the targets and marked them as completed	
Brief Description:	When children have accomplished the targets and marked them as completed, notifications are sent to parents and shown in the notifications interface, waiting for parents to confirm or reject the completion of targets	
Actors:	Parents	
Related Use Cases:	-	
Stakeholders:	Families	
Preconditions:	Confirmation notifications are sent to parents	
Postconditions:	Target status is changed to confirmed or rejected	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0054-N1]	1. Click on the notification icon in target and reward list interface	1.1 Display all the notifications
[SRS-0054-N2]	2. Click Confirm button	2.1 Change the status of target to confirmed
Exception Flow: [SRS-0054-E2.1]	2.1 If parent reject the completion of the target, then status of the target shows rejected.	

2.5.54.3 System Sequence Diagram

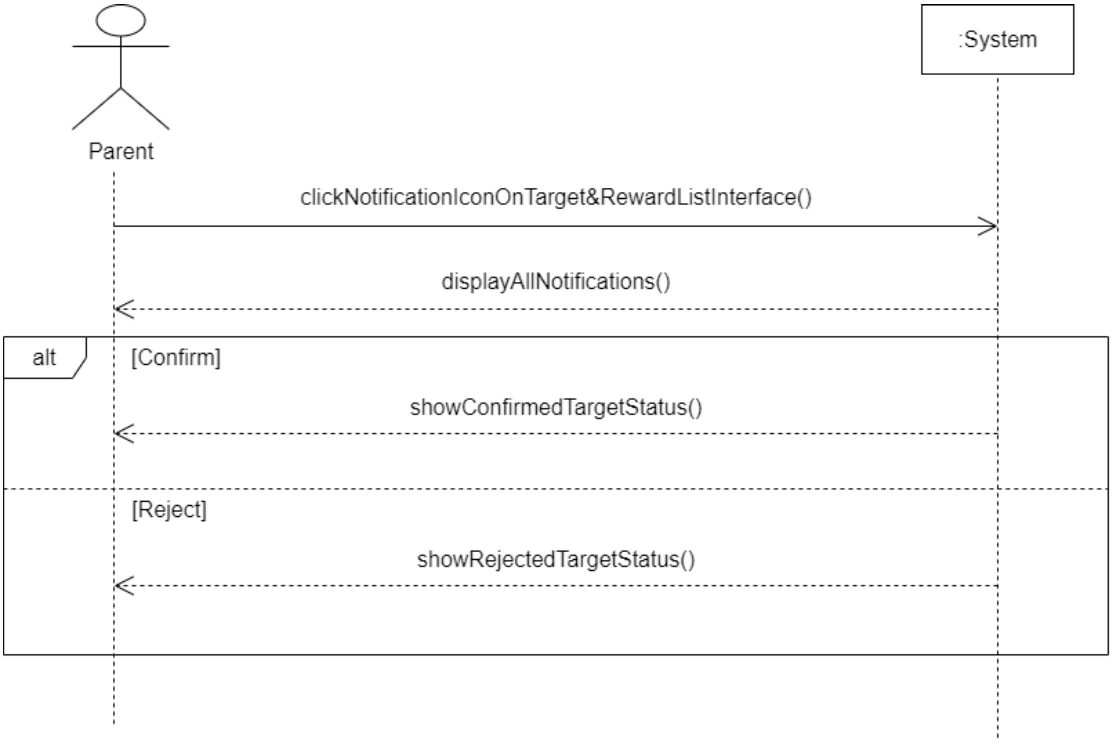


Figure 124:Sequence Diagram for Confirm Completion of Targets

2.5.55 Use Case: Give Rewards

2.5.55.1 Identifier [SRS-0055]

2.5.55.2 Use Case Description

Table 72: Use Case Description for Give Rewards

Use Case Name:	Give Rewards
Scenario:	Give rewards to children after completion of targets are confirmed
Triggering Event:	Children complete the target and parents confirm the completion of the target
Brief Description:	When children complete the target and parents confirm the completion, parents will give the rewards to the children
Actors:	Parent
Related Use Cases:	-
Stakeholders:	Families
Preconditions:	Targets are completed Completion of target is confirmed

Postconditions:	Children are motivated to work hard for another target	
Normal/Alternate Flow:	**Actor**	**System**
[SRS-0055-N1] **[SRS-0055-N2]**	1. Parents long press the target that they want to mark the reward as given 2. Click Give Out button	1.1 Display the Give Out button in the interface's upper right corner. 2.1 Change the status of reward from not given to given
Exception Flow: **[SRS-0055-E2.1]**	2.1 If parents are clicking outside, then the Give Out button disappears, and status of the reward remain unchanged as not given.	

2.5.55.3 System Sequence Diagram

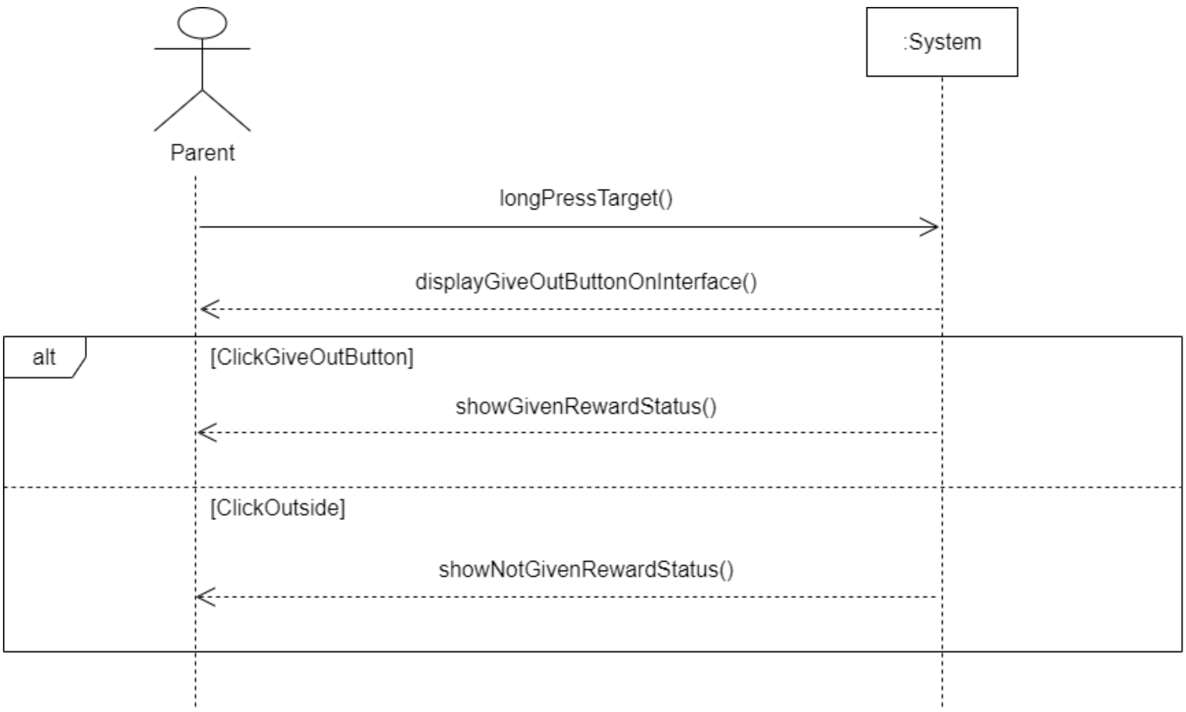


Figure 125:Sequence Diagram for Give Rewards

Finance Monitoring

2.5.56 Use Case: Create new expense/income record in personal account

2.5.56.1 Identifier: [SRS-0056]

2.5.56.2 Use Case Description

Table 73:Use Case Description for Create new expense/income record in personal account

Use Case Name:	Create new expense/income record in personal account	
Scenario:	Create new expense/income record	
Triggering Event:	User wants to new expense/income record in personal account.	
Brief Description:	When user click on the add record button, the system will navigate the user to add new expense/income record. User need to input the field shown in the interface and save the record.	
Actors:	Parents and children	
Related Use Cases:	Includes: *Update total balance, Update budget balance,* Extend: *Expenses record reminder, Overspend reminder*	
Stakeholders:	-	
Preconditions:	User must exist. The details need to be filled.	
Postconditions:	Finance record is created. Total balance and budget are updated.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS0056-A1] **[SRS0056-A3]**	1. Click the add new finance record button. 2. Fill out all the fields 3. Click save button	1.1 Navigate to add new finance record. 3.3 Check if the mandatory field is filled up. 3.4 The record is saved successfully and goes back to record list interface.
Exception Flow: **[SRS-0056-E3.1]**	3.1 If the information is not validated, then alert message is displayed to notify users about the error.	

2.5.56.3 System Sequence Diagram

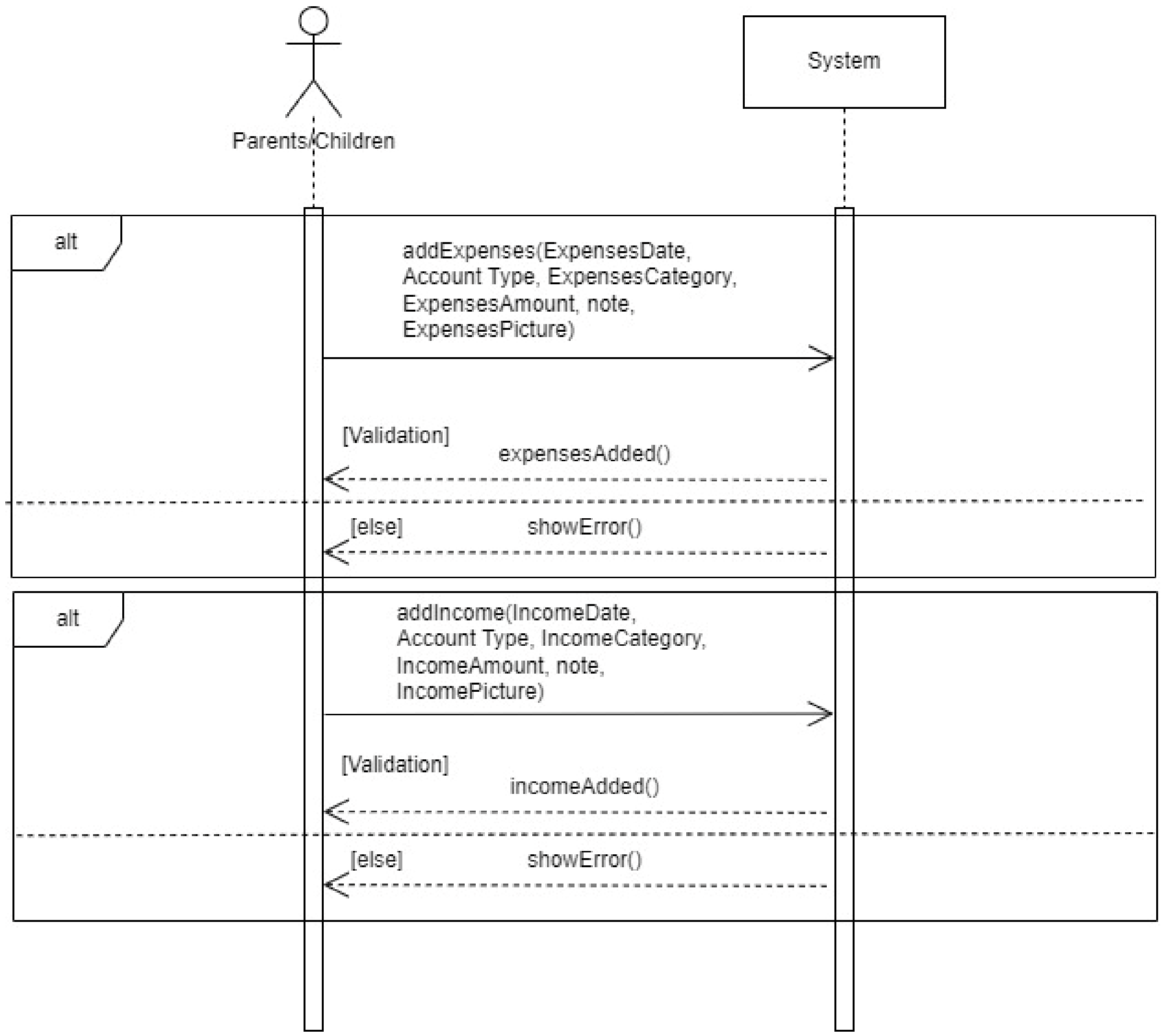


Figure 126 :Sequence Diagram of Create new expense/income record in personal account

2.5.57 Use-Case: Update total balance

2.5.57.1 Identifier: [SRS-0057]

2.5.57.2 Use Case Description

Table 74:Use Case Description for Update total balance

Use Case Name:	Update total balance
Scenario:	User has created a new finance record
Triggering Event:	New finance record is created.

Brief Description:	When an income/expense is created, the total balance which is the income minus the expenses will be updated.	
Actors:	System	
Related Use Cases:	Includes: *Create new expense/income record in personal account*	
Stakeholders:	Parents/children: Create new finance record	
Preconditions:	Finance record successfully saved.	
Postconditions:	Total balance is updated.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS0057-A1] **[SRS0057-A2]**	1. Parents/Children create a new finance record. [Refer SRS-0001] 2. Parents/Children edit an existing finance record.	1.1 Update total balance. 2.1 Check if the mandatory field is filled up. 2.2 The record is saved successfully and goes back to record list interface.
Exception Flow: **[SRS-0057-E2.1]**	2.1 If the information is not validated, then alert message is displayed to notify users about the error.	

2.5.57.3 System Sequence Diagram:

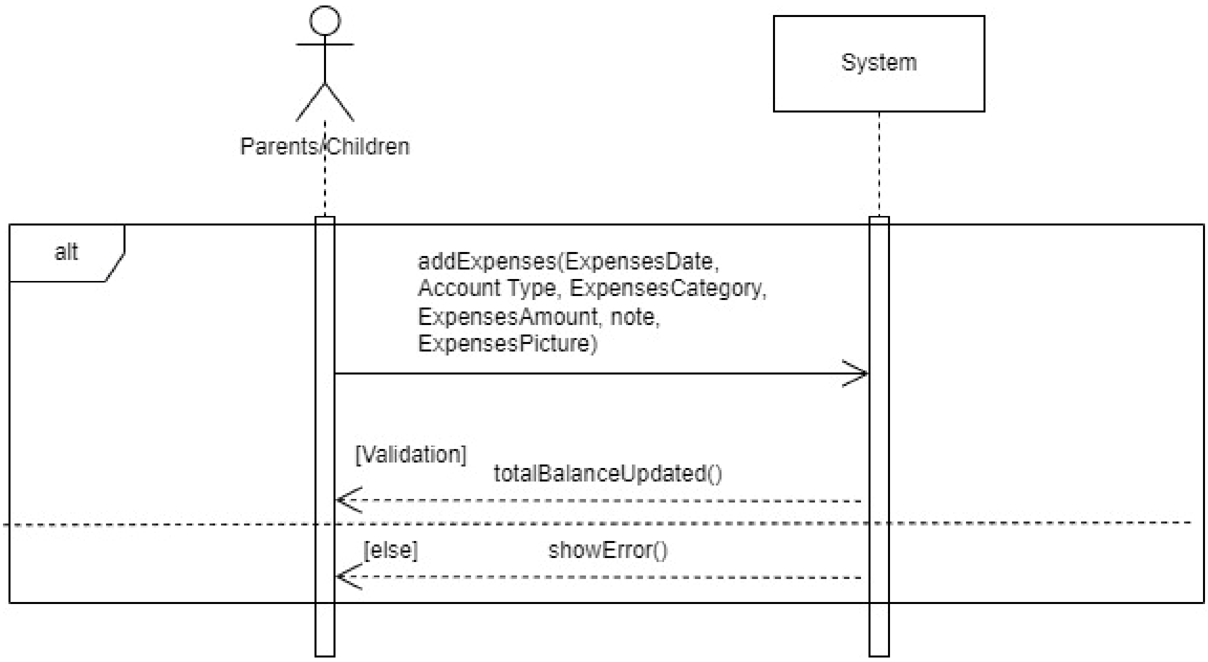


Figure 127: Update total balance

2.5.58 Use Case: Set budget

2.5.58.1 Identifier: [SRS-0058]

2.5.58.2 Use Case Description

Table 75:Use Case Description for Set budget

Use Case Name:	Set budget	
Scenario:	User has created a new budget for specific category.	
Triggering Event:	User wants to create budget for different expense categories.	
Brief Description:	When user wants to /set budget for different expense categories to avoid overspent.	
Actors:	Parents/Children	
Related Use Cases:	Includes: *Update budget balance*	
Stakeholders:	-	
Preconditions:	User must exist. Budget for specific expense category has not been created. The details need to be filled.	
Postconditions:	Budget balance is updated.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS0058-A1] **[SRS0058-A3]**	1. Click the add budget button 2. Fill out all the fields 3. Click save button	1.2 Navigate to add new budget 3.1 Check if the mandatory field is filled up. 3.2 Check if the budget for the chosen expense category has not set before. 3.3 The record is saved successfully and goes back to record list interface.
Exception Flow: **[SRS-0058-E3.1]** **[SRS-0058-E3.2]**	3.1 If the information is not validated, then alert message is displayed to notify users about the error. 3.2 If the chosen expense category is chosen before, then alert message is displayed to notify users about the error.	

2.5.58.3 System Sequence Diagram:

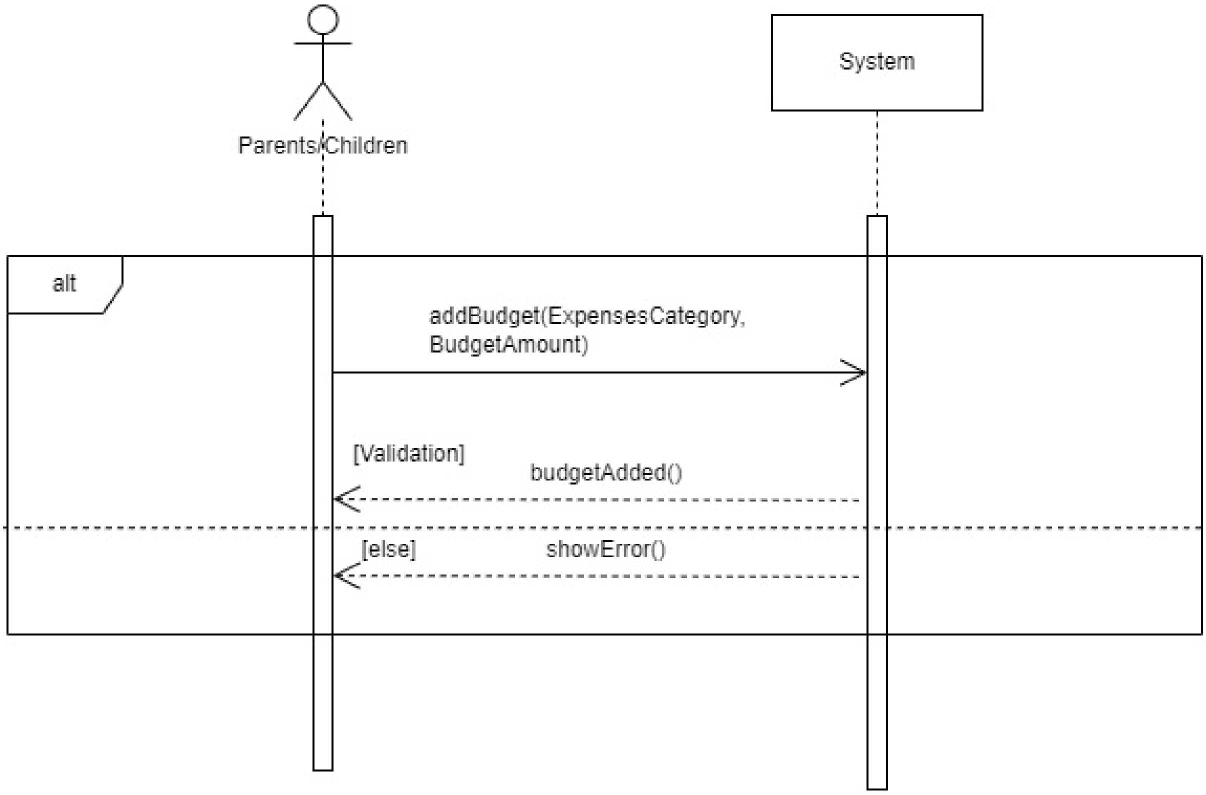


Figure 128: Sequence Diagram for add budget

2.5.59 Use Case: Update budget balance

2.5.59.1 Identifier: [SRS-0059]

2.5.59.2 Use Case Description

Table 76:Use Case Description for Update budget balance

Use Case Name:	Update budget balance
Scenario:	User has created a new finance record or created a new budget.
Triggering Event:	New finance record is created, or new expense budget category is created.
Brief Description:	When a new finance record or new expense budget category is created, the budget balance will be updated.
Actors:	System
Related Use Cases:	Includes: *Create new expense/income record in personal account, Set budget*
Stakeholders:	Parents/children: Create new finance record and set budget
Preconditions:	Finance record successfully saved. Budget set is successfully saved.
Postconditions:	Budget balance is updated.

Normal/Alternate Flow:	**Actor**	**System**
[SRS0059-A1] **[SRS0059-A2]**	1. Parents/Children create a new finance record.[Refer SRS-0002] 2. Parents/Children edit an existing finance record.[Refer SRS-0002] 3. Parents/Children create a budget. [Refer SRS-0003] 4. Parents/Children edit an existing budget record.	1 Update budget balance. 2.1 Check if the mandatory field is filled up. 2.2 The record is saved successfully and goes back to record list interface. 3.1 Update budget balance. 4.1 Check if the mandatory field is filled up. 4.2Check if the budget for the chosen expense category has not set before. 4.3 The record is saved successfully and goes back to record list interface.
Exception Flow: **[SRS-0059-E2.1]** **[SRS-0059-E4.1]** **[SRS-0059-E4.2]**	 2.1 If the information is not validated, then alert message is displayed to notify users about the error. 4.1 If the information is not validated, then alert message is displayed to notify users about the error. 4.2 If the chosen expense category is chosen before, then alert message is displayed to notify users about the error.	

2.5.59.3 System Sequence Diagram:

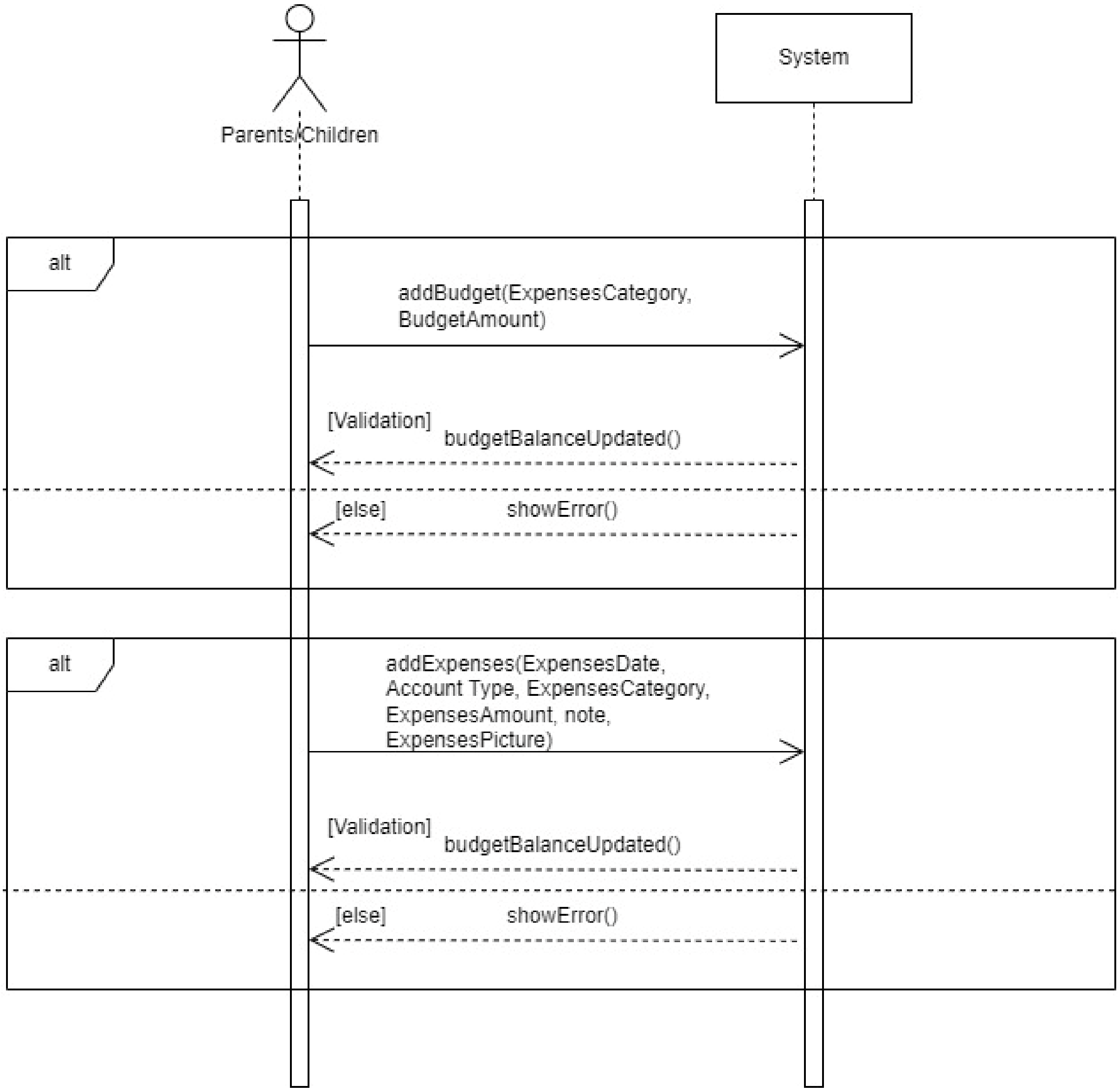


Figure 129:Sequence Diagram for update budget balance

2.5.60 Use Case: View personal finance record

2.5.60.1 Identifier: [SRS-0060]

2.5.60.2 Use Case Description

Table 77: Use Case Description for View personal finance record

Use Case Name:	View personal finance record
Scenario:	User wants to view own finance record.

Triggering Event:	User has created finance records and want to view it.	
Brief Description:	When user wants to view personal finance record is to see the list of the incomes/expenses that have been recorded.	
Actors:	Parents/Children	
Related Use Cases:	-	
Stakeholders:	-	
Preconditions:	User must exist. There are finance records that created by parents/children.	
Postconditions:	-	
Normal/Alternate Flow:	**Actor**	**System**
[SRS0060-N1] **[SRS0060-N3]**	1. View the list of finance records (expenses/incomes)	1.1 Display the list of finance record.
Exception Flow:	-	

2.5.60.3 System Sequence Diagram:

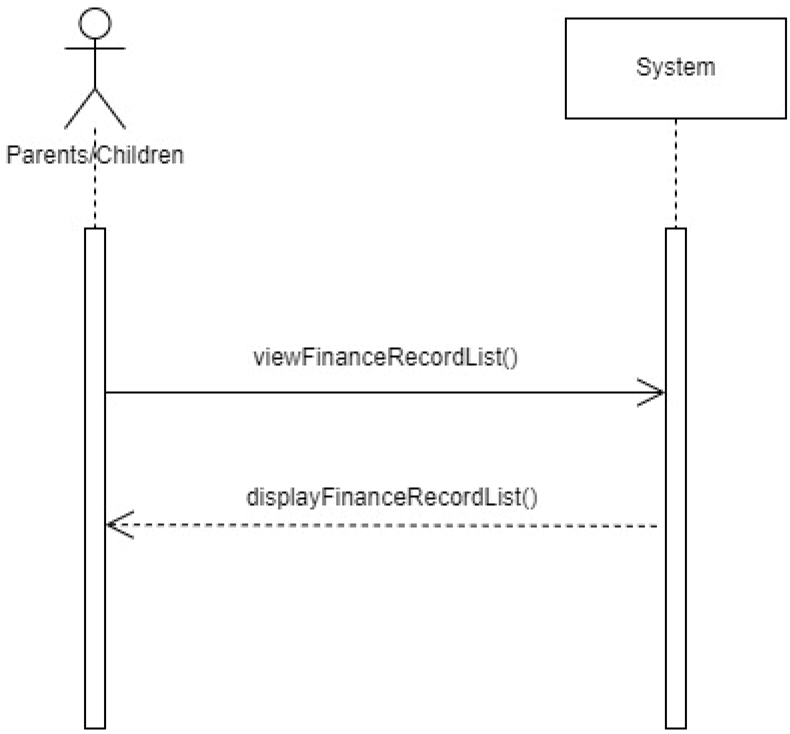


Figure 130:Sequence Diagram for View personal finance record

2.5.61 Use Case: Hide family account

2.5.61.1 Identifier: [SRS-0061]

2.5.61.2 Use Case Description

Table 78:Use Case Description for Hide family account

Use Case Name:	Hide family account	
Scenario:	Parent wants to hide the family account from children.	
Triggering Event:	Parents do not want the children to see the finance record of family's account.	
Brief Description:	When parents do not want the children to see the finance record of family's account, parents choose to hide the family account so that the children are not able to view and add finance record of family's account.	
Actors:	Parents	
Related Use Cases:	Extend: *Create new expense/income record in family account, View family account's finance record*	
Stakeholders:	Children: can create or finance record if parents choose to show.	
Preconditions:	There are finance records in family account.	
Postconditions:	Children cannot view/create family account's finance records.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS0061-N1]	1. Parents click to hide the family account from children.	1.1 Hide family account from children.
Exception Flow:	-	

2.5.61.3 System Sequence Diagram:

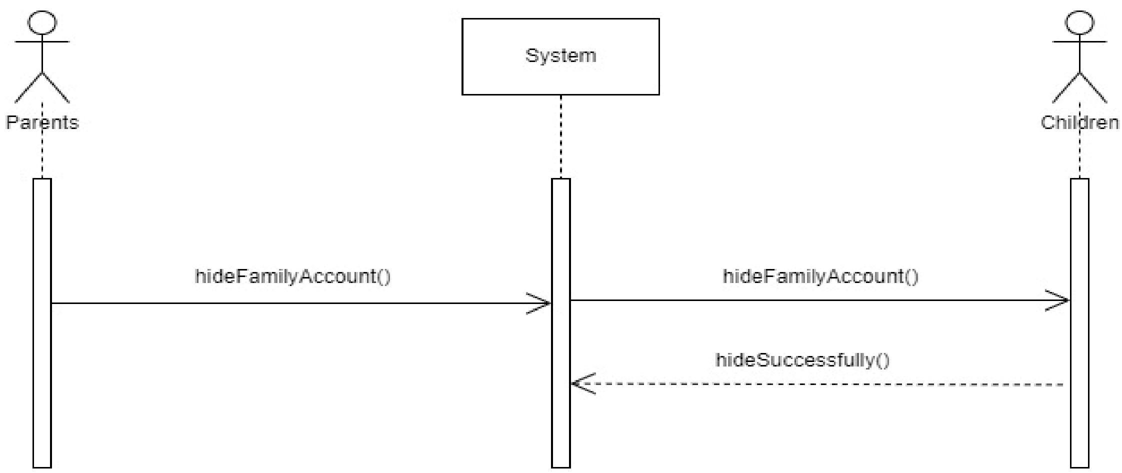


Figure 131:Sequence Diagram for Hide Family Account

2.5.62 Use Case: Create new expense/income record in family account

2.5.62.1 Identifier: [SRS-0062]

2.5.62.2 Use Case Description

Table 79:Use Case Description for Create new expense/income record in family account

Use Case Name:	Create new expense/income record in family account	
Scenario:	Create new expense/income record	
Triggering Event:	User wants to new expense/income record in family account.	
Brief Description:	When user click on the add record button, the system will navigate the user to add new expense/income record. User need to input the field shown in the interface and save the record.	
Actors:	Parents and children	
Related Use Cases:	Extend: *Hide Family Account*	
Stakeholders:	-	
Preconditions:	User must exist. The details need to be filled.	
Postconditions:	Finance record is created. Total balance and budget are updated.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS0062-A1] **[SRS0062-A3]**	1. Click the add new finance record button. 2. Fill out all the fields 3. Click save button	1.3 Navigate to add new finance record. 3.1 Check if the mandatory field is filled up. 3.2 The record is saved successfully and goes back to record list interface.
Exception Flow: **[SRS-0062-E3.1]**	3.1 If the information is not validated, then alert message is displayed to notify users about the error.	

2.5.62.3 System Sequence Diagram:

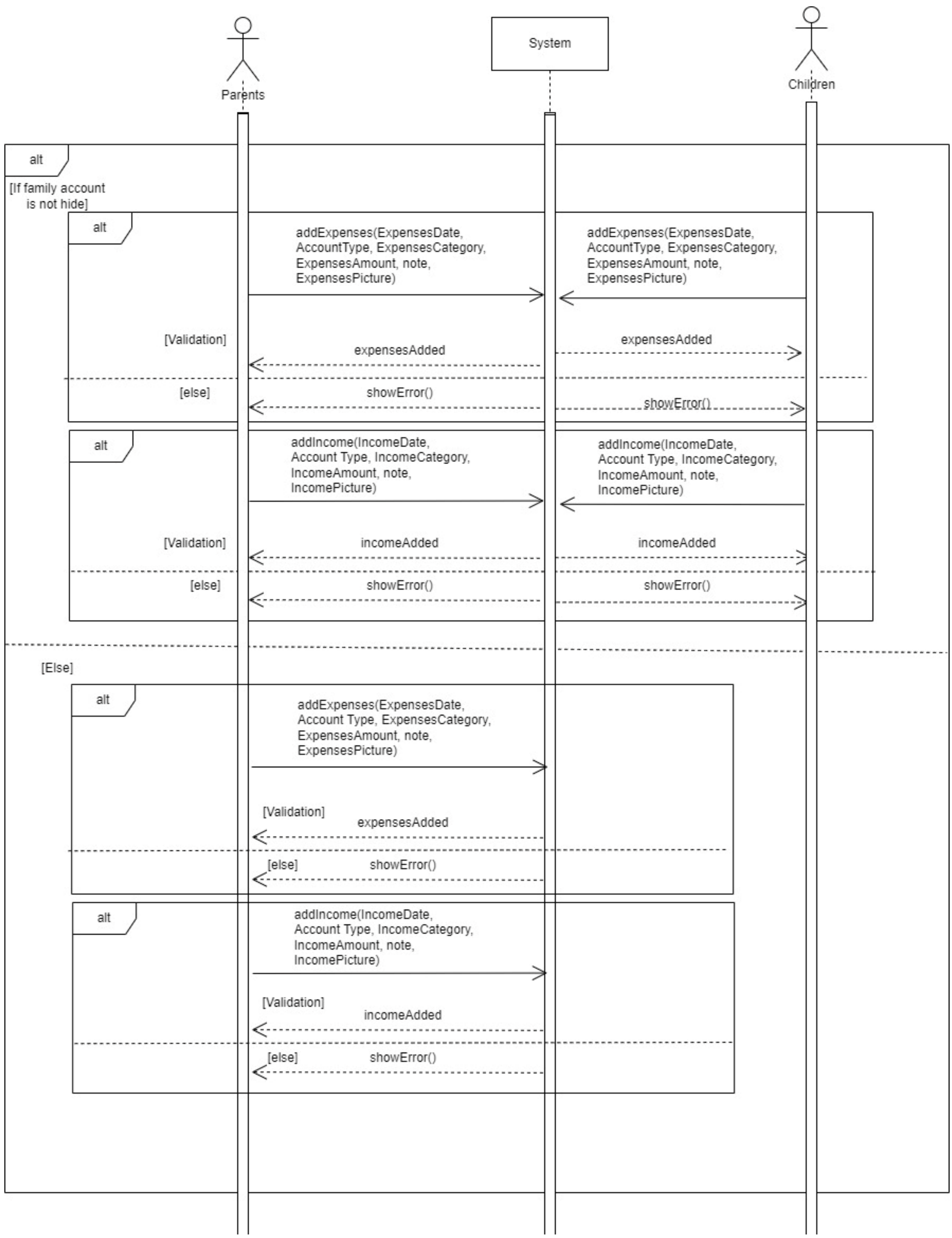


Figure 132:Sequence Diagram for Create new expense/income record in family account

2.5.63 Use Case: View Statistical Chart

2.5.63.1 Identifier: [SRS-0062]

2.5.63.2 Use Case Description

Table 80:Use Case Description for View Statistical Chart

Use Case Name:	View Statistical Chart	
Scenario:	View the pattern of incomes and expenses.	
Triggering Event:	User wants to see the pattern of incomes and expenses	
Brief Description:	When user wants to have a clearer figure on the spending and incomes to make amendment.	
Actors:	Parents/children	
Related Use Cases:	-	
Stakeholders:	-	
Preconditions:	There are finance records in account.	
Postconditions:	Statistical chart with percentage and amount is shown.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS0063-N1]	1. View the statistical chart.	1.1 Calculate the total for each category. 1.2 Show the percentage of each income/expense category. 1.3 Calculate the budget balance of each income/expense category.
Exception Flow:	-	

2.5.63.3 System Sequence Diagram:

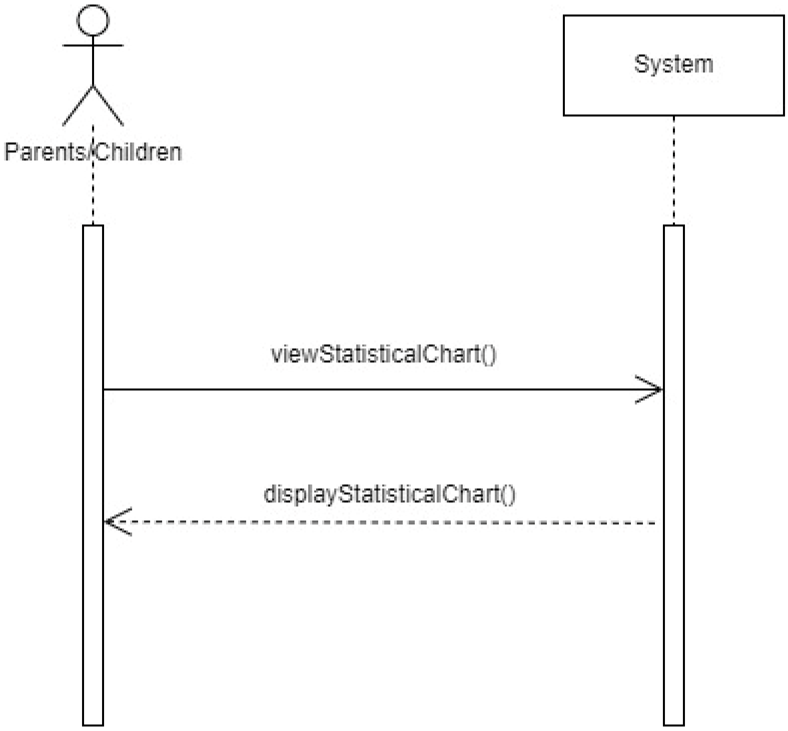


Figure 133:View Statistical Chart

2.5.64 Use Case: View Children's Monthly Expenses

2.5.64.1 Identifier: [SRS-0064]

2.5.64.2 Use Case Description

Table 81:Use Case Description for View Children's Monthly Expenses

Use Case Name:	View Children's Monthly Expenses	
Scenario:	View the monthly expenses spent by children.	
Triggering Event:	Parents want to see how much children have spent per month.	
Brief Description:	When parents want to view how much their children have spent per month.	
Actors:	Parents	
Related Use Cases:	Extend: *Option to hide monthly expenses*	
Stakeholders:	Children: Can choose to hide their monthly total expenses.	
Preconditions:	There are finance records in children's account. Children choose to show their total monthly expenses.	
Postconditions:	Total monthly expenses are shown.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS0064-A1]	1. View the children's monthly expenses.	1.1 Calculate the total expenses of children

Exception Flow:	-	

2.5.64.3 System Sequence Diagram:

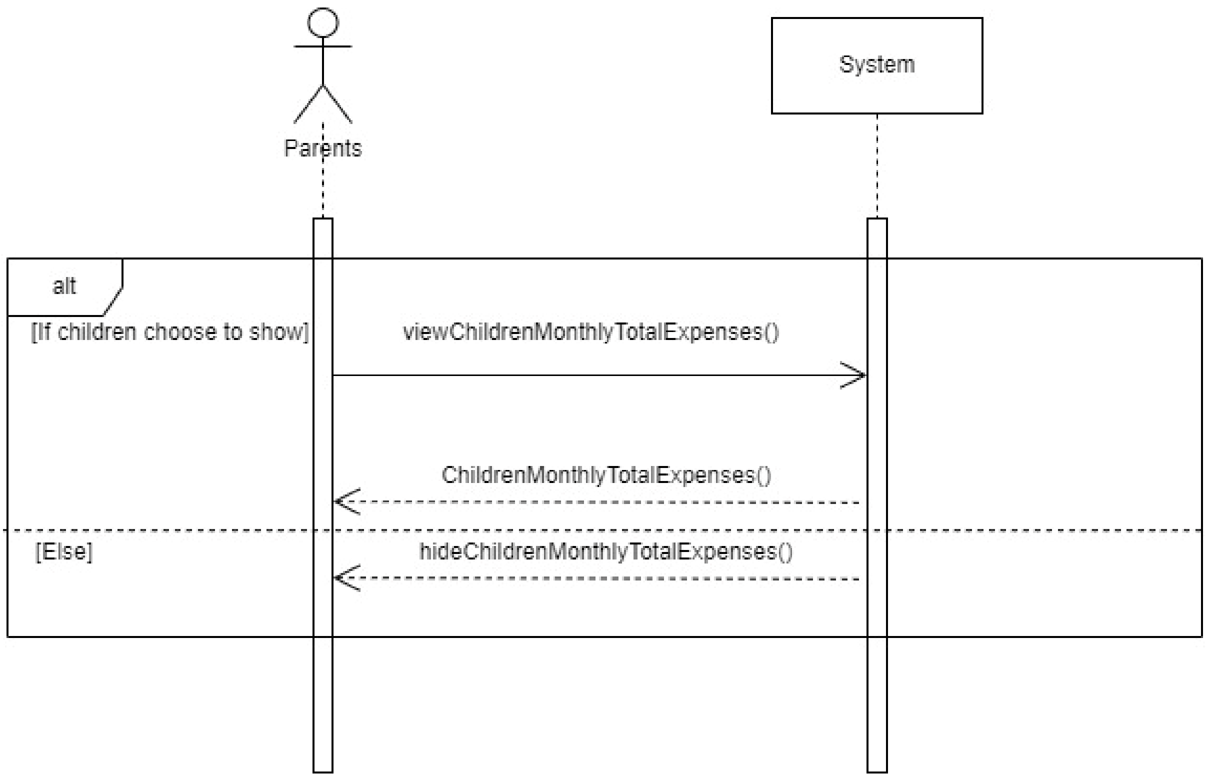


Figure 134:View Children's Monthly Expenses

2.5.65 Use Case: Option to Hide Monthly Expenses

2.5.65.1 Identifier: [SRS-0065]

2.5.65.2 Use Case Description

Table 82: Option to hide monthly expenses

Use Case Name:	Option to Hide Monthly Expenses
Scenario:	Hide monthly expenses from parents.
Triggering Event:	Do not want to show parents the total monthly expenses.
Brief Description:	When children want to keep their total monthly expenses as private and do not want to share with parents.
Actors:	Children
Related Use Cases:	Extend: *View Children's Monthly Expenses*
Stakeholders:	Parents: View children’s monthly expenses if children choose to share.

