Secure Finance

Application Prototyping

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Table of Contents

GOAL **3**

Why? 3

For who? 3

Where? 3

How does it work? 3

Creating an account. 4

USER STORIES AND USE CASE DIAGRAMS 8

User stories: 8

USE CASE DIAGRAM: **11**

C4 MODEL **12**

FLOWCHARTS **14**

WIREFRAMES **15**

ETHICS **15**

GOAL

Why?

In recent years since virtual money became more popular and it got easier to pay for goods and services online and in real life, the irresponsible spending of teenagers have increased. This app is created as a solution to this problem, helping teenagers become more financially responsible and also giving the parents a little control on their children's financial status with the hope of making their children more financially responsible in the future.

For who?

This application has two target clients, ***parents*** and ***teenagers***. The main goal is for parents to be able to manage and monitor their child's finances. And also for teenagers to provide a clear overview of their finances and along the way learn to be more financially responsible thanks to the effective reward system and other features our application has.

Where?

The app will be available to all member countries of the European Union and maybe extended to other countries as well in the future. The application will be available only on cell phones (play store/ Apple store). The languages are currently limited to English, Dutch and French but other languages will be available in future updates.

How does it work?

Parents can register and make an account for their teenage children. After successfully making an account, the parent/child will be able to log in through their **dedicated apps**. They can then view details about their transactions, where they spend their money, when and how much. There are extra features on the parent app like a spending limit, monthly bonus for teenagers when they consistently act financially responsible.

The bonus system works in a way that after each month of responsible spending, the entered amount in the "bonus section" of the parent app is added to their **fixed income** (in this case the monthly allowance the child receives from their parent).

Creating an account.

A parent can create an account for themselves and their child/children in a few easy steps. On the "create an account" screen, the parent has to enter their name, date of birth, account number, the number of sub accounts they will manage, their email and password. They also have to agree to the terms and conditions and tap next. On the second page, the parent needs to give the full name and bank account number of their child(ren) and email. The child will receive an email with a link on how to set a password for their account. The terms and conditions need to be agreed on this page as well and the account will be created.

Logging in as parent:

When a parent opens the app for the first time, they will find themselves on the welcome screen where they can log into their account. There isn't much on the welcome screen except a button to log in and another to create an account, a help button on the top right corner which takes you to another screen with instructions on how to navigate the app. On the bottom of the screen there is a "contact us" link to a webpage with contact information in case you need to get in touch with us.

The **log in** button takes the parent to a log in screen where they can fill in their email and password (must have an account). After the successful log in, they are taken to another screen which will be explained further in this document.

The **create account** button takes you to a new screen where the parent has to enter their credentials on the "parent" tab and accept the terms and conditions. Hitting the "next" button will take the parent to the "child" tab where they have to fill in child's credentials and opt in for the option of being notified if your child activates their account. The next page shows the terms and conditions of the app and you need to accept once more to finish the registration. A confirmation message is shown and the "continue" button takes you back to the homepage.

Logging in as child:

Just like the parent app, the welcome screen on the child app is also the same with the same icons but with just one button to log in. Other buttons and icons take you to basically the same page as parent app with very little difference for minimalistic and easy usability purpose. The child can log in by tapping the log in button and then entering their credentials to get access to their account.

Features in Parents app

Back button:

This button can be found on almost every screen to help the parent to return to the previous page.

Overview pages:

There are two scenario's when it comes to account overview, which means two pages. The first scenario is what if the parent manages multiple accounts (has multiple children) and the second is what if the parent has just one child (one account then)? With a carefully planned out layout, the app will be able to display the multiple accounts or the single account the parent manages properly. See wireframes for more details.

Reward System:

Parents get rewarded after 6 months of responsible financial spending by their child. This can be claimed on the overview page, there is a link "rewards" which takes the parent to a screen where it shows how many more days until they can claim their next reward. When it's time to claim the reward, the "claim" button gets activated which shows a pop up with a voucher code worth €50 which can be claimed in any store.

Add another account:

This link will take you to the page of creating an account, where you can once again enter the credentials of your second child. The parent's information will already be filled on the first tab so all you need to do is agree to the terms and conditions and the second child will have to follow the same steps in activating their account.

Account details:

After the parent selects an account to manage, they get taken to a screen with the different transactions their child has recently made. But there is limited info about the various transactions, the name, account number and amount is displayed. But if the parent wants more details on the transaction, they can tap on a transaction to see more details like date the transaction was made. For now, the exact time of transaction wouldn't be displayed for ethical/privacy reasons.

More:

This button can be found on the bottom right of the account details page. On this screen, the parent can take some administrative actions to manage their child's account. Each feature on this screen will be explained below.

