
Software Requirements Specification

for

StayHereLah

Version 1.0 approved

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Revision History

Name	Date	Reason For Changes	Version
Lee Zheng Xuan	08/11	Updated Functional Requirements	1.1

1. Introduction

1.1 Purpose

Planning the purchase of a dream home is never easy and can be confusing, the team would like to develop a website platform to help couples and families streamline the planning process in a systematic way.

1.2 Document Conventions

Title- font: Arial, Size: 18, style: bold

Subtitle-font:

Arial, Size:14, style: bold

Text-font:

Arial, Size:12, style: normal

1.3 Intended Audience and Reading Suggestions

The main target audience includes first-time home buyers in Singapore who want to learn more about purchasing Build-To-Order flats for purposes of research or buying a flat
Other audiences that may take interest in this web application include:

- Programmers who may want to continue working on the project and interested to develop further
- Property Websites who may want to acquire this website

1.4 Product Scope

StayHereLah is a web application developed using react.js that helps individuals and couples to streamline the planning process of purchasing a home in a systematic way. Users can learn more about the various pricing and facilities regarding the upcoming BTO projects. Users can enter their personal details to estimate their purchasing power and see the detailed mortgage breakdown. Users will be able to learn more about the different neighborhoods and facilities of BTO projects. The data for the facilities is extracted using python to web scrap from: <https://blog.seedly.sg/hdb-bto-august-2022-launch/>.

1.5 References

- 1.<https://www.99.co/>

- 2. <https://www.cpf.gov.sg/eSvc/Web/Miscellaneous/ContributionCalculator/Index?isFirstAndSecondYear=0&isMember=1>
- 3. <https://www.livspace.com/sg/magazine/hdb-renovation-guide>
- 4. <https://www.hdb.gov.sg/residential/buying-a-flat/flat-and-grant-eligibility/couples-and-families/enhanced-cpf-housing-grant-families>

2. Overall Description

2.1 Product Perspective

StayHereLah is developed for everyone who is interested to view current BTO flats and purchase these flats based on individual spending power. It also streamlines the BTO process for the users.

Finding a dream property is difficult as there are numerous different factors to consider such as ideal location, amenities and cost. This website aims to help users explore and have a better understanding of the different amenities in the different neighbourhoods and around the BTO projects.

Buying an HDB BTO flat is a long-drawn process and can be intimidating and confusing. The website aims to serve as a guide providing different information for the users. Information such as the latest BTO launches, grants, calculation guide and renovation costs will be on this all-in-one platform.

Calculations of home loan installments and buying power of houses can be challenging for many users. The application aims to make the calculation easier and faster by allowing users to enter relevant details and the website will generate the breakdown for different components.

2.2 Product Functions

Explore Page:

- Neighbourhood: Displays selected neighbourhood details

BTO Projects Page:

- Project: Displays information about the selected BTO project

Property:

- Nearby Facilities Checkbox: Displays details of the selected facilities on Google Maps
- Calculate Your Loan: Redirects users to the BTO Information Calculator page.

BTO Information Calculator:

- Calculate: Displays Buying Power details with the user input.
- Mortgage: Redirects user to Mortgage Calculator page.

Mortgage Calculator:

- Information Sliders: Real-time mortgage table and graphs for the selected house price, deposit, mortgage term and interest rate.

2.3 User Classes and Characteristics

- Mostly young married adults of age 18 years and above
- Individuals who are more than 35 years old
- The target audiences who are very familiar with information technology and are able to use smartphones and laptops.

2.4 Operating Environment

- Internet Browser e.g. Chrome, Firefox, Microsoft Edge etc.
- Windows 7,8.1,10
- Mac OSx El Capitan, Sierra, High Sierra
- Firebase
- Jupyter

- Approximately 100MB of free hard drive space and 128MB of RAM to install browser

2.5 Design and Implementation Constraints

- The team web scrapes the data from <https://blog.seedly.sg/hdb-bto-august-2022-launch/>, these data will be stored cloud in firebase. The developer must run the script once in a while to get the updated data from the website.
- The database must be updated for the website to reflect the amenities
- GoogleMaps API has limited API calls. The developer must have a usable key in order for Google Maps to work.
- Comments are written in different components, so maintenance can be carried out easily
- React JS may be hard for developers to adopt changes with all the continuous updates. Developers must regularly update their skills.
- React JS is considered a fairly new framework in the web development scene and each developer is required to write their own instruction to maintain the website.
- React JS uses JSX(a syntax extension that allows HTML with javascript). There is some complexity in learning.
- React JS covers only the UI layers of the app. Some other technologies need to get a complete tooling set for development in this project.
- There is no proper convention in React JS. Developers might require time to understand the current working design.
- Firebase can only allow 100 simultaneous connections.
- Firebase can only store 1GB worth of data.