Preconditions:	There are finance records in children's account. Children choose to hide their total monthly expenses.	
Postconditions:	Total monthly expenses are hide from parents.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS0065-N1]	1. Select to hide total monthly expenses from parents.	1.1 Hide total monthly expenses from parents.
Exception Flow:	-	

2.5.65.3 System Sequence Diagram:

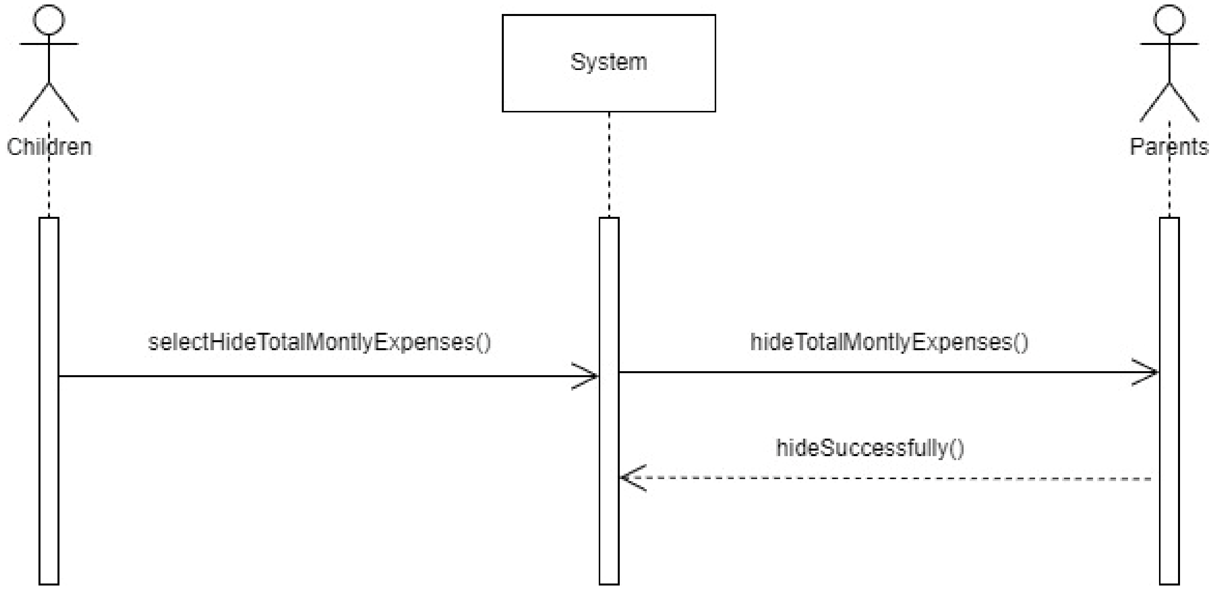


Figure 135:Option to hide monthly expenses

2.5.66 Use Case: Overspend Reminder

2.5.66.1 Identifier: [SRS-0066]

2.5.66.2 Use Case Description

Table 83:Overspend Reminder

Use Case Name:	Overspend Reminder
Scenario:	Receive overspent notification when total spending exceeds 70% of budget.
Triggering Event:	The total monthly expenses exceed 70% of budget set.
Brief Description:	When the total monthly expenses exceed 70% of budget set, a notification will be sent.

Actors:	Parents/Children	
Related Use Cases:	Extend: *Create new expense/income record in personal account*	
Stakeholders:	-	
Preconditions:	The total expenses on particular spending category exceeds 70% of budget set. User selects to receive notification.	
Postconditions:	Notification is sent to make user alert on this.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS0066-A1]	1. Select to receive overspent reminder notification.	1.1 Calculate the budget balance. 1.2 Check if exceed 70% of budget set. 1.3 Send notification.
Exception Flow:	-	

2.5.66.3 System Sequence Diagram:

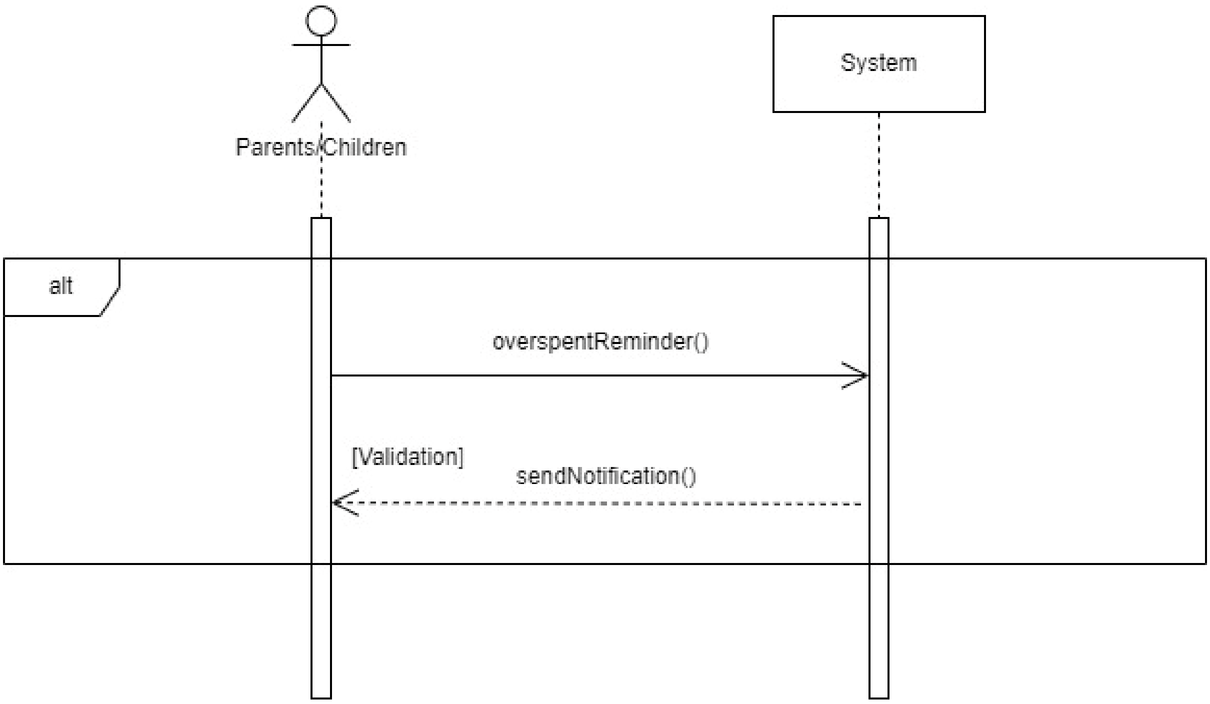


Figure 136:Overspend Reminder

2.5.67 Use Case: Expenses Record Reminder

2.5.67.1 Identifier: [SRS-0067]

2.5.67.2 Use Case Description

Table 84:Expenses Record Reminder

Use Case Name:	Expenses Record Reminder	
Scenario:	Receive daily expenses record notification when there is no expenses input.	
Triggering Event:	There is no daily expenses input after 8pm.	
Brief Description:	When there is no daily expenses input after 8pm, a notification will be sent to user.	
Actors:	Parents/Children	
Related Use Cases:	Extend: *Create new expense/income record in personal account*	
Stakeholders:	-	
Preconditions:	No daily expenses input after 8pm. User selects to receive notification.	
Postconditions:	Notification is sent to make user alert on this.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS0067-A1]	1. Select to receive expense record reminder notification.	1.1 Send notification.
Exception Flow:	-	

2.5.67.3 System Sequence Diagram:

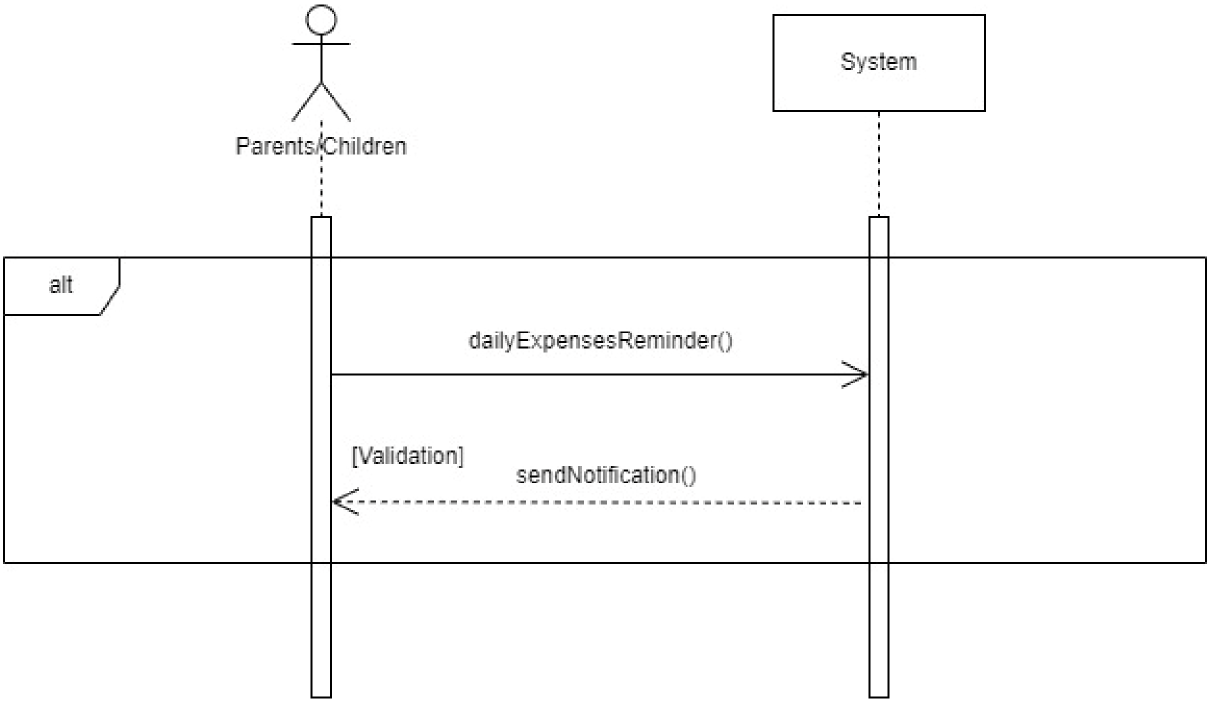


Figure 137:Expenses Record Reminder

2.5.68 Use Case: Edit Personal Finance Record

2.5.68.1 Identifier: [SRS-0068]

2.5.68.2 Use Case Description

Table 85:Edit Personal Finance Record

Use Case Name:	Edit personal finance record
Scenario:	Edit finance record in personal account when there are changes needed in existing record.
Triggering Event:	The details of the existing finance record need to be changed.
Brief Description:	When user want to do amendment on the details of existing finance record.
Actors:	Parents/Children
Related Use Cases:	Includes: *Update budget balance, Update total balance*

Stakeholders:	-	
Preconditions:	There are existing finance records.	
Postconditions:	Finance record is edited. Total balance and budget are updated.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS0068-A1] **[SRS0068-A3]**	1. Click the finance record that wanted to be edited 2. Fill out all the fields 3. Click save button	1.1 Navigate to edit finance record. 3.1 Check if the mandatory field is filled up. 3.2 The record is saved successfully and goes back to record list interface.
Exception Flow: **[SRS-0068-E3.1]**	3.1 If the information is not validated, then alert message is displayed to notify users about the error.	

2.5.68.3 System Sequence Diagram:

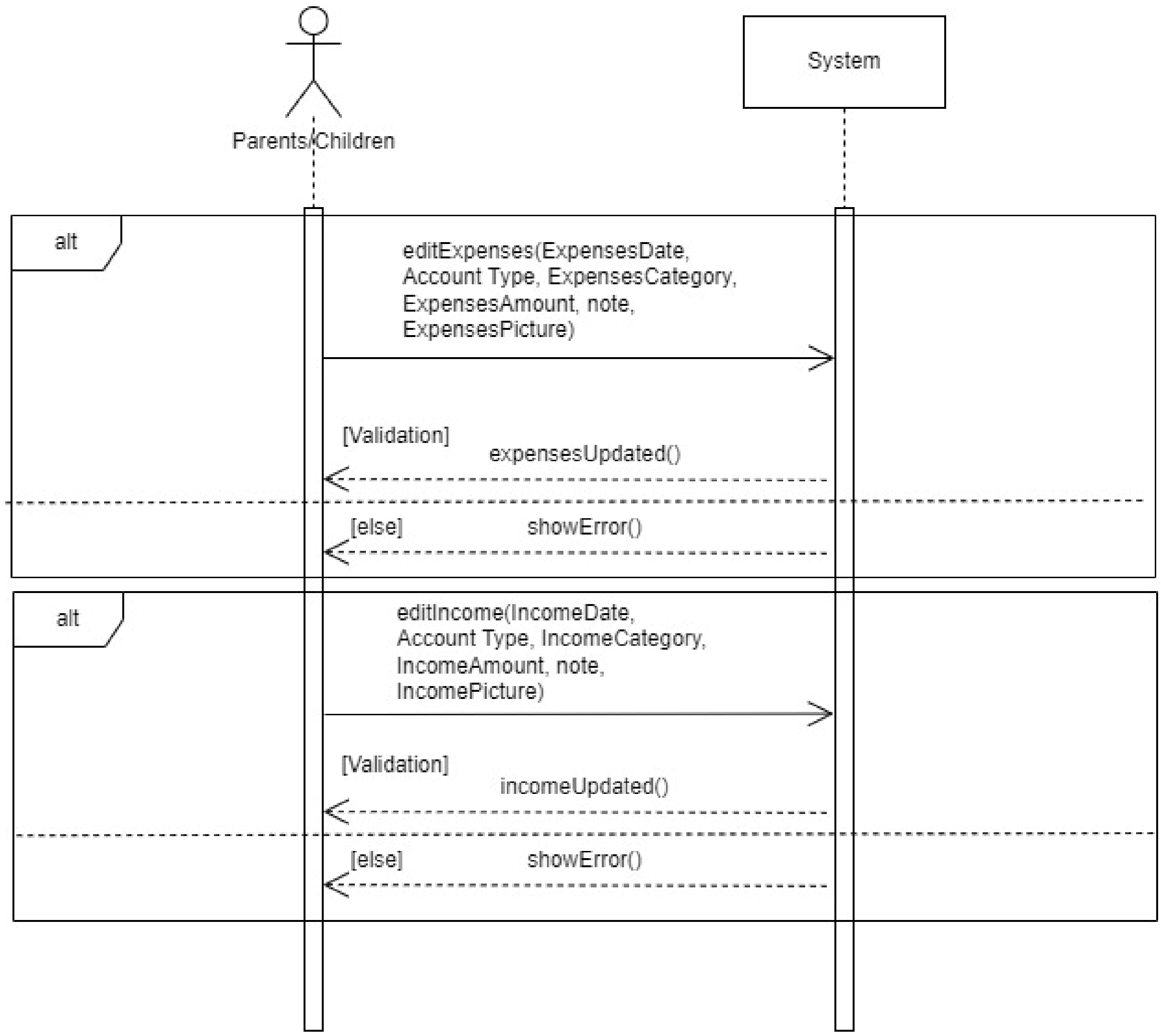


Figure 138 :Edit Personal Finance Record

2.5.69 Use Case: Delete Personal Finance Record

2.5.69.1 Identifier: [SRS-0069]

2.5.69.2 Use Case Description

Table 86: Delete Personal Finance Record

Use Case Name:	Delete personal finance record
Scenario:	Delete finance record in personal account when there is unwanted finance record

Triggering Event:	The selected existing finance record need to be deleted.	
Brief Description:	When user want to delete on the existing finance record.	
Actors:	Parents/Children	
Related Use Cases:	Includes: *Update budget balance, Update total balance*	
Stakeholders:	-	
Preconditions:	There are existing finance records.	
Postconditions:	Finance record is deleted. Total balance and budget are updated.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS0069-A1] **[SRS0069-A2]** **[SRS0069-A3]**	1. Click the finance record that wanted to be deleted. 2. Click on delete button. 3. Click confirm button	1.1 Navigate to edit finance record. 2.1 Pop out confirmation message. 3.1 The record is deleted successfully and goes back to record list interface.
Exception Flow:	-	

2.5.69.3 System Sequence Diagram:

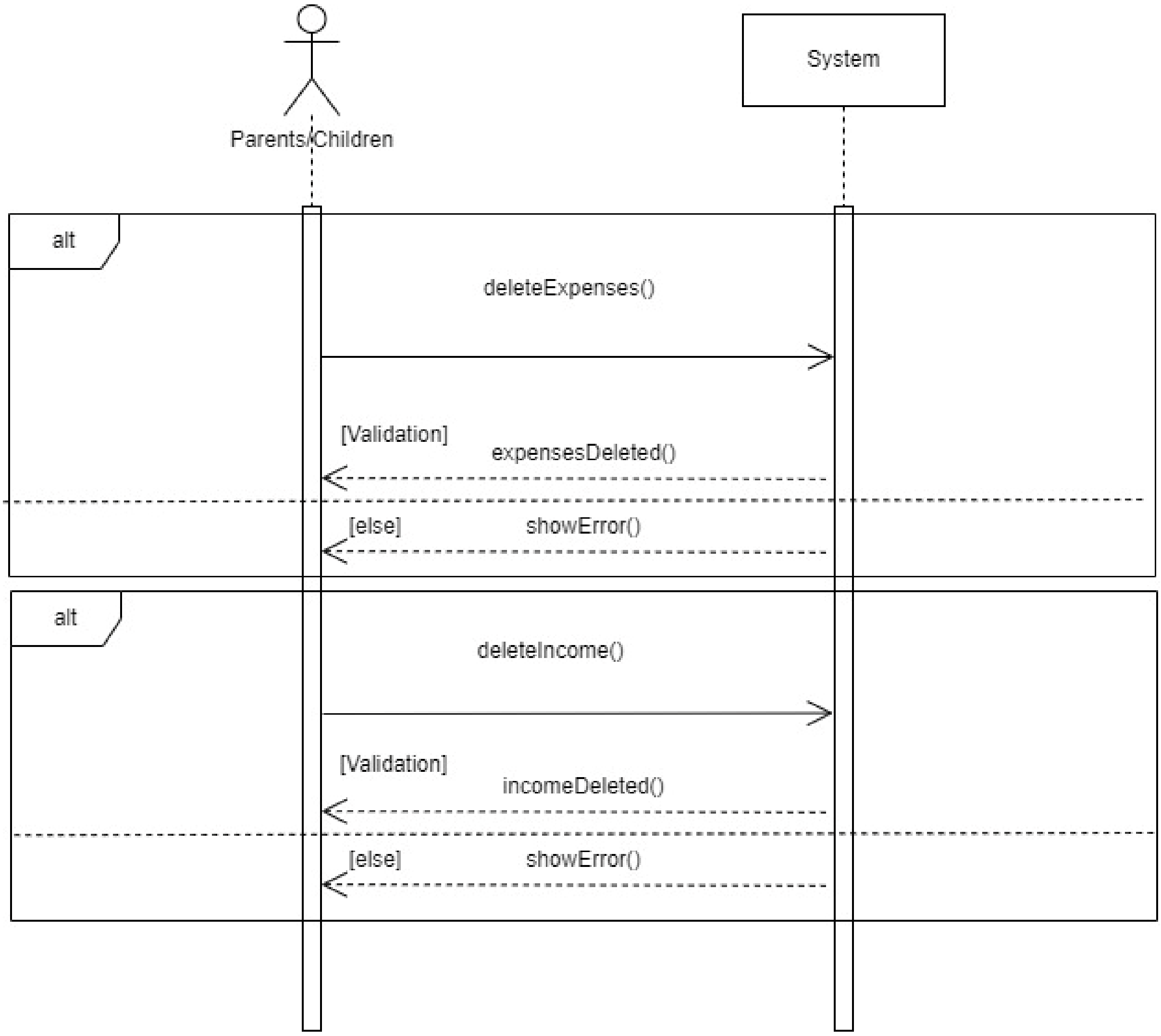


Figure 139: Delete Personal Finance Record

2.5.70 Use Case: Edit Budget

2.5.70.1 Identifier: [SRS-0070]

2.5.70.2 Use Case Description

Table 87:Edit Budget

Use Case Name:	Edit budget
Scenario:	Edit finance record in when there are changes needed in existing budget category.

Triggering Event:	The details of the existing budget in particular expenses category need to be changed.	
Brief Description:	When user want to do amendment on the budget.	
Actors:	Parents/Children	
Related Use Cases:	Includes: *Update budget balance*	
Stakeholders:	-	
Preconditions:	There are existing budget records.	
Postconditions:	Budget is edited. Budget balance are updated.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS0070-A1] **[SRS0070-A3]**	1. Click the edit icon at the budget that wanted to be edited 2. Fill out all the fields 3. Click save button	1.2 Navigate to edit finance record. 3.1 Check if the mandatory field is filled up. 3.2 The record is saved successfully and goes back to budget list interface.
Exception Flow: **[SRS-00015-E3.1]**	3.1 If the information is not validated, then alert message is displayed to notify users about the error.	

2.5.70.3 System Sequence Diagram:

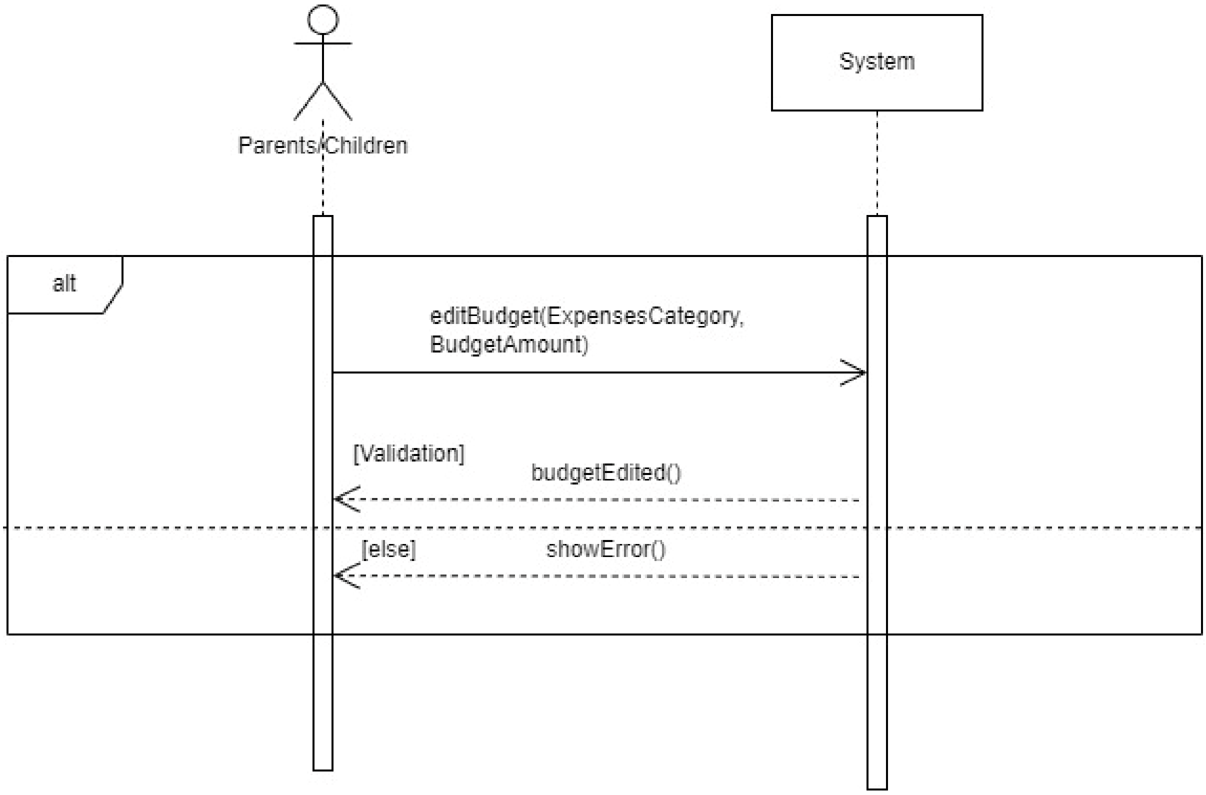


Figure 140:Edit Budget

2.5.71 Use Case: Delete Budget

2.5.71.1 Identifier: [SRS-0071]

2.5.71.2 Use Case Description

Table 88:Delete Budget

Use Case Name:	Delete budget
Scenario:	Delete budget category when there is unwanted budget.
Triggering Event:	The selected existing budget need to be deleted.
Brief Description:	When user want to delete on the existing budget category.
Actors:	Parents/Children
Related Use Cases:	Includes: *Update budget balance*
Stakeholders:	-
Preconditions:	There are existing budget.

Postconditions:	Budget is deleted. Budget balance are updated.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS0071-A1] **[SRS0071-A2]**	1. Click on delete button on the budget that wanted to be deleted. 2. Click confirm button	1.1 Pop out confirmation message. 2.1 The record is deleted successfully and goes back to budget list interface.
Exception Flow:	-	

2.5.71.3 System Sequence Diagram:

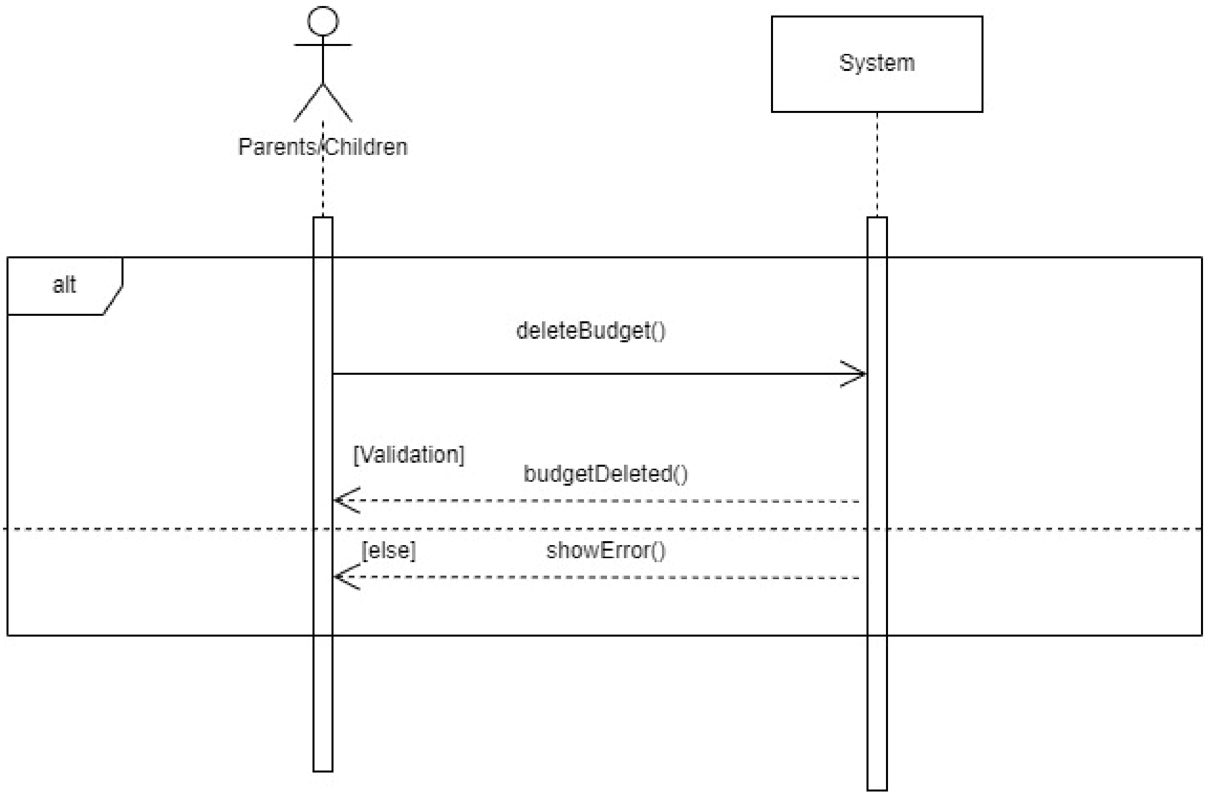


Figure 141:Delete Budget

2.5.72 Use Case: Edit Family Finance Record

2.5.72.1 Identifier: [SRS-0072]

2.5.72.2 Use Case Description

Table 89:Edit Personal Finance Record

Use Case Name:	Edit family finance record	
Scenario:	Edit finance record in family account when there are changes needed in existing record.	
Triggering Event:	The details of the existing finance record need to be changed.	
Brief Description:	When user want to do amendment on the details of existing finance record.	
Actors:	Parents/Children	
Related Use Cases:	Includes: *Update budget balance, Update total balance*	
Stakeholders:	-	
Preconditions:	There are existing finance records.	
Postconditions:	Finance record is edited. Total balance and budget are updated.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS0072-N1] **[SRS0072-N3]**	1. Click the finance record that wanted to be edited 2. Fill out all the fields 3. Click save button	1.1 Navigate to edit finance record. 3.1 Check if the mandatory field is filled up. 3.2 The record is saved successfully and goes back to record list interface.
Exception Flow: **[SRS-0072-E3.1]**	3.1 If the information is not validated, then alert message is displayed to notify users about the error.	

2.5.72.3 System Sequence Diagram:

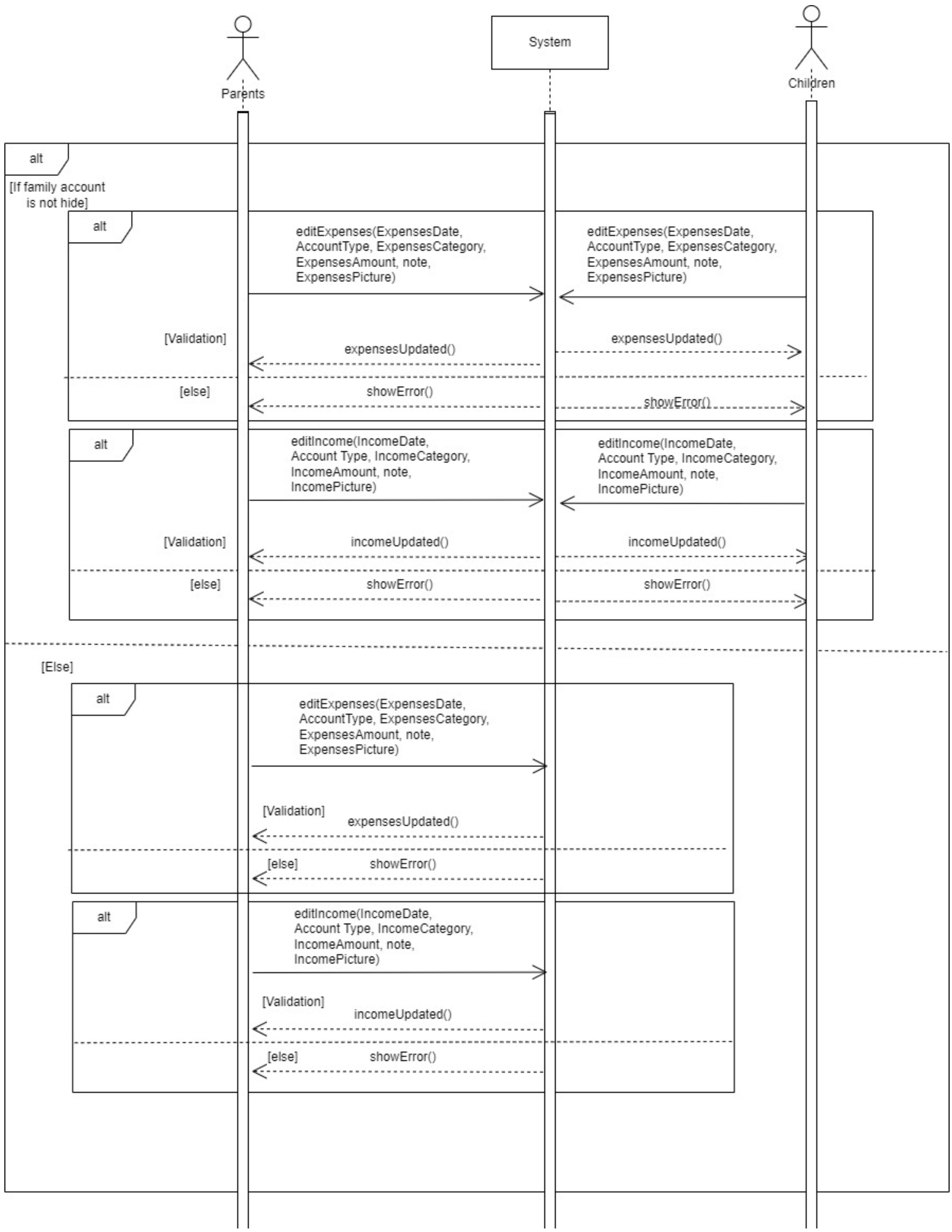


Figure 142:Edit Family Finance Record

2.5.73 Use Case: Delete Family Finance Record

2.5.73.1 Identifier: [SRS-0073]

2.5.73.2 Use Case Description

Table 90:Delete Personal Finance Record

Use Case Name:	Delete family finance record	
Scenario:	Delete finance record in family account when there is unwanted finance record	
Triggering Event:	The selected existing finance record need to be deleted.	
Brief Description:	When user want to delete on the existing finance record.	
Actors:	Parents/Children	
Related Use Cases:	Includes: *Update budget balance, Update total balance*	
Stakeholders:	-	
Preconditions:	There are existing finance records.	
Postconditions:	Finance record is deleted. Total balance and budget are updated.	
Normal/Alternate Flow:	**Actor**	**System**
[SRS0073-A1] **[SRS0073-A2]** **[SRS0073-A3]**	1. Click the finance record that wanted to be deleted. 2. Click on delete button. 3. Click confirm button	1.2 Navigate to edit finance record. 2.2 Pop out confirmation message. 3.1 The record is deleted successfully and goes back to record list interface.
Exception Flow:	-	

2.5.73.3 System Sequence Diagram:

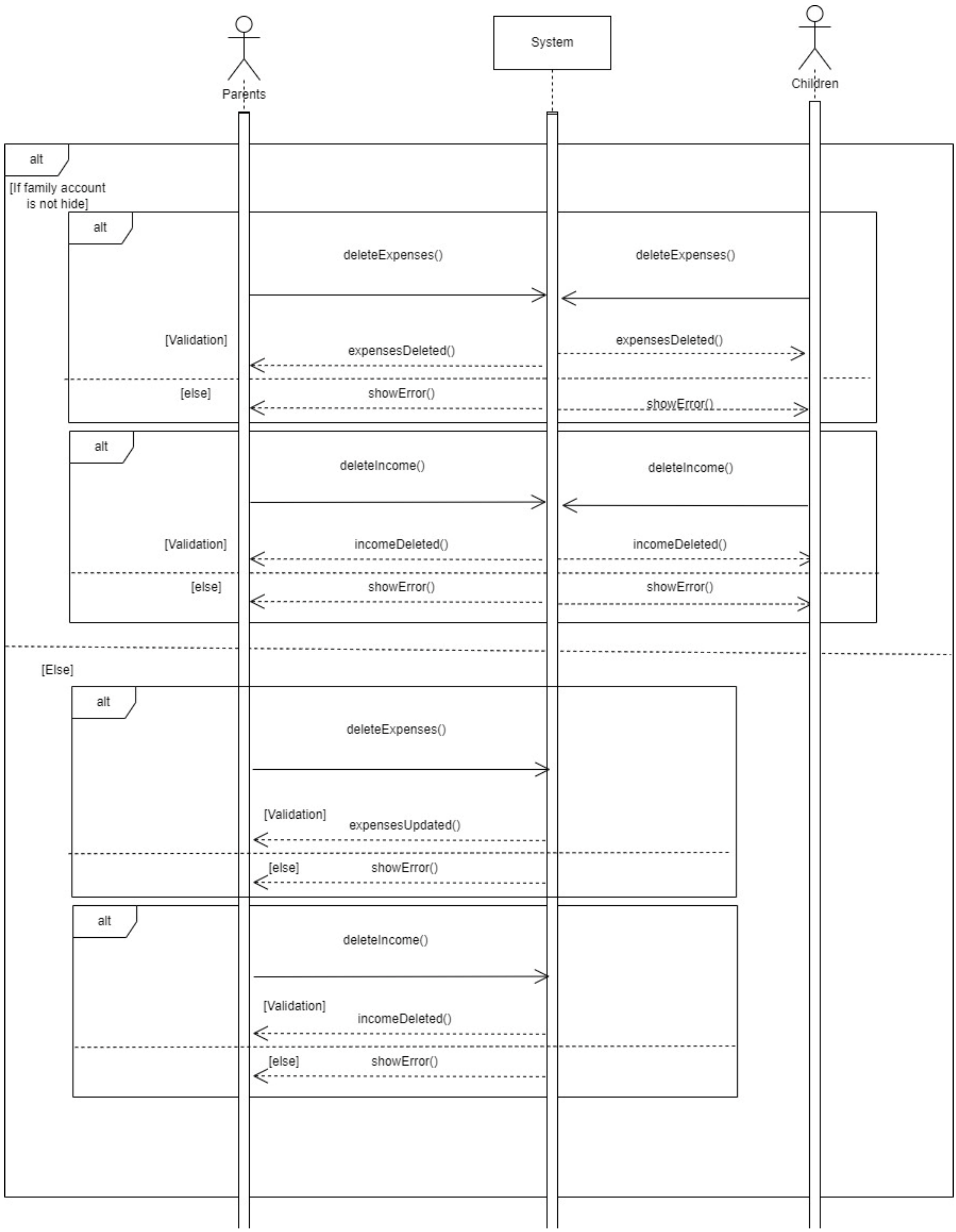


Figure 143:Delete Family Finance Record

2.6Non-Functional Requirements

2.6.1 Space Requirement

The following table indicates the system response time limits for processing inputs:

Table 91:System Sizing Limitations

Subsystem	Module	Description	Size
Contact and Appointment	Event Creation and Scheduling	This module needs larger server space and hard disk storage as it will record user's family events. It will suggest family event here.	Server Space: 80MB Hard disk: 30MB
	Chat Module	This module also needs larger server space and hard disk storage as this module will record all the chat details here including chat history and chat group documents. This module will record the contact list too.	Server Space: 100MB Hard disk: 50MB
	Location Module	This module needs moderate server space and hard disk storage as this module records the location information and supports navigation. All the location information including map is obtained from the social media API.	Server Space: 60MB Hard disk: 30MB
	One-stop story feed module	This module needs lower server space and hard disk storage as this module only records the post title and post author. All the post information is obtained from the social media API. The posted post is handled by the social media API too.	Server Space: 50MB Hard disk: 20MB
	Appointment Module	This module needs larger server space and hard disk storage as it will record the user appointments, personal events, and family events in the calendar view.	Server Space: 80MB Hard disk: 30MB
Child Education Tracking	Daily Activity Schedule	This module needs larger server space and hard disk storage as it will record all the activities and tasks of the users. It will	Server Space: 100MB Hard disk: 50MB

		generate time spent report and suggest weekly schedule which need quite large space to operate smoothly.	
	Important Dates Reminder	This module needs little space only since the countdown list is generated from the activities recorded down in the daily activity schedule module. All activities that marked as important would be added to the countdown list. Generation of reminder notifications use up little space only.	Server Space: 30MB Hard disk: 5MB
	Performance Tracking	This module also needs larger server space and hard disk storage as this module will record all the performance including exam scores, test scores, quiz scores and homework completion rate of each subject. Behavioral assessment also will be recorded. Besides, this module will display charts which consume more storage than text.	Server Space: 80MB Hard disk: 30MB
	Awards	This module does not need very large server space and hard disk storage as this module only records down awards obtained and target and reward set by parents. Records of these items would not many.	Server Space: 50MB Hard disk: 20MB
Finance Monitoring	Finance Record	This module needs larger server space and hard disk storage as it will record all the finance details of each record of the users. It will need some calculation on updating the total balance which need more space to operate smoothly.	Server Space: 80MB Hard disk: 30MB
	Budgeting	This module needs moderate server space and hard disk storage as this module only focuses on budget. It will need some calculation on updating the budget balance.	Server Space: 60MB Hard disk: 30MB
	Children Expenses Tracking	This module does not need high server space and hard disk storage as this module only	Server Space: 50MB Hard disk: 20MB

		record children's total monthly expenses value.	
	Statistical Chart	This module needs moderate server space and hard disk storage as this module will display chart which consume more storage than text. Calculation will also be performed in this module to calculate the percentage and budget balance.	Server Space: 60MB Hard disk: 30MB

2.6.2 Performance Requirement

The following table indicates the system response time limits for processing inputs:

Table 92:System Timing Targets

Subsystem	Response Time	Input	Description	Output
Contact and Appointment	1 second	Add new item	When users want to add new event, contact, location, and chat into the system.	Items are stored into the database in 1 second.
	1 second	Edit chosen item	When users want to edit chosen event, contact, location, and chat in the system.	Changes to the items are stored into the database in 1 second.
	1 second	Delete chosen item	When users want to delete chosen event, contact, location, and chat from the system.	Items are deleted from the database in 1 second.
	3-5 seconds	Invite family members to family event	Send invitation to chosen family members.	Time spent to send invitation to chosen family members is in 3 to 5 seconds.
	3-5 seconds	Schedule event	Processing time used to refresh the schedule after rescheduling.	New schedule is displayed within 3 to 5 seconds.
	1-3 seconds	Add suggested family event	Processing time used to add the suggested family event to the system.	Important event is displayed in the countdown within 1 to 3 seconds

	5-10 seconds	Sync user location	Processing time used to sync user's current location to the map.	Other family members can track user's current location in 5 to 10 seconds.
	3-5 seconds	Time used to receive SOS call	When user presses the SOS button to ask for help.	Receive SOS call within 3 to 5 seconds.
	3-5 seconds	Time used to receive SOS notifications	When user presses the SOS button to ask for help.	Receive SOS notifications within 3 to 5 seconds.
Child Education Tracking	1 second	Add new item	When users want to add new activity, task, performance, award and target into the system.	Items are stored into the database in 1 second
	5-10 seconds	Generate report of time spent	Time used to generate time spent report	Time spent report is generated in 5 to 10 seconds
	5-10 seconds	Schedule planning	Processing time used to plan a schedule	Suggested schedule with different arrangement is displayed within 5 to 10 seconds.
	1-3 seconds	Add to countdown list	Processing time used to display the important events in the countdown list when new important event is added	Important event is displayed in the countdown within 1 to 3 seconds
	1-3 seconds	Data Visualization	Processing time used to display the new added result in the charts	New added result is shown in the chart within 1 to 3 seconds
	1-3 seconds	Add to bookmarked award list	Processing time used to display the award that has been bookmarked into the bookmarked award list	Award is displayed in bookmarked award list within 1 to 3 seconds
	5-10 seconds	Time used to sync data	Processing time used to sync data with children when parents set new targets and rewards for their children	Children can view the new added targets within 5 to 10 seconds

	5-10 minutes	Time used to receive notifications	When children declare that they have completed the target, processing time used to send notifications to parents	Receive notifications within 5 to 10 minutes
Finance Monitoring	1 second	Add finance record	When users want to add new finance record(incomes/expenses) into the system.	Items are stored into the database in 1 second
	1 second	Edit finance record	When users want to edit finance record(incomes/expenses) in the system.	Changes are stored into the database in 1 second
	1 seconds	Search finance record	When users want to search for finance record(incomes/expenses) in the system.	Search items displayed in 1 second.
	1 seconds	Set budget	When users want to add new budget category and amount into the system.	Items are stored into the database in 1 second
	1-3 seconds	Data Visualization	Processing time used to display the new added record in the chart.	New added record is sync to the chart within 1 to 3 seconds
	1-3 seconds	Time to display children's monthly expenses	Processing time used to display the children's monthly expenses when children choose to show the monthly expenses	Children's total monthly expenses is shown within 1 to 3 seconds.
	1-3 seconds	Time used to sync data	Processing time used to sync data with family members when one of the family members inserts new finance record in family account.	Family members can view the new added finance within 1 to 3 seconds
	1-3 seconds	Time used to hide family account	When parents choose to hide the family account from children.	Children will not see family account within 1 to 3 seconds.