- ***Set limit*:** this is an input box where you can only enter a price limit. If a transaction is made above the limit, it first needs to be approved by the parent first. And the parent gets a notification if there is a pending transaction that requires approval.

- ***Fixed transfers:*** This input box is specifically made to enter a fixed amount which is transferred to the child's account on a monthly basis. The first time the parent uses this feature, the input box is grey and by tapping it, you are taken to another screen where the parent has to give in the account details of where the monthly allowance of the child is coming from, and the account details of the account the money goes to. This is meant to be changeable in case the child gets another source of income (example: a student job). After the accounts have been set, the input box becomes active so you can easily change the amount when needed. To delete or change account details, the parent has to tap on the text "fixed transfer" instead of the input box.

- ***Bonus:*** With this input box, the parent can give in an amount meant to be the bonus for each month of responsible spending by their child.

- ***Emergency transfers:*** This switch is usually activated because it allows emergency transactions which can be later reviewed by the parent and discussed with the child. This feature is meant as a last resort for in case the child has to make an emergency transaction without having to wait for approval from the parent. It requires a little honesty from the child though, because it really has to be an emergency. But the parent can always turn this feature off if they feel their child is abusing it or wrongly using it.

- ***Temporarily disable account:*** This switch allow the parent to temporarily disable their child's account for 24 hours. This feature is meant to be used when the child doesn't responsibly go about with their finances and they need a kind of cool down.

- ***Pending transactions:*** This shows the number of "over-the-limit" transactions that still need to be approved by the parent. Tapping on it takes you to a screen which shows thee various transactions that need to be approved. There is a button to approve or decline a transaction.

- ***Save changes:*** This button saves all the changes made on the manage account screen and takes you back to the account overview menu.

Features in Child app:

Back button:

This button can be found on almost every screen to help the child to return to the previous page.

Actions:

After the child successfully log in, they are taken to a screen showing four possible actions that can be taken.

- ***Transfer:*** You can transfer funds from one account to the other using this button. All the child has to do is give in the amount, sender account number, name and recipient account number. After the transfer is complete, the authentication screen comes next where the transfer can be confirmed and completed.

- ***Scan:*** Tapping on this takes you to a screen with the child's camera open to scan QR codes. After the code is successfully scanned, the child is automatically taken to the authentication page where the transfer can be confirmed and completed.

- ***Receive:*** The receive feature is meant for the child to create a transfer request to a specific account. All they have to do is enter the amount, name and account number and then authenticate to confirm the transfer. All the other party has to do is accept/decline the transfer request.

- ***Emergency:*** In cases of emergencies, the child can make a transaction over the limit but has to explain later to the parent why. On the child app, they can make an emergency transaction by tapping emergency > fill in the amount > the account number > name > next and authenticate.

More (account details):

The child gets an overview of their account balance and most recent transactions when they tap on this button. And just like in the parent app, tapping on a transaction gives more details than showed on the menu.

Authentication:

The child app has 3 authentication methods to confirm each transaction. A password can be used to confirm transactions, face ID or fingerprint reader if the user's phone supports that.

This is meant to provide safety and prevent unauthorized transactions or access to the accounts.

USER STORIES AND USE CASE DIAGRAMS

User stories:

A user story describes the interaction between the user and the system to meet specified requirements.

User stories for potential users

As a potential user (child), I want

- To be able to log in on the app
  - **Rule**: The user must always log in for security purposes.
  - **Example**: Mark accidentally left his phone unlocked when he went to the bathroom at his friend's. He can be rest assured that nobody has access to his account because he is automatically logged out after 5 minutes of inactivity.

- An overview of my financial spending's.
  - **Rule**: Recent transactions are always displayed when the child logs into their account
  - **Example**: Mark is a little suspicious about someone else using his account, he can easily scroll through the list of recent transactions made to verify if his suspicions are true.

- To view my transactions with more details
  - **Rule**: For more details on transactions you've made, you can tap on a specific transfer in the list to view more details about the transfer.
  - **Example**: Mark wants to see how much and when he transferred money to Ralph a few days ago, all he has to do is check the list.

- To be able to easily transfer money to other accounts
  - **Rule**: For transfers where QR codes aren't possible, the child can manually enter the bank details and the amount he/she wants to transfer.
  - **Example**: Mark wants to transfer €10 to his cousin for a bus ticket, since his cousin isn't around he can just enter the bank details and amount on the transfer screen.

- To pay by scanning a QR-code
  - **Rule**: The child can easily pay for things without having to follow long steps in transferring money
  - **Example**: I want to easily pay for things by scanning a QR code on a screen

- Receive transfers (create transfer request)
    - **Rule**: Users can easily create a transfer request in a form of QR code to easily receive payments.
    - **Example**: Mark has to hurry and catch the train but Ralph wanted to transfer money to him for a train ticket. Mark can easily create a QR code for ralph to scan to complete the transfer.