2.6 User Documentation

- Readme file link : <https://github.com/mollymcmuffin/StayHereLah/blob/main/README.md>

2.7 Assumptions and Dependencies

The system assumes that internet access is available and the user has an internet browser installed on their devices.

The system assumes that the HTML structure of the website used for web scraping remains constant throughout.

The system depends heavily on the Firebase database and Google Map API, hence any changes to the API might also affect the web application.

Business logic also depends heavily on government policies. If the government chooses to update the requirement to purchase a BTO flat, the system has to be updated accordingly.

3. External Interface Requirements

3.1 User Interfaces

 <p>The screenshot shows the StayHereLah homepage. At the top is a navigation bar with links: StayHereLah, Explore, BTO projects, BTO Information Calculator, and Mortgage Calculator. Below the navigation bar is a large image of a modern building. Underneath the image is the heading 'Matured projects'. Below this heading are four orange rectangular boxes, each containing the name of a project: 'Central Weave @ Ang Mo Kio', 'Alexandra Vale @ Bukit Merah', 'Havelock Hillside @ Bukit Merah', and 'Sun Plaza Spring @ Tampines'.</p>	<h3>StayHereLah's Homepage</h3> <p>This is the homepage that displays the latest matured projects. The user is able to navigate to various pages through the navbar.</p>
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StayHereLah!

ExploreBTO projectsBTO Information CalculatorMortgage Calculator

Non-Mature Projects

Katong Heritage @ Choo Chu Kang

Jurong East Breeze @ Jurong East

Woodlands South Plains @ Woodlands

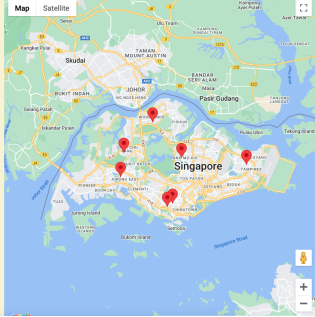
Mature Projects

Central Waters @ Ang Mo Kio

Alexandra Vale @ Bukit Merah

Harbour Woods @ Bukit Merah

Sun Plaza Spring @ Tampines



BTO Projects Page

This page displays all the currently available BTO projects that users can purchase. The user can view the BTO details by clicking on the name of the BTO project.

StayHereLah!

ExploreBTO projectsBTO Information CalculatorMortgage Calculator

Jurong East Breeze @ Jurong East

Completion Date: 2Q2028

Flat types & Number of Units

2-room Flexi (Type 1): 62

2-room Flexi (Type 2): 161

3-room: 87

4-room: 252

Total: 562

TWO ROOM STARTING PRICE: \$97000

THREE ROOM STARTING PRICE: \$194000

FOUR ROOM STARTING PRICE: \$283000

TWO ROOM FLEXI STARTING PRICE: \$109000

TWO ROOM NEARBY PRICE: \$164000

THREE ROOM NEARBY PRICE: \$328000

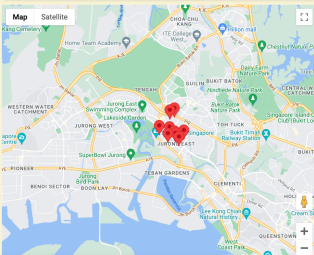
FOUR ROOM NEARBY PRICE: \$399000

TWO ROOM FLEXI NEARBY PRICE: \$164000

Calculate Your Loan

Nearby Facilities

MRT, Mid, Primary School, Secondary School, Highway



BTO Project Details

The user views the BTO project details on this page. The user can choose to view the nearby facilities by clicking on the relevant checkbox such as MRT, etc. To get your individual profile on purchasing BTO, click on “Calculate your Loan”.

BTO Information Calculator

Age

Married ☒ Yes ☐ No

Gross Monthly \$

Monthly Expenses \$

Disposable Income \$

CPF \$

Savings \$

Calculate

Mortgage

BTO Information Calculator

The page asks the user to enter their personal details.

Once valid inputs are entered, the user can choose to click on "Calculate".

The BTO Information calculator will calculate and generate the user's purchasing power and report if the user is eligible to buy the BTO.

To go to the mortgage calculator, the user can click on "Mortgage".

BTO Information Calculator

Age

Married ☒ Yes ☐ No

Gross Monthly \$

Monthly Expenses \$

Disposable Income \$

CPF \$

Savings \$

Congrats!! You are eligible to bto!! Refer to renovation guide for tips!