2.6.3 Other Relevant Non-Functional Requirement

The final system will have to meet the following performance goals:

Table 93:System Performance Goals

Metric	Description	Goal
Performance	The responses of the system to view information	No longer than 5 seconds to appear on the screen.
	Response time for clicking button	At most 0.7 second
Throughput	Number of sustained transactions per second (TPS)	Min. 5,000 TPS
Scalability	Number of concurrent transaction requests	Min. 1,000 simultaneous transactions
Usability	User satisfaction of using the system	Very satisfied
	Learnability of the system	Easy to learn
	User interface aesthetics	The system design should be consistent for all modules.
Reliability	Rate of failure occurrence in the system	1 per 1000 days
	Recoverability	The system shall be recovered within 10 minutes if it is down.
Maintainability	Difficulty to add code to the existing system	Very easy
Security	Percentage of services still available under denial-of-services attack	95%
	Authenticity	The system should check the user's credentials to allow authorized users to use the system.
Portability	Operating system that system can operate in	IOS, Android
Modifiability	Cost in terms of number of elements affected	Low
Testability	Probability of failure if fault exists	5%
Availability	Repair time when system down	Max. 1 hour
	The system shall be operational most of the time	The system should be available for 24/7.

3 Software Design Description (SDD)

3.1 Storyboard

Common Modules

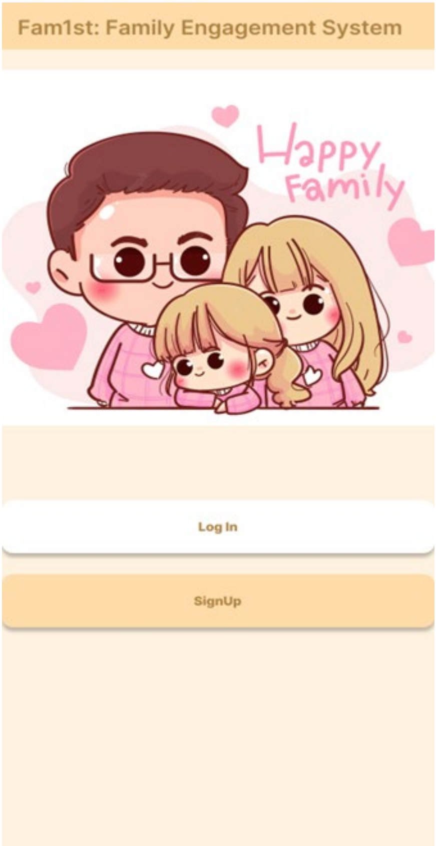


Figure 144:Login or Sign up

User can choose to log in or sign up to the system in this interface.

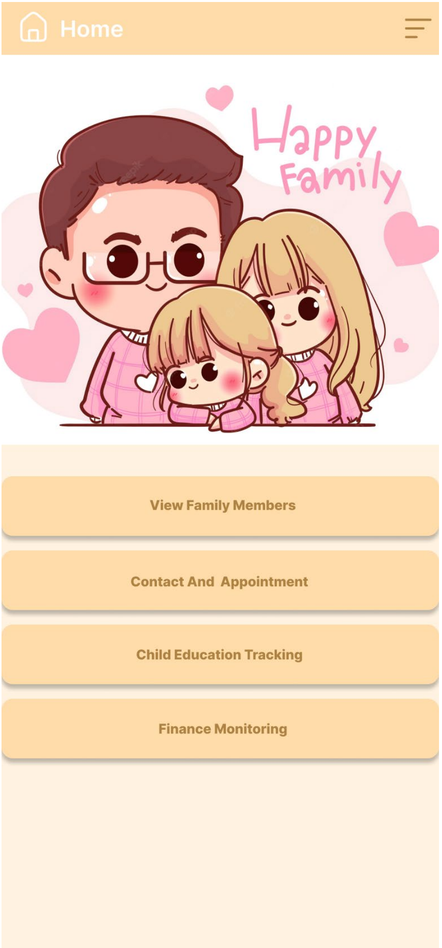


Figure 145:Home Page

User can navigate to view family members and other subsystem in home page. User can also go to setting in the home page.

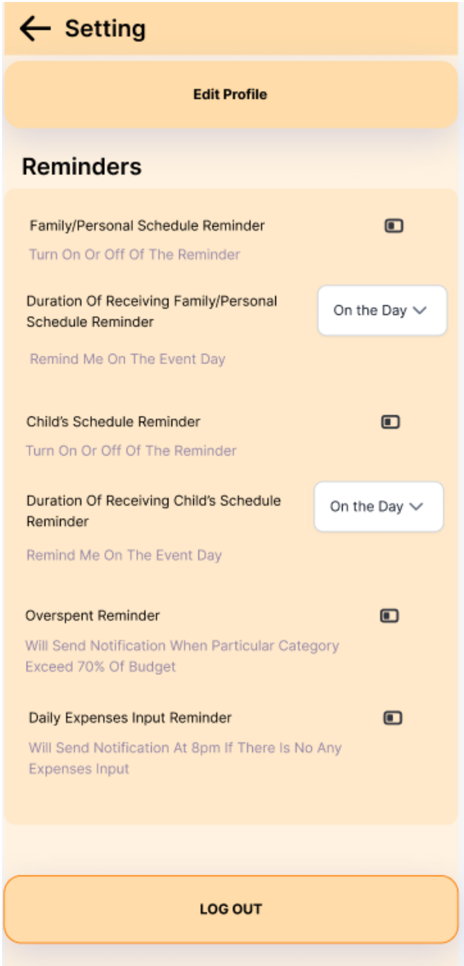


Figure 146:Setting

User can navigate to edit profile. Users can change the various settings based on their preferences. Users can also log out on this page.

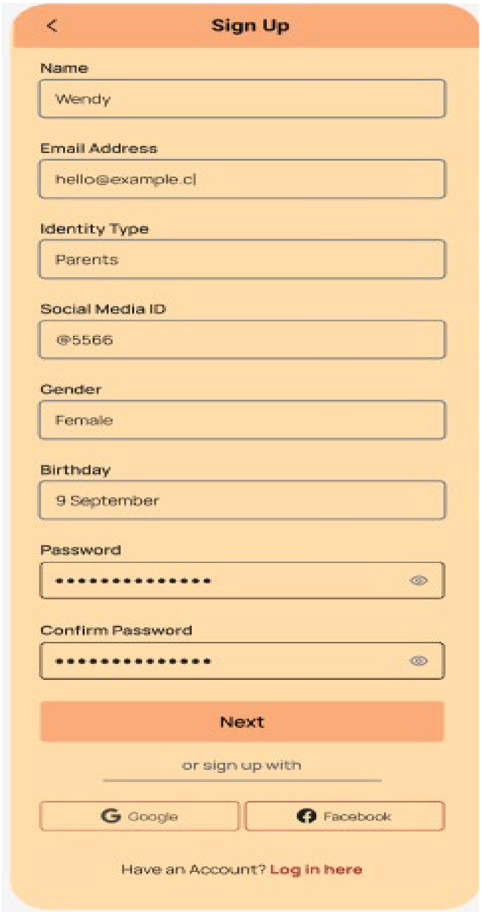


Figure 147:Sign Up

User can sign up an account by filling up details such as name, email address, identity type, social media id, gender, birthday, password and password confirmation. User can also choose to sign up using google email or Facebook account.

Figure 148:Record Contact Number

User is required to input his or her contact number in this interface.

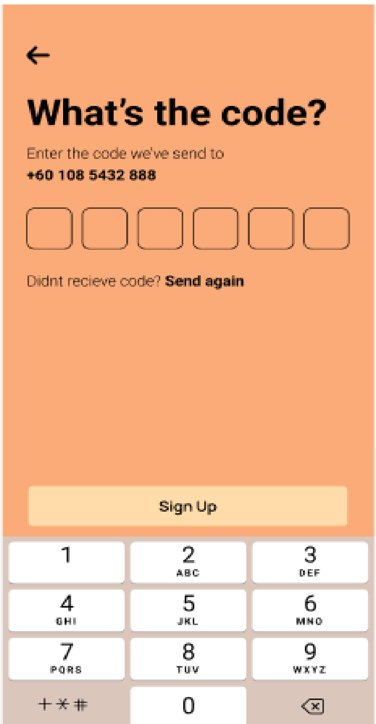


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Figure 149:Phone Number Verification

There will be a code sent to user's phone. User should verify the contact number by entering the code received by the system. If user does not receive any code, they may ask for verification code by pressing the "Send again".

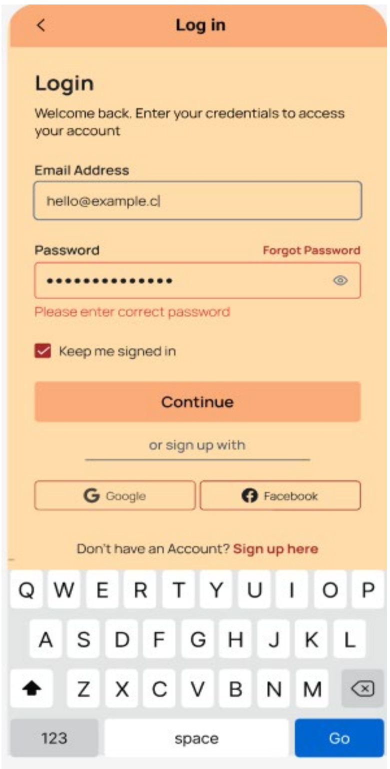

Figure 150:Log In

User can login using email address and password. If user forget the password, user can press the forget password button which will send the change password request to user email to allow user to regain his or her access to the account. User can choose to sign up using google email or Facebook account to save time. User can also sign up by filling up their details in the sign-up form.

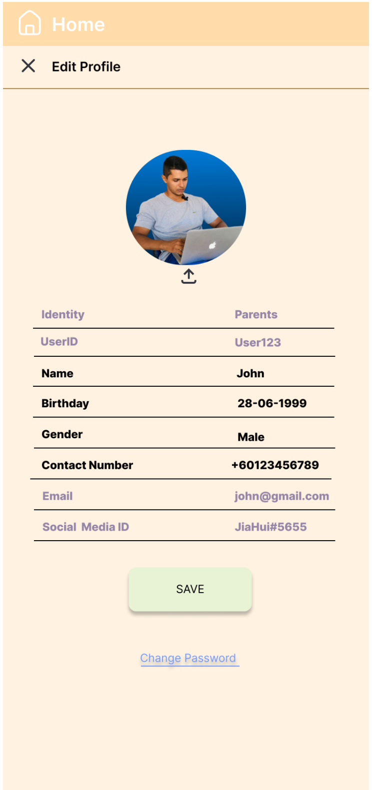

Figure 151:Edit Profile

User can edit personal information like name, birthday, gender, contact number and navigate to change password. The grey field cannot be changed.

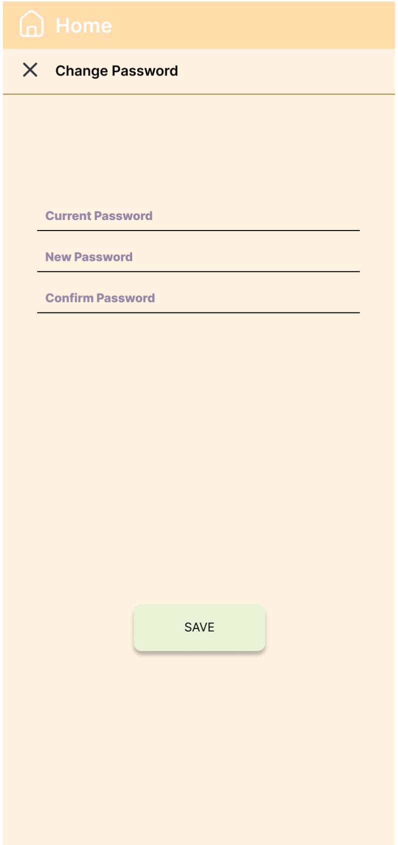

Figure 152:Change Password

User can change password in this interface.

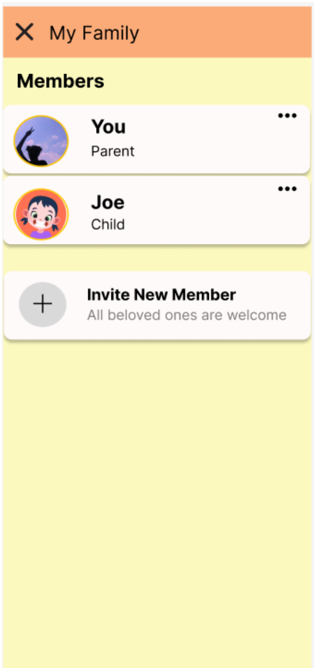

Figure 153:Family List

Users can view their family by clicking the view family member button on the home page. They can invite new members by tapping the invite new member button. The interface will direct to contact module.

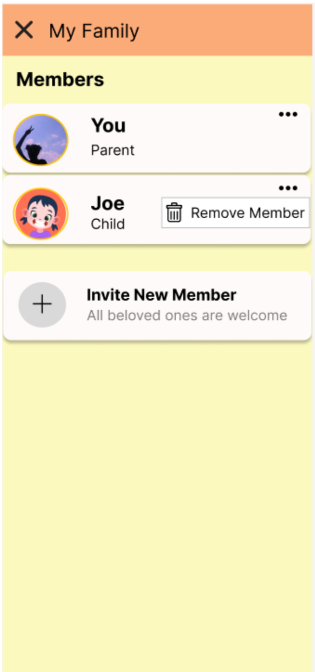

Figure 154:View Family with Remove Member

When users click on the more icon, remove member button displays. Users can remove members by tapping the button.

Contact and Appointment Subsystem

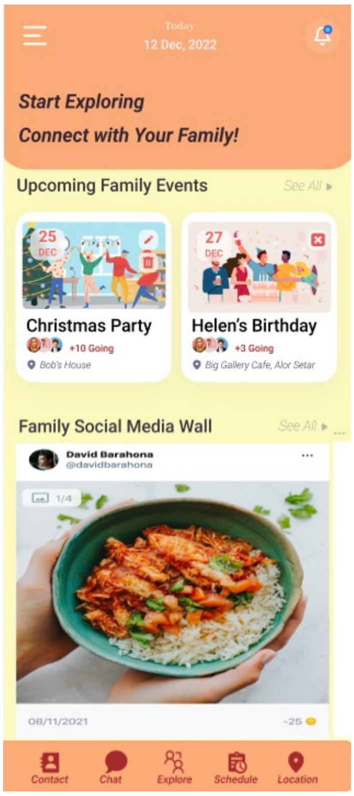

Figure 155: Explore Interface (Landing Page)

When user navigates to the contact and appointment subsystem, the system will lead to the landing page for this subsystem, the Explore interface. This subsystem uses tab navigation. It has five main tabs: Contact, Chat, Explore, Schedule and Location. The menu button will provide options to navigate to other subsystems. The notification button will lead to the navigation page for this subsystem. In the Explore interface, user can view the Upcoming Family Events section and the Family Social Wall section. User can choose the “See All” to view the Family Events dashboard. User can also choose the “See All” to view the Family Social Wall dashboard.

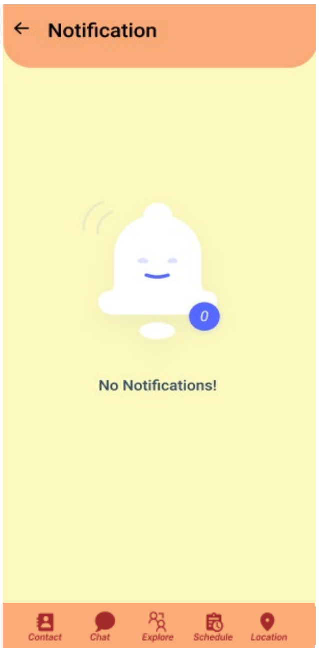

Figure 156: Empty State for Notification

When there is no notification, the Notification page will show an empty state.

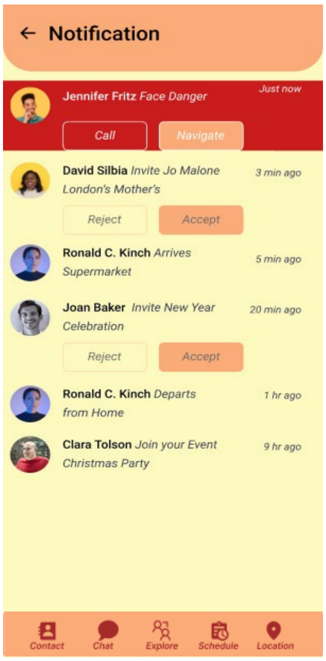

Figure 157: Notification Interface

User can view all the notifications of this subsystem in the Notification Interface. The notifications will be sent as push notifications in user's device too. The notifications are arranged based on each notification's received time. User can choose to delete a notification by pressing the notification for a longer time. A pop up will be prompted for delete confirmation.

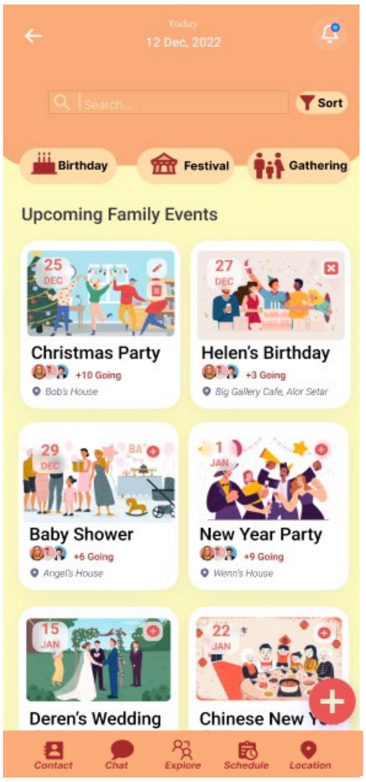

Figure 158: Family Event Dashboard

When user chooses the "See All" option in the Explore interface's Upcoming Family Event section, the system will lead user to the Family Events Dashboard. User can view all the upcoming family events created by user and other users in this dashboard. User can search, filter and sort the family events based on the family event name, type and time. User can choose to join or remove the upcoming family event here. If user is the owner of the family event, user can choose to edit or delete the family event here. In this interface example, user is the owner of the Christmas Party and he had joined the Helen's Birthday. User can choose to view the event details by pressing on the family event card. User can also create a new family event by pressing the "+" button.

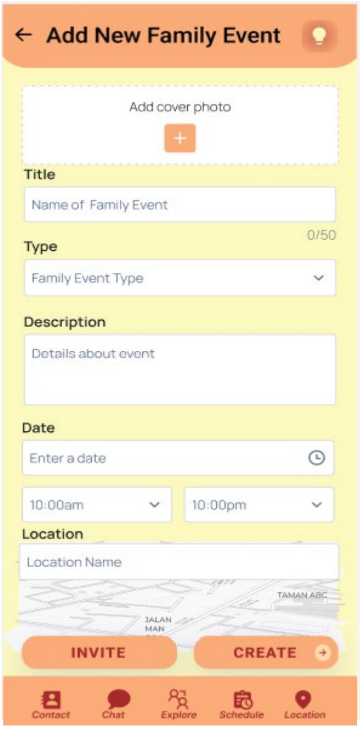

Figure 159: Family Event Creation

When user wants to add a new family event, the system will lead to the Family Event Creation page. The light bulb is the toggle to open the family event suggestion feature. User needs to insert family event information such as the event name, event type, event description, event place, and event start time and end time. User can send invitation to other family members to join the new family event here. User can attach the latitude and longitude of the event place under this interface. There will be input validation here to confirm no empty fields. After user has filled up all the required information and presses the “CREATE” button, the new family event is added to the system.

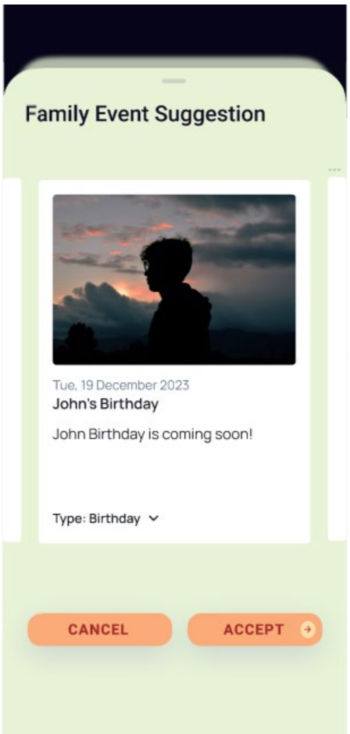

Figure 160: Family Event

When user turns on the family event suggestion feature, the system will show the Family Event Suggestion page. This page shows the possible family events based on users' profiles database and calendar database. User can accept the family event suggestion. After user accepts the family event suggestion, the system will lead user to the Family Event Creation page to allow user to fill in information that is still missing. User can invite the other family members to the new family event through the page.

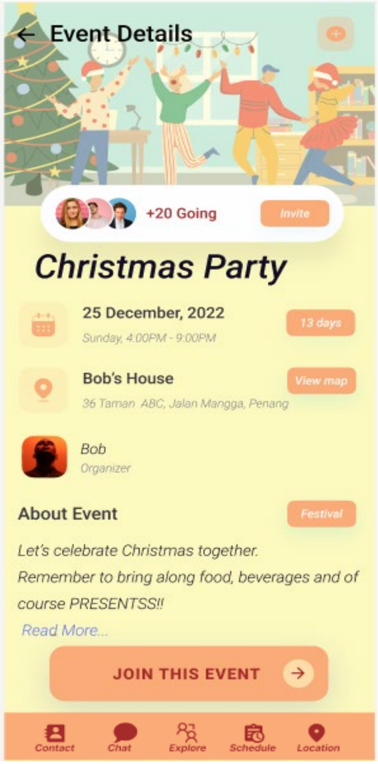

Figure 161: Family Event Detail (Not joining)

When user wants to see the family event details that he has not join, there will be a button asking user to join the event. User can see how many people are going to the activity. User also can choose to invite people to join this family event together. User can view the participants of the chosen family events, family event name, family event type, family event place, and family event time. This interface also show countdown to the family event. User can navigate to the family event place by accessing the family event place coordinates by viewing the map.

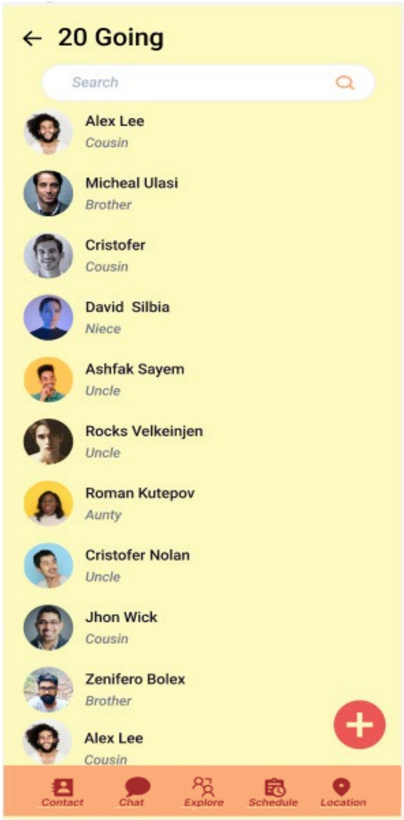

Figure 162: Family Event Participants List

When user presses on the Going word, it will lead to the Family Event Participants List. User can view the participants' name and their relationship with user here. User can also search based on the name to find a particular participant here. User can also choose to invite other users to the family event here.

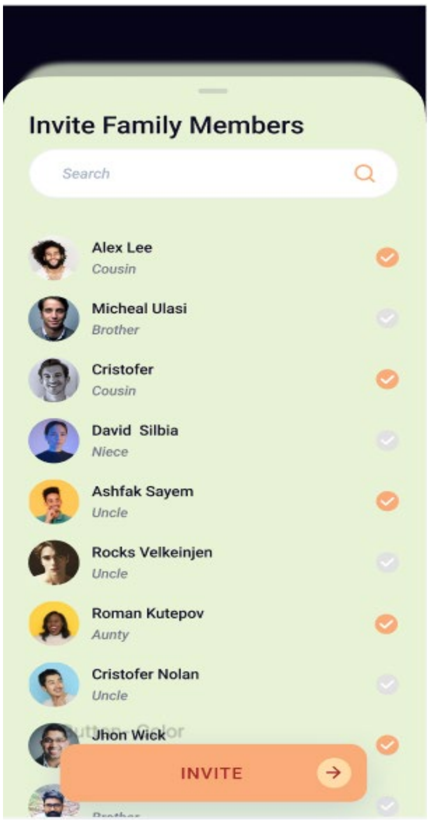

Figure 163: Invite Family Members

When user choses to invite the other family members to the event, the system will lead to the Invite Family Members page. User can choose to invite multiple family members from the contact lists through this page. User can search user by name here.

Figure 164: Family Event Map View

When user chooses to see the family event location in the map view, it will lead to the Family Event Map View interface. User can see the label of the family event location in the map. User can also search other places to explore around the location. User can see a series of the family event details here too. When user swipes to another family event details, the location of the family event will change accordingly.

Figure 165: Family Event Detail (Owner)

When user is the owner of the family event, user can edit and delete the family event. When user chooses to delete the family event, a pop up will be shown to confirm the deletion. There will be a button allowing user to navigate to the group chat for the family event. User can see how many people are going to the activity. User also can choose to invite people to join this family event together. User can also remove the chosen participants from the family event by pressing the chosen participant longer in the Family Event Participants List. User can view the participants of the chosen family events, family event name, family event type, family event place, and family event time. This interface also show countdown to the family event. User can navigate to the family event place by accessing the family event place coordinates by viewing the map.

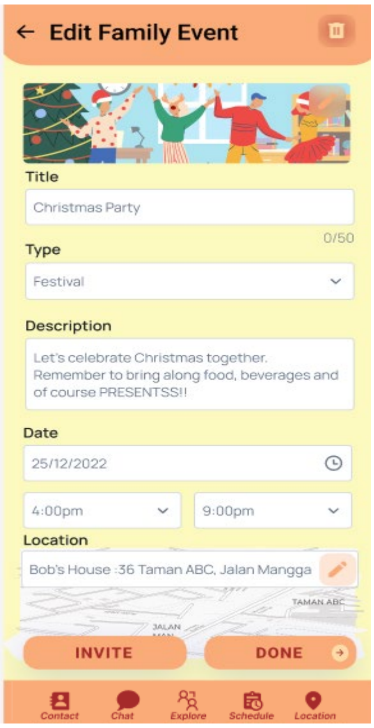

Figure 166: Edit Family Event

When user is the family event owner and chooses to edit the family event, the system will lead it to the Edit Family Event interface. This interface shows the recorded details of the chosen family event. User can edit and modify the information of the family event here. User can also choose to delete the family event here. When user chooses to delete the family event, a pop up will be shown to confirm the deletion. User can also invite other family members to join this family event through this interface. When user has done with the changes and press the done button, the updated family event information will be recorded in the database.

Figure 167: Family Event Detail (Joined)

When user wants to see the family event details that he joined, there will be a button allowing user to navigate to the family event group chat. User can choose whether he wants to remove the family event from his family event joining list. User can see how many people are going to the activity. User also can choose to invite people to join this family event together. User can view the participants of the chosen family events, family event name, family event type, family event place, and family event time. This interface also show countdown to the family event. User can navigate to the family event place by accessing the family event place coordinates by viewing the map.

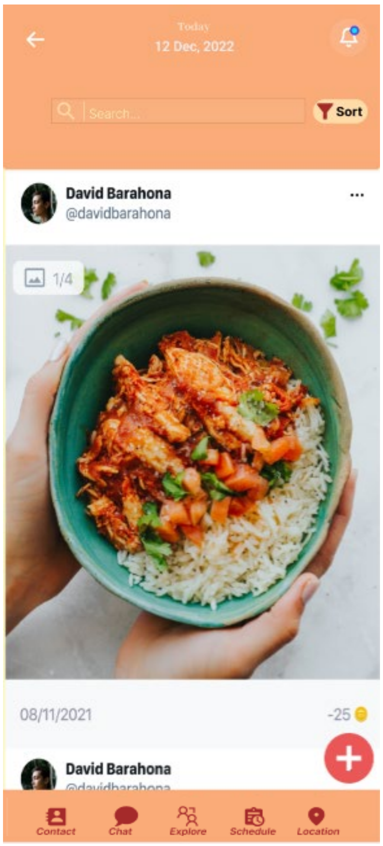

Figure 168: Social Media Dashboard

When user chooses the "See All" option in the Explore interface's Family Social Media Wall section, the system will lead user to the Social Media Dashboard. User can view all the social media posts from Instagram and Facebook posted by user and other users in this dashboard. User can filter and sort the family events based on the post author. User can choose to view the post details by pressing on the post, which will redirect user to the respective social media. User can create new social media post by pressing on the "+" button.

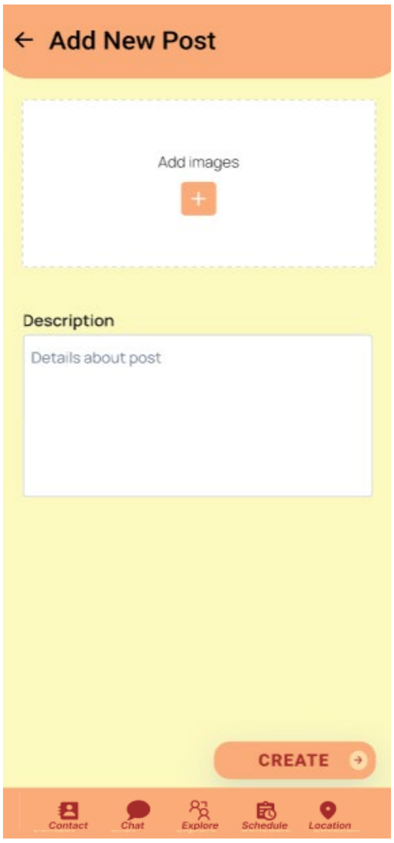

Figure 169: Add New Post

When user presses the “+” button, the system leads user to the Add New Post interface. User needs to insert post information such as post description and post pictures. There will be input validation here to ensure no empty fields. After user press the CREATE button, the post information will be updated in the Media Post Wall interface.

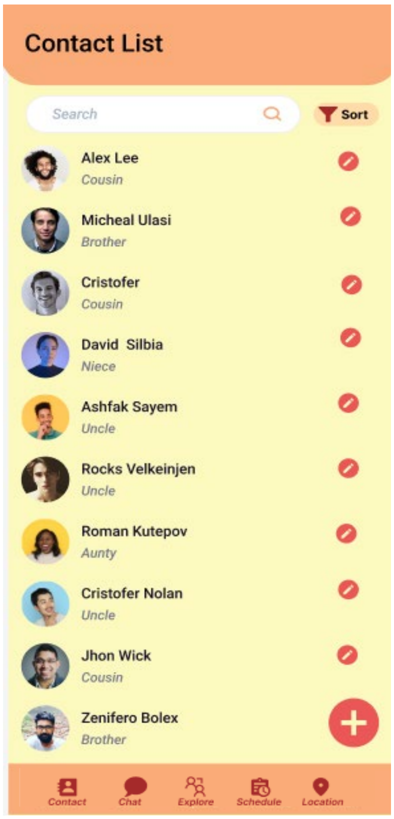

Figure 170: Contact List

When user press the Contact tab, the system will navigate user to the Contact List interface. In this page, user can view all the existing contacts. User can also search by using filter by name, by grouping, by contact number and by area. User can also sort the contact list based on alphabetical order. User can select a contact to edit and delete the details. User can add a new contact in the contact list by pressing the “+” button here.

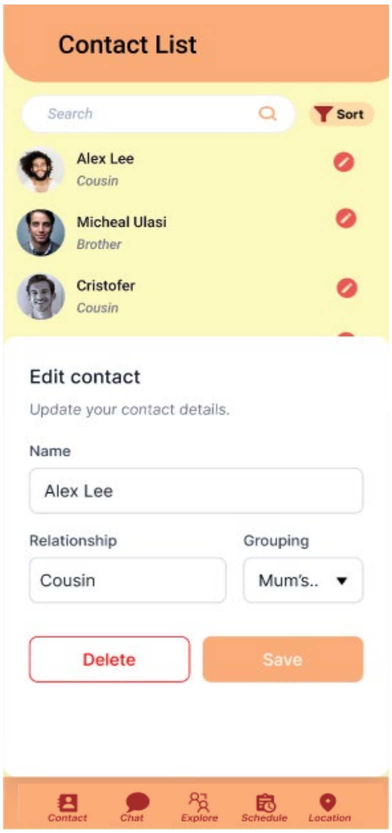

Figure 171:Edit Contact

When user chooses to edit the chosen contact, the system will pop up the Edit Contact form. The Edit Contact form contains the recorded contact information. User can change the contact information such as the name, relationship, and the grouping of the contact here. The changes of the contact information will be saved to the database when user press the Save button. If user press the Delete button, a pop up will be prompted and ask user for delete confirmation. If user agrees to delete the chosen contact, the chosen contact will be deleted from the system.

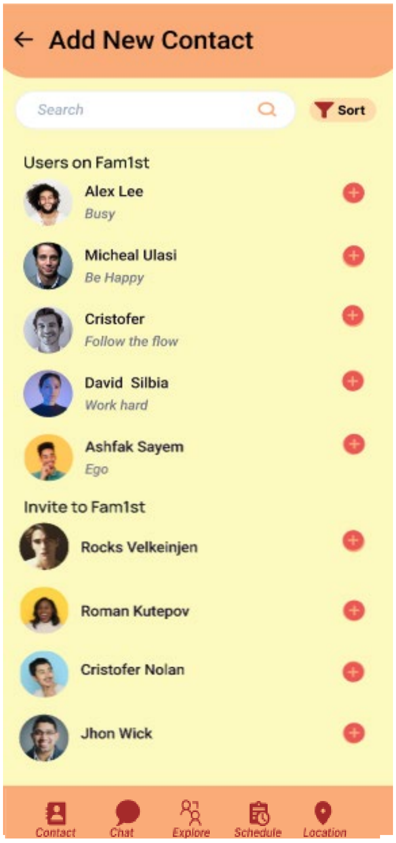

Figure 172: Add New

When user press the "+" button, the system leads user to the Add New Contact page. User gives access to this page for accessing to user's device contact. User can view the other Fam1st users which is from his device contact and a list of other contacts that do not use Fam1st. User can filter and sort the contacts based on contact name.

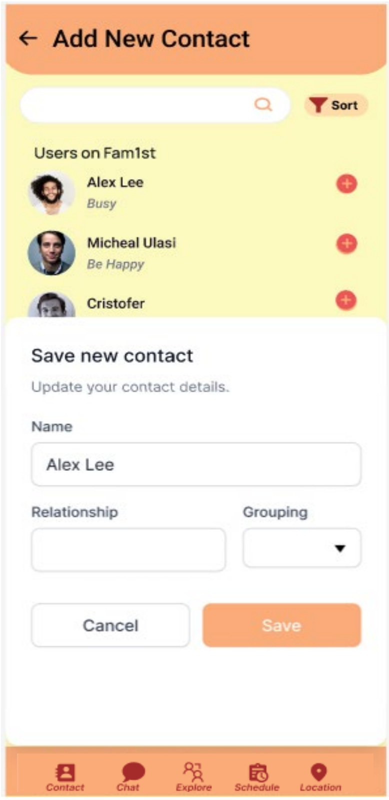

Figure 173: Save Contact

User can add the other existing Fam1st users which is from his device contact by pressing the add button. User needs to input the additional contact information such as name, relationship with user and grouping to save the contact.

Figure 174: Invite Contact

When user wants to add the contact which is from the list of other contacts that do not use Fam1st, user can press the add button. A pop up will be prompted to invite the chosen contact to Fam1st. User can share the download link to the chosen user through other applications to allow user to add them in the contact list. This is because all contacts in the contact list must be a user using Fam1st.

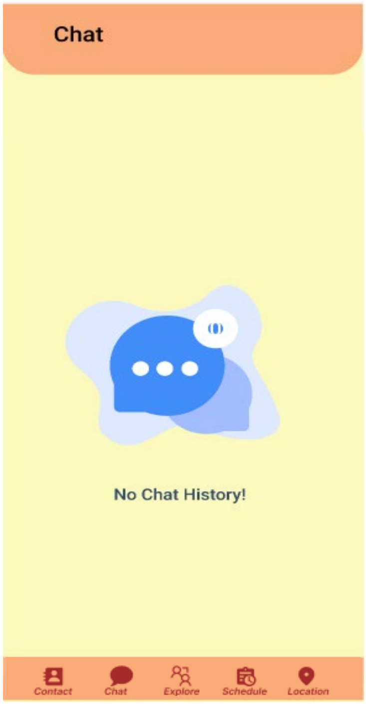

Figure 175: Empty State for Chat

When user navigates to the Chat tab and there is no chat history, user can view the empty state for chat.

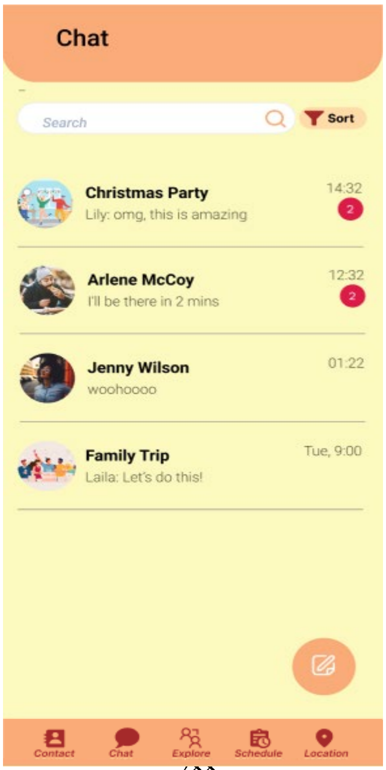

Figure 176: Chat List

When user navigates to the chat tab, user can view the chat list which contains the chat history and group chat that a user has. User can filter based on the chat title name and sort by name. The updated chat list will be updated in the system database. User can add a new chat by pressing the write button.

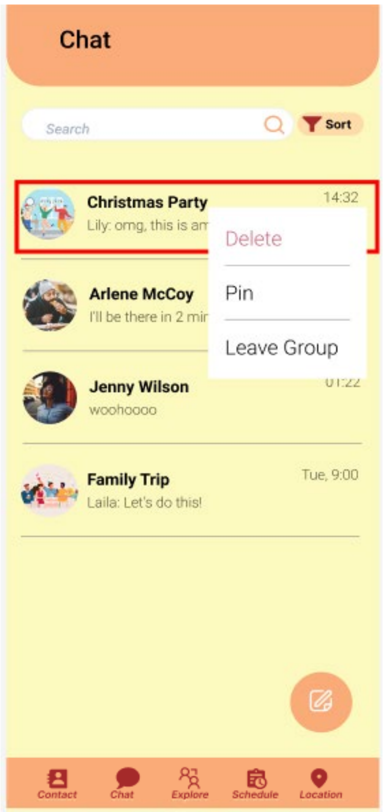

Figure 177: Long Press Chat History for Actions

User can choose to pin, delete a chat history, or leave a chat group here by pressing the chosen chat history longer.

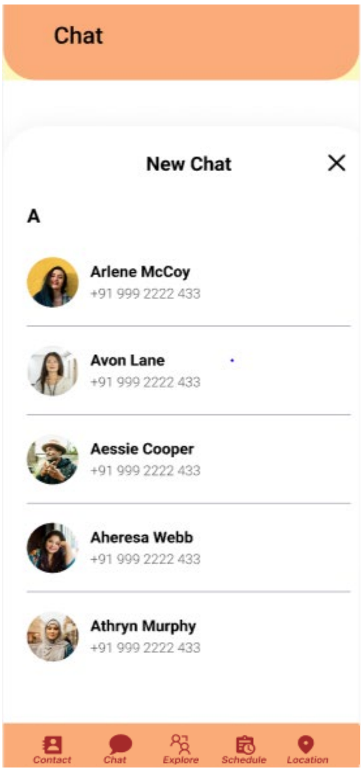

Figure 178: New Chat

When user presses the write button, the system leads user to the new chat interface. User can view a list of contacts. User can choose any contact from the contact list and start a new chat with it.

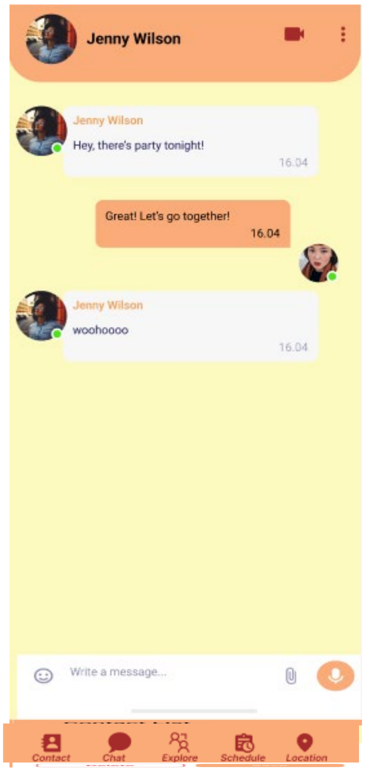

Figure 179: Personal Chat

After user select the chosen chat history from the chat list, the system will lead the user to the chat history. In this case, the figure above shows the chat history for personal chat. In this page, user can view all the chat history with another user. User can chat here using text, pictures and share location here. User can choose and delete the chat history here by long press on the chat. A pop up will be prompted for delete confirmation. User can also start a call using this interface. The chat history will be stored in the database.

Figure 180: Personal Chat Actions

When the user presses on the three vertical dots in the personal chat, the system will show that there are three action that user can perform to this personal chat, which are to clear all the chat history, delete the whole personal chat, or to search for a particular chat history.

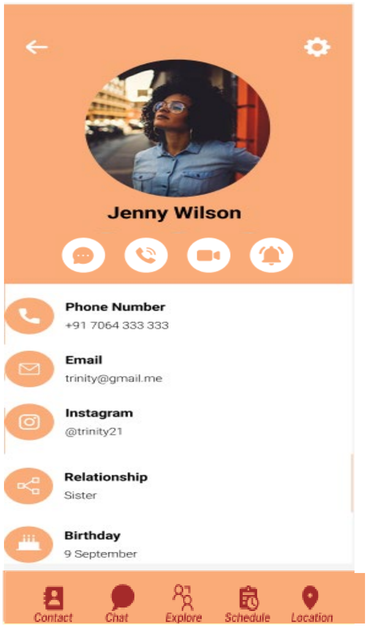

Figure 181: Contact Profile

When user press on the contact's name, the system will lead user to the Contact Profile. User can view the contact's name, phone number, email address, grouping, social media ID, relationship with user, and the contact's birthday in this page. User can also choose to chat, phone or video call to the contact. User can also choose to open notifications to notify when their relationship closeness is low.