- To receive a kind of reward for good spending behaviour
    - **Rule**: Parents can set a monthly bonus which gets transferred into child's account after 2 months of consistent responsible spending.
    - **Example**: Mark has been spending money responsibly for the past month and he is never above the limit, he is very excited to get his bonus next month all he has to do is keep up the good work.

- A fast and easy-to-navigate application to give me an appropriate financial overview
    - **Rule**: The app is minimalistic and doesn't contain unnecessary features to complicate it.
    - **Example**: Mark isn't a tech expert but he can easily navigate through the app to find whatever he needs.

As a potential user (parent), I want

- To be able to create an account for me and my child
    - **Rule**: Parents have to give in their child's bank details and email to integrate them into the system.
    - **Example**: Mrs Rogers doesn't have to contact costumer service to be able to add her just-turned 14 son's account to the app because this can easily be done via the app.

- Easily navigate through the app
    - **Rule**: The app is minimalistic and doesn't contain unnecessary features to complicate it.
    - **Example**: Mr Orleans isn't a tech expert but he can easily navigate through he app to find whatever he needs.

- To have an overview of my child's spending's
    - **Rule**: The parent can view what their child has been spending money on.
    - **Example**: Mrs Rogers trusts her son but she couldn't believe his monthly allowance was already depleted before the month ended, she can easily check the app to see what little mark spent all his money on.

- To view my child's transactions in detail
    - **Rule**: Tapping on a transaction shows more details.
    - **Example**: Mrs Rogers wants to confirm her child spent money at this specific place, tapping on that transaction can give her more details.

- To be able to set a spending limit
    - **Rule**: A parent can set a limit to help teach their child to spend responsibly.
    - **Example**: Mark likes to spend a lot of money on video games so his mum set a limit on how much he can spend per transfer to help him be more financially responsible.

- To be able to temporarily disable the account when over limit
    - **Rule**: The manage account page gives the parent the ability to disable the child's account for 24 hours after excessive spending
    - **Example**: Mark got some Christmas bonus and decided to go on a spending spree which his parents didn't agree with. Mr Rogers decided to temporarily disable his account to prevent any more damage being done.

- To receive compensation for managing my child's finances
    - **Rule**: The app provides a reward system for the parent which can be redeemed every 6 months.
    - **Example**: Mrs Rogers gets a €50 gift card to her favourite shop after every 6 months of responsible spending by her child

- To approve transactions over the limit
    - **Rule**: Parents need to approve all transactions above the set limit.
    - **Example**: Mrs Rogers can decide to approve or disapprove Mark's €320 transaction to Zalando if she agreed on him buying that many stuff online