Estimated Buying Power: \$ 240000

Downpayment required(15%): \$ 36000

Downpayment Option 1 Cashpayment: \$ 36000

Downpayment Option 2 CPF: \$ 36000

\$ Grants

Step-Up CPF Housing Grant: 15000

EHG Grant: 55000

Total Grant: 70000

Recommended Renovation Cost: \$ 24000

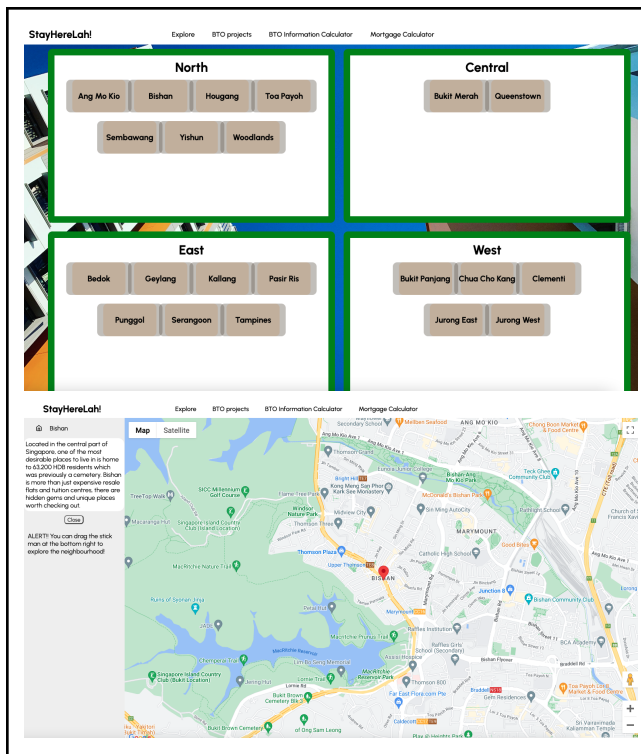
Calculate

Mortgage



Mortgage Calculator

The user can input the price of the BTO they are considering, amount of the deposit, mortgage terms and interest rates. The mortgage calculator will calculate and generate the user's mortgage report over the years.



Neighbourhood

The system displays the list of neighbourhoods in Singapore. The user can select the desired neighbourhood they want to explore or know more about. Once the user selects the desired neighbourhood, the system displays the relevant information about the neighbourhood, including a description and a map.

The user can see a 3D street view of the map by dragging a figure (at the bottom right) and placing it on a valid point on the map.

3.2 Hardware Interfaces

For the running of the system

- Windows 7,8.1,10
- Mac OSx El Capitan, Sierra, High Sierra

For network connection:

- network adapter and drivers

For storage:

- Minimum 100MB of free hard drive space and 128 MB of RAM.

3.3 Software Interfaces

StayHereLah requires an internet connection to load the BTO information and GOOGLE API. An Internet connection is required to scrape data from Seedly websites.

The web application uses Firebase CLI v9.6.0 for cloud storage. Every component from the web application consumes or produces data that will require an instance of the data access object to read from the database. The database objects use firebase API to access the database.

The web application uses the panda package version 1.5.1, beautifulsoup version, 4.9.0 and nominatim version 4.1.0 to gather data from the internet. This includes a connection to <https://blog.seedly.sg/hdb-bto-august-2022-launch/>.

The web application requires the use of Google Maps' API version 3.4.9 for geocoding as well as displaying maps in the software.

The web application uses react version 18.2.0 to develop the web application. The table shows the dependencies used.

1. @emotion/react": "^11.10.4",
2. @emotion/styled": "^11.10.4",
3. @mui/icons-material": "^5.10.9",
4. @mui/material": "^5.10.9",
5. @react-google-maps/api": "^2.13.1",
6. @testing-library/jest-dom": "^5.16.5",
7. @testing-library/react": "^13.4.0",
8. @testing-library/user-event": "^13.5.0",

9. firebase": "^9.12.1",
10. react": "^18.2.0",
11. react-chartjs-2": "^4.3.1",
12. react-dom": "^18.2.0",
13. react-icons": "^4.6.0",
14. react-pro-sidebar": "^1.0.0-alpha.7",
15. react-router-dom": "^6.4.2",
16. react-scripts": "5.0.1",
17. styled-components": "^5.3.6",
18. uuid": "^9.0.0",
19. web-vitals": "^2.1.4"

3.4 Communications Interfaces

StayHereLah requires an internet connection to load the firebase database, Google Maps API and to get information for HDB project details and amenities. HTTP Connection is used to scrape data from <https://blog.seedly.sg/hdb-bto-august-2022-launch/>.