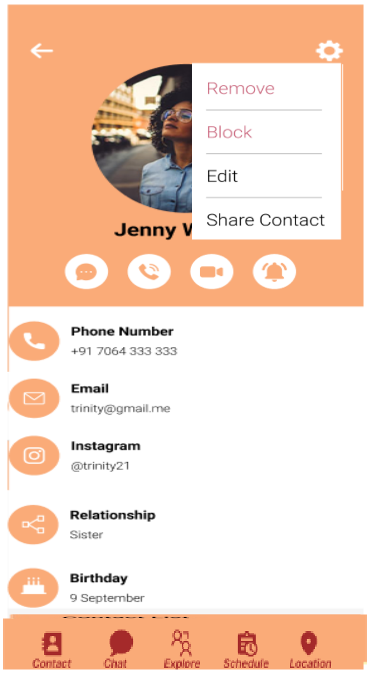

Figure 182: Contact Profile Actions

When user presses the setting in the contact profile, user can see a few options to do with the contact, which are to edit the contact detail, to remove it from the contact list, block the contact or share the contact to other users.

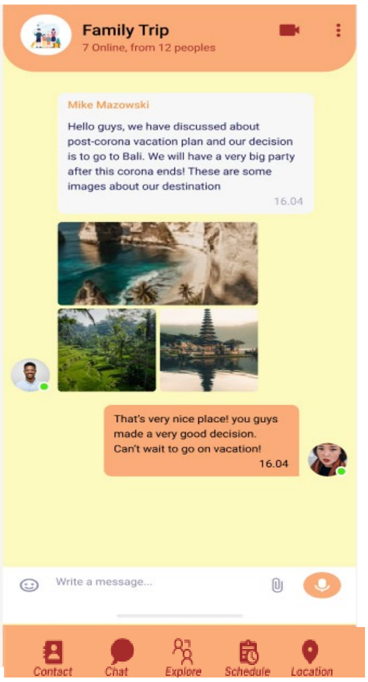

Figure 183: Group Chat

After user select the chosen chat history from the chat list, the system will lead the user to the chat history. In this case, the figure above shows the chat history for group chat. In this page, user can view all the chat history with other users. User can chat here using text, pictures and share location here. User can choose and delete the chat history here by long press on the chat. A pop up will be prompted for delete confirmation. User can also start a call using this interface. The chat history will be stored in the database.

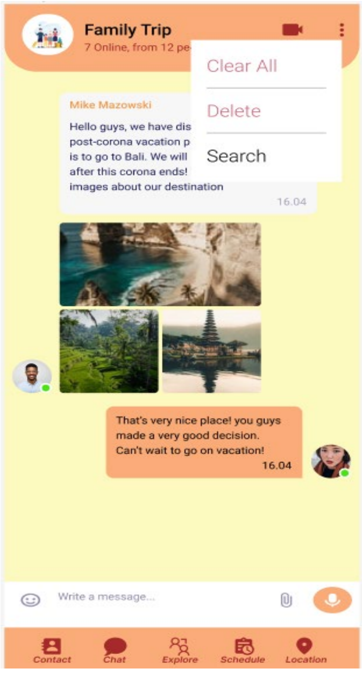

Figure 184: Group Chat Actions (Admin)

When the user presses on the three vertical dots in the group chat and he is the admin of the group chat, the system will show that there are three actions that user can perform to this group chat, which are to clear all the chat history, delete the whole group chat, or to search for a particular chat history.

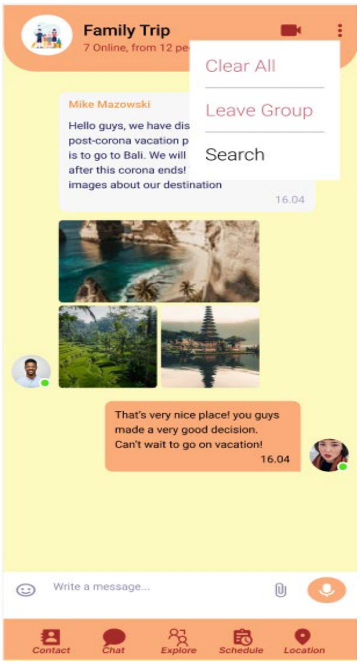

Figure 185: Group Chat Actions (Normal)

When the user presses on the three vertical dots in the group chat, the system will show that there are three actions that user can perform to this group chat, which are to clear all the chat history, leave the group chat, or to search for a particular chat history.

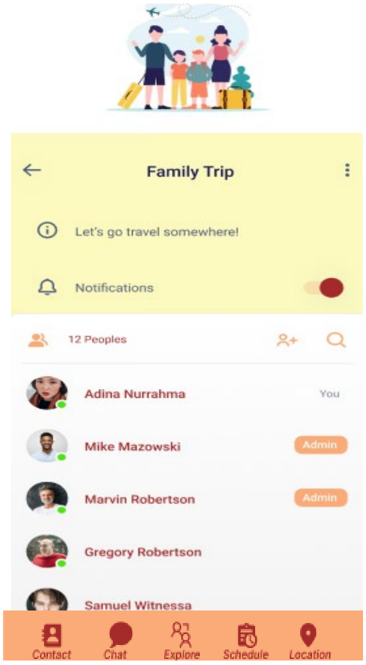

Figure 186: Group Chat Details

When the user press on the group chat's name, the system will lead user to the Group Chat Details page. User can view the group chat information such as the group description, the participants, and the admins of the group chat. User can search group chat participants by name in this page. User can also invite other family members to join the group chat here. User can turn the notification for the family trips on here.

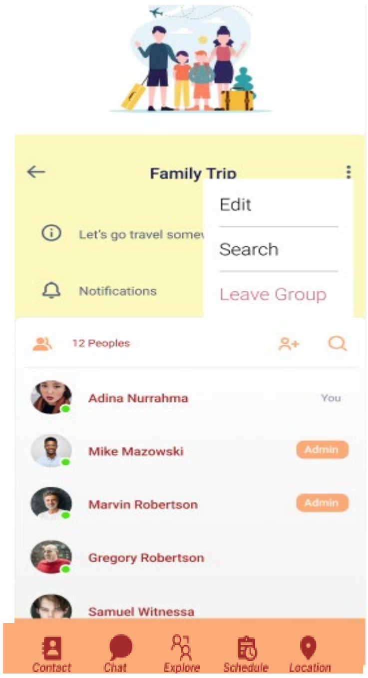

Figure 187: Group Chat Details Actions

When the user presses on the three vertical dots in the Group Chat Details page, the system will show that there are three actions that user can perform to this group chat, which are to edit the group chat details, leave the group chat, or to search for a particular chat history. When user chooses to leave the group chat, there is a pop up for leave confirmation.

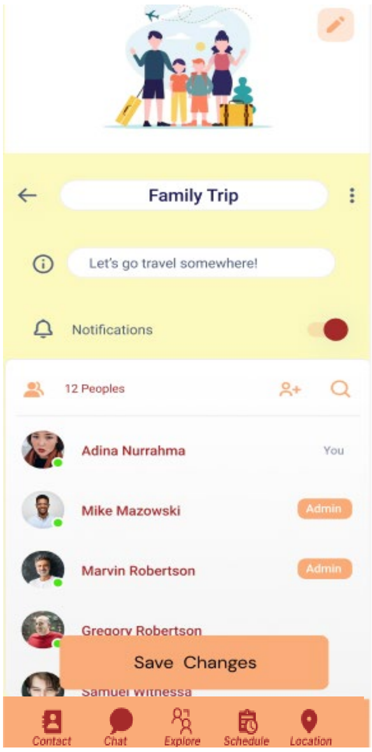

Figure 188: Edit Group Chat

When user chooses to edit the group chat, the system will lead user to the Edit Group Chat page. User can view the recorded group chat details as default. User can change the group chat photo, chat title and chat description here. After user presses on the Save Changes button, all the changes of the chat information are stored in the database.

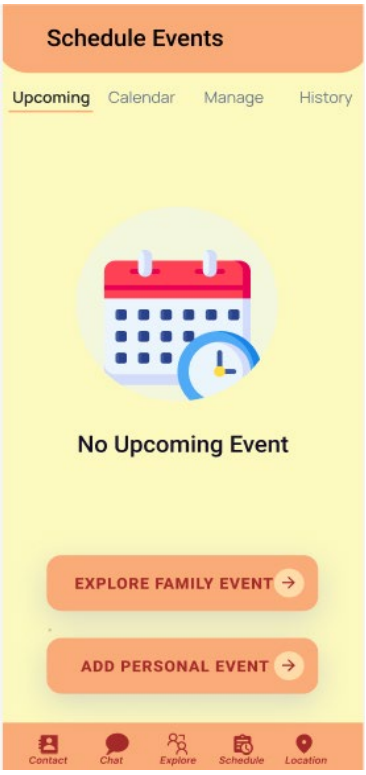

Figure 189:Empty State for Schedule Event

When user navigates to the Schedule tab and there is no upcoming event, the system will show the empty state for schedule event. There are four sections in the Schedule tab, which are Upcoming Events, Calendar View, Manage Created Events and the Past Events. User can navigate to family event dashboard to add family event by pressing the Explore Family Event button in the. User can add personal event by pressing the Add Personal Event.

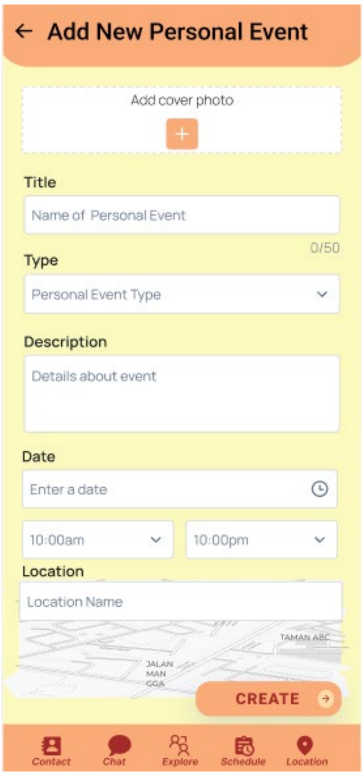

Figure 190: Add New Personal Event

When user presses the Add New Personal Event button, the system will navigate user to the Add New Personal Event interface. User can create new personal event here. User needs to fill in personal event information such as title, type, description, time, photo and location. There is input validation here to confirm there is no empty fields before form submission. After user presses the CREATE button, the new personal event is created in the system.

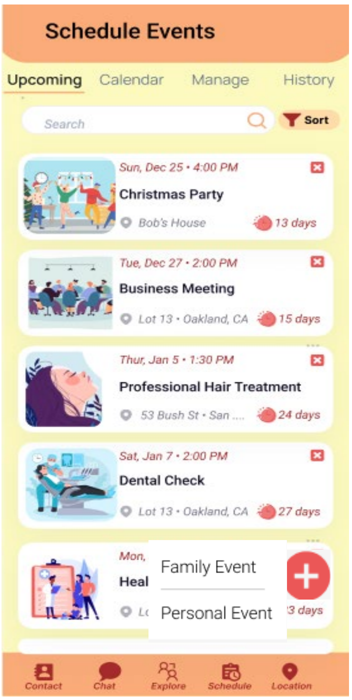

Figure 191: Upcoming Event List

When user navigates to the Schedule tab, user will navigate to the Upcoming Event List which contains all the accepted events including family events and personal events. User can view the event's details such as the event title name, event location, countdown to the event date, and the event time. User can remove the accepted upcoming events from the upcoming event list in this page. By pressing the "+" button, user has two options either to add family event by exploring the family event dashboard or add a new personal event in this page. User can search the event based on event title name here. When user presses on the event card, user can navigate to see the event details. If the event is a family event, the system will navigate user to the Family Event Detail page. If the event is a personal event, the system will navigate user to the Personal Event Detail page.

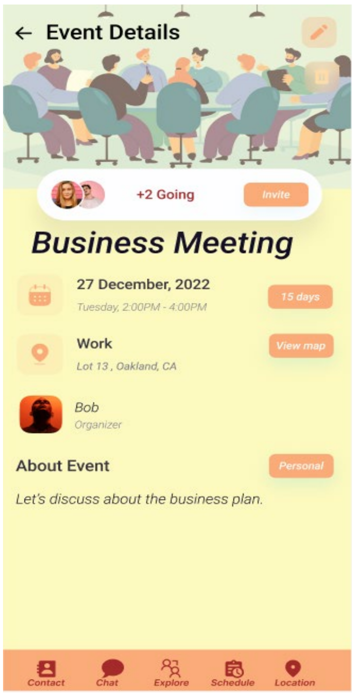

Figure 192: Personal Event Detail

User can choose whether he wants to delete the personal event from his event list. A pop up will be prompted for delete confirmation. User can see how many people are going to the activity. User also can choose to invite people to join this personal event together. User can view the participants of the personal event, personal event name, personal event type, personal event place, and personal event time. This interface also show countdown to the personal event. User can navigate to the personal event place by accessing the personal event place coordinates by viewing the map. User can choose to edit the personal event by pressing the edit button.

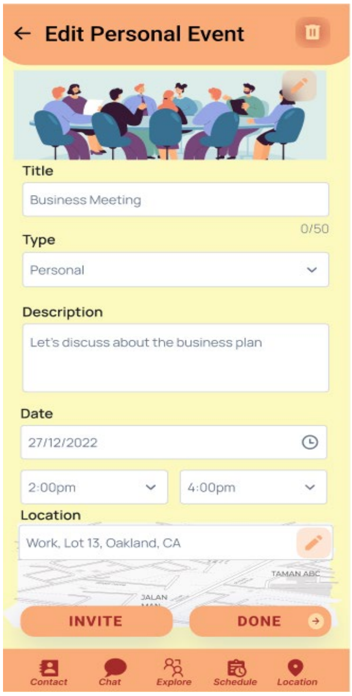

Figure 193: Edit Personal Event

When user chooses to edit the personal event, the system will lead it to the Edit Personal Event interface. This interface shows the recorded details of the personal event. User can edit and modify the information of the personal event here. User can also choose to delete the personal event here. When user chooses to delete the personal event, a pop up will be shown to confirm the deletion. User can also invite other users to join this personal event through this interface. When user has done with the changes and press the done button, the updated personal event information will be recorded in the database.

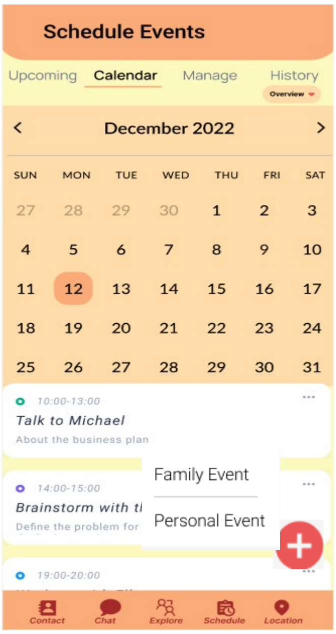

Figure 194: Calendar View (Overview)

When user navigates to the Calendar section, user will navigate to the Calendar View which contains all the accepted events including family events and personal events in the calendar view. User can choose to view the accepted events in a daily, weekly, monthly, and yearly view. User can also add appointments or personal event or add family event by exploring the family event dashboard in this view. User can check whether their personal appointments or events clash with the family events. If there is a clash between them, user can choose to reschedule and manage his or her events better through this interface. In this example, the system is showing the overview of event calendar.

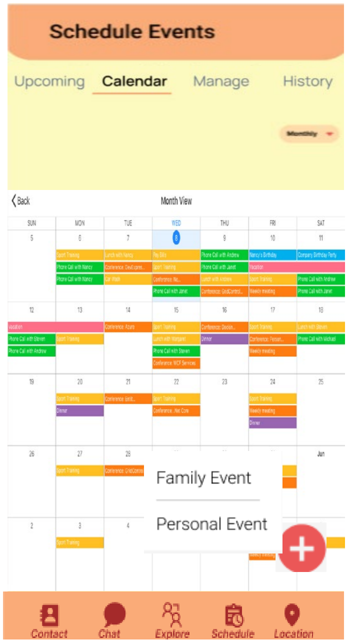

Figure 195: Calendar View (Monthly)

When user choose to view the event calendar in monthly view, user can view all the accepted events including family events and personal events in the monthly event calendar view. User can also add appointments or personal event or add family event by exploring the family event dashboard in this view. User can check whether their personal appointments or events clash with the family events. If there is a clash between them, user can choose to reschedule and manage his or her events better through this interface.

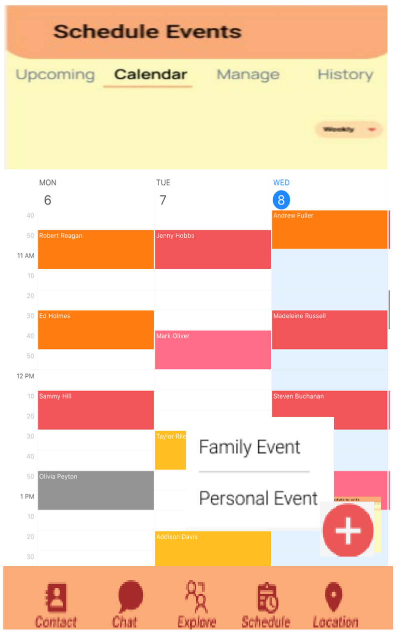

Figure 196: Calendar View (Weekly)

When user choose to view the event calendar in weekly view, user can view all the accepted events including family events and personal events in the weekly event calendar view. User can also add appointments or personal event or add family event by exploring the family event dashboard in this view. User can check whether their personal appointments or events clash with the family events. If there is a clash between them, user can choose to reschedule and manage his or her events better through this interface.

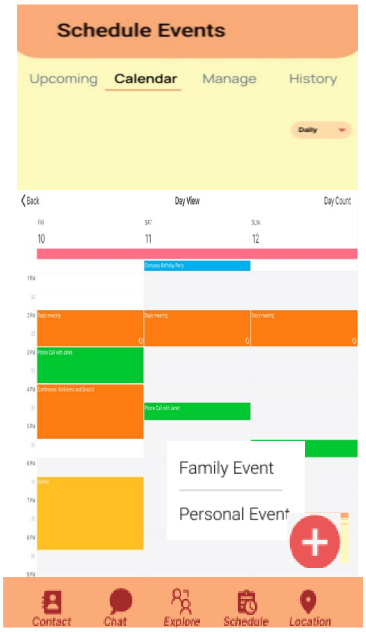

Figure 197: Calendar View (Daily)

When user choose to view the event calendar in daily view, user can view all the accepted events including family events and personal events in the daily event calendar view. User can also add appointments or personal event or add family event by exploring the family event dashboard in this view. User can check whether their personal appointments or events clash with the family events. If there is a clash between them, user can choose to reschedule and manage his or her events better through this interface.

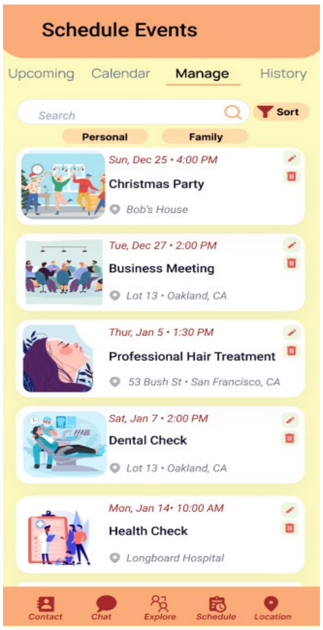

Figure 198: Manage Created Events

When user navigates to the Manage section, user will navigate to the Manage Created Events which contains all the upcoming events including family events and personal events created by the user. User can view the event's details such as the event title name, event location, and the event time. User can edit or delete his or her created events here. User can search, filter, and sort the events by event type and event name. When user chooses to delete the event, user will see a pop up asking for delete confirmation. When user presses on the event card, user can navigate to see the event details. If the event is a family event, the system will navigate user to the Family Event Detail page. If the event is a personal event, the system will navigate user to the Personal Event Detail page.

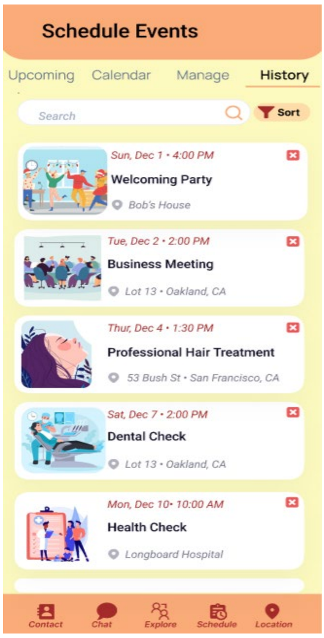

Figure 199: History section

When user chooses to navigate to the History section, user can all the past events' details such as the event title name, event location, and the event time. User can delete his or her past events here. User can search, filter, and sort the events by event type and event name. When user chooses to delete the event, user will see a pop up asking for delete confirmation. When user presses on the event card, user can navigate to see the event details. If the event is a family event, the system will navigate user to the Family Event Detail page. If the event is a personal event, the system will navigate user to the Personal Event Detail page.

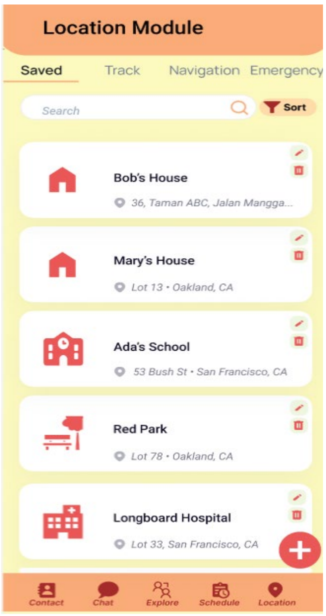

Figure 200: Location Module (Saved Locations)

When user navigates to the Location tab, the system will lead user to the Location Module. There are four sections for the Location Module, which are the Saved Locations List, Track, Navigation, and the Emergency Module. The landing page of the Location Module is the Saved Locations page. User can view all the saved locations details such as the place name, place type and place location. User can choose to add a new location here by pressing the "+" button. User can also search and sort the location list by type and name. User can edit and delete the chosen location here.

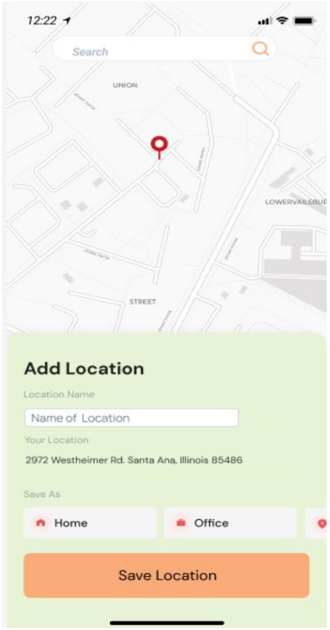

Figure 201: Add New Location

When user presses on the "+" button, the system leads user to the Add New Location page. As default, user can view his or her current place in the map. Users need to input the location name and the location type before saving the location. Input validation will be performed here to ensure no empty inputs. User can also search for other place to add the location into the location list.

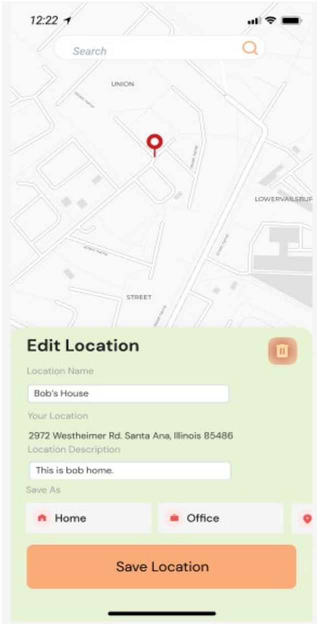

Figure 203: Edit Location

When user chooses to edit a chosen location, the system will lead user to the Edit Location page. User can view the recorded location details here as default. User can change the location information such as the location name, location coordinates and the location type here. All the changes made will be saved after user presses the Save Location button. User can also delete location here.

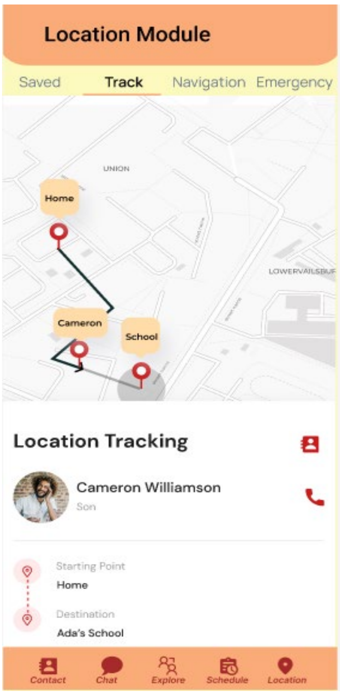

Figure 204: Location Module (Location Tracking)

When user navigates to the Track section, the system will lead user to the Location Tracking page. User can choose the other family members that he or she wants to track in this interface by pressing on the contact book button. User can view the location tracking of the chosen family member in the map, from the starting point to the destination. User can call the tracked family member through this page. User will receive the notification when the chosen family member leaves the starting point and arrives at the destination.

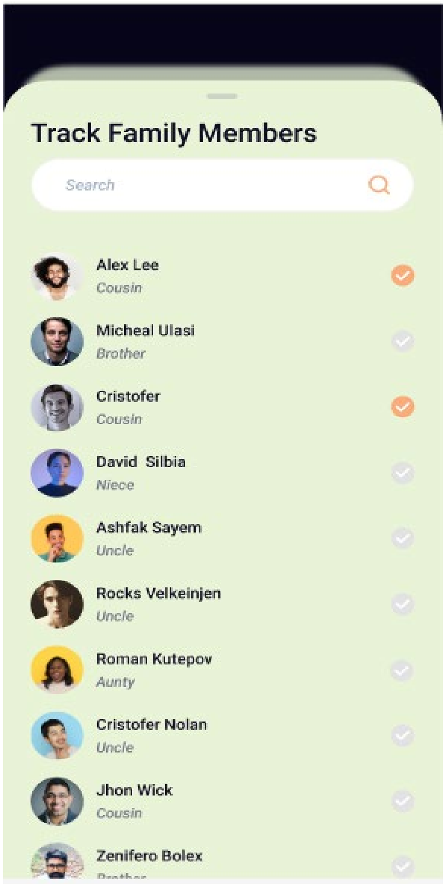

Figure 205: Choose Family Members to Track

When user presses on the contact book button, user can choose from a list of family members to keep track of their whereabouts. User can search by name in this page.

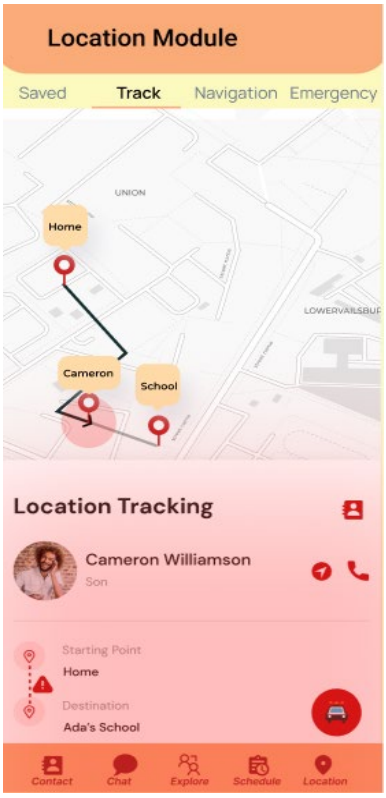

Figure 206: Family Member in Danger

When the chosen family member presses the SOS button in the Emergency Module, user will receive danger notification and chooses whether to navigate to the chosen family member location or call the chosen family member. User can also navigation to the chosen family member location by pressing on the navigation button which leads to the navigation page. User can also call the chosen family member here to confirm his safety. If there is no respond from the chosen family member and user cannot find the chosen family member at the location, user can call the police by pressing the police button.

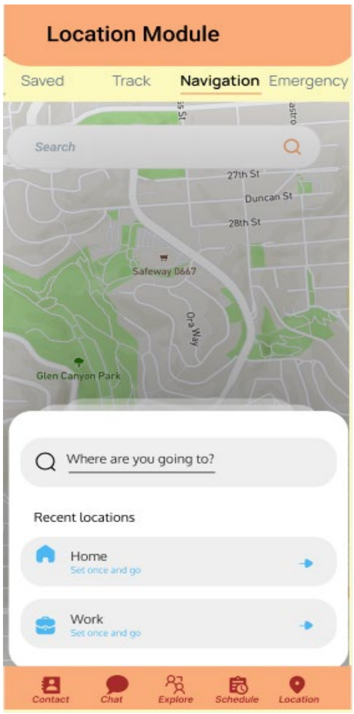

Figure 207: Location Module

When user navigates to the Navigation section, user can view the map view for the navigation. User can insert the destination where he wants to go. User also can choose the destination from the saved location lists. User can search for the place he wants to navigate here.

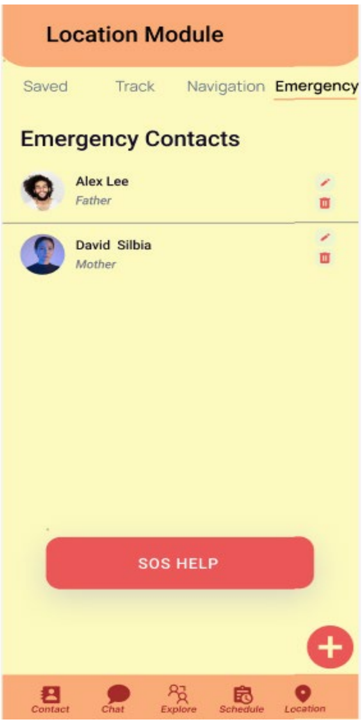

Figure 208: Location Module (Emergency Module)

When user navigates to the Emergency Module section, user can view a list of emergency contacts and their relationship with user. User can add new emergency contact here by pressing the "+" button. User can edit and delete the emergency contact too. User can ask for help if he or she faces danger by pressing the SOS help. When user wants to delete the emergency contact, a pop up will be prompted by the system for delete confirmation.

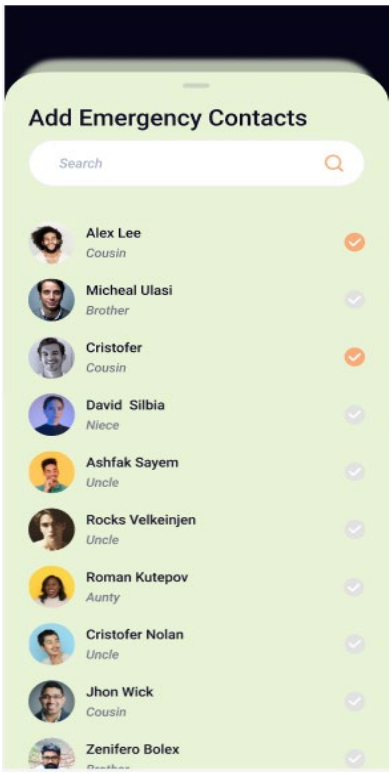

Figure 209: Add Emergency Contact

When user presses the "+" button, the system leads user to the Add Emergency Contact page. User can search by name here. User can add the emergency contact from the list of contacts.

Child Education Tracking Subsystem

Child Education Tracking Subsystem: Parent View

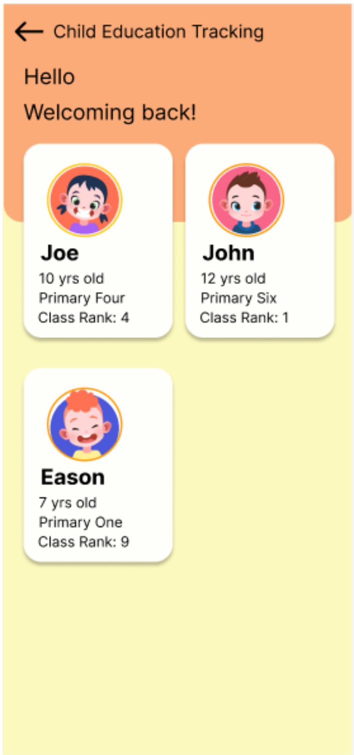

Figure 210:Children Panel

This is the first interface what parents can see when click into the child education tracking subsystem. This interface shows all the children. When parents click one of the children, the interface will go to children profile.

Figure 211:Children Profile

This interface shows the personal details of the chosen child. Parents can choose to see their study matters including daily activity schedule, countdown, performance and award.

Figure 212:Daily Activity Schedule

Parent can see the daily activity schedule of the child. Parents can search activities and tasks using the filters.

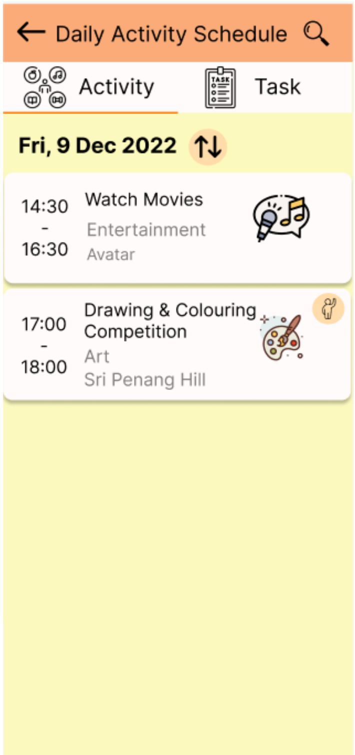

Figure 213:Activity List

Parents can see all the activities of the day and the details if they click into one of the days. The hand up icon shows that this activity needs parents to pick the children up.

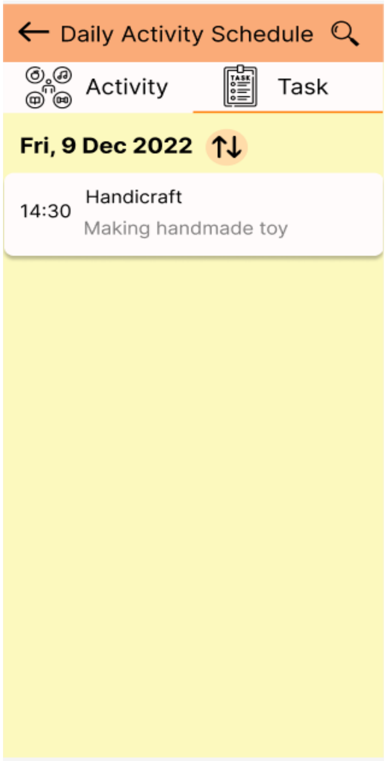

Figure 214:Task List

Task list is displayed when the task tab is clicked. The tasks that are scheduled to be due on the selected day are all displayed. The sort of task is available here.

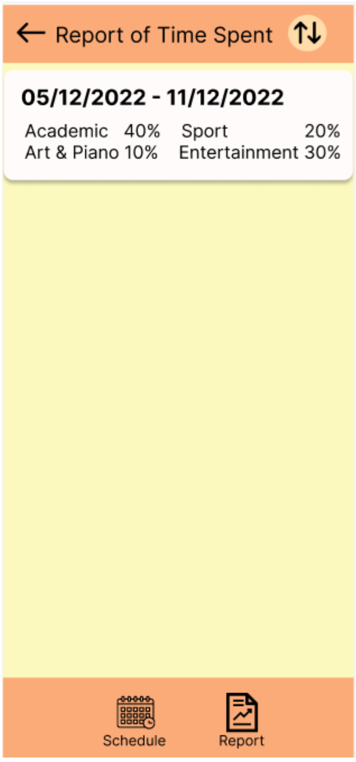

Figure 215:Report of Time Spent

This interface is displayed when report tab is tapped. This interface shows all the time spent reports. Parents can sort the list in ascending and descending order.

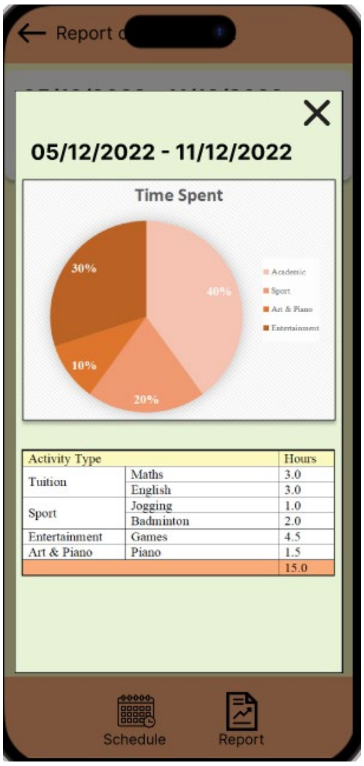

Figure 216:Details of time spent report

Details of time spent report displays when one of the reports is clicked.

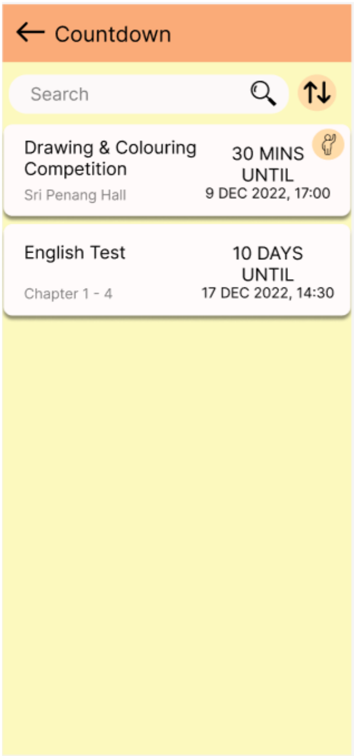

Figure 217:Countdown to the important dates

Interface goes to this page when countdown on children profile is clicked. This interface shows all the countdown to the events that are marked important by the children. Parents can search activities using the filters. Sorting is available too.

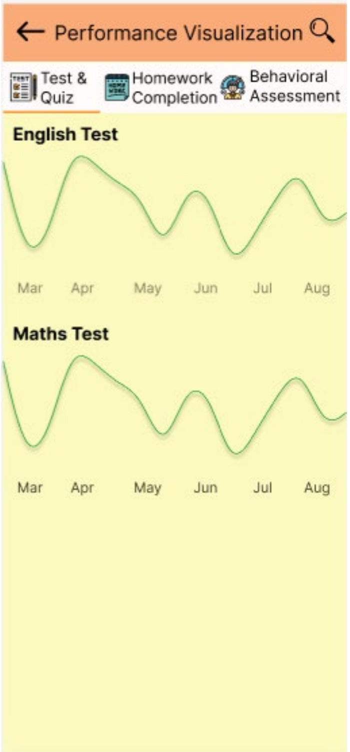

Figure 218:Performance Visualization

Interface goes to this page when performance on children profile is clicked. This interface shows all the performance of children on their academic results, homework completion rate and behavioural assessment. Parents can search charts using the filters.

Figure 219:Result List

All the results of selected chart are displayed when one of the charts is clicked. Appropriate words and images are displayed based on the results obtained. Parents can also sort the result list based on date and results.

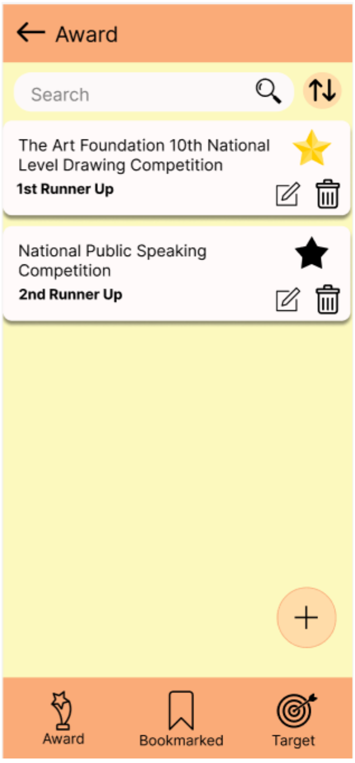

Figure 220:Award List

Interface goes to this page when award on children profile is clicked. This interface shows the awards obtained by children. Parents can search awards using the filters and bookmark significant awards. Parents can also add new award, edit award and delete award. Sorting of the list is available too.

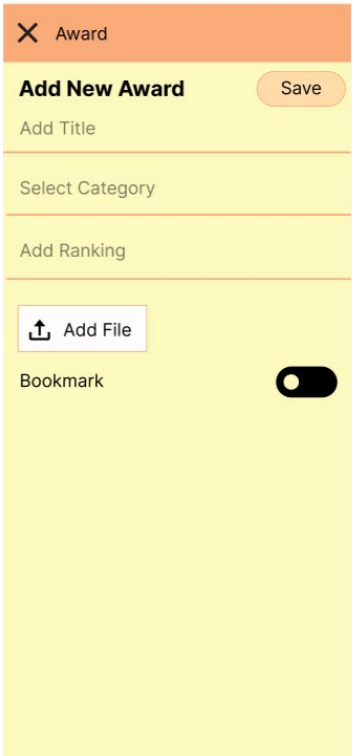

Figure 221:Add New Award

Parents can add the new award's details here.

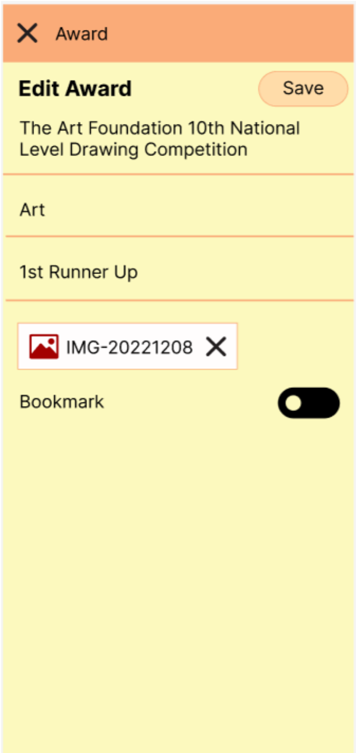

Figure 222:Edit Award

Parents can edit the details of the award that has been recorded down.

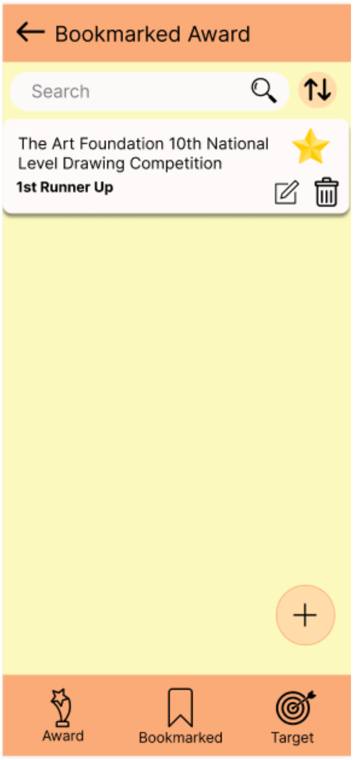

Figure 223:Bookmarked Award List

This interface is directed to when Bookmarked tab is tapped. This interface shows all the bookmarked awards. Parents can search bookmarked awards using filter, add new award, edit award and delete award. Sorting of the list is available too.