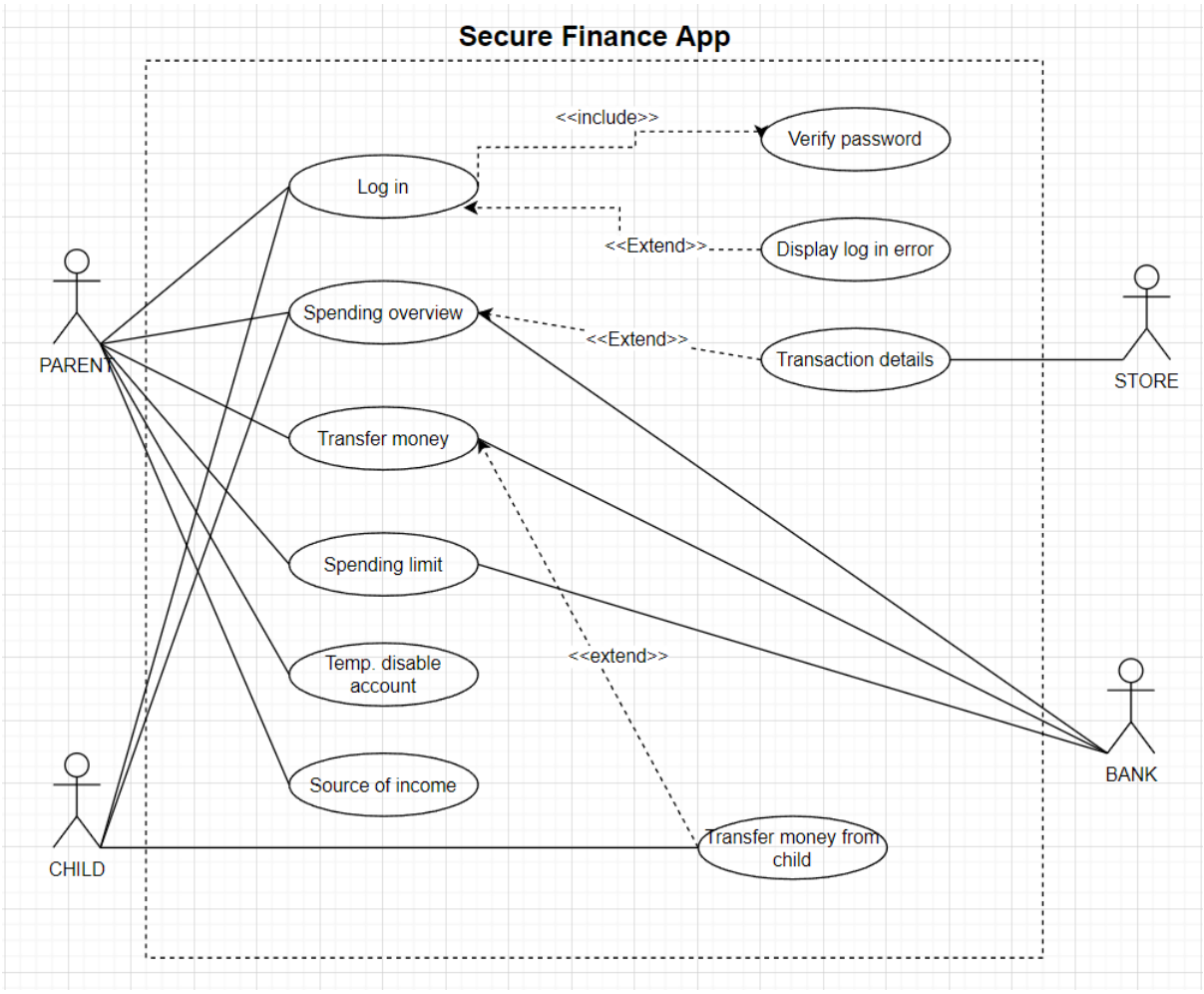
- To set my child's source of income
    - **Rule**: The app gives parents the option to set source of income.
    - **Example**: Mark used to get a monthly allowance from his mum but he got a vacation job so his employer can provide his mum with the necessary information to switch where the fixed income comes from.

- To create an emergency savings for emergency situations only
    - **Rule**: An emergency savings is set up for emergency situations
    - **Example**: Mark went on vacation with his friends but he ran short of money, he can't get his mum to approve the transaction because its bedtime back home. He can use the emergency transfer and later explain the reason for using it to his parents.

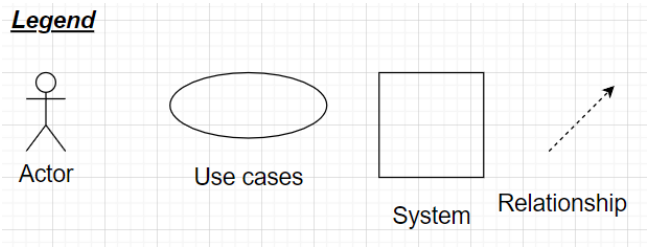
USE CASE DIAGRAM:

- **Primary actors:** The parent and child are the primary actors in this UCD because they actively interact with the app.

- **Secondary actor** is bank and store: they provide data and just react to the actions of the primary actors for example; if a user wants to check their balance, that is the only time the bank's database is consulted for that data.



Below is the legend for the UCD:

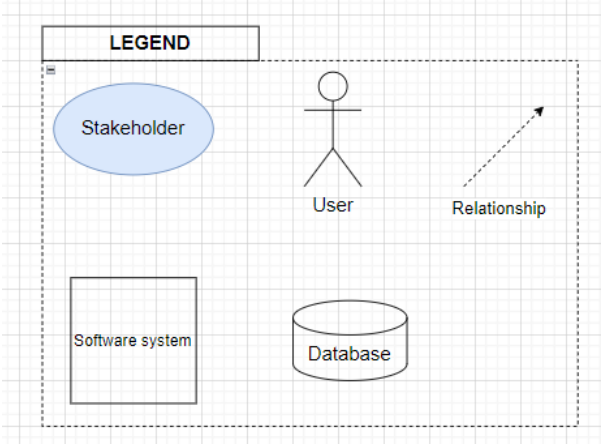


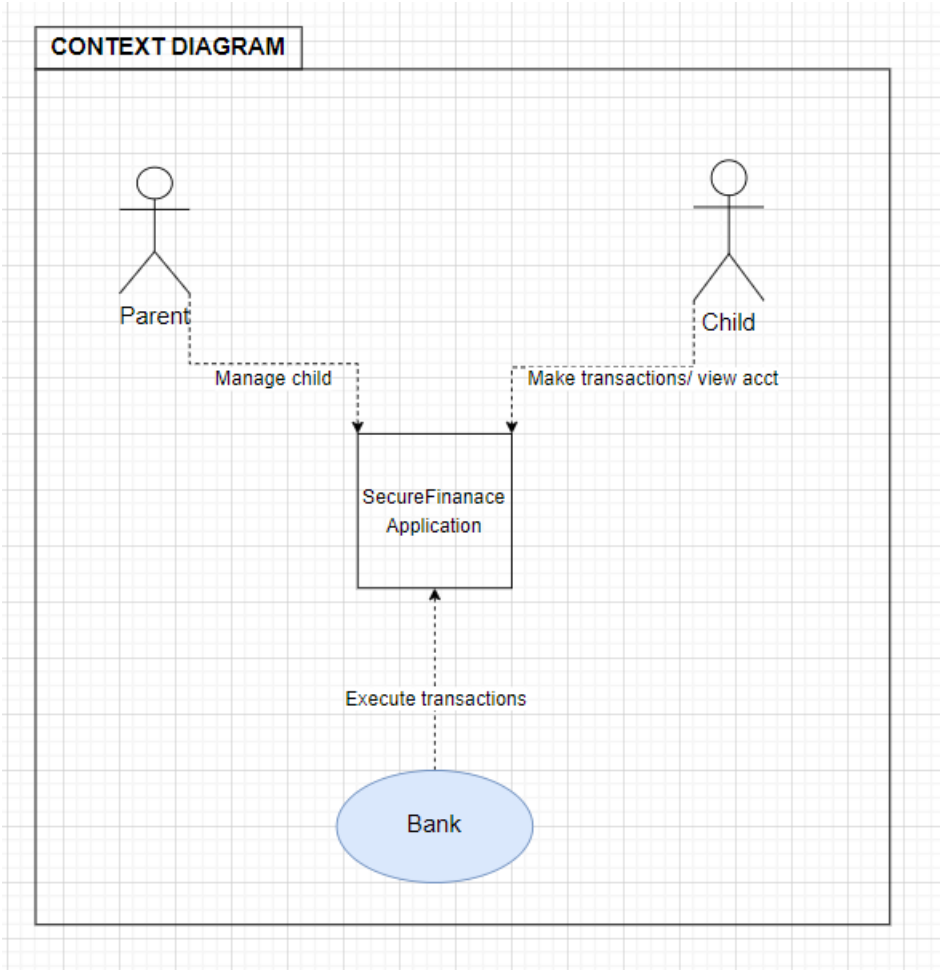
C4 MODEL

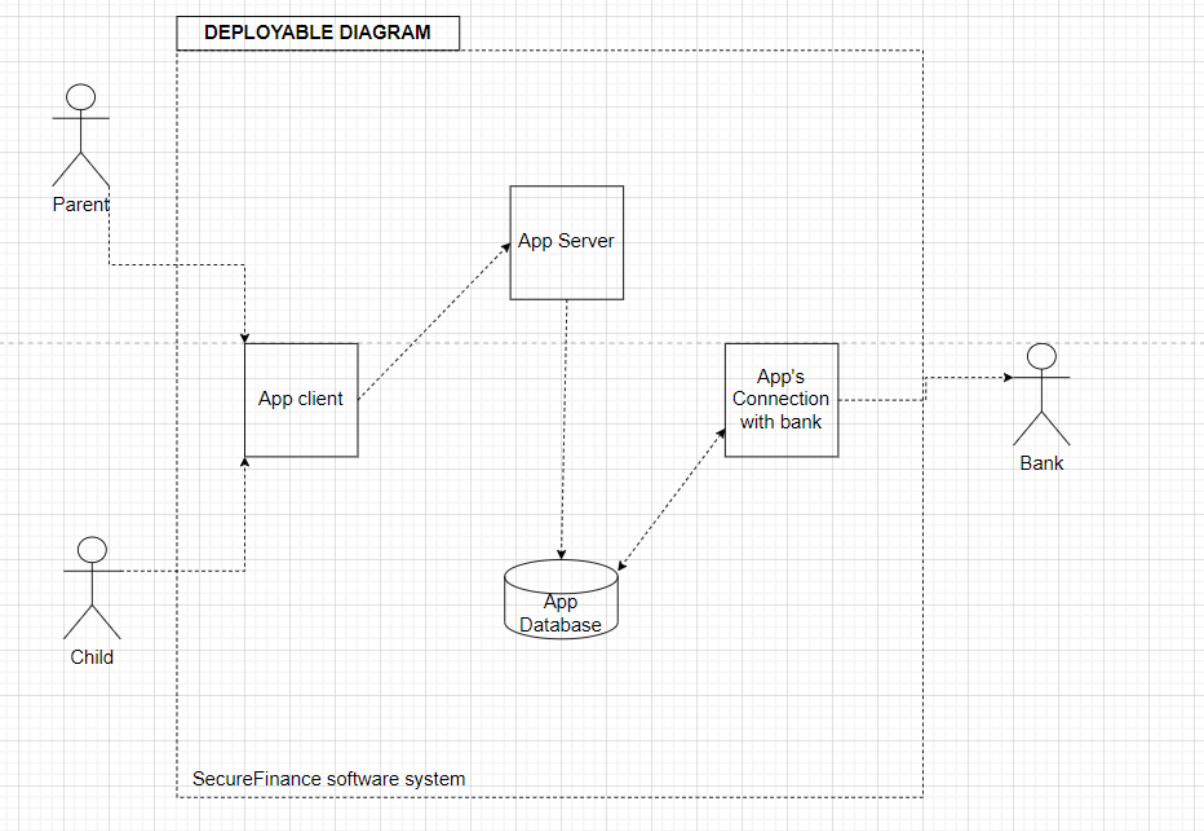
The software model used in this assignment consists of:

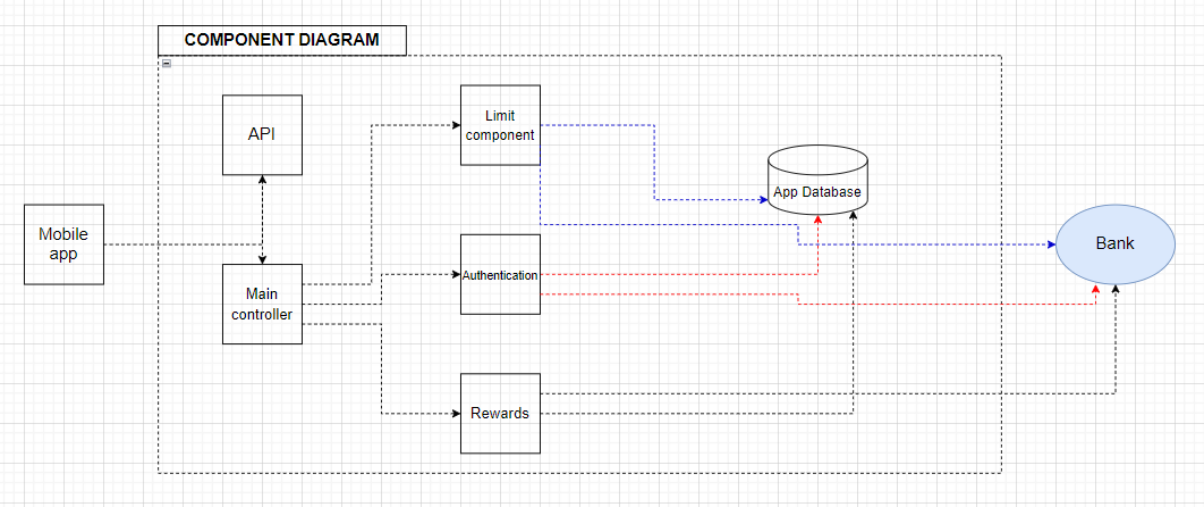
- Context diagram
- Deployable diagram
- Components diagram

This is the Legend for the C4 model for this assignment.



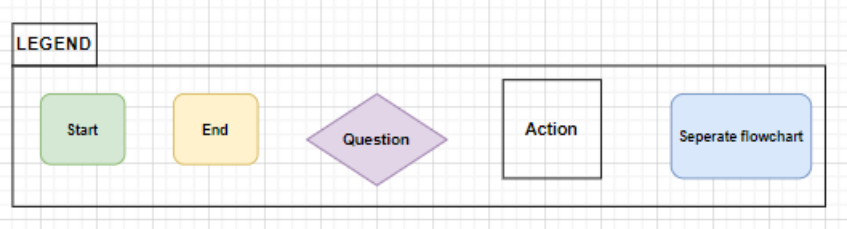



DEPLOYABLE DIAGRAM
Parent
App Server
App client
App's Connection with bank
Bank
Child
App Database
SecureFinance software system