4. System Features

This section is organized by use case.

4.1 UC1 View Latest BTO

Use Case Description 1 (View latest BTO)

<u>Use Case ID:</u>	<u>UC1</u>		
<u>Use Case Name:</u>	View latest BTO		
<u>Created By:</u>	Lee Yu Xuan	<u>Last Updated By:</u>	Ng Zheng Kai
<u>Date Created:</u>	17/9/2022	<u>Date Last Updated:</u>	21/11/2022

<u>Actor:</u>	User
<u>Description:</u>	User is able to view a list of BTO flats that are currently accepting bidders
<u>Preconditions:</u>	1. User must be in any page to access view latest BTO
<u>Postconditions:</u>	1. User must reach property page
<u>Priority:</u>	Medium
<u>Frequency of Use:</u>	When the user wants to view all the currently available BTO flats
<u>Flow of Events:</u>	<p>The system displays the any page</p> <ol style="list-style-type: none"> 1. The user will click on the BTO button 2. The system will fetch the data from firebase

	3. The user will be redirected to a map with the list of BTOs available displayed on the left
<u>Alternative Flows:</u>	-
<u>Exceptions:</u>	-
<u>Includes:</u>	1. Showing the property flat types, number of units, near facilities
<u>Special Requirements:</u>	-
<u>Assumptions:</u>	1. User must be in any page
<u>Notes and Issues:</u>	-

4.2 UC 1.1 Property

Use Case Description (Property)

Use Case ID:	UC1.1		
Use Case Name:	Property		
Created By:	Lee Yu Xuan	Last Updated By:	Lee Yu Xuan
Date Created:	17/09/2022	Date Last Updated:	2/11/2022

Actor:	User
Description:	<p>User is able to view the following details when they click onto a property</p> <ol style="list-style-type: none"> 1. Flat Types 2. Number of units 3. Transacted prices of nearby resale flats 4. Nearby facilities <ol style="list-style-type: none"> a. Mrt Stations b. Schools c. Malls d. Highways 5. Completion Date 6. Selling price (Excluding grants) 7. BTO information calculator
Preconditions:	<ol style="list-style-type: none"> 1. User must have access to the property information by clicking on “BTO”
Postconditions:	-
Priority:	Medium
Frequency of Use:	1 time per selected property

Flow of Events:	<ol style="list-style-type: none"> 1. User clicks on “BTO” 2. User sees a list of BTO projects on the left side 3. User can scroll through the list of property 4. User will then select on the property that they are interested to know more about
Alternative Flows:	-
Exceptions:	-
Includes:	-
Special Requirements:	-
Assumptions:	-
Notes and Issues:	-

4.3 UC1.2 View public transport and facilities

Use Case ID:	UC1.2		
Use Case Name:	View public transport and facilities		
Created By:	Lee Zheng Xuan	Last Updated By:	Lee Zheng Xuan
Date Created:	17/09/2022	Date Last Updated:	2/11//2022

Actor:	User
Description:	Users are able to view the locations of public transport and facilities in the neighbourhood that are pinpointed on the map.
Preconditions:	User is on the desired property page
Postconditions:	

Priority:	Medium
Frequency of Use:	Once each time the user wants to view the public transport and facilities of a particular BTO project.
Flow of Events:	<ol style="list-style-type: none"> 1. User clicks on the “MRT” checkbox button in the options menu. 2. System requests for data from API. 3. The API returns all the MRT locations within the neighbourhood of the chosen BTO project. 4. System plots the bus stop locations onto the map located below the options menu. 5. Repeat Steps 2 to Step 4 for each of the available amenities options.
Alternative Flows:	
Exceptions:	<p>EX3: API request time out:</p> <ol style="list-style-type: none"> 6. The system displays “Error, please refresh again.” message on the map. 7. The user has to refresh the page. 8. Go back to Step 1 in flow of events.
Includes:	
Special Requirements:	
Assumptions:	User is on the desired neighbourhood page.
Notes and Issues:	

4.4 UC 1.1.1 BTO Information Calculator

Use Case Description (BTO Information calculator)

Use Case ID:	UC 1.1.1		
Use Case Name:	BTO information calculator		
Created By:	Toh Leong Seng	Last Updated By:	Toh Leong Seng