Figure 224:Target and Reward List

This interface shows all the target and its reward. There is status showing the status of target whether the target is accepted, completed, confirmed or rejected. There is also another status showing the status of the reward. If it is not yet given to children, it shows not given. Parents can add new target, edit existing target and delete target. Parents can also search targets using filter and sort the list.

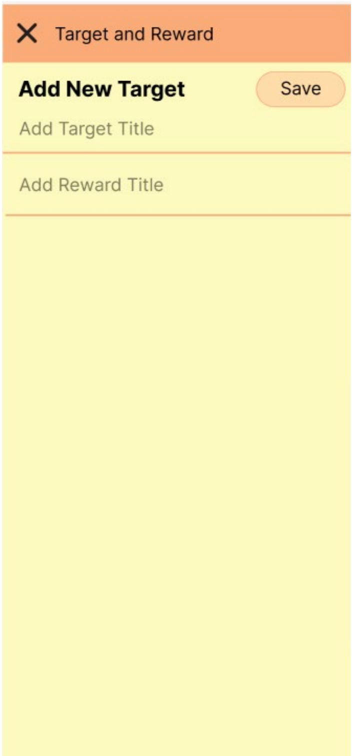

Figure 225:Add New Target

Parents can set the target and reward here.

Figure 226:Edit Target

Parents can edit the details of the target and reward that have been recorded down.

Figure 227:Give Out Reward

If status of the target shows confirmed, Give Out button can be displayed by long press the selected record.

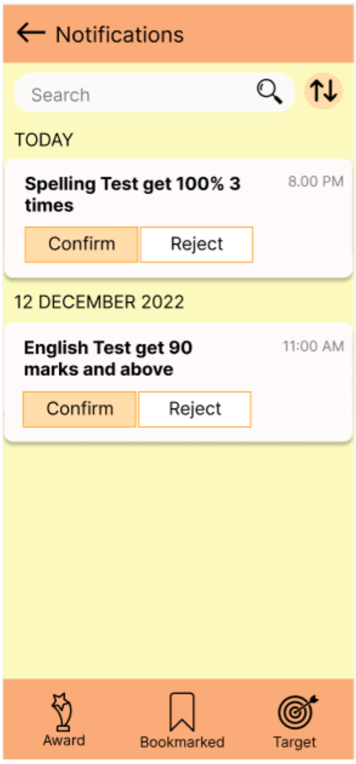

Figure 228:Notifications to confirm and reject completion of task

This interface is directed when the notifications icon in target and reward list is tapped. This interface allows parents to confirm or reject the completion of target. Parents can also search notifications using filter. Sorting of notifications is available too.

Child Education Tracking Subsystem: Children View

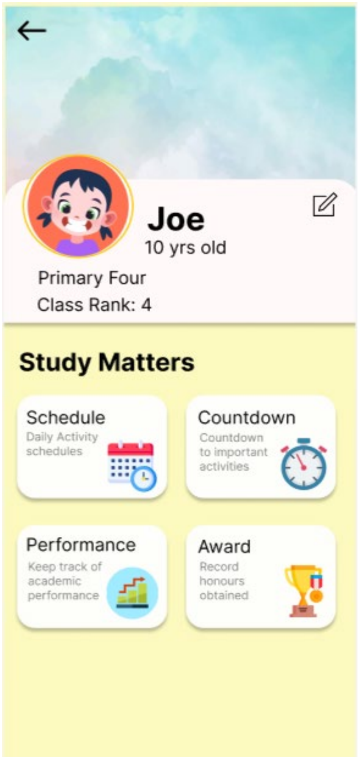

Figure 229:Children Profile

This is the interface that children can see when they click into the child education tracking subsystem. They can see their personal details, edit the details and see their study matters including daily activity schedule, countdown, performance and award.

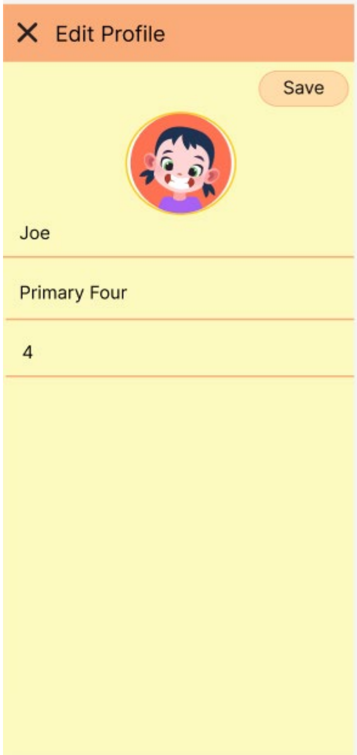

Figure 230:Edit Profile

Children can edit their personal details here.

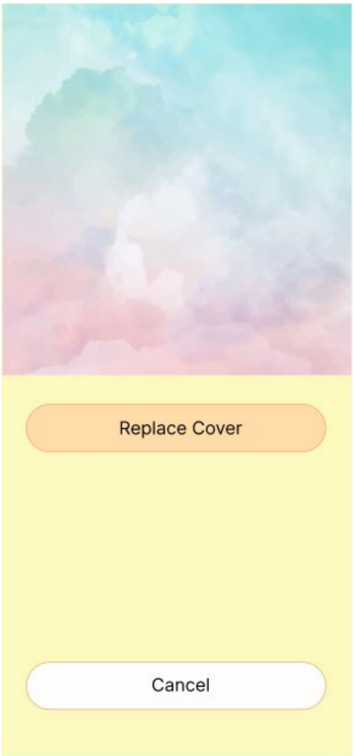

Figure 231:Edit Background Cover

Children can replace their background cover by tapping on the cover.

Figure 232:Daily Activity Schedule

Children can see their daily activity schedule here. They can also add new schedule and view all the activities and tasks of the day by clicking one of the days. Children can also search activities and tasks using filter.

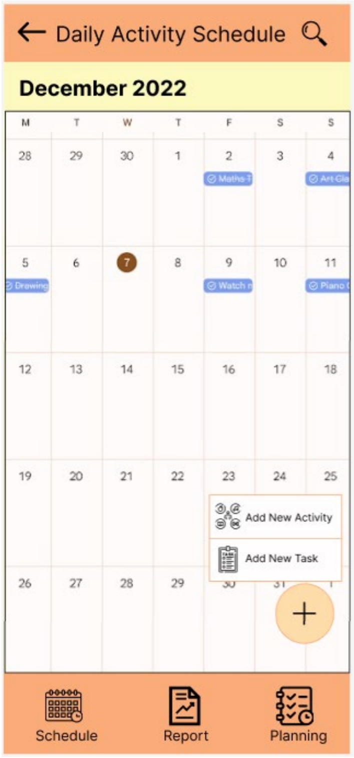

Figure 233:Daily Activity Schedule with the add button

When children click the add button, they can choose to add a new activity or new task.

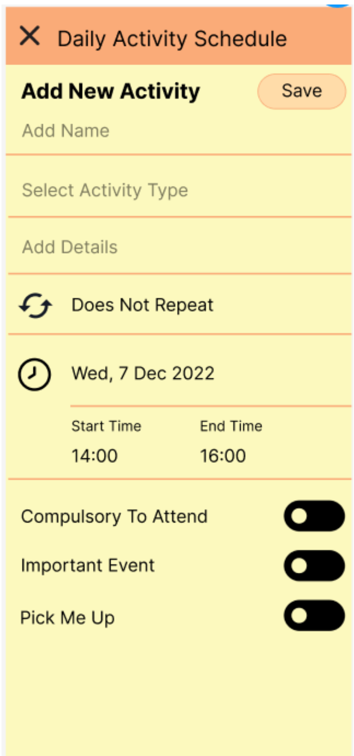

Figure 234:Add New Activity (Does Not Repeat)

This is the interface of adding new activities. If the activity is not repeated, then children need to fill in the exact date, start time and end time of the activity.

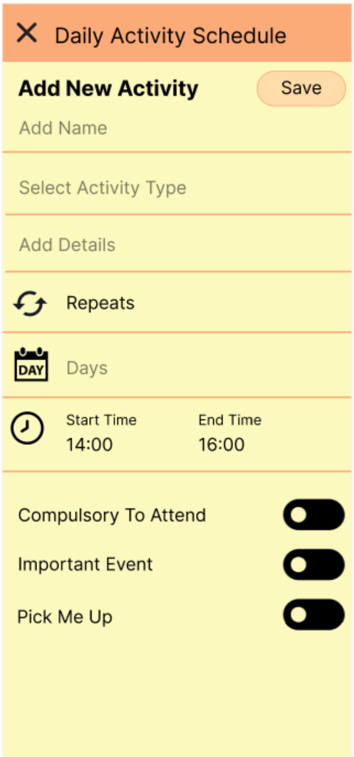

Figure 235:Add New Activity (Repeats)

This is the interface of adding new activities. If the activity is repeated, then instead of exact date of the activity, children need to fill in the day of the activity.

Figure 236:Add New Task

Add New Task interface displays when add new task button is selected.

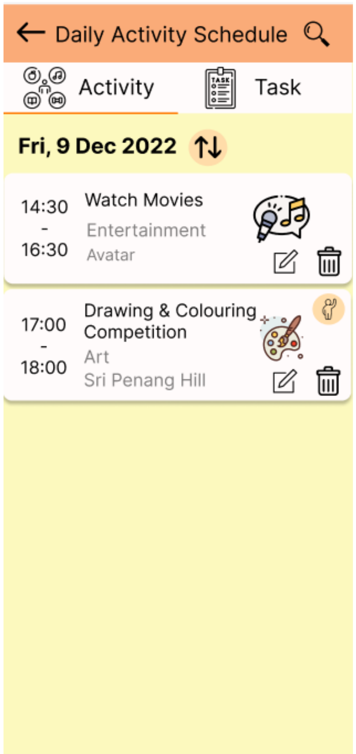

Figure 237:Activity List

All the activities will be displayed when one of the days is clicked. Children can edit and delete the activities. Sorting of activities is allowed. The hand up icon shows that this activity needs parents to pick the children up.

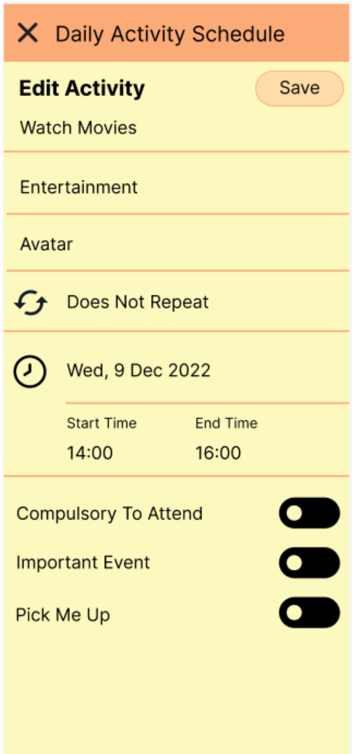

Figure 238:Edit Activity

Children can edit the details of the activity here.

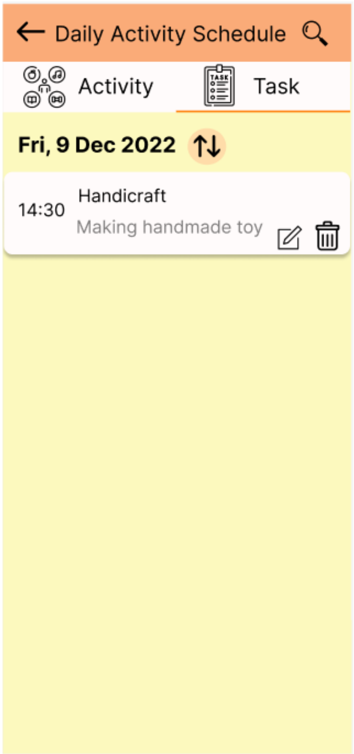

Figure 239:Task List

Task list is displayed when task tab is clicked. The tasks that are scheduled to be due on the day are all displayed. Children can edit and delete the tasks. Sorting of tasks is allowed.

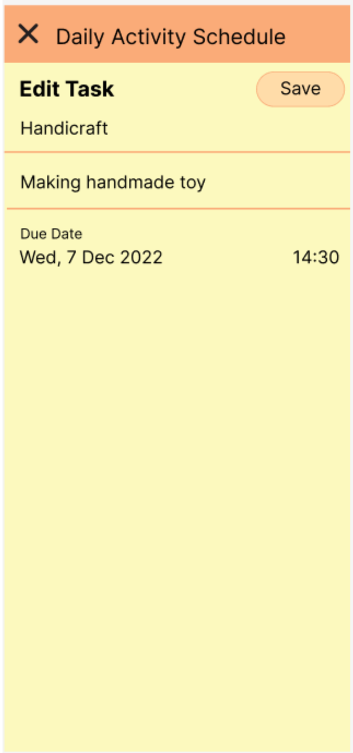

Figure 240:Edit Task

Children can edit the details of the task here.

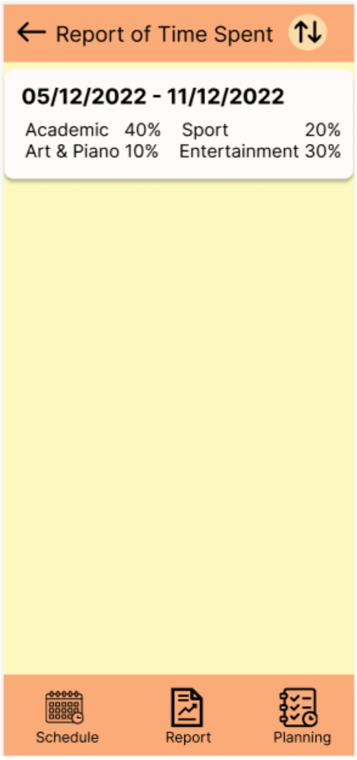

Figure 241:Report of time spent

This interface is displayed when Report tab is tapped. This interface shows all the generated time spent report. Sorting of report is available in ascending order and descending order.

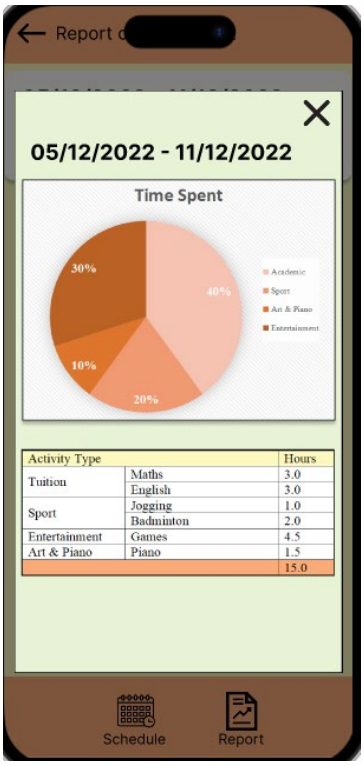

Figure 242:Details of time spent report

Details of time spent report displays when one of the reports is clicked.

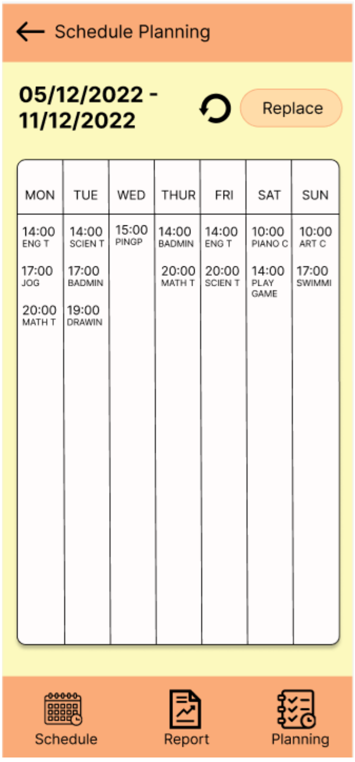

Figure 243:Schedule Planning

This interface is displayed when Planning tab is tapped. This interface shows the suggested weekly schedule for the children. If they wish to use the schedule, they can click the replace button. If they want another arrangement of the schedule they can click the repeat icon.

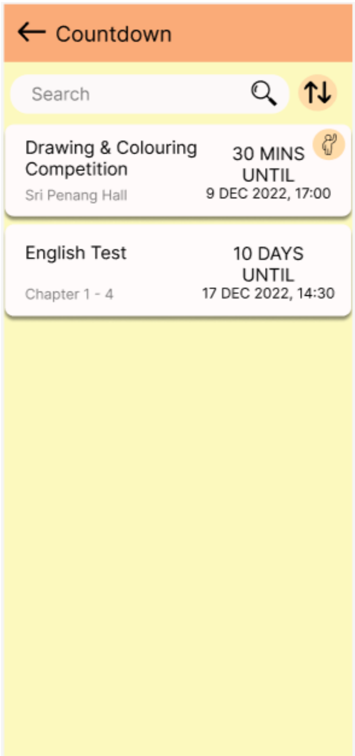

Figure 244 : Countdown to the important dates

Interface goes to this page when countdown on children profile is clicked. This interface shows all the countdown to the events that are marked important by the children at add new activity interface. Children can search activities by using the filter. Sorting is available here.

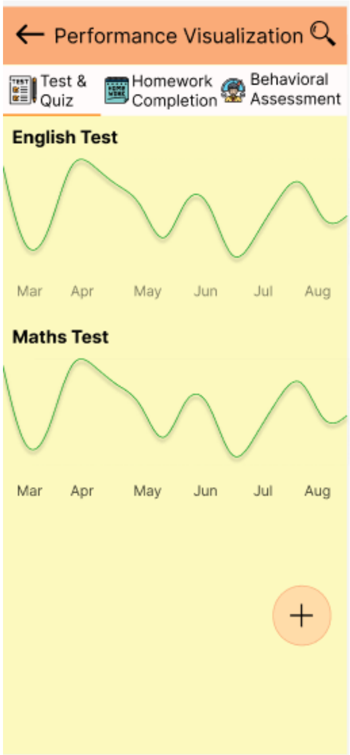

Figure 245:Performance Visualization

Interface goes to this page when Performance on children profile is clicked. This interface shows all the performance of children on their academic results, homework completion and behavioural assessment. Children can add new result and search the charts using the filter.

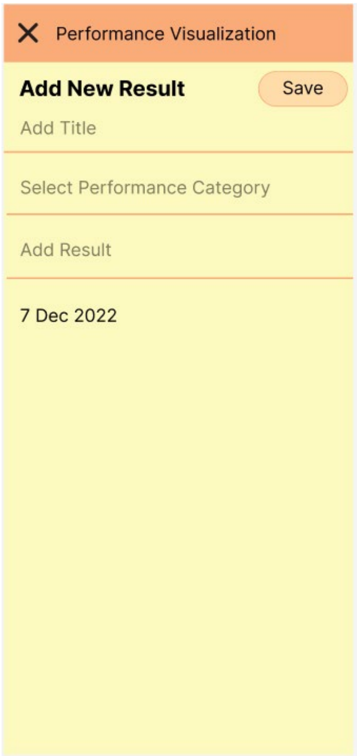

Figure 246:Add New Result

Children can add new result by tapping on the add new result button

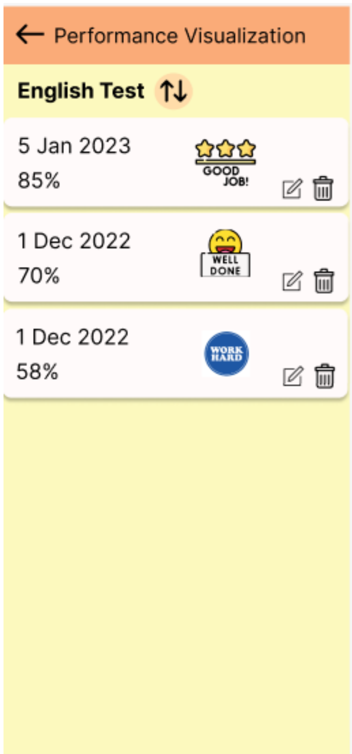

Figure 247:Result List

All the results of selected chart are displayed when one of the charts is clicked. Children can edit and delete the results. Appropriate words and images are displayed beside the record based on the results obtained. Sorting of the result is available here.

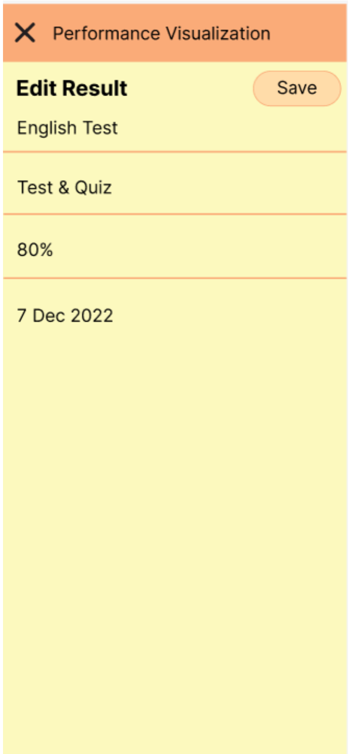

Figure 248:Edit Result

Children can edit the result that has been recorded down before.

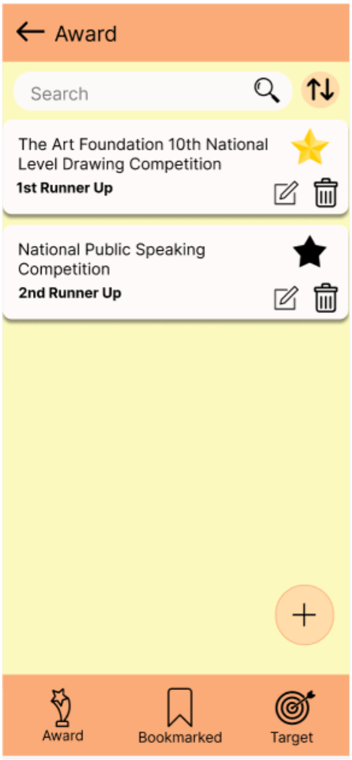

Figure 249:Award List

Interface goes to this page when Award on children profile is clicked. This interface shows the awards recorded down by children and parents. Children can also search awards using filter and bookmark significant awards. Children can also add new award, edit award and delete award. Sorting of awards are allowed.

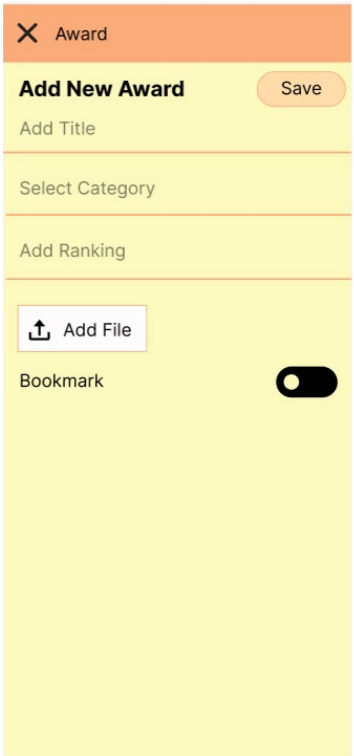

Figure 250:Add New Award

Children can add the new award's details here.

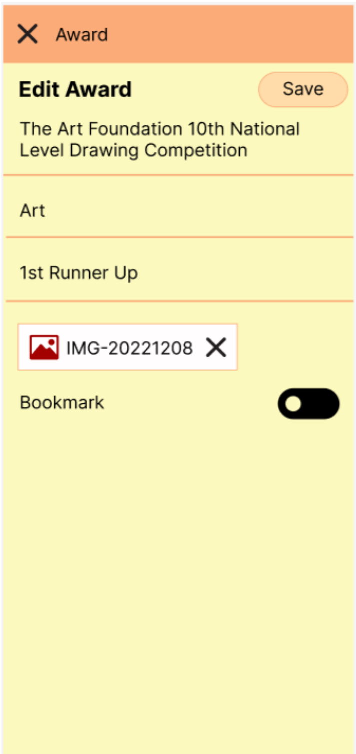

Figure 251:Edit Award

Children can edit the details of the award that has been recorded down.

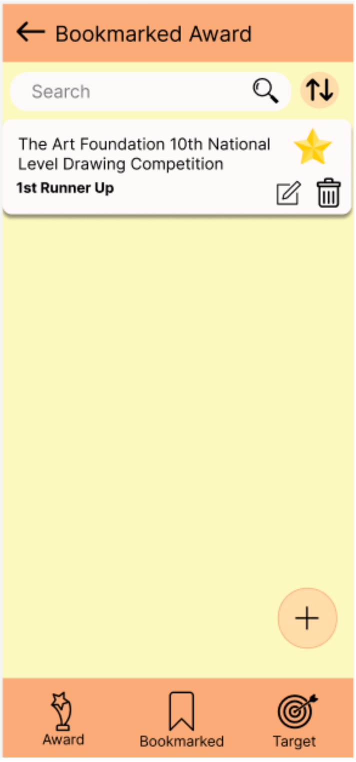

Figure 252: Bookmarked Award List

This interface shows all the bookmarked awards. Children can also search bookmarked awards using filter, add new award, edit bookmarked award and delete bookmarked award. Children can also sort the list in ascending and descending order.

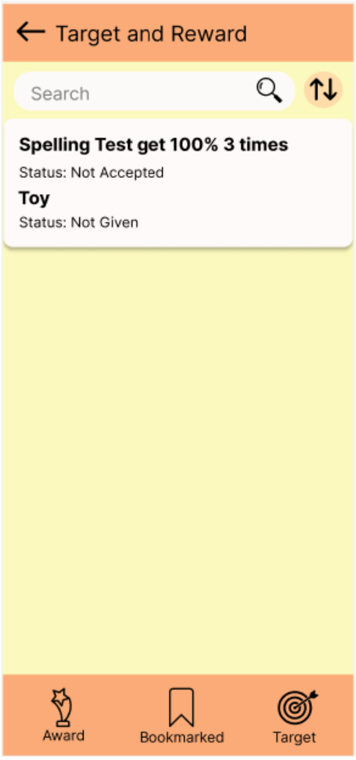

Figure 253:Target and reward list

This interface shows all the target and its reward. There are labels showing the target and reward status. Children can search target using filter. Sorting is allowed here.

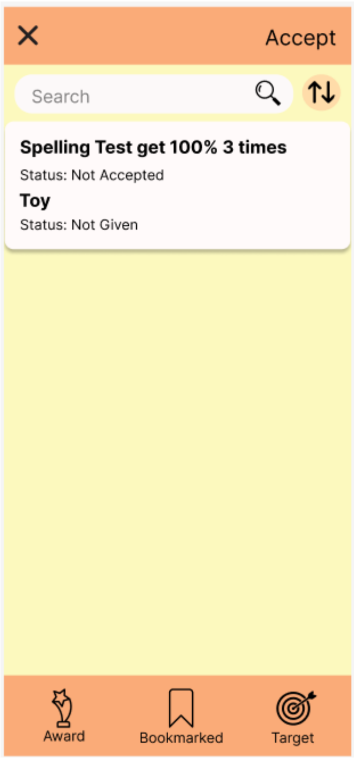

Figure 254:Accept Target

When children want to accept the target, they can long press the selected target. Accept button will be displayed after that.

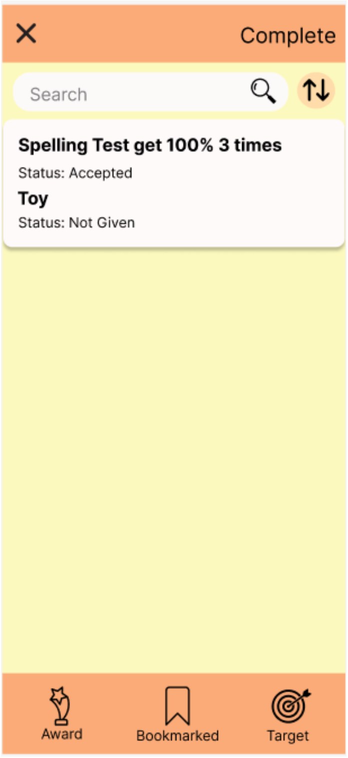

Figure 255:Complete Target

After children have accepted the target and want to mark the target as completed, they can long press the selected target and the complete button will be displayed after that.

Finance Monitoring Subsystem

Figure 256:Personal Daily Finance Record

This is the first interface that user will see when navigate to Finance Monitoring Subsystem. User can see the finance record (incomes/expenses) that been recorded successfully. User can add by click the "plus" icon and edit the finance record by clicking the record. The total income and total expenses is shown in this page and the total balance is calculated (total income – total expense). Besides, user can search finance record in this interface.

Figure 257:Personal Monthly Finance Record

User can also view the monthly income and monthly expenses in personal monthly finance record interface.

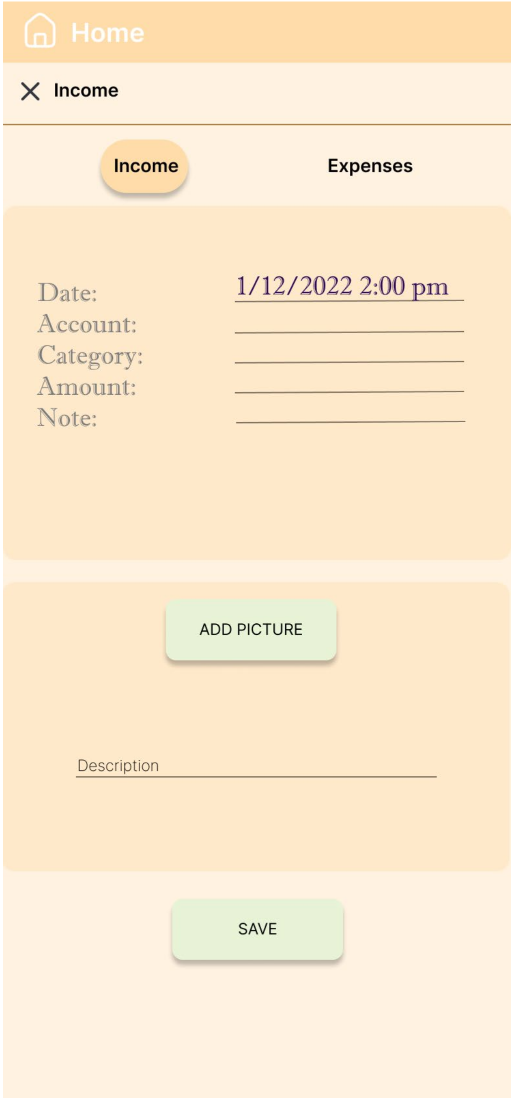

Figure 258:Add Income/Expense

User can add the finance details here which including date, account (personal/family), category, amount, note, picture, and picture's description.

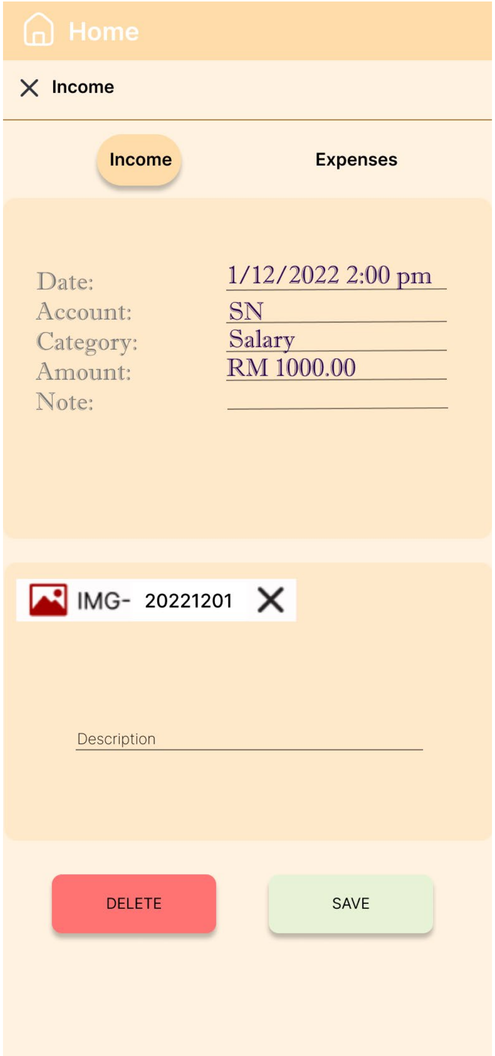

Figure 259:Edit / Delete Finance Record

User can edit the finance details in this interface and click on “Save” when done editing. User can also delete the finance record in this page.

Figure 260:Search Finance Record

User can enter the note written in the finance record. The search result is shown with the date, category, amount, income and expenses.

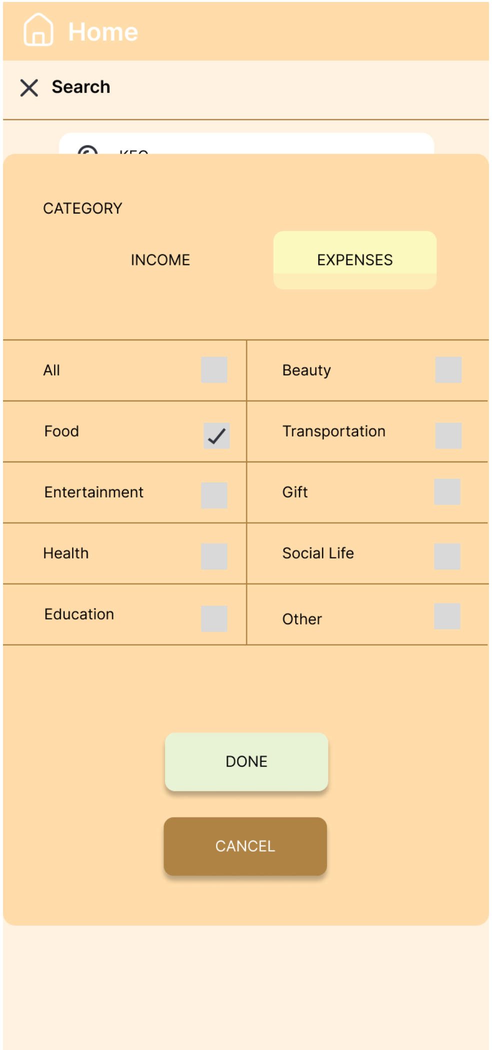

Figure 261:Search Finance Record by Category

User can also search finance record using category. User can check on the category that wanted to be searched.

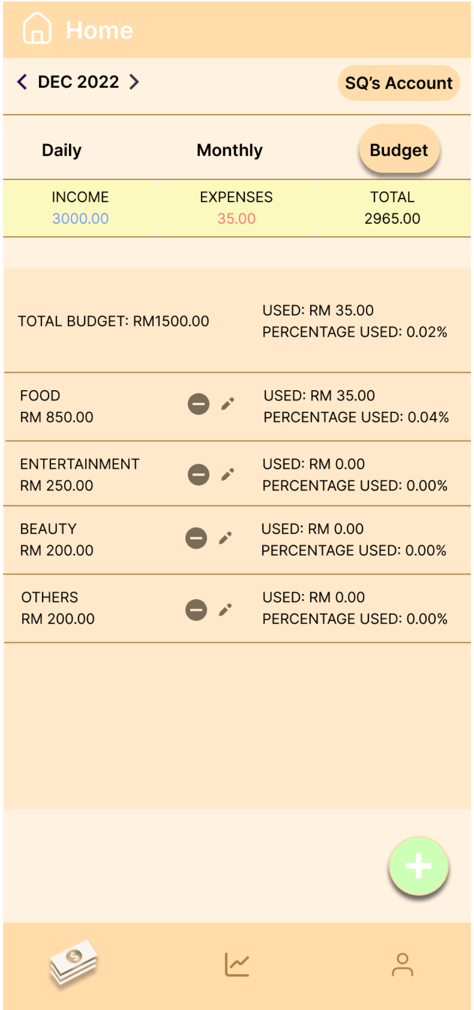

Figure 262:Set Budget

User can add new budget category by clicking the "plus "button. This interface shows the total budget, budget for each spending category and budget used. User can remove the unwanted category and edit the budget.

Figure 263:Add Budget

When user choose to add new budget, the system will direct user to this interface. User can add budget in this interface by choosing the category and the budget amount. Save the budget when the details are entered.

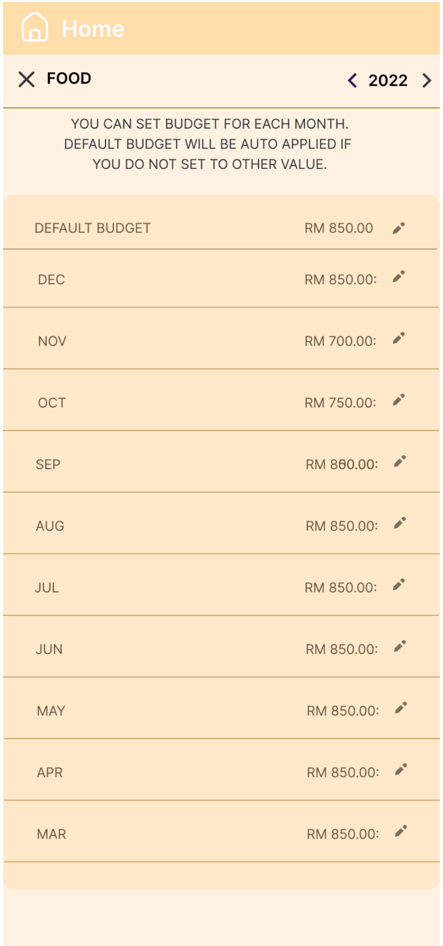

Figure 264:Edit Budget

When user choose to edit the budget, system will direct user to this interface. User can see the budget set for each month. User can set budget differently for each month. The default budget amount will be auto applied on the first day of the month if user does not change the value.

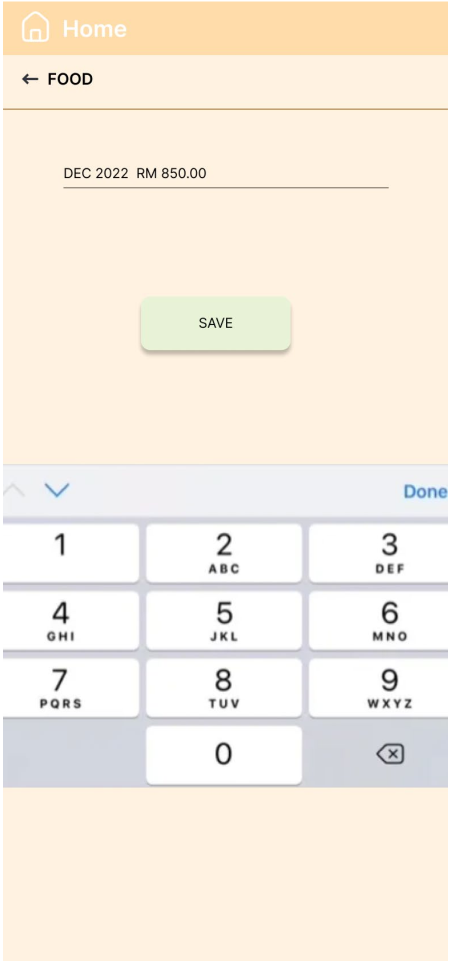

Figure 265:Edit Budget of Month

User can change the monthly budget to another amount in this page. Click save to update the budget amount.

Figure 266:Statistical Chart of Expenses

:

User can view the statistical chart and see the pattern of spending in this interface. The percentage of expenses, budget used and left will be also shown here.

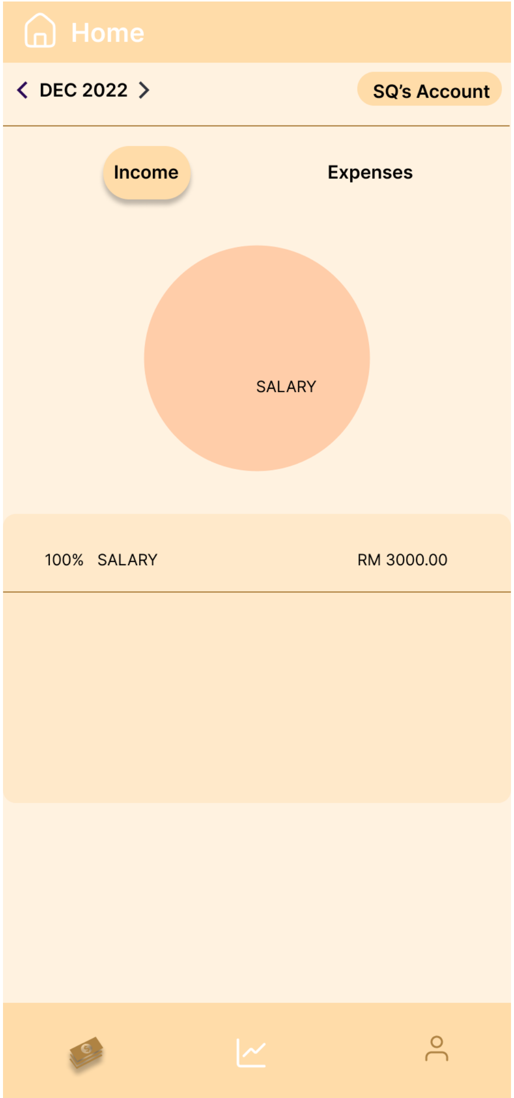

Figure 267:Statistical Chart of Income

:

User can view the statistical chart and see the pattern of incomes in this interface.

Figure 268:Family Daily Finance Record

User can see the finance record of family account that been recorded successfully in this interface by clicking the account at the top right. User can add by click the "plus" icon and edit the finance record by clicking the record. Children will not able to see this interface if parents choose to hide it from children.

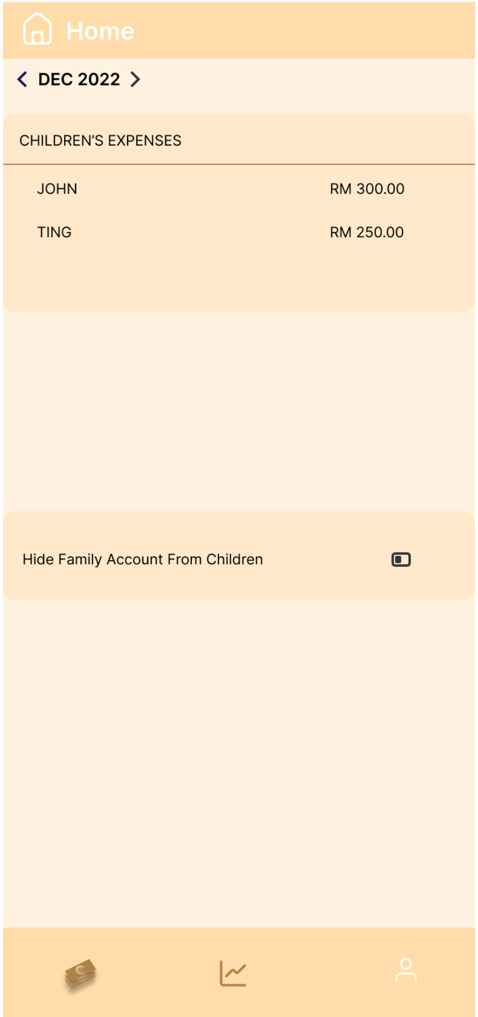

Figure 269:Children Expenses Tracking

This is parents' view which children will not see this interface. Parents can view their children's total monthly expenses in this interface. Parents can choose to hide family account from children so that children will not be able to add, edit and view family account's finance record. If children choose to hide the monthly total expenses, parents will not be able to see it.