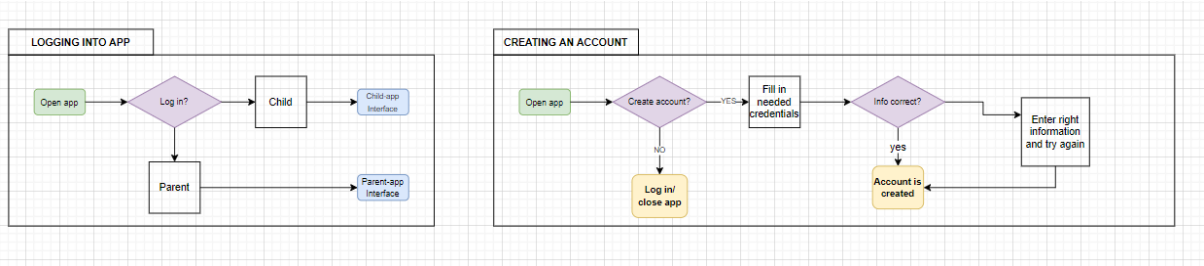

COMPONENT DIAGRAM
API
Limit component
App Database
Mobile app
Authentication
Bank
Main controller
Rewards

FLOWCHARTS

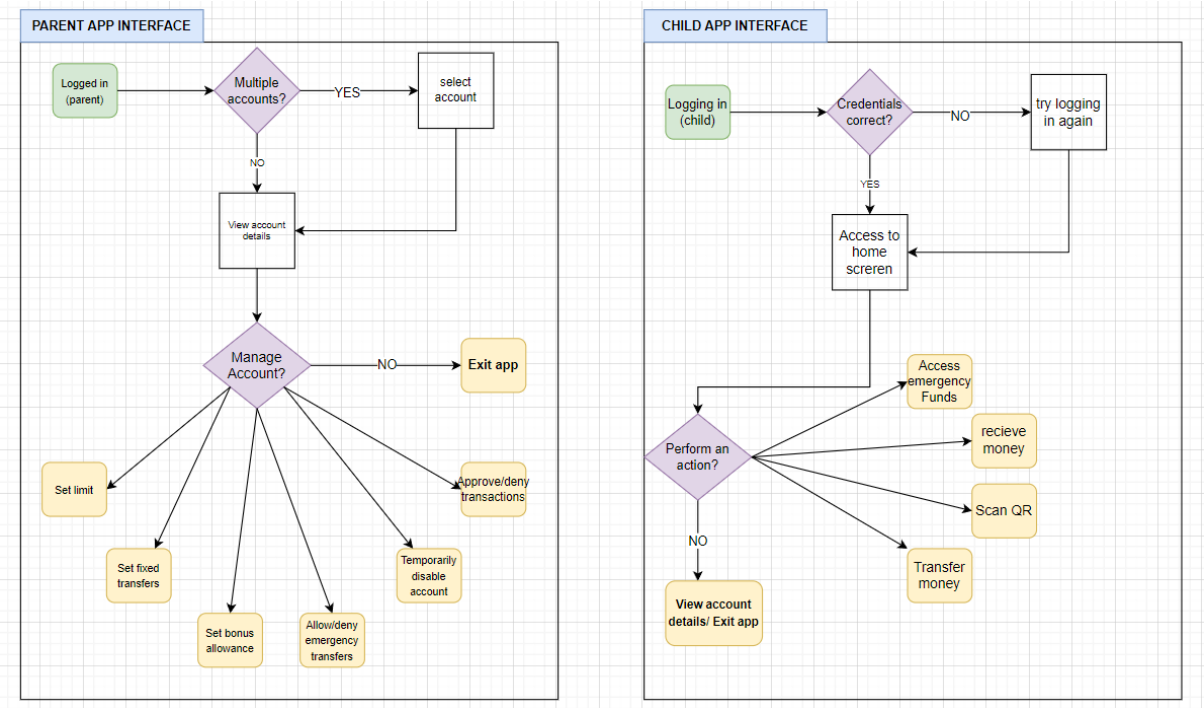
Here is a legend for the flowcharts used in this document.



Below are the flowcharts for the app user (parent/child) on how to log in and create an account.



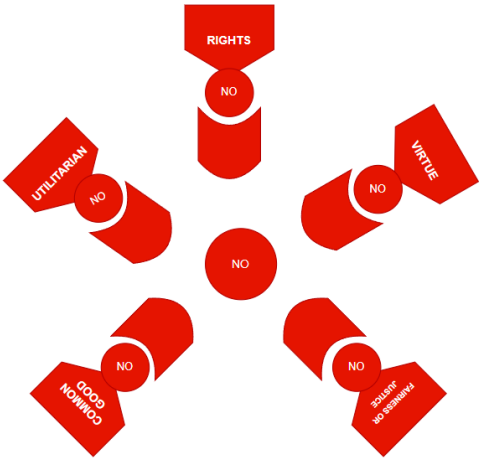
Below are the flowcharts for how parents and their child(ren) can interact with the app.



WIREFRAMES

Check the separate .pdf files for the clickable wireframes for this project. If a button isnt clickable, it means it leads to a separate wireframe (cant be linked with each other) or it's a duplicate of a **working** version in another wireframe.