Figure 270:Hide Monthly Expenses

This is children's view which parents will not see this interface. Children can choose to hide the monthly total expenses so that parents will not able to view children's total monthly expenses.

3.2 High Level Design

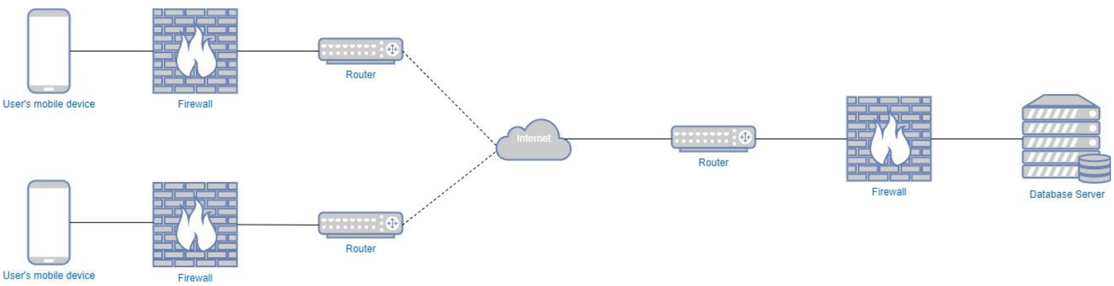

Figure 271: Network Diagram of Family Engagement System

3.2.1 System Architecture

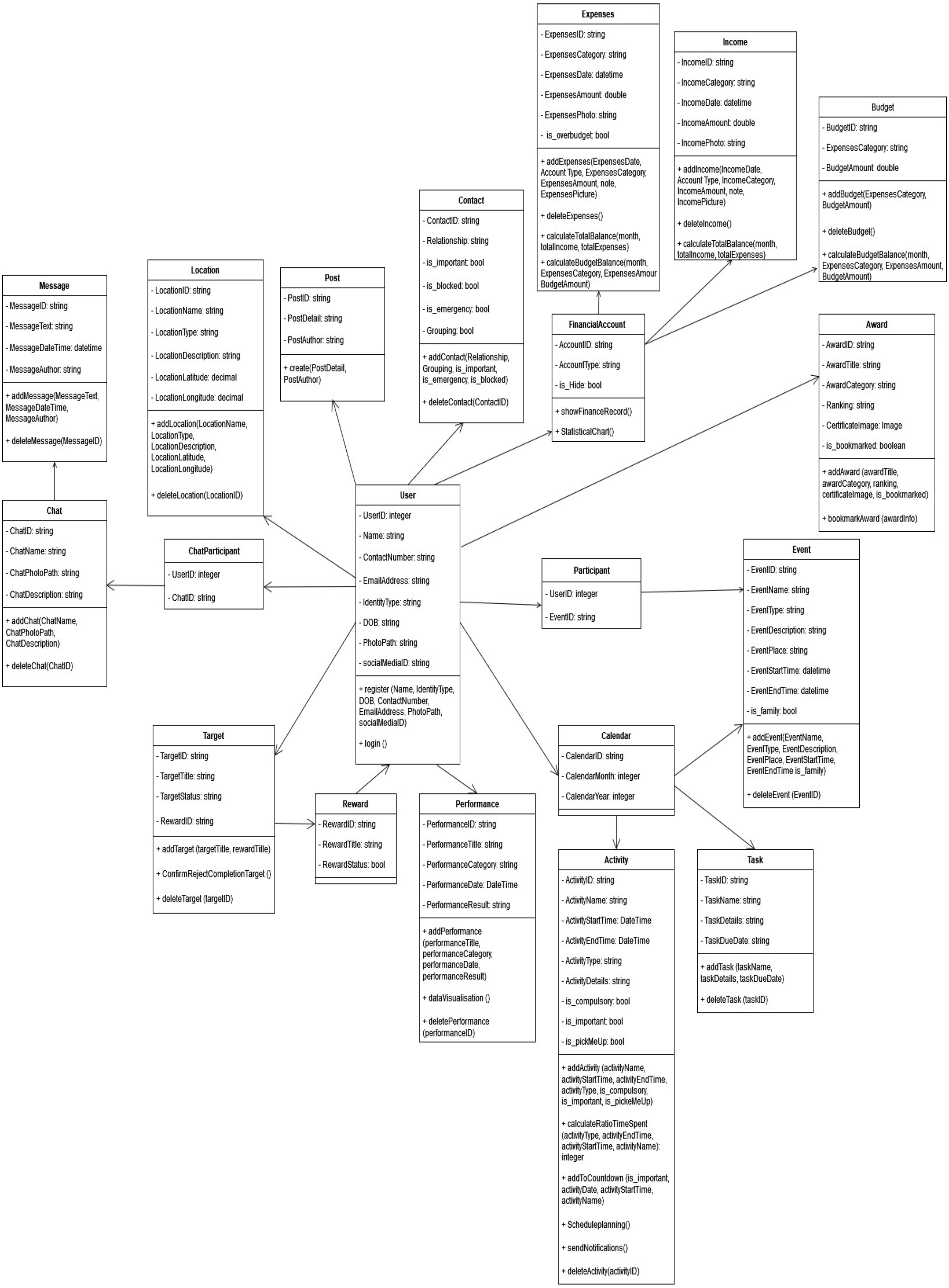

Figure 272: Design Class Diagram for Family Engagement System

User is associated with chat by involving as the chat participant in a chat. Chat is associated to message because one chat can have zero or more than one messages in the chat history. User is associated with Contact because user can have zero or many contacts in the system. User is associated with Event by involving as the event participant. User is associated with Calendar because each user will have one calendar for them to manage their schedule. Calendar is associated with Event because calendar can contain many events. User is associated with Location because one user can check in zero or many locations in the system. User is associated to Post because user can post zero or many posts to their social media account in the system.

The calendar is associated with Activity and Task. One calendar can store zero or many activities and tasks. User is associated with Performance as users with role child can add in their performance such as test and quiz scores. Besides, user is associated with Award because they can record down the awards obtained by children. User is associated with Target as user with role parent can set targets for the children. Target is associated with Reward as reward is given if children can accomplish the target.

User is associated with Finance Account and each user will have its own personal account and family account which user can choose to under incomes/expenses under own account or family account. Finance account is associated with Income where used for record income while Finance Account also associate with Expenses which used to record expenses. Finance Account also associate with Budget for budgeting purpose.

4 Software Test Plan

4.1 Purpose and scope

The purpose of this Software Test Plan is to develop a test plan to assess all functionalities of the Family Engagement System for the software company. The scope of this plan is to test the Family Engagement System by each component, component integration, and full system functionality. This Software Test Plan will include unit testing, component testing, system testing and acceptance testing.

4.2 Test items

The first subsystem that will be tested is the Contact and Appointments Subsystem. This system helps user which are parents or children to have a better management of the family and personal appointments or events. It aims to build a better communication among the family members too. This subsystem consists of five modules which are chat module, event creation and scheduling module, location module, one-stop story feed module, and appointment module. Chat module aims to ease daily communication between family members. Event creation and scheduling module allows users to manage and schedule their family activities and personal events. Location module allows users to check in their locations and track other family members' locations. Location module also have SOS features where users can ask for help if they are in danger. One-stop story feed module allows users to view all the social media posts from the other family members. One-stop story feed module also allows users to add new posts to the social media. Appointment system allows users to view all the important events that they had accepted in the calendar system and see whether their personal appointments clashed with their accepted family events. The system would send reminders to invited family members when family activities or personal appointments are approaching.

The second subsystem that will be tested is the Child Education Tracking Subsystem. This subsystem helps parents to keep track of their children's performance and get involved in their children's education. This subsystem consists of four modules which are daily activity schedule, important dates reminder, performance tracking and awards modules. Daily activity schedule module aims to help children to record down their daily activities and tasks and display the schedule on the calendar. It will also generate time spent report automatically and plan weekly schedule for the children to achieve balance schedule. Important dates reminder module aims to remind users about the important event dates. It will show countdown to the important dates and send reminder notifications to users when the events are approaching. Performance tracking module aims to help children to record the results obtained from various aspects. It will analyse the data and display it in charts. Alert notifications will be sent to parents when children do not perform well. Awards module aims to help children to record the honours obtained by themselves. Parents can set targets for the children. When children have declared that they have accomplished the targets, notifications are sent to parents for confirmation.

Next, the third subsystem to be tested is the Finance Monitoring Subsystem. There are four modules in this subsystem which are finance record module, budgeting module, statistical chart module and children's expenses. In Finance Record module, each family member can record their incomes and expenses in their own account and family account. Parents or children that already have work can also put some of their income to family account. When family members are recording their expenses, they can either choose to record in their own individual account or in the family account. For the children that have not working, their income might be the pocket money get from parents. Parents can choose to hide family account from children. In Statistical Chart, family members can view the monthly statistic of outcomes to have a better figure on the expenses. This module shows the pattern analysis each spending category and will recommend how much to spend in each category. In Budgeting module, user can set budget for each expense category, a reminder will be shown when the expenses of a particular category have exceeded 70% of the budget set earlier. Besides, a reminder to log in daily expenses will also be shown if the user does not key in any expenses. In Children Expenses Tracking module, parents can check their children's total monthly spending so that parents can know whether they have overspending. There is an option which to not showing the total monthly expenses to their parents.

4.3 Requirements/Features to be tested

Table 94:Requirements/Features to be tested

Features to be tested	**Description**
Contact and Appointment	
Register contact	New contact must be added to the user's contact list. The newly added contacts are displayed on the contact list with correct contact information.
Edit contact	The latest chosen contact details must be updated to the database.
Delete contact	The chosen contact must be deleted from the database.
Create event	New event must be created and stored in the system database after user confirms to create new event.
Suggest possible family events	Suggestion on possible family events should be generated and displayed to user.
View event calendar	The system must show user's correct family events and personal events with the correct time and information in the calendar.
Schedule event	The system shall allow user to schedule and reschedule the accepted family events and personal events. The changes on the events should be recorded in the database. The rescheduled events list should be displayed correctly.
Update event	The details of the chosen event are displayed in the edit event interface. Chosen family event or personal event detail must be updated and recorded in the database after user made changes to the details.
Delete event	The selected events are deleted from database and event list. The latest event list should be updated after user delete the chosen event.
Receive reminders about upcoming events	The system sends reminders about the upcoming events to users when the events are approaching.
Check in location	New location is created and stored in database. Newly added location should be added to the location list.
Edit location	The changes made to chosen location details must be updated to the database.

Delete location	The chosen location must be deleted from the database and removed from the location list.
Track other family member location	The system shows the location of other family member, from the beginning to the destination, to allow location tracking.
SOS help module	The system displays a SOS button in the Emergency interface. The system sends the last location of user to emergency contacts after user presses the SOS button. The system should allow calling to user from emergency contact and to the police.
Create social media post	The system should create a new post to user's social media account.
View social media posts by other family members	The system displays the posts by other family members from social media.
Create chat	New chat must be created and added in the chat list after user creates a new chat.
Make chat call	The system should be able to make chat call for the chat participants.
Edit chat	The latest changes to the chat details should be updated in the system database.
Pin chat	The chosen chat must be pin to the top of the chat list.
Leave chat	The system should remove user from the group chat participants and the changes should be updated to the database. The system should delete the group chat from user's chat list.
Delete chat	The selected chat must be deleted from the database and the chat list after user's deletion.
Add Message	The newly added message should be added to the chat history.
Delete Message	The selected message must be deleted from the database and the message list after user's deletion.
Receive Notifications for Important Contacts	The system sends notifications to user when user rarely connects with the important contacts.
Child Education Tracking	
Add new activity	The newly added activities are stored into the database successfully. The activities are displayed on the activity list and daily activity schedule on the correct date.
Edit activity	The details of the selected activity are displayed in the edit activity interface. The database is updated with the most recent information on the activity.

Delete activity	The selected activities are deleted from database, activity list and daily activity schedule.
Add new task	The newly added tasks are stored into the database successfully. The tasks are displayed on the task list and daily activity schedule on the correct date.
Edit task	The details of the selected tasks are displayed in the edit task interface. The database is updated with the most recent information on the task.
Delete Task	The selected tasks are deleted from database, task list and daily activity schedule.
Suggest weekly timetable schedule	The system shall plan a balanced weekly timetable schedule for children. All activities are arranged properly without crashing with other activities
Label important events	The system shall show the activities that are marked as important in the countdown list.
View countdown to important events	The system shall show the countdown to all the events that are marked as important. The countdown timer is working correctly for all the important events.
Receive reminder notifications	When events that are marked as important are approaching, the system will send reminder notifications to the users
View report of time spent	The system calculates time spent calculation accurately. Charts show the correct percentage of time spent within a week.
View daily activity schedule	The system can show the daily activity schedule correctly with all the added activities
Add the results of various academic achievements	The newly added results are stored into the database successfully. The results are displayed on the result list and chart correctly based on the result type.
Edit results	The details of the selected results are displayed in the edit result interface. The database is updated with the most recent information on the result.
Delete results	The selected results are deleted from database, result list and chart.
View academic achievements' results in charts	The system shall show the children results in charts and the charts are classified in correct categories.

Receive alert notifications	When children's performance keeps declining or gets worse over time, alert notifications are sent to parents so that they can give attention of their children's education.
Add awards obtained	The newly added awards are stored into the database successfully. The awards are displayed on the award list. If the awards are being bookmarked, then the awards are shown on the bookmarked award list.
Edit award	The details of the selected awards are displayed in the edit award interface. The database is updated with the most recent information on the award. Award is showing the updated details on the award list.
Delete award	The selected awards are deleted from database and award list.
Bookmark important awards	The system shall push the awards that are being bookmarked to the bookmarked award list.
Set targets and rewards for children	The newly added targets and rewards are stored into the database successfully and displayed on the target and reward list.
Edit targets and rewards	The details of the selected target and rewards are displayed in the edit target interface. The database is updated with the most recent information on the target and reward. Target is showing the updated details on the target and reward list.
Delete targets and rewards	The selected targets and rewards are deleted from database and target and reward list.
Accept target	The system shall show accepted target status if children have accepted the target.
Mark accepted target as completed	The system shall show the complete button on the upper right corner if the target is accepted, and the target is being long pressed. The target status should change to completed after the complete button is pressed.
Receive confirmation notifications	Once the target is marked as completed, notifications should be sent to parents for confirmation of the target's completion.
Confirm completion of targets	The system should show all the confirmation requests on the notifications. Correct status (confirmed / rejected) is displayed on the target and reward list.
Give rewards	The system shall show the give out button on the upper right corner if the target's status shows confirmed and the target is

	being long pressed. The reward status should change to given after the give out button is pressed.
Finance Monitoring	
Edit budget	The budget amount can be edited based on the month and category. The data of budget is updated to the database. The budget balance is calculated and updated to the database.
Delete budget	Budget category with amount can be deleted on selected month. The data of budget is deleted in the database. The budget balance is calculated and updated to the database.
Set budget	Budget with category, amount and month is added and store in database. The budget balance is calculated and updated to the database.
Create new expense/income record (finance record) in personal account	New finance record with necessary details is added to the database. The total balance and the budget balance is also updated to the database based on the finance record created by the user in personal account.
Overspend reminder	An overspend reminder is sent when the expenses has over 70% of the budget set.
Expenses record reminder	Expenses record reminder is sent when there are no expenses record after 8pm.
View personal finance record	The system will show the personal finance record with correct details in personal account.
Delete personal finance record	Selected finance record can be deleted. The data of finance record is deleted in the database. The total balance and budget balance is calculated and updated to the database in personal account.
Edit personal finance record	Selected finance record can be edited. The data of finance record is updated to the database. The total balance and budget balance is calculated and updated to the database in personal account.
View statistical chart	The system calculates the budget left and shows the chart with percentage of each finance category.
Create new expense/income record (finance record) in family account	New finance record with necessary details is added to the database. The total balance and the budget balance is also updated to the database based on the finance record created by the user in family account.

View family finance record	The system will show the personal finance record with correct details in family account.
Delete family finance record	Selected finance record can be deleted. The data of finance record is deleted in the database. The total balance and budget balance is calculated and updated to the database in family account.
Edit family finance record	Selected finance record can be edited. The data of finance record is updated to the database. The total balance and budget balance is calculated and updated to the database in family account.
Hide family account	Parents can hide the family account from children. Children cannot do any action on family account.
View children's monthly expenses	Parents can view children's monthly expenses.
Hide monthly expenses	Children can hide their monthly expenses from children. Parents cannot see children's monthly expenses when children hide their monthly expenses.

4.4 Requirements/Features not to be tested

Table 95: Requirements/Features not to be tested

Subsystem	**Features Not to be Tested**	**Reasons**
Contact and Appointment	Provide map information	Google Map API is well-known and stable to provide accurate map information.
	Provide public holidays information	Holidays API is stable to provide accurate Malaysia public holidays information.
	Provide social media posts	Social Media API is stable to provide accurate social media posts from social media accounts.
Child Education Tracking	Setting up the calendar	Google Calendar API is used; thus, it is stable

4.5 Test approach/strategy

4.5.1 Testing Levels

We will carry out the main four levels of testing in software testing which are unit testing, integration system, system unit and acceptance testing.

4.5.1.1 Unit Testing

Unit testing is the first level of testing that is done before integration testing. The smallest testable unit of a system is tested during unit testing. We test each subsystem and each module separately in this unit testing. It determines whether an individual unit or component is performing its functions. We probably will carry it out throughout the coding process. To carry out unit testing, we will construct unit tests in individual function, method, procedure, or object forms to verify the correctness of the unit under test [21]. Since every piece of the code will be tested in unit testing, it also can be referred to as the white box testing technique. When unit testing is done properly early in the development process, bugs are fixed early which can then save time and money in the end.

4.5.1.2 Integration Testing

Integration testing is a type of software testing in which the different units, modules or components of a software application are tested as a combined entity. It focuses on determining the correctness of the interface. The purpose of integration testing is to expose faults in the interaction between integrated units. Once all the modules have been unit tested, integration testing is performed. To avoid missing out on any integration scenarios, proper sequence needs to be followed. Exposing the defects is the major focus of the integration testing and the time of interaction between the integrated units.

4.5.1.3 Acceptance Testing

Acceptance testing is the last testing before the software is released to the production environment [22]. We plan to implement alpha testing and user acceptance testing for Fam1st. We will conduct alpha testing by playing role as testers for each other’s subsystem. This aims to discover development bugs before deployment. All the bugs will be recorded in a document and solved to improve the system quality. We plan to carry out user acceptance testing by gathering a group of possible end users to test Fam1st before delivering it. We will provide the end user testers with tasks that covers test scenarios and test plans as stated in section 4.6 to allow them testing the flow of our software. We will record all the bugs and defects found in a document. Based on the documentation, we will solve the defects accordingly and improve Fam1st quality before deploying to users.

4.5.2 Testing Techniques

We would use the two basic types of software testing techniques, which are static testing and dynamic testing, to test our system.

4.5.2.1 Static Testing

Testing methods known as static testing do not call for the execution of a code base. Static testing techniques that we would carry out are informal review, technical review, walkthrough, and inspection.

4.5.2.1.1 Informal Review

A review that doesn't follow a formal or written method is called an informal review. It is similar to pair review, buddy check, and buddy pairing. The primary objective is to find possible defects, but it may also come up with ideas, solutions, or swiftly fix little issues [23]. These reviews are not documented or based on the procedure. It's not required to execute the code to check for errors. This testing method is used at the beginning of the document's test life cycle. We implement this testing technique and review each other's documents to prevent unnecessary defects or bugs.

4.5.2.1.2 Technical Review

Technical review is a review meeting when only the technical features of the document are being reviewed and discussed to reach an agreement. It is a form of peer review. The difference between this review and informal review is it is necessary to consult with technical professionals like architects and chief designers to do the technical review [24]. They check the software product's suitability for the application for which it is designed and detect deviations from requirements and standards. The focus on defect detection using reference documentation is minimal to nonexistent. To make sure we employ the proper technical principles, we are prepared for reviews from our supervisors and examiners.

4.5.2.1.3 Walk Through

Walk through is an informal meeting for an author to explain the software product to other peers to receive comments [25] Through walk through, we can determine the feasibility of suggested work product. We plan to carry out walk through whenever we need to get feedback from other people in design and development stage. For example, we had a walk through on the design flow of a module together. The module author would lead the conversation and explains the flow to other members. Other members could give constructive suggestions about the design flow. The module author takes down the defects and suggestions given by other team members. This aims to improve Fam1st quality.

4.5.2.2 Inspection

Inspection is a formal type of review that involves checking the documents thoroughly before a meeting that is led by moderators. A meeting is then held to review the code and the design. During inspection the documents are prepared and checked thoroughly before the meeting. Inspection meetings can be held both physically and virtually and the purpose of these meetings is to review the code and the design with everyone and to report any bugs found. It involves peers to examine the product. A separate preparation is carried out during which the product is examined, and the defects are found. The defects found are documented in a logging list or issue log and a formal follow-up is carried out by the moderator applying exit criteria.

4.5.2.3 Dynamic Testing

The dynamic behavior of software code is tested using the software testing technique known as dynamic testing. White box testing and black box testing are the two categories into which dynamic testing is divided.

4.5.2.3.1 White Box Testing

White box testing is a testing method that examines the internal organization, code, and design of software to validate input-output functionality and enhance design, usability, and security [26]. White box testing is also known as Clear box testing, Open box testing, Transparent box testing, Code-based testing, and Glass box testing since code is visible during this type of testing. The features that will be tested using this type of testing are summarized in section 4.5.3.

4.5.2.3.2 Black Box Testing

Black box testing is a software testing method in which the functionalities of software applications are tested without having knowledge of internal code structure, implementation details and internal paths. Black box testing focuses on input and output of software application, and it is entirely based on software requirements and specifications. Tester “do not need to know how a system is coded or architected and expect to receive an appropriate response to their requests, a tester can simulate user activity and see if the system delivers on its promises.

4.5.2.3.3 Scenario-Based Testing

Scenario-Based Testing is testing on specific user scenarios which emphasizes on validating the main goals of the system [27]. We carry out scenario-based testing based on our use case scenario to ensure that our system can enable end users to conduct the specified tasks in our system from the beginning to the end successfully. We allow testers to test according to the test cases stated in section 4.6

4.5.3 Testing Strategy / Approach Applied on Features to be Tested

Table 96: Test cases with the black box testing or white box testing

Test Case	**Black box testing / unit testing**	**White box testing**
Contact and Appointment Subsystem		
Register contact	✓	

Edit contact	✓	
Delete contact	✓	
Create event	✓	
Suggest possible family events	✓	✓
View event calendar	✓	✓
Schedule event	✓	✓
Update event	✓	
Delete event	✓	
Receive reminders about upcoming events	✓	
Check in location	✓	✓
Edit location	✓	
Delete location	✓	
Track other family member location	✓	✓
SOS help module	✓	✓
Create social media post	✓	
View social media posts by other family members	✓	✓
Create chat	✓	

Make chat call	✓	✓
Edit chat	✓	
Pin chat	✓	
Leave chat	✓	
Delete chat	✓	
Edit contact	✓	
Delete contact	✓	
Receive notifications for important contacts	✓	✓
Child Education Tracking Subsystem		
Add new activity	✓	
Edit activity	✓	
Delete activity	✓	
Add new task	✓	
Edit task	✓	
Delete task	✓	
Suggest weekly timetable schedule	✓	✓
Label important events	✓	
View countdown to important events	✓	✓

Receive reminder notifications	✓	
View report of time spent	✓	✓
View daily activity schedule	✓	✓
Add the results of various academic achievements	✓	
Edit results	✓	
Delete results	✓	
View academic achievements' results in charts	✓	✓
Receive alert notifications	✓	
Add awards obtained	✓	
Edit award	✓	
Delete award	✓	
Bookmark important awards	✓	
Set targets and rewards for children	✓	
Edit targets and rewards	✓	
Delete targets and rewards	✓	
Accept target	✓	
Mark accepted target as completed	✓	✓

Receive confirmation notifications	✓	
Confirm completion of targets	✓	✓
Give rewards	✓	
Finance Monitoring Subsystem		
Edit budget	✓	
Delete budget	✓	
Set budget	✓	
Create new expense/income record (finance record) in personal account	✓	
Overspend reminder	✓	✓
Expenses record reminder	✓	✓
View personal finance record	✓	✓
Delete personal finance record	✓	
Edit personal finance record	✓	
View statistical chart	✓	✓
Create new expense/income record (finance record) in family account	✓	
View family finance record	✓	✓
Delete family finance record	✓	
Edit family finance record	✓	

Hide family account	✓	
View children's monthly expenses	✓	✓
Hide monthly expenses	✓	✓

4.6 Item pass/fail criteria

Contact and Appointment Subsystem

Table 97: Test Case for Register Contact

Test Case ID		TC-0001	
Use Case ID		SRS-0001	
Use Case Name		Register Contact	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Contact Name: Mary Lim Relationship: Mum is_important: true is_emergency: true Grouping: Mum's Side is_blocked: false	New contact must be added to the user's contact list and recorded in the database. The newly added contact is displayed on the contact list with correct contact information.	New contact is displayed on the user's contact list. The newly added contact is added to the database with correct contact information.	Cannot add new contact because the input data is missing (all fields should not be empty). The newly added contact is not inserted into the database. The newly added contact does not display correctly on the contact list.

Table 98: Test Case for Edit Contact

Test Case ID		TC-0002	
Use Case ID		SRS-0002	
Use Case Name		Edit Contact	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Contact Name: Mary Lim Relationship: Mum is_important: true is_emergency: true Grouping: Mum's Side is_blocked: false	The latest chosen contact details must be updated to the database. The latest chosen contact detail is displayed correctly in the contact details page.	The chosen contact details must be updated with the latest update in the database. The latest chosen contact detail is displayed correctly in the contact details page.	Cannot update contact because the input data is missing (all fields should not be empty) or contact does not exist as the system user. The details of the contact are not displayed or displayed incorrectly in the contact details interface. The database is not updated with the latest contact details.

Table 99: Test Case for Delete Contact

Test Case ID		TC-0003	
Use Case ID		SRS-0003	
Use Case Name		Delete Contact	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click delete contact button. Click delete confirmation button.	The deleted contact is removed from the contact list and the database.	The deleted contact disappears from the contact list and the database.	The supposed-to-be-deleted contact still exists in the contact list and the database.

Table 100: Test Case for Create event

Test Case ID		TC-0004	
Use Case ID		SRS-0004	
Use Case Name		Create event	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Event Name: Helen’s Birthday Event Type: Birthday Event Description: Let’s celebrate Helen’s birthday together. Event Place: Helen’s house Event Start Time: 2022-09-10 19:00 Event End Time: 2022-09-10 23:00 is_family: true	New event must be added to the user’s event list and recorded in the database. The newly added event is displayed on the event list with correct event information. New group chat for the event is created along with the event creation.	New event is displayed on the user’s event list. The newly added event is added to the database with correct event information. A new group chat dedicated to the event is created and added in the chat list.	Cannot add new event because the input data is wrong (missing inputs or wrong date/time). The newly added event is not inserted into the database. The newly added event is not displayed correctly on the event list. A new group chat dedicated to the event is not created and added in the chat list.

Table 101: Test Case for Suggest Possible Family Events

Test Case ID		TC-0005	
Use Case ID		SRS-0005	
Use Case Name		Suggest Possible Family Events	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click the suggest family event button.	Suggestion on possible family events should be generated based on holiday information such as New Year holiday, and user detail such as	System displays possible family events to user.	Cannot display possible family events to user (might be due to database error).

	birthday and anniversary. Suggested family event is displayed to user.		

Table 102: Test Case for View Event Calendar

Test Case ID		TC-0006	
Use Case ID		SRS-0006	
Use Case Name		View Event Calendar	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click “Calendar” tab in Schedule Events section.	The system displays all the user’s correct family events and personal events with the correct time and information in the calendar.	All the user’s accepted family events and personal events are displayed in the calendar with correct information.	There is missing or incorrect event including family or personal events displayed in the calendar. There is missing or incorrect event information.

Table 103: Test Case for Schedule Event

Test Case ID		TC-0007	
Use Case ID		SRS-0007	
Use Case Name		Schedule Event	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Drag the chosen event and place at the desired time slot. *Or* Edit the chosen event start time and end time.	The chosen event could be dragged and placed in desired empty time slot. The changes on the event’s start time and end time are recorded in the database.	The chosen event could be dragged and placed in correct time slot. The changes on the event’s start time and end time are recorded in the database. The rescheduled events list is	Cannot place the chosen event in other time slot because the time slot has another event. The changes on the event’s start time and end time are not recorded in the database.

	The rescheduled events list is displayed correctly.	displayed correctly with correct information.	There is missing or incorrect event including family or personal events displayed in the event list. There is missing or incorrect event information.

Table 104: Test Case for Update Event

Test Case ID		TC-0008	
Use Case ID		SRS-0008	
Use Case Name		Update Event	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Event Name: Helen's Birthday Event Type: Birthday Event Description: Let's celebrate Helen's birthday together. Event Place: Helen's house Event Start Time: 2022-09-10 19:00 Event End Time: 2022-09-10 23:00 is_family: true	The latest chosen event details must be updated to the database. The latest chosen event detail is displayed correctly in the event details page.	The chosen event details must be updated with the latest update in the database. The latest chosen event detail is displayed correctly in the event details page.	Cannot update event because the input data is missing or chosen event does not exist in the system. The details of the event are not displayed or displayed incorrectly in the event details interface. The database is not updated with the latest event details. There is missing or incorrect event information.

Table 105: Test Case for Delete Event

Test Case ID		TC-0009	
Use Case ID		SRS-0009	
Use Case Name		Delete Event	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click delete event button. Click delete confirmation button.	The deleted event is removed from the event list and the database.	The deleted contact disappears from the event list and the database.	The supposed-to-be-deleted event still exists in the event list and the database.

Table 106: Test Case for Receive Reminders about Upcoming Events

Test Case ID		TC-0010	
Use Case ID		SRS-0010	
Use Case Name		Receive Reminders about Upcoming Events	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Turn on the app notifications	Users receive reminders when the event is approaching. (one week to go, five days to go, three days to go and one day to go, on the day: every two hours and in the last 30 minutes until the event occurrence)	Reminder notifications are sent to the users one week before, five days before, three days before and one day before, on the day: every two hours and in the last 30 minutes until the event occurrence	Reminder notifications are not sent to the users, or the notifications are sent after the event's date

Table 107: Test Case for Check in Location

Test Case ID		TC-0011	
Use Case ID		SRS-0011	
Use Case Name		Check in Location	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Location Name: USM Location Type: University Location Description: Samy's university Location Latitude: 5.3537 Location Longitude: 100.3014	New location must be added to the user's location list and recorded in the database. The newly added location is displayed on the location list with correct location information.	New location is displayed on the user's location list. The newly added location is added to the database with correct location information.	Cannot add new location because the input data is missing (all fields should not be empty). The newly added location is not inserted into the database. The newly added location is not displayed correctly on the location list.

Table 108: Test Case for Edit Location

Test Case ID		TC-0012	
Use Case ID		SRS-0012	
Use Case Name		Edit Location	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Location Name: USM Location Type: University Location Description: Samy's university Location Latitude: 5.3537 Location Longitude: 100.3014	The latest chosen location details must be updated to the database. The latest chosen location detail is displayed correctly in the location details page.	The chosen location details must be updated with the latest update in the database. The latest chosen location detail is displayed correctly. in the location details page.	Cannot update location because the input data is missing (all fields should not be empty) or the chosen location does not exist in the system database. The details of the location are not displayed or displayed incorrectly in the location details interface.

			The database is not updated with the latest location details.

Table 109: Test Case for Delete Location

Test Case ID		TC-0013	
Use Case ID		SRS-0013	
Use Case Name		Delete Location	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click delete location button. Click delete confirmation button.	The deleted location is removed from the location list and the database.	The deleted location disappears from the location list and the database.	The supposed-to-be-deleted location still exists in the location list and the database.

Table 110: Test Case for Track Other Family Member Location

Test Case ID		TC-0014	
Use Case ID		SRS-0014	
Use Case Name		Track Other Family Member Location	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Pick family member from the contact list to track him or her.	The location of other family member is displayed for location tracking, from the beginning to the destination.	The location of other family member is displayed for location tracking, from the beginning to the destination.	Cannot choose family member for tracking purposes because the chosen family member does not grant location access permission, or the chosen family member is not system user. The map displayed incorrect chosen family member's location. The map does not display any family member' s location.

Table 111: Test Case for SOS Help Module

Test Case ID		TC-0015	
Use Case ID		SRS-0015	
Use Case Name		SOS Help Module	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click the SOS Help button in the Emergency interface.	The last location of user is sent to emergency contacts after user presses the SOS Help button. User can call emergency contact and police after they press the SOS Help button.	The correct last location of user is sent to emergency contacts after user presses the SOS Help button. User can call emergency contact and police successfully after they press the SOS Help button.	Incorrect last location of user is sent to the emergency contacts after user presses the SOS Help button. The calling from user to emergency contact and police fails (incorrect call to other irrelevant people) due to database return error or human error.

Table 112: Test Case for Create Social Media Post

Test Case ID		TC-0016	
Use Case ID		SRS-0016	
Use Case Name		Create Social Media Post	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Social Media Post Detail: It's a wonderful day!	New social media post must be added to the user's social media account. The newly added social media post is displayed on the social media wall with correct post information.	The newly added social media post with correct post information is added to the user's social media account. New social media post is displayed on the social media wall.	Cannot add new social media post because the social media post input detail is missing, or user does not include social media account, or user's social media account is invalid. The newly added social media post is

			not displayed correctly into the social wall.

Table 113: Test Case for View Social Media Posts by Other Family Members

Test Case ID		TC-0017	
Use Case ID		SRS-0017	
Use Case Name		View Social Media Posts by Other Family Members	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click on the "See All" in Family Social Wall section.	The social media posts by other family members are displayed with correct information in the Family Social Wall section.	The social media posts by other family members are displayed with correct information in the Family Social Wall section.	Cannot display social media posts by other family members because other family members do not have valid social media accounts. The social media posts by other family members are displayed with incorrect information in the Family Social Wall section.

Table 114:Test Case for Create Chat

Test Case ID		TC-0018	
Use Case ID		SRS-0018	
Use Case Name		Create Chat	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Add chat participants for the chat.	New chat must be added to the user's chat list and recorded in the database.	New chat is displayed on the user's chat list. The newly added chat is added to the	Cannot add new chat because the input data is missing such as the chat name or other chat

And input chat information as below: Chat Name: John's Wedding Chat Photo Path: chatPhoto.jpg Chat Description: Let's join John's Wedding	The newly added chat is displayed on the chat list with correct chat name.	database with correct chat information.	participants are missing. The newly added chat is not inserted into the database. The newly added chat does not display correctly on the chat list.

Table 115: Test Case for Make Chat Call

Test Case ID		TC-0019	
Use Case ID		SRS-0019	
Use Case Name		Make Chat Call	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click the chat call button in the chat history interface.	User can make chat call with other chat participants.	User can make chat call successfully with other chat participants.	Fails to make chat call with other chat participants because other chat participants are not system user.

Table 116: Test Case for Edit Chat

Test Case ID		TC-0020	
Use Case ID		SRS-0020	
Use Case Name		Edit Chat	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Add or delete chat participants for the chat.	The latest chosen chat details must be updated to the database.	The chosen chat details must be updated with the latest update in the database.	Cannot update chat detail because the input data is missing such as missing chat name or chat does

And changes chat information as below: Chat Name: John's Wedding Chat Photo Path: chatPhoto.jpg Chat Description: Let's join John's Wedding	The latest chosen chat detail is displayed correctly in the chat details page.	The latest chosen chat detail is displayed correctly in the chat details page.	not exist in the system. The details of the chat are not displayed or displayed incorrectly in the chat details interface. The database is not updated with the latest chat details.

Table 117: Test Case for Pin Chat

Test Case ID		TC-0021	
Use Case ID		SRS-0021	
Use Case Name		Pin Chat	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Choose a chat and click the pin button.	The chosen chat could be pinned on the top of the chat list.	The chosen chat could be pin on the top of the chat list.	The chosen chat cannot be pinned on the top of the chat list because the chosen chat does not exist in the system. Incorrect chat is pinned on the top of the chat list.

Table 118: Test Case for Leave Chat

Test Case ID		TC-0022	
Use Case ID		SRS-0022	
Use Case Name		Leave Chat	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**

Choose a group chat and click the leave chat button, then click the leave confirmation button.	User should no longer exist in the group chat participants list. The latest group chat participants list is displayed in the system. The latest group chat participants list is recorded to the database with correct information. The leaved group chat is deleted from the user's chat list and updated to the database.	User is removed from the group chat participants list. The latest group chat participants list is displayed in the system. The latest group chat participants list is recorded to the database with correct information. The leaved group chat is deleted from the user's chat list and updated to the database.	Cannot remove user from the group chat participants list because the group chat does not exist in the system. Incorrect group chat participants list is displayed in the system. The latest group chat participants list is not recorded to the database with correct information. The leaved group chat is not deleted from the user's chat list and is not updated in the database.

Table 119: Test Case for Delete Chat

Test Case ID		TC-0023	
Use Case ID		SRS-0023	
Use Case Name		Delete Chat	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click delete chat button. Click delete confirmation button.	The deleted chat is removed from the chat list and the database.	The deleted chat disappears from the chat list and the database.	The supposed-to-be-deleted chat still exists in the chat list and the database.

Table 120: Test Case for Add Message

Test Case ID		TC-0024	
Use Case ID		SRS-0024	
Use Case Name		Add Message	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**

Message Text: Hi! Message Date Time: 2022-12-27 08:26:49.219717 Message Image Path: messageImg.jpg	New message must be added to the message list and recorded in the database. The newly added message is displayed on the chat history page with correct information.	New message is displayed on the user's message list in chat history page. The newly added message is added to the database with correct message information.	Cannot add new message because the input data is missing such as missing message text, and message date time. The newly added message is not inserted into the database. The newly added message does not display correctly on the message list, such as display wrong date time.

Table 121: Test Case for Delete Message

Test Case ID		TC-0025	
Use Case ID		SRS-0025	
Use Case Name		Delete Message	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click delete message button. Click delete confirmation button.	The deleted message is removed from the message list and the database.	The deleted message disappears from the message list and the database.	The supposed-to-be-deleted message still exists in the message list and the database.

Table 122: Test Case for Receive Notifications for Important Contacts

Test Case ID		TC-0026	
Use Case ID		SRS-0026	
Use Case Name		Receive Notifications for Important Contacts	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Turn on the important contact notifications	User receives notifications when user rarely connects with the important contacts.	Reminder notifications are sent to the users when the user does not connect with the	Reminder notifications about the reduce of relationship closeness are not

		important contact for a long time.	sent to the users when the user does not connect with the important contact for a long time.

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Table 123:Test Case for Add New Activity

Test Case ID		TC-0027	
Use Case ID		SRS-0027	
Use Case Name		Add New Activity	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
ActivityName: Watch Movies Date: 24 Dec 2022 Type: Entertainment Details: Avatar is_repeated: false Start Time: 14:00 End Time: 16:00 is_compulsory: true is_pickMeUp: false	Activity should be added into the database and displayed on the activity list and daily activity schedule.	Activity is added into the database. Activity is displayed on the daily activity schedule	Cannot add new activity because the input data is incorrect (wrong date/time or missing info). Activity is not added into the database. The newly added activity is not displayed on the daily activity schedule.

Table 124:Test Case for Edit Activity

Test Case ID		TC-0028	
Use Case ID		SRS-0028	
Use Case Name		Edit Activity	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
ActivityName: Watch Movies Date: 24 Dec 2022 Type: Entertainment Start Time: 14:00 End Time: 16:00	The details of the selected activity should be displayed in the edit activity interface correctly and the database is	The details of the selected activity are displayed in the edit activity interface. The database is updated with the	Cannot update activity because the input data is incorrect (wrong date/time or missing info).

Details: Avatar is_repeated: false is_coumpulsory: true is_pickMeUp: false	updated with the most recent information on the activity	most recent information on the activity	The details of the selected activity are not displayed or displayed incorrectly in the edit activity interface. The database is not updated.

Table 125:Test Case for Delete Activity

Test Case ID		TC-0029	
Use Case ID		SRS-0029	
Use Case Name		Delete Activity	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click Delete button	The deleted activities' records disappear from the database, activity list and daily activity schedule.	The selected activities are deleted from the database, activity list and daily activity schedule	The selected activities are not deleted from the database, activity list or daily activity schedule.

Table 126:Test Case for Add New Task

Test Case ID		TC-0030	
Use Case ID		SRS-0030	
Use Case Name		Add new task	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Task Name: Handicraft Details: Making handmade toys Due Date: 7 Dec 2022 14:30	Task should be added into the database and displayed on the task list and daily activity schedule.	A task is added into the database. Task is displayed on the daily activity schedule	Cannot add new task because the input data is incorrect (wrong due date or missing required info). Task is not added into the

			database. The newly added task is not displayed on the daily activity schedule.

Table 127:Test Case for Edit Task

Test Case ID		TC-0031	
Use Case ID		SRS-0031	
Use Case Name		Edit Task	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Task Name: Handicraft Details: Making handmade toys Due Date: 7 Dec 2022 14:30	The details of the selected task should be displayed in the edit task interface correctly and the database is updated with the most recent information on the task.	The details of the selected tasks are displayed in the edit task interface. The database is updated with the most recent information on the task	Cannot update task because the input data is incorrect (wrong due date or missing required info such as task name and due date). The details of the selected task are not displayed or displayed incorrectly in the edit task interface. The database is not updated.

Table 128:Test Case for Delete Task

Test Case ID		TC-0032	
Use Case ID		SRS-0032	
Use Case Name		Delete Task	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**

Click Delete button	The deleted tasks' records disappear from the database, task list and daily activity schedule.	The selected tasks are deleted from the database, task list and daily activity schedule	The selected tasks are not deleted from the database, task list or daily activity schedule.

Table 129:Test Case for Suggest Weekly Timetable Schedule

Test Case ID		TC-0033	
Use Case ID		SRS-0033	
Use Case Name		Suggest Weekly Timetable Schedule	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click Schedule Planning function	The suggested schedule is balanced. Activities are arranged properly without clashing with other activities.	A balanced weekly timetable schedule is planned. All activities are arranged properly without clashing with other activities	The suggested schedule is not balanced. There are activities clashing with other activities. There are no activities added into the schedule, but weekly timetable schedule is planned.

Table 130:Test Case for Label Important Events

Test Case ID		TC-0034	
Use Case ID		SRS-0034	
Use Case Name		Label Important Events	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Mark the events as important when adding new activity is_important: Yes	The activities that are marked as important are shown in countdown list	All the important activities are displayed in countdown list.	There are important activities that are not shown in countdown list

Table 131:Test Case for View Countdown to the Important Events

Test Case ID		TC-0035	
Use Case ID		SRS-0035	
Use Case Name		View Countdown to the Important Events	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click Countdown feature on the children profile interface	The activities that are marked as important are shown in the countdown list. The countdown timer shows correct time remaining to the events' dates.	All the important activities are displayed in the countdown list. The countdown timer shows correct time remaining to the events' dates.	There are important activities that are not shown in countdown list, or the countdown timer shows incorrect time remaining to the events' dates

Table 132:Test Case for Receive Reminder Notifications

Test Case ID		TC-0036	
Use Case ID		SRS-0036	
Use Case Name		Receive Reminder Notifications	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Turn on the app notifications	Reminder notifications are sent to the users before the events	Reminder notifications are sent to the users based on users' preferences either one week before, 3 days before and on the day.	Reminder notifications are not sent to the users, or the notifications are sent after the event's date

Table 133:Test Case for View Report of Time Spent

Test Case ID		TC-0037	
Use Case ID		SRS-0037	
Use Case Name		View Report of Time Spent	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**

Select one report from the report of time spent list	Time spent on various activity types are calculated accurately and correct percentage of time spent are shown on the charts	Charts show the correct percentage of time spent within a week time.	Charts are showing incorrect percentage of time spent

Table 134:Test Case for View Daily Activity Schedule

Test Case ID		TC-0038	
Use Case ID		SRS-0038	
Use Case Name		View Daily Activity Schedule	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click on the schedule feature on children profile interface	Daily activity schedule is displayed with all the added activities and tasks	Activities and tasks are presented on the correct date on the daily activity schedule	Activities and tasks are not displaying on correct date or there are activities or tasks omitted from the daily activity schedule.

Table 135:Test Case for Add the Results of Various Academic Achievements

Test Case ID		TC-0039	
Use Case ID		SRS-0039	
Use Case Name		Add the Results of Various Academic Achievements	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Title: English Test Date: 25 Dec 2022 Category: Test and Quiz Result: 85	Results should be added into the database and displayed on the result list and chart	Result is added into the database. Result is displayed on the chart correctly	Cannot add new result because the input data is incorrect (wrong date or missing required info). Results are not

	correctly based on the result type		added into the database. The newly added result is not displayed on the chart.

Table 136:Test Case for Edit Results

Test Case ID		TC-0040	
Use Case ID		SRS-0040	
Use Case Name		Edit Results	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Title: English Test Date: 25 Dec 2022 Category: Test and Quiz Result: 85	Edit result interface is displayed with the details of the result. The database should be updated with the most recent information on the result.	The details of the selected results are displayed in the edit result interface. The database is updated with the most recent information on the result	The details of the selected results are not displayed or displayed incorrectly in the edit result interface. Cannot update result because the input data is incorrect (wrong date or missing required info). The database is not updated.

Table 137:Test Case for Delete Results

Test Case ID		TC-0041	
Use Case ID		SRS-0041	
Use Case Name		Delete Results	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click Delete button	The deleted results' records disappear from the database, result list and chart	The selected results are deleted from the database, result list and chart	The selected results are not deleted from the database, result list or chart.

Table 138:Test Case for View Academic Achievements' Results in Charts

Test Case ID		TC-0042	
Use Case ID		SRS-0042	
Use Case Name		View Academic Achievements' Results in Charts	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click performance feature on children profile interface	Show the results in charts and the charts are classified in correct categories	Results are plotted correctly on the charts and the charts are classified in correct categories	Results are not plotted correctly on the charts and the charts are not classified in correct categories

Table 139:Test Case for Receive Alert Notifications

Test Case ID		TC-0043	
Use Case ID		SRS-0043	
Use Case Name		Receive Alert Notifications	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Turn on the app notifications	Alert notifications are sent to parents when children's performance keeps declining or gets worse over time	Alert notifications are sent to parents when children's performance decline for three times	There are no notifications sent to parents

Table 140:Test Case for Add Awards Obtained

Test Case ID		TC-0044	
Use Case ID		SRS-0044	
Use Case Name		Add Awards Obtained	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Title: The Art Foundation 10th	Awards should be added into the	Award is added into the database. Award	Cannot add new award because the

National Level Drawing Competition Category: Art and Piano Ranking: 1st runner up Certificate image: IMG-20221225.jpg	database and displayed on the award list and bookmarked award list if the award is being bookmarked.	is displayed on the award list and bookmarked award list if the award is being bookmarked.	input data is incorrect (invalid ranking or missing required info). Awards are not added to the database. The newly added award is not displayed on the award list.

Table 141:Test Case for Edit Award

Test Case ID		TC-0045	
Use Case ID		SRS-0045	
Use Case Name		Edit Award	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Title: The Art Foundation 10th National Level Drawing Competition Category: Art and Piano Ranking: 1st runner up Certificate image: IMG-20221225.jpg	Edit award interface is displayed with the details of the award. The database should be updated with the most recent information on the award.	The details of the selected awards are displayed in the edit award interface. The database is updated with the most recent information on the award.	Cannot update task because the input data is incorrect (invalid ranking or missing required info). The details of the selected awards are not displayed or displayed incorrectly in the edit award interface. The database is not updated.

Table 142:Test Case for Delete Award

Test Case ID	TC-0046
Use Case ID	SRS-0046
Use Case Name	Delete Award

Test Input	Expected Result	Pass Criteria	Fail Criteria
Click Delete button	The deleted awards' records disappear from the database, award list	The selected awards are deleted from the database and award list.	The selected awards are not deleted from the database or award list

Table 143:Test Case for Bookmark Important Awards

Test Case ID		TC-0047	
Use Case ID		SRS-0047	
Use Case Name		Bookmark Important Awards	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Mark the awards as bookmarked when adding new award or tapping the star icon that appears beside the award is_bookmarked: Yes	Awards that are being bookmarked are displayed on the bookmarked award list	Awards that are being bookmarked are displayed on the bookmarked award list	Awards that are being bookmarked are not displayed on the bookmarked award list

Table 144:Test Case for Set Targets and Rewards for Children

Test Case ID		TC-0048	
Use Case ID		SRS-0048	
Use Case Name		Set Targets and Rewards for Children	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
TargetTitle: Spelling Test get 100% 3 times RewardTitle: Toy	Targets and rewards should be added into the database and displayed on the target and reward list.	Target and reward are added into the database. Target and reward are displayed on the target and reward list.	Cannot set new target and reward because the input data is incorrect (missing required info). Target and reward are not added to the database. The newly added target and

			reward is not displayed on the target and reward list.

Table 145:Test Case for Edit Targets and Rewards

Test Case ID		TC-0049	
Use Case ID		SRS-0049	
Use Case Name		Edit Targets and Rewards	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
TargetTitle: Spelling Test get 100% 3 times RewardTitle: Toy	Edit target interface is displayed with the details of the target and reward. The database should be updated with the most recent information on the target and reward. Target is showing the updated details on the target and reward list	The details of the selected targets are displayed in the edit target interface. The database and target and reward list are updated with the most recent information on the target and reward.	Cannot update target and reward because the input data is incorrect (missing required info). The details of the selected targets are not displayed or displayed incorrectly in the edit target interface. The database is not updated.

Table 146:Test Case for Delete Targets and Rewards

Test Case ID		TC-0050	
Use Case ID		SRS-0050	
Use Case Name		Delete Targets and Rewards	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click Delete button	The deleted targets' records disappear from the database	The selected targets are deleted from the database and target and reward list.	The selected targets are not deleted from the database or target and reward list

	and target and reward list		

Table 147:Test Case for Accept Target

Test Case ID		TC-0051	
Use Case ID		SRS-0051	
Use Case Name		Accept Target	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click Accept button	Show accepted target status if children have accepted the target	The status of target changes to accepted after clicking the Accept button on the upper right corner of interface	The status of target shows status other than accepted.

Table 148: Test Case for Mark Accepted Targets as Completed

Test Case ID		TC-0052	
Use Case ID		SRS-0052	
Use Case Name		Mark Accepted Targets as Completed	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click Complete button	Show the Complete button on the upper right corner if the target is accepted, and the target is being long pressed. Target status shows completed after the Complete button is pressed.	The status of target changes to completed after clicking the Complete button on the upper right corner of interface	Instead of the Complete button, Accept button is displayed. The status of target shows status other than completed.

Table 149:Test Case for Receive Confirmation Notifications

Test Case ID		TC-0053	
Use Case ID		SRS-0053	
Use Case Name		Receive Confirmation Notifications	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Turn on the app notifications	Notifications should be sent to parents for confirmation of the targets' completion	Once the target is marked as completed, parents should be receiving the confirmation notifications within 5 to 10 minutes	Parents don't receive notifications or receive after 10 minutes.

Table 150:Test Case for Confirm Completion of Targets

Test Case ID		TC-0054	
Use Case ID		SRS-0054	
Use Case Name		Confirm Completion of Targets	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click Confirm or Reject button	Show all the confirmation requests on the notifications. Correct status (confirmed / rejected) is displayed on the target and reward list	All confirmation requests are displayed on the notifications. If parents confirm the completion of target, then the target status change to confirmed.	Some confirmation requests are not shown on the notifications, or the target status shows incorrect status.

Table 151:Test Case for Give Rewards

Test Case ID		TC-0055	
Use Case ID		SRS-0055	
Use Case Name		Give Rewards	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**

Click Give Out button	The Give Out button is shown on the upper right corner if the target's status shows confirmed, and the target is being long pressed. Reward status change to given after pressing the Give Out button	The status of reward changes to given after clicking the Give Out button on the upper right corner of interface	Instead of the Give Out button, other buttons are displayed. The status of reward shows not given.

Finance Monitoring Subsystem

Table 152: Test Case for Create new expense/income record in personal account

Test Case ID		TC-0056	
Use Case ID		SRS-0056	
Use Case Name		Create new expense/income record in personal account	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Expenses Date: 05/04/2023 1:30pm Account: Personal Category: Food Amount: 25.00 Note: KFC	Record should be added into the database and displayed on the finance list. Expenses total, total balance and budget balance updated.	Record is added into the database. Record is displayed on the finance list. Expenses total, total balance and budget balance updated.	Cannot add new finance record because the input data is incorrect (wrong date/time or missing info). Finance record is not added into the database. The new finance record is not displayed on the finance list. Expenses total, total balance and budget balance is not updated.

Table 153:: Test Case for Create new expense/income record in personal account

Test Case ID		TC-0057	
Use Case ID		SRS-0056	
Use Case Name		Create new expense/income record in personal account	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Incomes Date: 05/04/2023 1:30pm Account: Personal Category: Salary Amount: 2500.00 Note: March Salary	Record should be added into the database and displayed on the finance list. Incomes total and total balance updated.	Record is added into the database. Record is displayed on the finance list. Incomes total and total balance updated.	Cannot add new finance record because the input data is incorrect (wrong date/time or missing info). Finance record is not added into the database. The new finance record is not displayed on the finance list. Incomes total and total balance is not updated.

Table 154:Test Case for Set Budget

Test Case ID		TC-0058	
Use Case ID		SRS-0058	
Use Case Name		Set Budget	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Category: Food Amount: 500.00	Record should be added into the database and displayed on the	Record is added into the database. Record is displayed on the budget list. Budget balance updated.	Cannot add new budget because the input data is incorrect (missing info). Budget record is not

	budget list. Budget balance updated.		added into the database. The new budget record is not displayed on the budget list.

Table 155: Test Case for View personal finance record

Test Case ID		TC-0059	
Use Case ID		SRS-0060	
Use Case Name		View personal finance record	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Month: March 2023	All finance records in selected month should be shown with correct dates, account, category, income, expense.	Finance record shows the correct dates, account, category, income, expense.	Finance record shows incorrect dates, account, category, income, expense.

Table 156: Test case for hide family account

Test Case ID		TC-0060	
Use Case ID		SRS-0061	
Use Case Name		Hide Family Account	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Select to hide family account.	Children cannot view family account, create/edit/delete finance record from children view.	Children cannot view family account, create/edit/delete finance record from children view.	Children can view family account, create/edit/delete finance record from children view.

Table 157: Test case for Create new expense/income record in family account

Test Case ID	TC-0061

Use Case ID		SRS-0062	
Use Case Name		Create new expense/income record in family account	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Expenses Date: 05/04/2023 1:30pm Account: Family Category: Food Amount: 35.00 Note: Chicken	Record should be added into the database and displayed on the finance list. Expenses total and total balance updated.	Record is added into the database. Record is displayed on the finance list. Expenses total and total balance updated.	Cannot add new finance record because the input data is incorrect (wrong date/time or missing info). Finance record is not added into the database. The new finance record is not displayed on the finance list. Expenses total and total balance is not updated.

Table 158:Test case for Create new expense/income record in family account

Test Case ID		TC-0062	
Use Case ID		SRS-0062	
Use Case Name		Create new expense/income record in family account	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Incomes Date: 05/04/2023 1:30pm Account: Family Category: Salary Amount: 1000.00 Note: SuQi Salary	Record should be added into the database and displayed on the finance list. Incomes total updated.	Record is added into the database. Record is displayed on the finance list. Incomes total updated.	Cannot add new finance record because the input data is incorrect (wrong date/time or missing info). Finance record is not

			added into the database. The new finance record is not displayed on the finance list. Incomes total is not updated.

Table 159: Test case for View Statistical Chart

Test Case ID		TC-0063	
Use Case ID		SRS-0063	
Use Case Name		View Statistical Chart	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Month: March 2023	Pie chart should show with percentage correctly. Budget and budget balance for each category is shown correctly.	Pie chart is showing with percentage correctly. Budget and budget balance for each category is shown correctly.	Pie chart is not showing. Pie chart is not showing with percentage correctly. Budget and budget balance for each category is shown wrongly.

Table 160: Test case for View Children's Monthly Expenses

Test Case ID		TC-0064	
Use Case ID		SRS-0064	
Use Case Name		View Children's Monthly Expenses	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Month: March 2023	Children’s monthly expenses interface should show the	Children’s monthly expenses interface is showing the	Children’s monthly expenses interface is not showing the

	children's name and the total monthly expenses correctly.	children's name and the total monthly expenses correctly.	correct children's name. The total monthly expenses are not shown correctly.

Table 161: Test case for Option to Hide Monthly Expenses

Test Case ID		TC-0065	
Use Case ID		SRS-0065	
Use Case Name		Option to Hide Monthly Expenses	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Choose to hide monthly total expenses from parents.	Children's total monthly expenses should be hide from parents' view.	Children's total monthly expenses is hide in parents' view.	Children's total monthly expenses is not hide in parents' view.

Table 162: Test case for Overspend Reminder

Test Case ID		TC-0066	
Use Case ID		SRS-0066	
Use Case Name		Overspend Reminder	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Turn on the overspend reminder. Create expense record to over 70% of food budget. Date: 05/04/2023 1:30pm Account: Family Category: Food Amount: 35.00 Note: Chicken	Overspend reminder should be sent.	Overspend reminder is sent.	Overspend reminder is not sent.

Table 163: Test case for Expenses Record Reminder

Test Case ID		TC-0067	
Use Case ID		SRS-0067	
Use Case Name		Expenses Record Reminder	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Turn on the expenses record reminder. Not recording any expenses record until 8 pm.	Expenses record reminder should be sent.	Expenses record reminder is sent.	Expenses record reminder is not sent.

Table 164: Test case for Edit personal finance record

Test Case ID		TC-0068	
Use Case ID		SRS-0068	
Use Case Name		Edit personal finance record	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Expenses Date: 05/04/2023 1:30pm Account: Personal Category: Food Amount: 35.00 Note: McD	Record should be updated into the database and displayed on the finance list. Expenses total, total balance and budget balance updated.	Record is updated into the database. Record is displayed on the finance list. Expenses total, total balance and budget balance updated.	Cannot update finance record because the input data is incorrect (wrong date/time or missing info). Finance record is not updated into the database. The updated finance record is not displayed on the finance list.

			Expenses total, total balance and budget balance is not updated.

Table 165: Test case for Delete personal finance record

Test Case ID		TC-0069	
Use Case ID		SRS-0069	
Use Case Name		Delete personal finance record	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Select finance record, click delete and confirm delete.	The deleted finance record should be removed from the database. Total balance, income/expenses balance and budget balance should be updated.	The deleted finance record is removed from the database. Total balance, income/expenses balance and budget balance are updated.	The selected finance record is not deleted from the database. Total balance, income/expenses balance and budget balance are not updated.

Table 166: Test case for Edit budget

Test Case ID		TC-0070	
Use Case ID		SRS-0070	
Use Case Name		Edit budget	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Click on budget category that wanted to be edited. Category: Food Month: April Amount: 550.00	Record should be updated into the database and displayed on the budget list. Budget balance updated.	Record is updated into the database. Record is displayed on the budget list. Budget balance updated.	Cannot update budget because the input data is incorrect (missing info). Budget record is not updated into the database.

Table 167: Test case for Delete budget

Test Case ID		TC-0071	
Use Case ID		SRS-0071	
Use Case Name		Delete budget	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Select budget record, click delete and confirm delete.	The deleted budget record should be removed from the database.	The deleted budget record is removed from the database.	The selected budget record is not deleted from the database.

Table 168: Test case for Edit family finance record

Test Case ID		TC-0072	
Use Case ID		SRS-0072	
Use Case Name		Edit family finance record	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Expenses Date: 05/04/2023 1:30pm Account: Family Category: Food Amount: 200.00 Note: McD	Record should be updated into the database and displayed on the finance list. Expenses total and total balance updated.	Record is updated into the database. Record is displayed on the finance list. Expenses total and total balance updated.	Cannot update finance record because the input data is incorrect (wrong date/time or missing info). Finance record is not updated into the database. The updated finance record is not displayed on the finance list. Expenses total and total balance are not updated.

Table 169: Test case for Delete family finance record

Test Case ID		TC-0073	
Use Case ID		SRS-0073	
Use Case Name		Delete family finance record	
Test Input	**Expected Result**	**Pass Criteria**	**Fail Criteria**
Select finance record, click delete and confirm delete.	The deleted finance record should be removed from the database. Total balance and income/expenses balance should be updated.	The deleted finance record is removed from the database. Total balance and income/expenses balance are updated.	The selected finance record is not deleted from the database. Total balance and income/expenses balance are not updated.

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APPENDICES

Appendix A – Questionnaires

Family Engagement System

Greetings! This survey is conducted to gather information on how to engage family. This survey is used as a preliminary analysis for our final year project.

All information gathered through this survey will be kept private and used exclusively for research.

All of your response is highly appreciated. Thank you.

Tan Jia Hui (jiahuimm99@student.usm.my)
Tay Ming Shan (mingshan99@student.usm.my)
Ting Su Qi (tingsuqi@student.usm.my)

* Required

Demography

1. Gender *

◯ Female

◯ Male

2. Age Group *

- ◯ Below 18
- ◯ 18-25
- ◯ 26-35
- ◯ 36-45
- ◯ 46-55
- ◯ Other

3. How many family members are there in your family? *

- ◯ 1-2
- ◯ 3-4
- ◯ 5-6
- ◯ 7-8
- ◯ Above 8

4. Are you a parent? *

- ◯ Yes
- ◯ No

5. How many child/children do you have? *

- 1
- 2
- 3
- 4
- Other

Child Education Tracking System (Children)

6. Do you think your schedule is balance between academic and entertainment? *

- ◯ Yes
- ◯ No

7. Do you think schedule planning is useful for balancing your schedule? *

- ◯ Yes
- ◯ No
- ◯ Maybe

8. Do you think awards record is important for your future planning? *

- ◯ Yes
- ◯ No
- ◯ Maybe

Child Education Tracking System (Parents)

9. How often do you get updates from your children about their study matters? *

- ◯ Daily
- ◯ Weekly
- ◯ Monthly
- ◯ Yearly
- ◯ Never

10. Do you find it difficult to get involved in your children's education? *

- ◯ Yes
- ◯ No

11. Do you think that busy schedule is the main problem for becoming involved with your children's education? *

- ◯ Yes
- ◯ No

12. What steps have you taken to address this problem? *

- [ ] Plan out and organize your time wisely
- [ ] Create predictable routines to follow every day (eg. eat breakfast/ dinner together)
- [ ] Utilize friends and family members to support children's education
- [ ] Other

13. Do you find these efforts effective? *

- ◯ Yes
- ◯ No
- ◯ Maybe

14. Do you think it is easy to keep track of your children's education if there is a system that helps to keep track of those study matters? *

- ◯ Yes
- ◯ No
- ◯ Maybe

15. What types of information would you like to have about your children? *

- [ ] Daily activity schedule
- [ ] Events participate in
- [ ] Academic performance
- [ ] Awards obtained
- [ ] Other

16. Ratio of time spent on various activities (eg. Academic 4, Sport 2, Entertainment 3, Art & Piano 1; Total: 10) *

	1	2	3	4
Academic	○	○	○	○
Sport	○	○	○	○
Entertainment	○	○	○	○
Arts & Piano	○	○	○	○

17. Duration of receiving notifications for important dates reminder *

- ○ On the day
- ○ 1-2 days
- ○ 3-4 days
- ○ 5-6 days
- ○ 7-8 days

18. What types of performance you wish to keep track of? *

- [ ] Test and quiz scores
- [ ] Homework completion rates
- [ ] Behavior assessments
- [ ] Other

19. What are the features that you want on that system?

Contact and Appointment System

20. How frequently do you connect with your family members? *

- ○ 0-5 times a week
- ○ 6-10 times a week
- ○ 11-20 times a week
- ○ Above 20 times a week

21. How do you manage your family activities right now(such as a family member's gathering and festival)? *

- ☐ Google Calendar
- ☐ Through messaging apps such as WhatsApp, Telegram and many more
- ☐ Other

22. Do you find it troublesome to manage family activities through the current available platforms? *

- ○ Yes
- ○ No
- ○ Maybe

23. Why do you think so? *

24. Do you wish to have a mobile app to manage and schedule your family activities? *

- ◯ Yes
- ◯ No
- ◯ Maybe

25. Do you wish to have recommendation scheduling (eg: Suggest to create an upcoming birthday as a family event)? *

- ◯ Yes
- ◯ No
- ◯ Maybe

26. What features do you wish to have to connect with your family members in the mobile app? *

- ☐ Can schedule family activities and have reminders to remind about them.
- ☐ Can see other family members' social media posts at one stop.
- ☐ Can chat with family members about family activities in the app.
- ☐ Can track other family members' location to keep them safe.
- ☐ Other

27. What other features that you think should be included in the platform?

Finance Monitoring System

28. Do you use app that record income and expenses (finance monitoring)? *

- ◯ Yes
- ◯ No

29. Do you think recording expenses helps people to eliminate wasteful spending habits from the spending records? *

- ◯ Yes
- ◯ No
- ◯ Maybe

30. Do you agree that do budgeting on each spending category (food, entertainment,...) can help to avoid overspending? *

- ◯ Yes
- ◯ No
- ◯ Maybe

31. Do you wish to have reminder on overspending or record daily expenses? *

- ◯ Yes
- ◯ No
- ◯ Maybe

32. Do you think storing picture of receipt/invoice in daily expenses record is helpful in monitoring finance? *

- ◯ Yes
- ◯ No
- ◯ Maybe

33. If you are parents, do you want to see your children's total monthly expenses? *

- ◯ Yes
- ◯ No
- ◯ Maybe

34. If you are children, do you want your parents to see your total monthly expenses? *

- ◯ Yes
- ◯ No
- ◯ Maybe

35. Do you think separate family and individual expenses record is better than having just individual expenses record? *

- ◯ Yes
- ◯ No
- ◯ Maybe

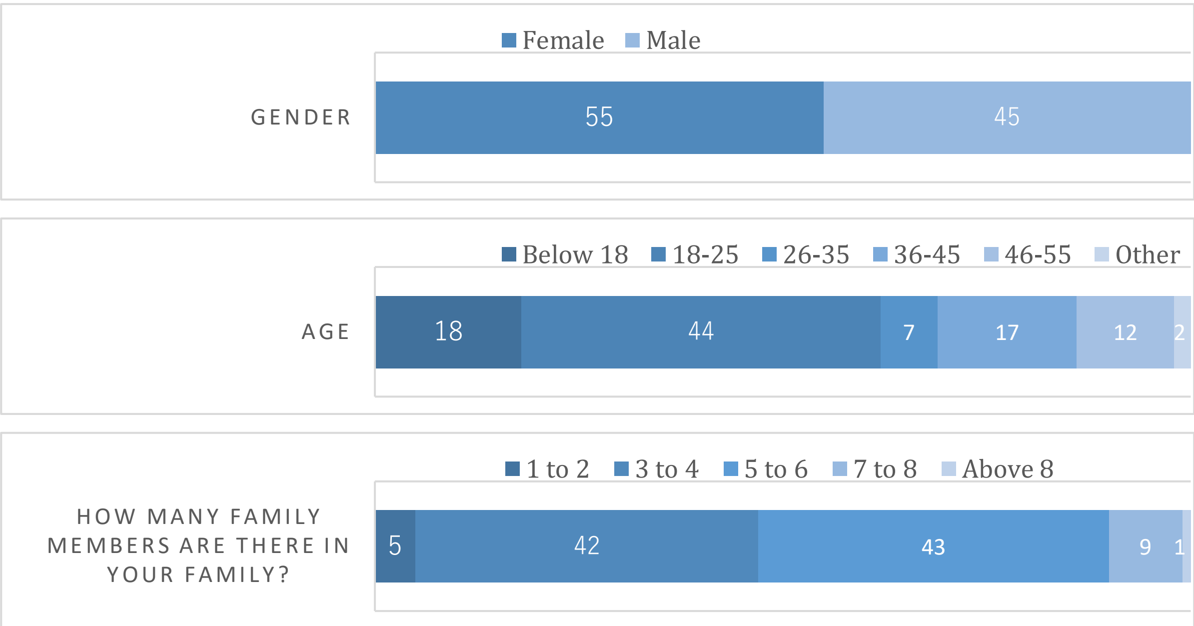
36. Please rate the features needed in finance monitoring app (1: most important) *

	1	2	3	4	5
Record expenses & income	○	○	○	○	○
Do budget in each spending category (entertainment, food, ...)	○	○	○	○	○
Reminder if exceed budget	○	○	○	○	○
Reminder to key in daily expenses	○	○	○	○	○
Analysis on spending	○	○	○	○	○
Storing pic of receipt/invoice in daily expenses	○	○	○	○	○
Parents can view children's total monthly expenses	○	○	○	○	○
Separate family and individual expenses	○	○	○	○	○

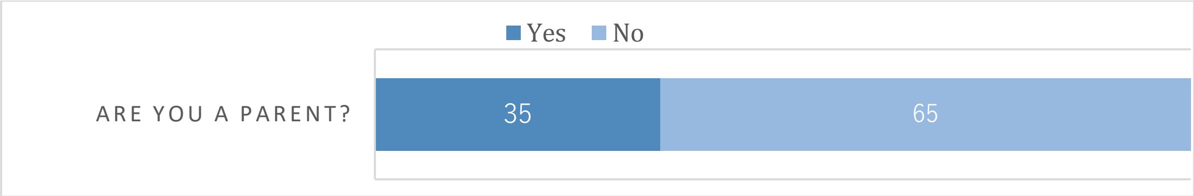
37. What are the other features that you want in Finance Monitoring System?

Discussion of Findings

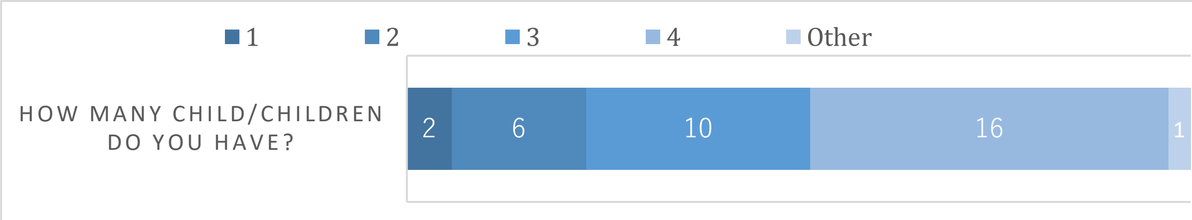
Section 1 – Demography



There are a total of 100 respondents answering the survey questions. The respondents who have done our survey consists of 55 females and 45 males and 44 respondents are from age range of 18 to 25 which made up the most number in the age range. There are 18 respondents are below age of 18, 7 respondents from age range of 36 to 45, 17 respondents are from age range of 46 to 55 and lastly 2 respondents are in age range that above 55. Most of the respondents with number of 43 having 5 to 6 family members in their family. 42 respondents declared that there are 3 to 4 family members in their family which is the second largest number of respondents. There are 5 respondent state that there are 1 to 2 family members in their family, 9 respondents have 7 to 8 family members and 1 respondent have 8 family members in the family.

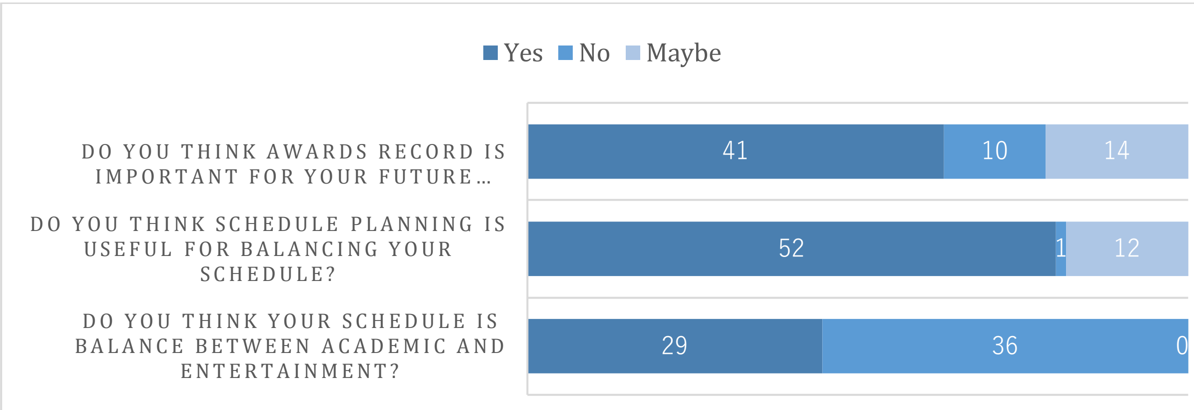


Out of the 100 respondents, 35 of them are parents, and 65 of them declared that they are children.



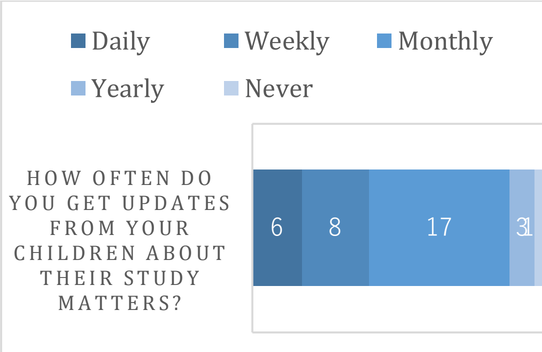
Out of the 35 parents, 16 of them declared that they have four children while 10 of them said that they have three children. 6 respondents, which is 17.10% of the respondents declared that they have two children whereas 2 respondents (5.71%) said that they have only one child.

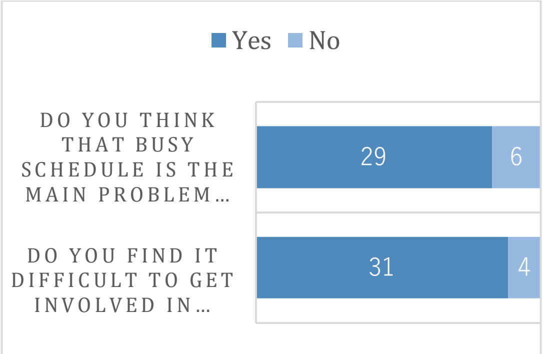
Section 2 – Child Education Tracking System (Child)



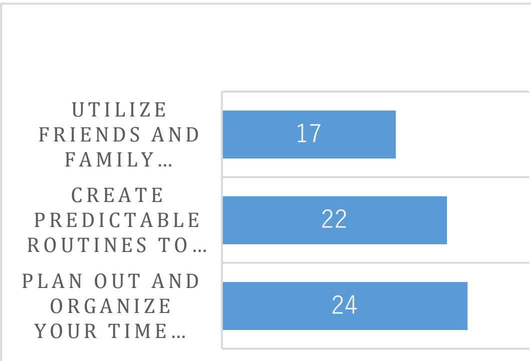
29 out of 65 respondents think that their schedules are not balance between academic and entertainment while 52 out of 65 respondents think that schedule planning is useful for balancing their schedule. With the help of this data, we can conclude that schedule planning must be a part of our system in order for it to recommend users with a balanced schedule. 41 out of 65 respondents, which is 63.10% of the respondents think that having record of awards can help in future planning. Thus, this feature must have in our system.

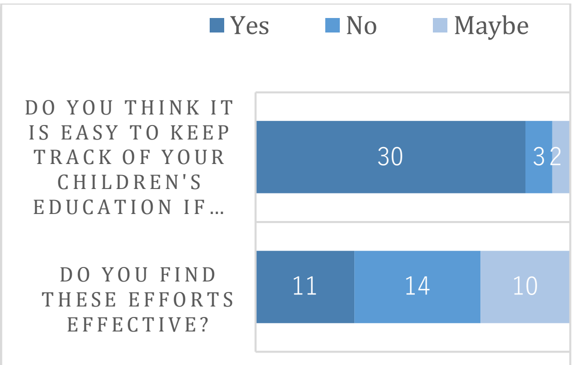
Section 3 - Child Education Tracking System (Parent)



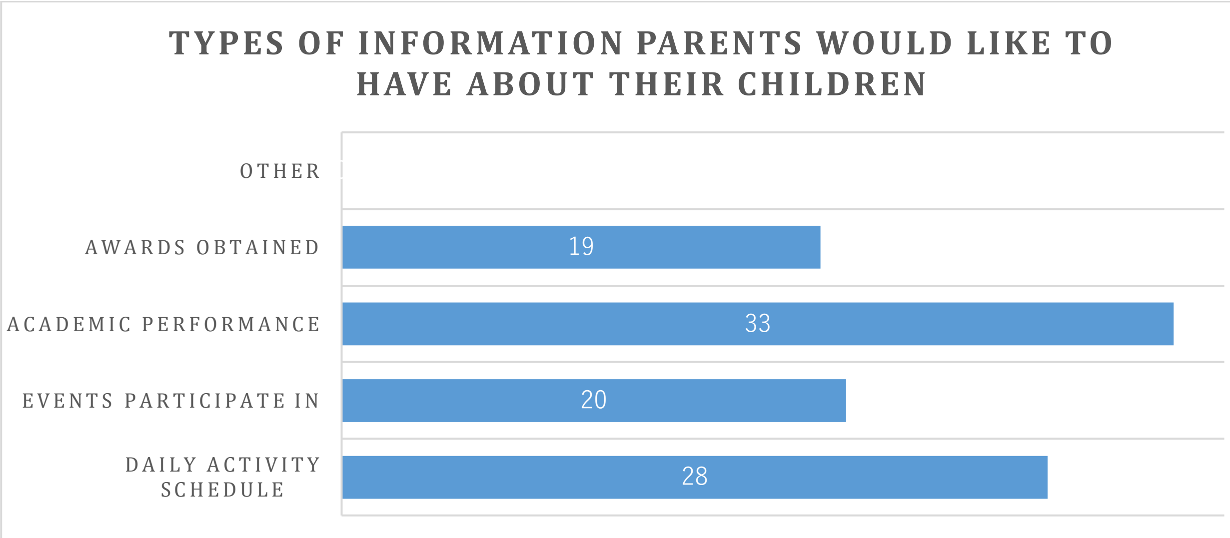


Most of the respondents, which is 17 out of 35 respondents say that they get updates from their children about their study matters monthly. 31 respondents, which is 88.60% of the respondents find out that it is difficult to get involved in their children education while 29 out of 35 respondents, which is 82.90% of the respondents think that the biggest issue preventing them from being active in their children's education is their hectic schedule. From these findings, we are aware that a system must be developed to enable parents to monitor their children's education despite their hectic schedules.

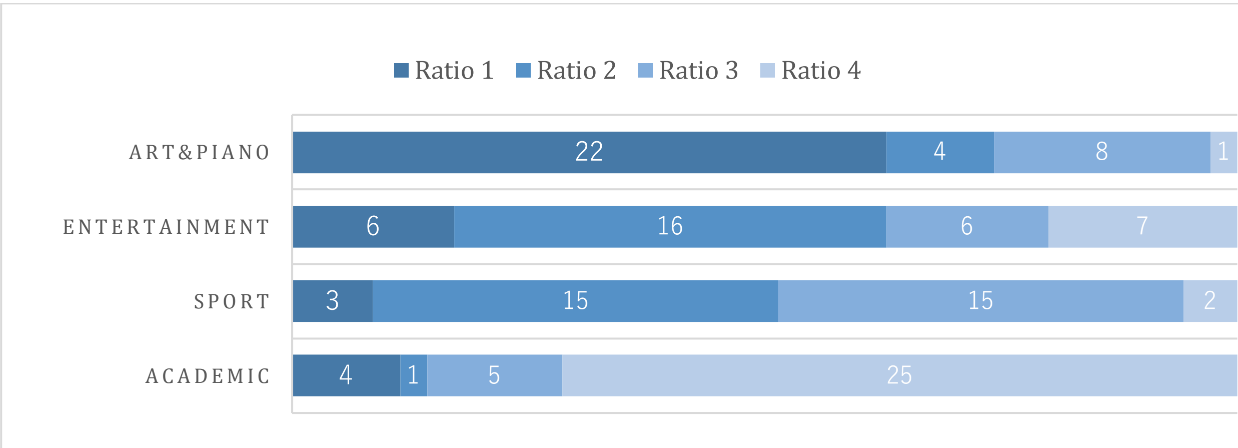




There are some steps taken to address the problem caused by the busy schedule such as utilize friends and family members to support children's education, create predictable routines to follow every day for example, eat breakfast or dinner together and plan out and organize your time wisely. Almost all the respondents have carried out all these actions so that they can get involved in their children's education. However, 14 out of 35 respondents do not find these efforts effective while 10 respondents do not know whether these efforts are effective or not. There are only 11 out of 35 respondents who think that these efforts are effective. I think it is because parents cannot get many details about their children's study matters although they have tried their best to squeeze some time with their children. The topic of education cannot be summed up in one or two words.

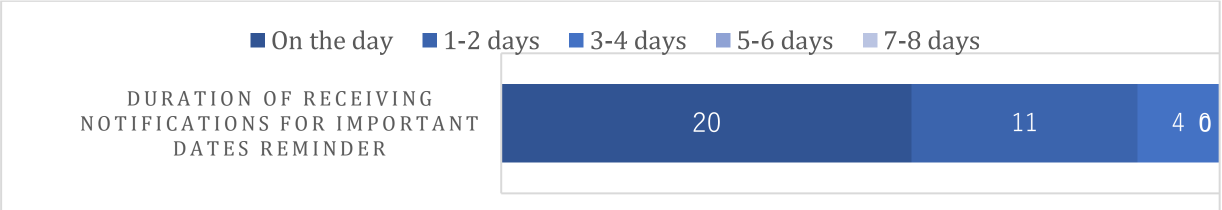


33 respondents would like to keep track of their children's academic performance while 28 respondents want to know about their children's daily activity schedule. 20 respondents and 19 respondents would like to obtain information about their children's awards and events they participate in respectively. Our system would assist in keeping track of these four categories of information as they receive at least 50% of the respondents' support.

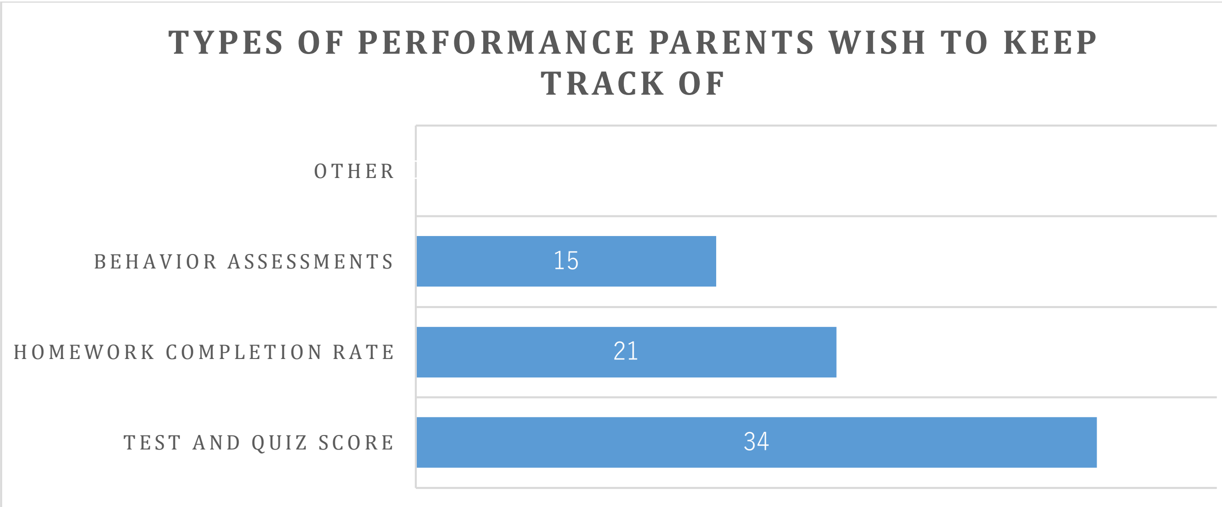


25 respondents, which is 71.40% of respondents agree that children should put 2/5 of their time on their academic while 15 respondents think that children should spend at least 1/5 of their time and at most 3/10 of their time on sport. 16 respondents agree that children should spend 1/5 of their time on entertainment while 22 respondents, which is 62.9% of respondents think that children should only take 1/10 of their time on art

and piano. From the responses, we can conclude that children should take 2/5 of their time on academic, 3/10 of time on sport, 1/5 of time on entertainment and 1/10 of time on art and piano. Our system would plan the schedule based on this standard.



20 respondents think that receiving notifications for important dates reminder on the day is enough while 11 respondents think that the system should remind them of the events one to two days before the event date. Since all respondents have their own preferences, I would make "on the day" as the default duration of receiving notifications but users can also change the duration based on their preferences.

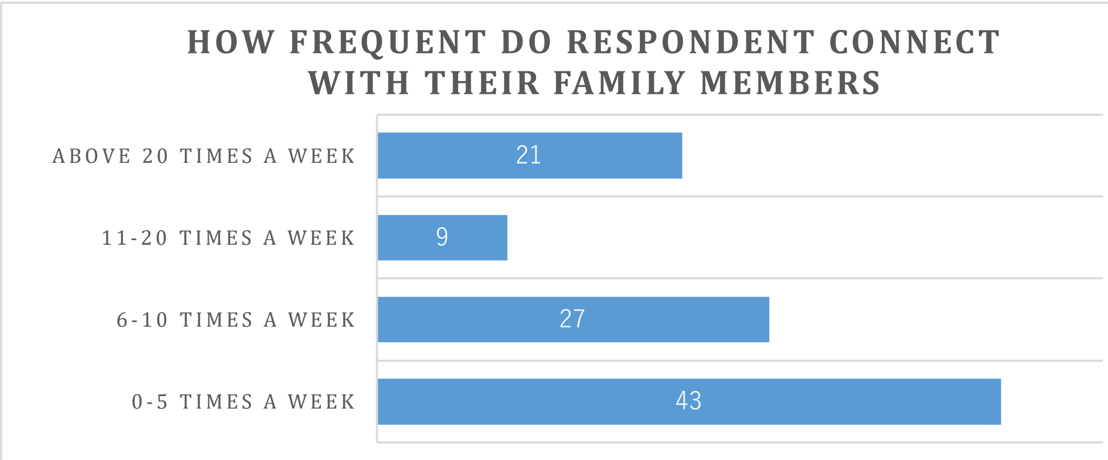


Almost all respondents, 34 out of 35 respondents want to keep track of their children's test and quiz scores. Besides, 21 respondents and 15 respondents want to know their children's homework completion rate and behavior assessments respectively. Given that many respondents wish to keep track of these sorts of performances, our system will record all of them.