ETHICS



Ethical choice 1: Should parents be allowed to see exactly when and where their children spend their funds?

Virtue:

(No, because)

This feature can be misused by overprotective parents who basically want to know literally every move of their children. Our goal is to help teenagers become more financially responsible, not allow overprotective/ insecure parents use it as a way to keep their children under surveillance.

Common good:

(No, because…)

It is best if we provide needed information about the transactions made, not extra information which may overstep the privacy of the teenagers. That is why only surface information like date of transaction is shown.

Utilitarian:

(No, because…)

Our target users wouldn't be happy knowing that we share too much of their private data with their parents/guardians. This will lead to more backlash and causing the app to be a total failure.

Rights:

(No, because…)

We can decide to give our users the option to choose whether to show exactly **where**, **when**, and **what time** they made a transaction but everyone will obviously choose to disable that feature. Its their right to choose but we don't need to waste resources developing a feature we know nobody is ever going to use.

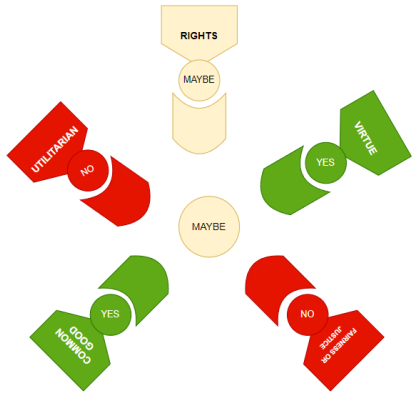
Fairness or justice:

(No, because…)

Even though they are still under the supervision of their parents, our users(teenagers) have a right to privacy.

CONCLUSION

We aren't going to provide detailed information about transactions made by teenagers and we are not going to give our users the option to Activate/Deactivate such an option. The disadvantages outweigh the advantages and we see no point in adding this feature.



Ethical choice 2: Should we share our gathered data with the government for a research on how financially responsible the teenagers of the country are becoming?

Virtue:

(Yes, because…)
Our goal is to help as many people as we can so if sharing our gathered data proves we are making a positive impact on teenagers, we are basically fulfilling our biggest goal and changing lives in the process.

Common good:

(Yes, because…)

With the success of the research and our app, we will be able to reach more people and help more people become financially responsible. This will pay off in the long run and change a lot of lives.

Utilitarian:

(No, because…)

With the recent decline in trustworthiness of the government, most people wouldn't trust their date being handled correctly by the government.

Rights:

(Not entirely, because…)

Since it's the user's data, they get to have a say in what their data is used for so they will be given the choice to opt in our out of this experiment. This is the best way to deal with such a dilemma to get a "happy ending". That is why users have to agree to the terms and conditions of the app when they register. Users who opt out of this will not be allowed to proceed.

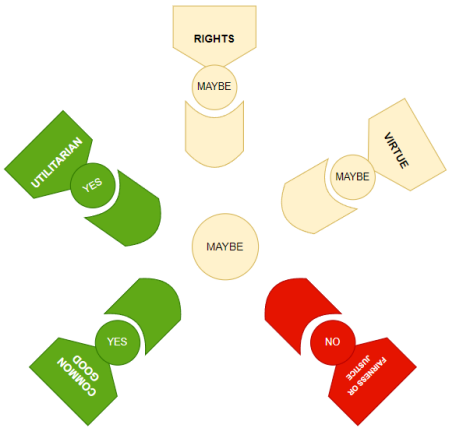
Fairness or justice:

(No, because…)

It's not fair if we share people's data without their permission. So we give them the option to accept or decline to partake in the research.

CONCLUSION

Even though this may have a positive impact on the lives of many others, we will still give users the option to opt in or out of the research. Based on the amount of users who opt in on the research, we will decide if we are going to take part in the research since we need a minimum amount of participants to provide unbiased data.



Ethical choice 3: Should the government make this application mandatory to help teenagers become more responsible financially?

Virtue:

(Maybe, because…)

If this app successfully reaches its goal of helping teenagers become more financially responsible, then yes I think the government should make it mandatory for its citizens.

Common good:

(Yes, because…)

This is a very well built system with a very high success rate so I would agree if the government made it mandatory. They wouldn't gain much from it but its surely going to help a lot of people.

Utilitarian:

(Yes, because…)

In the long run, most people will be grateful this system was mandatory because the next generation will be financially responsible and know how to handle money the right way.

Rights:

(Maybe, because…)

The users have the right to decide if this should be done or not. The voice of the people is the most important thing so depending on whether they agree or not, this law will be implemented.

Fairness or justice:

(No, because…)

Different people may have different opinions about this decision.

CONCLUSION

The government will make this application mandatory based on its success rate in the country. And maybe there will be an expansion to the whole of Europe.