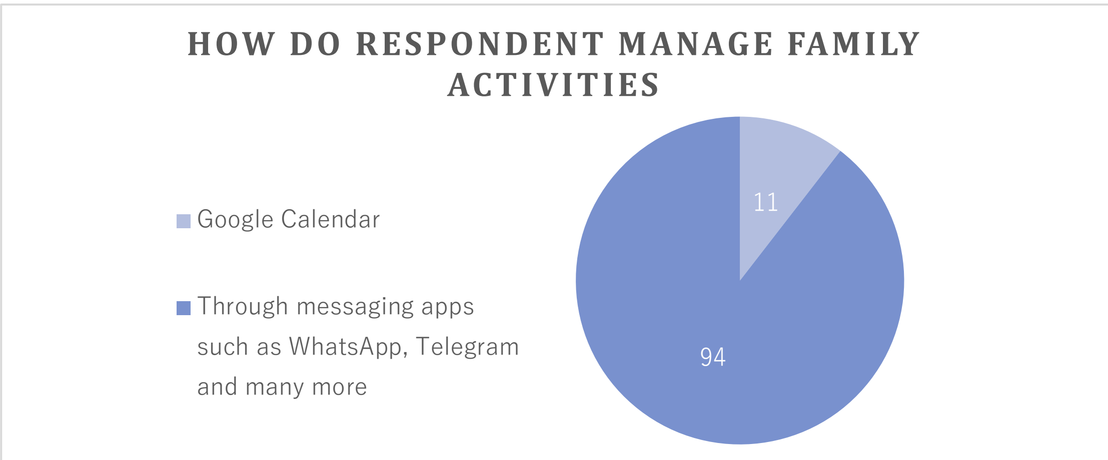
What are the features that you want on that system?	
1	I care about my children's mental health. Perhaps this system can help on that
2	The system can suggest where to go when waiting for my children to end his or her activities.

These two suggestions on features are quite good. Mental health conditions are increasing worldwide, it is pretty good if the system can record down the mood of the children and alert parents when children are depressed for a long time. For the second suggestion, it is also a good feature. Usually, parents need to pick their children up to the destination, after the activities end, they need to bring their children back. Hence, they need to wait at the place for a few hours. It is good if the system can suggest parents where to go to kill time. As part of my future work, I would like to incorporate these functionalities into the system.

Section 4 – Contact and Appointment Subsystem

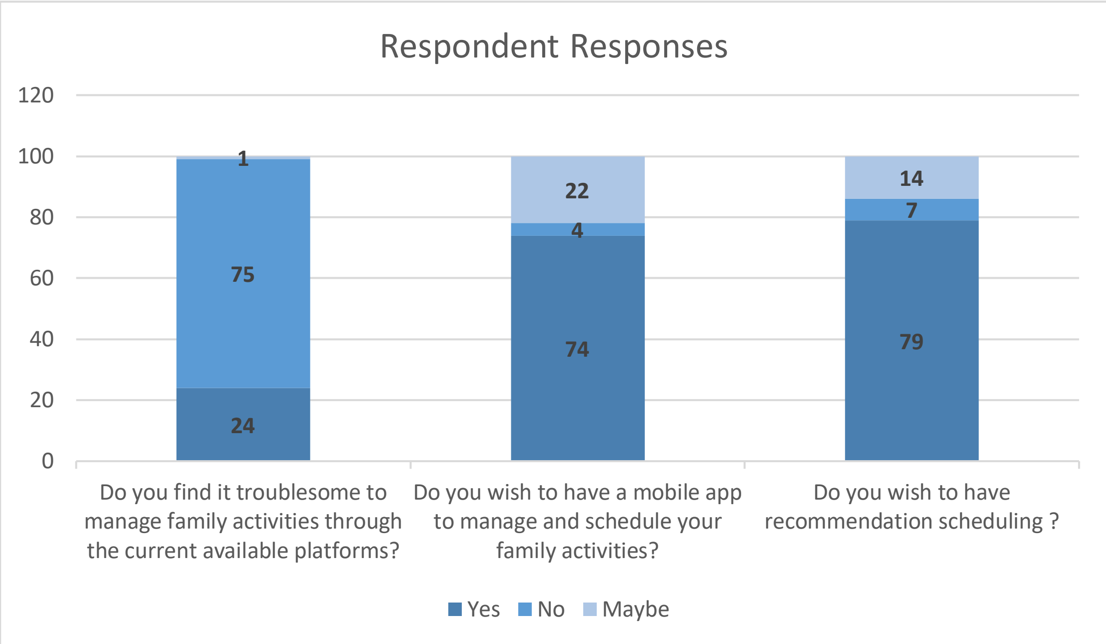


Most of the respondents, which is 43 out of 100 respondents connect 0-5 times a week with their family members. 27% of the respondents join their family activities 6-10 times a week. 21% of the respondents connect with their family members above 20 times a week. 9 out of 100 respondents connect 11-20 times with their family members in a week. We can conclude that most of the respondents still have low interest in



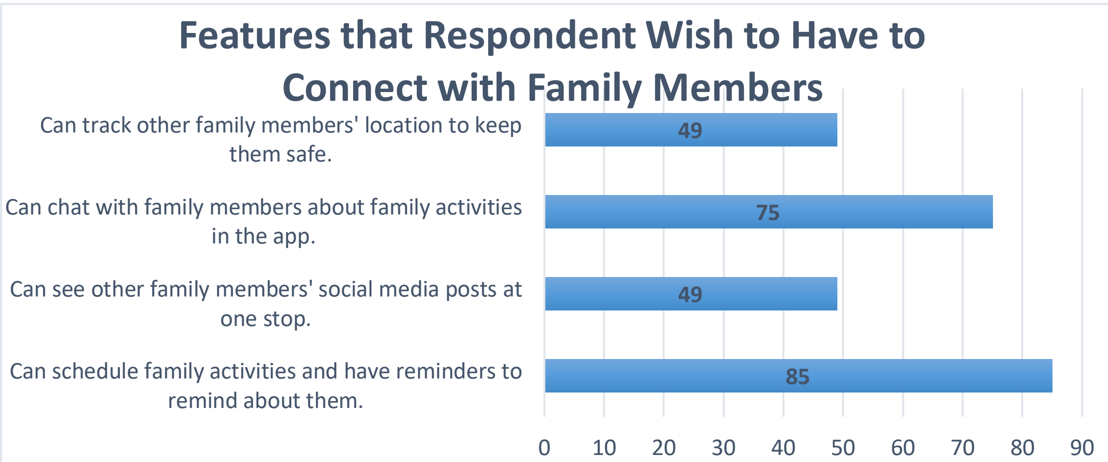
connecting with their family members. Therefore, we need to develop an application to ease communication between family members to increase the family bonding.

From the responses, we can see that most of the respondents, 94 out of 100 respondents are using messaging applications to handle their family activities. 11 out of 100 respondents are using Google Calendar to manage their family activities. We can learn that messaging systems are useful to manage family activities. Thus, we include the chat system in our system to help user for better family activities management. We also fuse the use of Calendar system into our system to have a better overview of scheduled family events.



Based on the findings, most of the respondents, which is 75 out of 100 respondents are satisfied with the current available platform for family events management. 25% of respondents feel troublesome to manage family events using current available platforms and leave their thoughts about it. Nevertheless, most of the respondents, which is 96% of the respondents show positive feedbacks (yes and maybe) about having a mobile application to manage and schedule their family activities. Only a minority of respondents, which is 4% of the respondents think that they do not need a mobile application to manage and schedule their family activities. We can conclude that our system purpose is in highly required by the respondents. A majority of respondents, which is 93% of respondents wish (yes and maybe) that recommendation scheduling feature is included in the system. 7 out of 100 respondents feel that they would not want recommendation scheduling features. From the result, we can say that recommendation scheduling feature is demanded by most of the respondents, thus we include it in our system.

The figure below shows the word cloud based on users' responses on the question "Why do you think existing method is troublesome?". From the word cloud, we can see the "different group" is the most mentioned word in their responses. Respondents said that it is difficult to manage family events with different group in existing group. For example, they need to create groups manually for each event and ends up with too many groups which make things complicated.

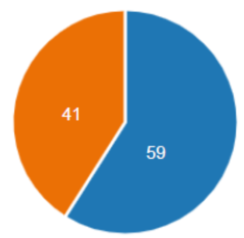


Most respondents, 85 out of 100 respondents want to schedule family activities and have reminders to remind about them. Besides, 75% of respondents want to chat with family members about family activities in the application. 49% of respondents want to track other family members' location to keep them safe and to see other family members' social media posts at one stop. Our system will have all the features stated due to respondents' demand.

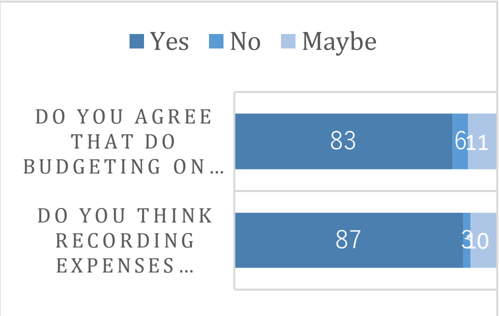
What other features that you think should be included in the platform?	
1	Maybe a notification reminder like "Hey, you haven't call Mom for a week". Maybe we can choose few people in the family to set this reminder because you know, old people get sad when we forgot about them. Also, maybe after some time, the app will choose random family member (the one we didn't choose to be reminded) and notify us like "Hey, aren't you wondering how [insert name] is doing?" or "Do you think [insert name] is doing fine?".
2	Reminder on special date (such as anniversary)

The two suggestions on features are very good, especially the first suggestion. It could help to remind user to contact their loved ones which the subsystem purposes, which is to enhance the relationship among family members. We really appreciate the feedbacks given by the respondents and we think that it is pretty good to have these features in our system. Therefore, we integrated these features into the system.

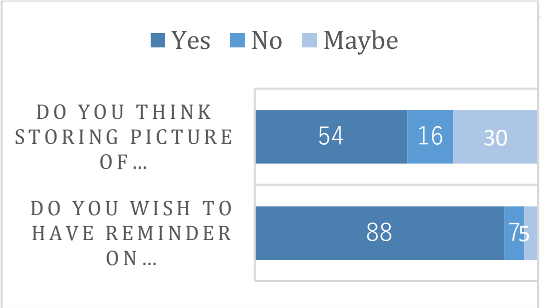
Section 5- Finance Monitoring Subsystem

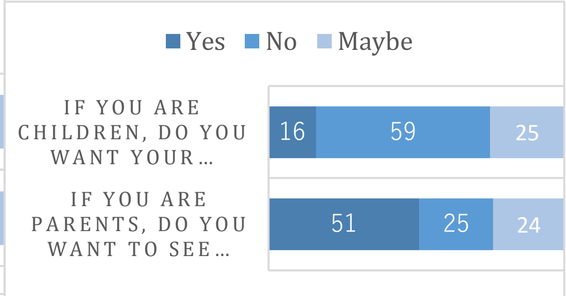


Do you use app that record income and expenses?(finance monitoring)

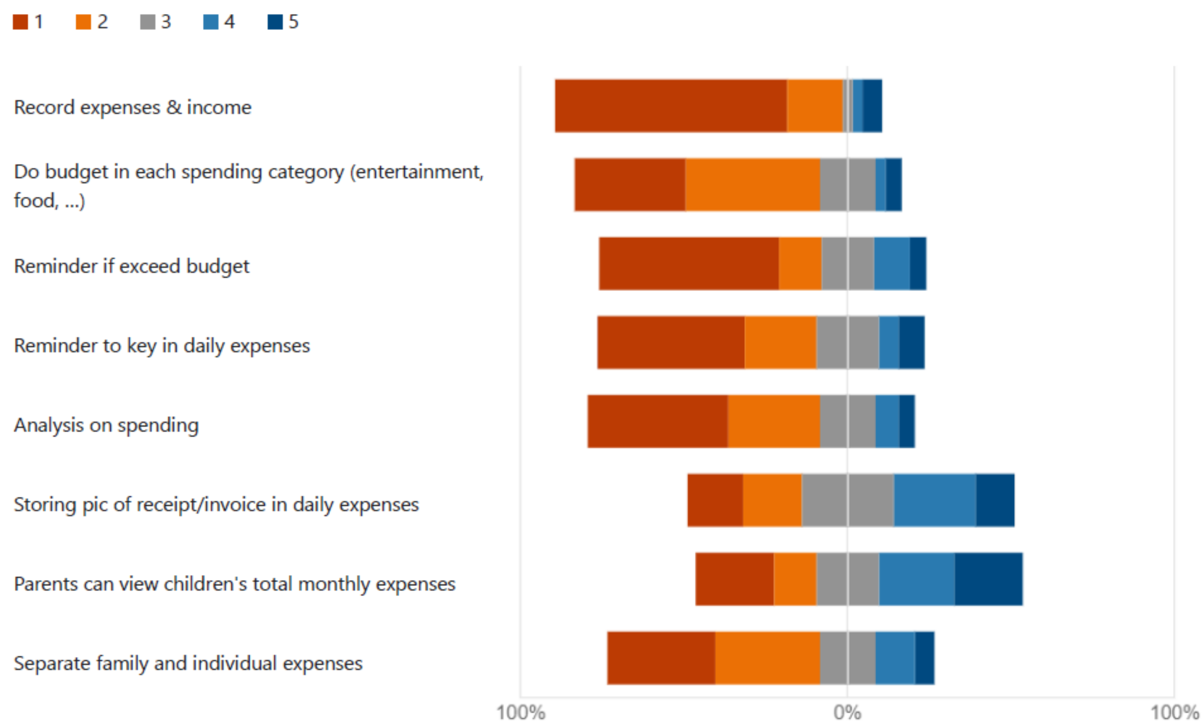


There are 59 respondents out of 100 has used a finance monitoring app before and 41 respondents does not used it. This means that there is quite a large amount of people do not manage or track their finance. Besides, 83 respondent agree that recording expenses helps people to eliminate wasteful spending habits from the spending records and 87 respondents agree that do budgeting on each spending category (food, entertainment...) can help to avoid overspending. This statistic shows that a finance monitoring app is necessary to help in tracking our spending and avoid overspending.





There are 54 respondents agree that storing picture of receipt/invoice in daily expenses record is helpful in monitoring finance and 30 respondents choose maybe in this question. This shows that many people agree or somehow agree that storing picture of receipt/invoice is helpful in monitoring finance. Besides, 88 respondents wish to have reminder on overspending or record daily expenses and this has concluded that both storing picture and overspending reminder are needed by most of the people. Moreover, this survey also shows that only 16 respondents agree to show parents on their monthly total expenses and 59 respondents disagree to show their monthly total expenses while 51 respondents want to see their children's monthly total expenses. This summarizes that an option to hide children's monthly total expenses needs to be deployed.



The figure above is asking the respondents to rate the features in finance monitoring app which 1 is most important. From this survey, we can conclude that record expenses and income is the most important feature, follow by overspending reminder, daily expenses reminder, budgeting, analysis on spending, separate family and individual expenses, parents can view children's total monthly income and lastly storing the picture of receipt/invoice. This question helps in prioritise the features needed in the finance monitoring subsystem.

What are the other features that you want in Finance Monitoring System?	
1	Budget based on categories.
2	Stocks

There are 2 responses on this question. The first feature is budgeting based on categories which is a good idea, and this will be added in the finance monitoring subsystem. The second response is about stocks. However, this is not relevant to the finance monitoring subsystem that to be implemented. Thus, this response will not be considered.

Appendix B – Interview

Interview 1

Date: Friday 02 December 2022

Time: 10:30

Respondent: A forty-year-old woman with three children. (Lim Gok Leng)

Interviewers: Ting Su Qi, Tan Jia Hui, Tay Ming Shan

Questions	Response / Comments
Contact and Appointment Subsystem	
How frequently do you connect with your family members?	I will talk to my family members every day. So perhaps it is in the range of above 20 times for a week.
How do you manage your family activities right now (such as a family member's gathering and festival)?	Now my family use WhatsApp to chat and manage our family activities.
Do you find it troublesome to manage family activities through the current available platforms? Why?	Actually, I think it's fine to use WhatsApp, but sometimes it would be troublesome when there are too many family activities. Last time, they create a group for my sister birthday. Then, for

	another wedding event, they create another group. It is hard to keep track of the event when it is too many of it.
Do you wish to have a mobile app to manage and schedule your family activities?	Yes sure, there is still no app dedicated for scheduling and managing family activities.
Do you wish to have recommendation scheduling (eg: Suggest to create an upcoming birthday as a family event)?	Yeah, I always have troubles to think of family events for everyone to join. I think it's a good feature.
What features do you wish to have to connect with your family members in the mobile app?	I'm too busy taking care of everything in the house. Maybe I can have reminders for every accepted events so that I would not forget to join or prepare for the event.
What other features that you think should be included in the platform?	I think you can add reminders on countdown to the accepted events. It helps to remind people about the countdown days left.
Child Education Tracking Subsystem	
How often do you get updates from your children about their study matters?	Perhaps I can say monthly. When I believe it is time for exams, I shall enquire about their exam dates and academic progress. I'll then request the results from them. They will be sent to tuition classes if they didn't perform well.
Do you find it difficult to get involved in your children's education? Why?	Yes, it is quite difficult. I am busy with my work. I had to make dinner for the family once I got back home. Additionally, I have some housework that has to be done, like laundry. I was exhausted after doing those tasks. I watched some live streaming and then went to sleep.
Do you think that busy schedule is the main problem for becoming involved with your children's education?	Yes, without a doubt, it is the fundamental issue. My hectic day begins with making breakfast for my family before I go for work. I spend 1-2 hours making dinner after leaving work at 5p.m. Then, finish up some housework. After I finished everything, it was already 10pm at night. After viewing some videos or live streaming, I am heading to bed. I must go to bed before 11am so that I can get up at 5am. I am the one who takes my kids to and from tuition if they need to attend classes.
What steps have you taken to address this problem? Do you find these efforts effective?	Regarding this issue, I did nothing. I think I have done my best to become a mother. I can help them by bringing them up from tuition lessons, checking on their academic achievement once a

	month, and making meals for them. I am out of time to accomplish anything else right now.
Do you think it is easy to keep track of your children's education if there is a system that helps to record your children's classes and activities and keep track of your children's performance and awards? Why do you think so?	Yes, I think it is good if there is a system that can record down my children's study matters. I always forgot when and where are the tuition classes. It is so nice and lovely if the system can help me to keep track of my children's results and awards. With this ability, I think I can better understand my kids' strengths and limitations and adjust their academic schedule accordingly.
What types of information would you like to have about your children?	Their results are a major piece of information I want from them. In addition, I believe it is good for them to let me know when their exams are so I can make sure they prepare properly. It would be great to know when and where to pick them up from their classes.
There are a total of four types of activities: Academic, Sport, Entertainment, Art & Piano. Please rate 1-4 to these four types of activities. If you choose 4, it indicates that you believe individuals should devote 2/5 of their time to that type of activity. It is against the rules to give another activity type the same rating.	Okay. Of course, children should spend most of their time on their academic, so I rate academic as 4. Since they work so hard on their studies, they should have enough entertainment too, so I rate entertainment as 3. Then, sport is 2 while art and piano are 1.
How frequently do you think it is suitable to receive reminder notifications on the important event dates?	I believe I would want to be reminded three days before the activities. The system should, of course, also remind me on the day of the event. Since everyone checks their phones when they get up, I believe it is best to send the alerts early in the morning and the system can send them again one hour before the activities.
What types of performance you wish to keep track of?	Perhaps I can get the results of their tests, quizzes, and examinations. I also want to know how well-behaved my kids are in their tutoring sessions and at school. Finally, I would like to know if they finished their homework or not.
What are the features that you want on that system?	I want to monitor their academic progress, classes, and significant events like test dates. I hope that children will be able to talk to me if they are feeling stressed or have any issues. I am concerned about their mental health, but I don't have enough time to assess whether they have had any issues. I hope this system can help me on this.

Finance Monitoring Subsystem	
Do you think recording expenses helps people to eliminate wasteful spending habits from the spending records?	Yes, as we can see the total amount that be used and will be more careful when spending. Recording expenses can also help to identify wasteful spending so I think is correct that recording expenses can help to eliminate wasteful spending.
Do you agree that do budgeting on each spending category (food, entertainment,...) can help to avoid overspending?	Yes, budgeting on different category will help to avoid to much spending on specific category and results in less budget remain for other spending category. I like to buy clothes but I will limit myself to a certain amount to avoid overspending.
Do you wish to have reminder on overspending or record daily expenses?	Of course, this can help to remind me not to spend to much and record all my expenses.
Do you think storing picture of receipt/invoice in daily expenses record is helpful in monitoring finance?	For me this feature is not too important for me, but it is good to have in the app.
Do you want to see your children's total monthly expenses?	Sure, I always wondering how much my children can spend in a month, but I respect their privacy, so it is okay for me if they do not want to show me.
Do you think separate family and individual expenses record is better than having just individual expenses record?	Yes, as individual spending is my own personal use that I can see what I have spent for myself while family expenses is for the whole family. It is better to separate it.
What are the other features that you want in Finance Monitoring System?	I have no idea about this, as long as it can record expenses, income and budget then I am okay with the app.

Interview 2

Date: Friday 09 December 2022

Time: 14:00

Respondent: A thirteen-year-old male student. (Joseph)

Interviewers: Ting Su Qi, Tan Jia Hui, Tay Ming Shan

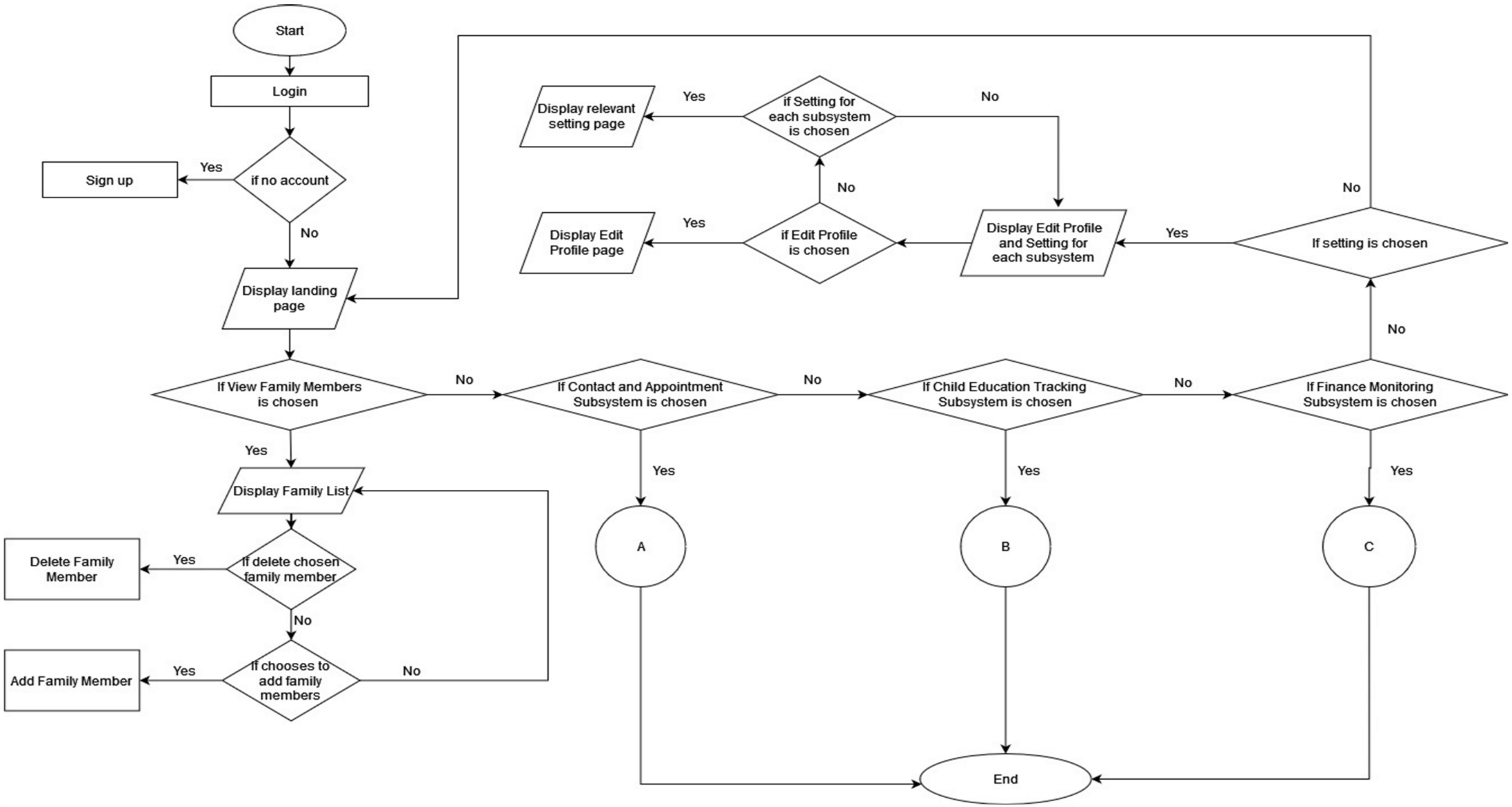
Questions	Response / Comments
Contact and Appointment Subsystem	
How frequently do you connect with your family members?	I would say it would be 10-20 times in a week.
How do you manage your family activities right now (such as a family member's gathering and festival)?	We handle everything about family using WhatsApp.

Do you find it troublesome to manage family activities through the current available platforms? Why?	So far it's ok, but when things become complicated, it would be hard to know which family activity that I promise to join.
Do you wish to have a mobile app to manage and schedule your family activities?	Yeah, I could see the overview of my schedule better, and checking whether my family events will clash with my personal activities.
Do you wish to have recommendation scheduling (eg: Suggest creating an upcoming birthday as a family event)?	Yeah, why not. It is great to know others birthday beforehand and gather everyone together.
What features do you wish to have to connect with your family members in the mobile app?	I wish I can discuss with other family members and can schedule my family events.
What other features that you think should be included in the platform?	Maybe can include location coordinates in the event part to allow easy navigation.
Child Education Tracking Subsystem	
Do you think your schedule is balance between academic and entertainment?	No, I don't think so. I devote more time to my studies, but I also get enough of relaxation afterward. To decompress, I would watch movies, reality shows, and play video games.
Do you think event scheduling is useful for balancing your schedule?	I hope so. I am hoping the system can assist me in setting up a balanced routine so I can get better-quality sleep while still getting more relaxation and personal time. Maintaining a regular routine might also assist to reduce stress.
Do you think awards record is important for your future planning?	Yes, I think it is important. By having these records, I can identify my strengths. My strengths or natural talents can be one of the factors when choosing a career in the future. Hence, these awards records can help me in making decision.
Finance Monitoring Subsystem	
Do you think recording expenses helps people to eliminate wasteful spending habits from the spending records?	Yes, I am using a finance tracking app also and it helps me to control myself from spending too much as I can see the total amount of spending.

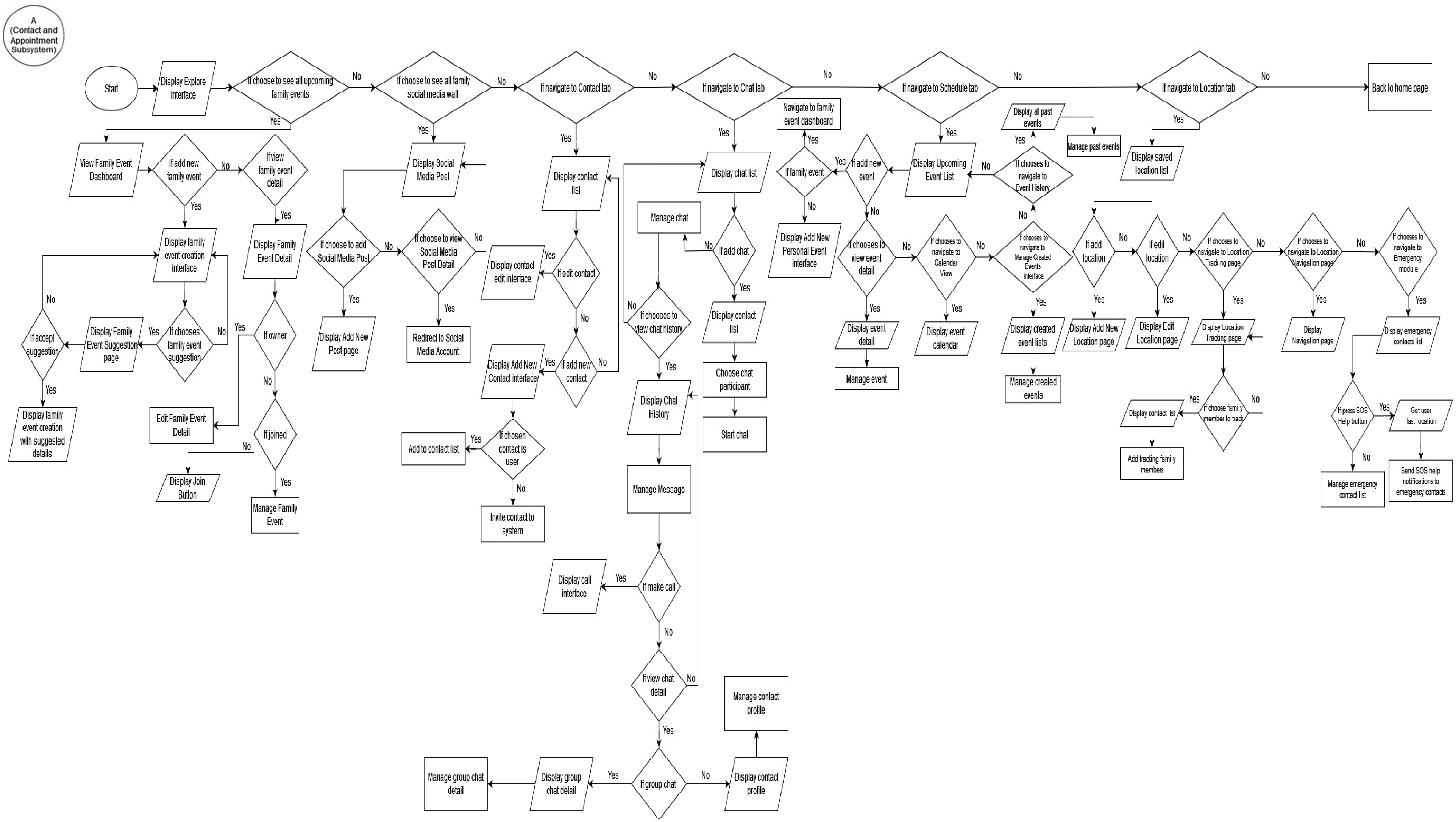
Do you agree that do budgeting on each spending category (food, entertainment,...) can help to avoid overspending?	Yes, budgeting on different expense category can avoid overspending and can develop good spending practices.
Do you wish to have reminder on overspending or record daily expenses?	It is good to have these reminders to remind me not to overspend and record my finance flow.
Do you think storing picture of receipt/invoice in daily expenses record is helpful in monitoring finance?	Yes, this is a good feature which I can see clearly what items I have spent and I can do comparison on price on same item in different stores by looking back the receipts.
Do you want your parents to see your total monthly expenses?	Definitely no. I do not want my parents to know my total spending as I think this is my privacy and this is offending me if my parents want me to show my monthly spending.
Do you think separate family and individual expenses record is better than having just individual expenses record?	I think yes as a people should have own finance record that spend for only him/herself. Family account should be separated from individual.
What are the other features that you want in Finance Monitoring System?	I think you can add customise spending categories as the default categories is not enough like I can remove unwanted category and add new category by myself.

Appendix C – Flowchart

Common Modules Flow Chart

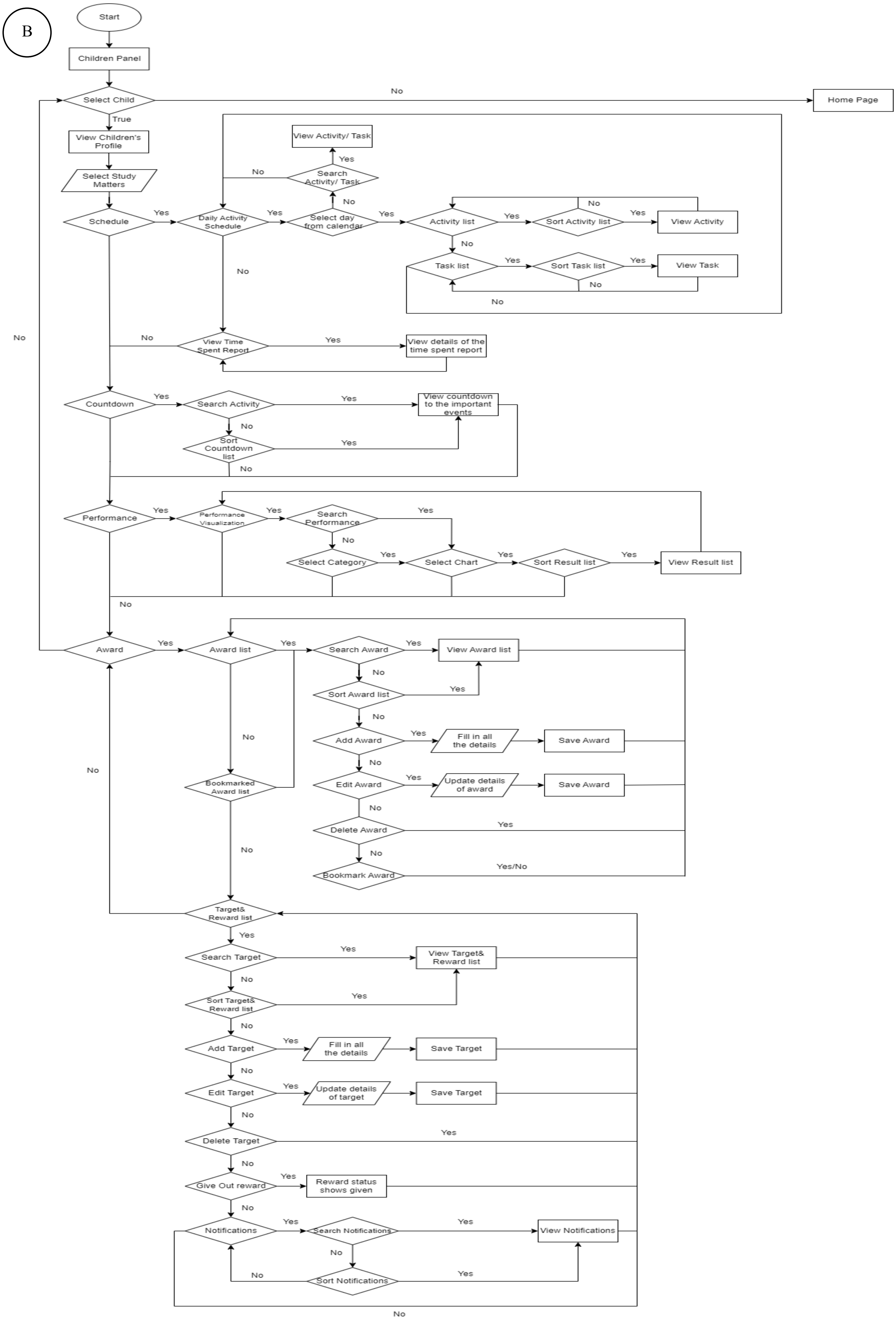


Contact and Appointment Subsystem Flow Chart

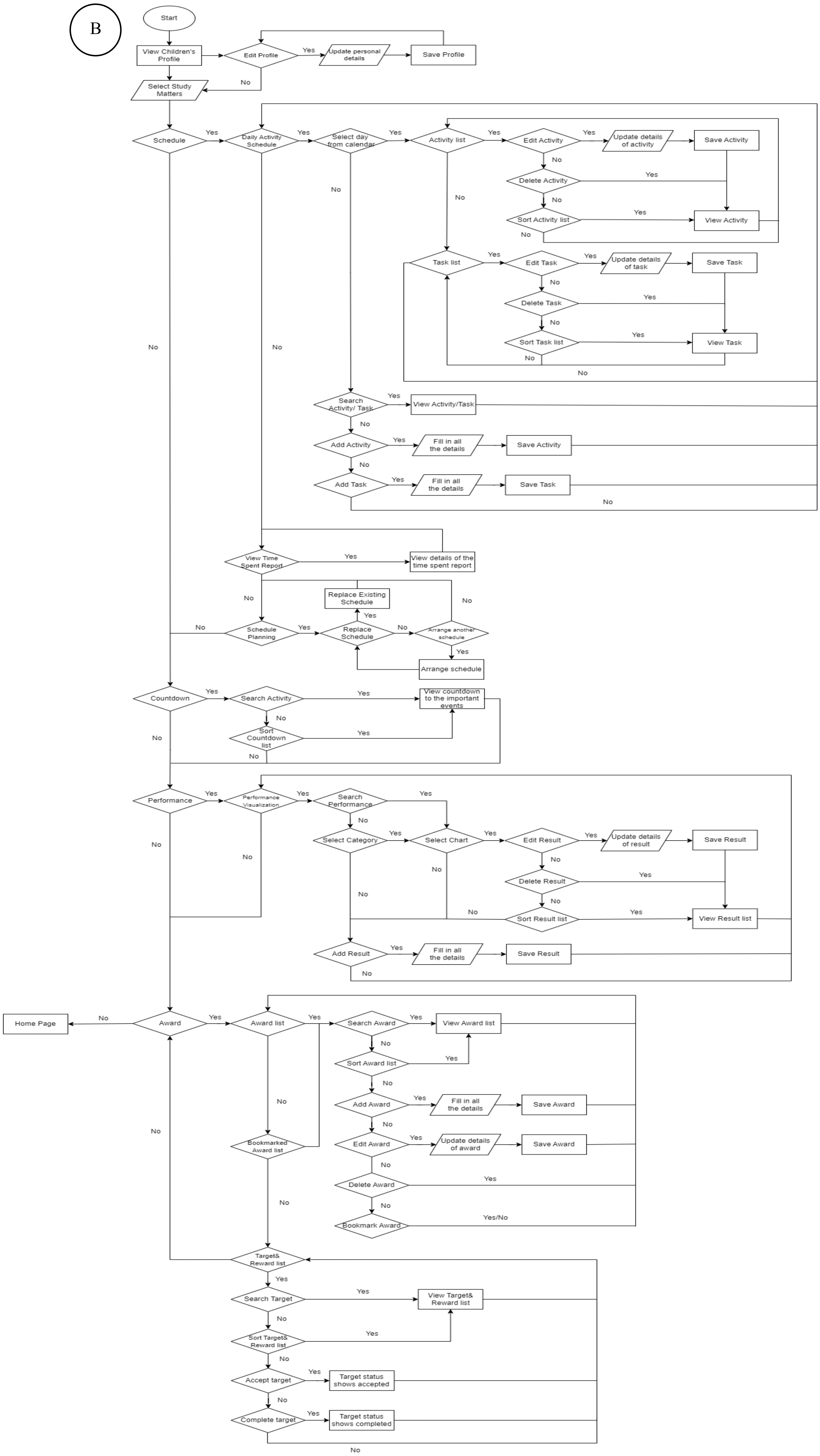


Child Education Tracking Flow Chart

Parent View

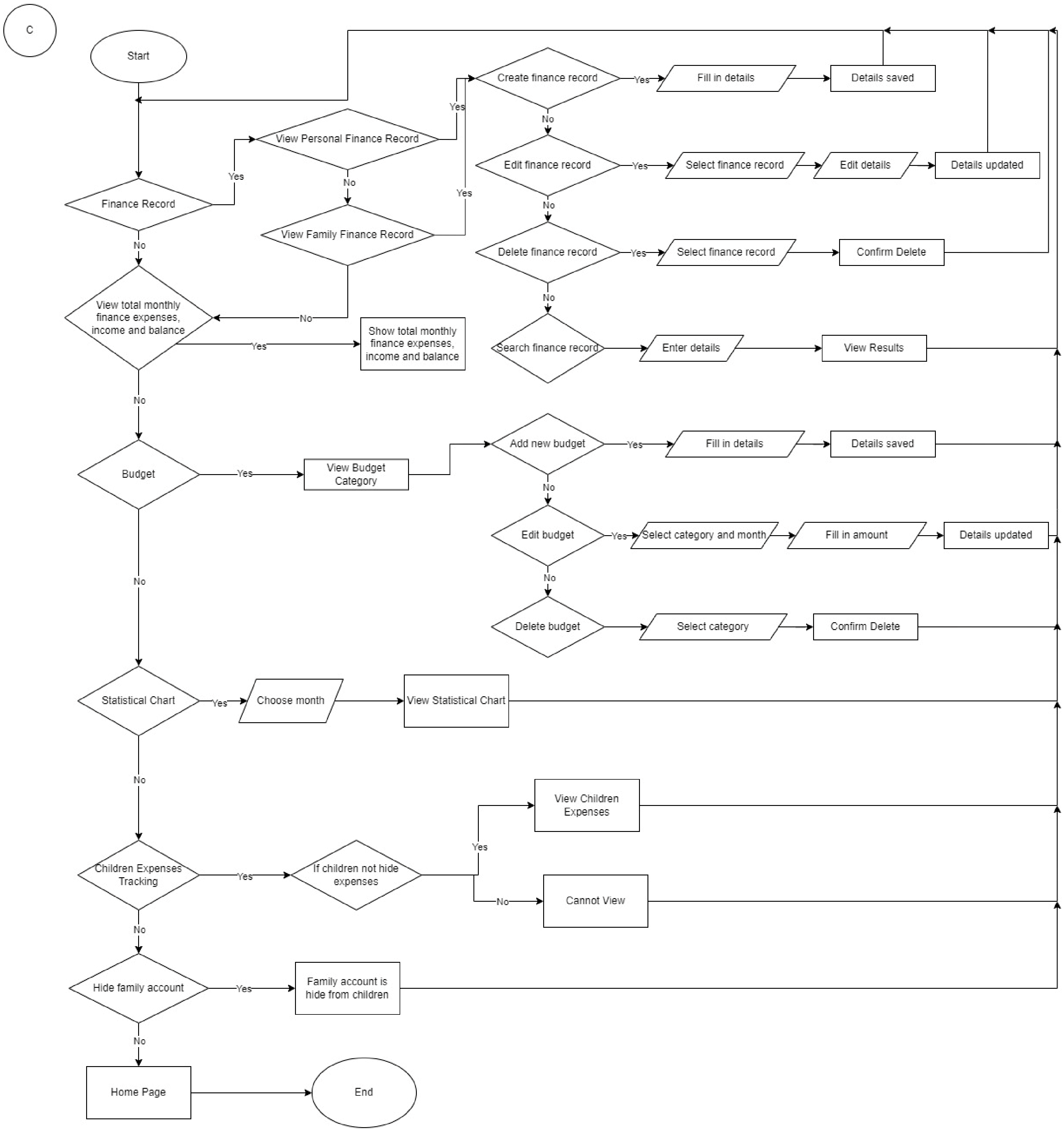


Children View



Finance Monitoring Subsystem Flow Chart

Parents View



Finance Monitoring Subsystem Flow Chart

Children View