Date Created:	17/09/2022	Date Last Updated:	2/11/2022
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Actor:	User
Description:	<p>Users are able to view, estimate/calculate the personalized cost for the property using different inputs (Age, Gross Monthly, Monthly Expenses, Disposable Income, CPF and Saving).</p> <p>Users are able to see the estimated buying power and break of different costs down payment, renovation cost and grants breakdown. Information regarding renovation and grant will be also provided.</p>
Preconditions:	-
Postconditions:	User must view the generated result
Priority:	High
Frequency of Use:	One calculation per input
Flow of Events:	<ol style="list-style-type: none"> 1. The calculator will prompt users to input different information <ol style="list-style-type: none"> a. User inputs age b. User will select married status (Yes, No) c. User input gross monthly d. User input monthly expenses e. User input disposable income f. User input CPF balance g. User input Saving h. User must press the submit button 2. The calculator will verify the information and display the estimated cost and information 3. The calculator will show the breakdown of calculation (Estimated buying power, down payment required, remaining cost required when using cash downpayment, remaining cost required when using cpf down payment). Total given grant, Enhance CPF housing grant and recommended renovation cost. 4. The page will also display information regarding grants and renovation guide 5. If the user select Mortgage calculator, it will redirect to Mortgage calculator page

Alternative Flows:	<p>AF-2 If user is eligible to BTO(married and above 18 have gross monthly less than 12000 not negative, disposable income not negative) or (single and above 35 have gross monthly less than 7000 not negative, disposable income not negative)</p> <p>1. The system will display 'Your age is not eligible to apply for BTO'</p> <p>AF-3 if the user enter invalid information or gross monthly input greater than 12000 for couple or gross monthly input greater than 7000 for singles or gross monthly<=0:</p> <p>1. The system will display invalid income unable to purchase BTO</p>
Exceptions:	-
Includes:	-
Special Requirements:	-
Assumptions:	<p>Missing Information/null information:</p> <p>The system will provide a default value of 0 for gross monthly, monthly expense, disposable income, cpf and saving if there are not any inputs.</p> <p>Married status will be yes in default</p>
Notes and Issues:	-

4.5 UC 1.1.1.1 Mortgage Calculator

Use Case Description (Mortgage Calculator)

Use Case ID:	UC 1.1.1.1		
Use Case Name:	Mortgage Calculator		
Created By:	Toh Leong Seng	Last Updated By:	Toh Leong Seng

Date Created:	17/09/2022	Date Last Updated:	2/11/2022
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Actor:	User
Description:	User is able to view the monthly payment, total interest annually, loan to value details. Table and graph will be displayed to show the payment breakdown.
Preconditions:	-
Postconditions:	-
Priority:	High
Frequency of Use:	One calculation per usage
Flow of Events:	<ol style="list-style-type: none"> 1. User drags the slide bar to select purchasing house price 2. User drags the slide bar to select deposit 3. User drags the slide bar to select Mortgage term 4. User drags the slide bar to select interest rate 5. The graphs and the table for breakdown will change dynamically according to the input
Alternative Flows:	-
Exceptions:	-
Includes:	-
Special Requirements:	-
Assumptions:	-
Notes and Issues:	-

4.6 C 2 Explore Neighbourhood

Use Case Description

Use Case ID:	UC 2
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Use Case Name:	Explore Neighborhood		
Created By:	Lee Zheng Xuan	Last Updated By:	Lee Zheng Xuan
Date Created:	17/09/2022	Date Last Updated:	17/09/2022

Actor:	User
Description:	Users are able to explore and learn more based on the chosen neighbourhood.
Preconditions:	User can be in any page
Postconditions:	
Priority:	Medium
Frequency of Use:	Once each time the user wants to view the nearby public transport and facilities of the neighbourhood.
Flow of Events:	<ol style="list-style-type: none"> 1. User clicks on the "Explore" button in the Homepage. 2. System brings user to a page containing a list of all neighbourhoods in Singapore 3. User clicks on the name of the desired neighbourhood. 4. System requests for data from API. 5. The API returns the street view of the chosen neighbourhood.
Alternative Flows:	
Exceptions:	EX5: API request TIMEOUT: <ol style="list-style-type: none"> 1. The system display "Error, please refresh again." 2. The user has to refresh the page.
Includes:	
Special Requirements:	
Assumptions:	-
Notes and Issues:	

5. Functional Requirements

5.1. Main Menu

- a) The system must display the latest matured BTO projects.
- b) The system must be able to navigate to the Explore page, BTO projects page, Loan Calculator page and Mortgage Calculator page.

5.2. Explore Neighborhood

- a) The system must allow users to select a specific neighborhood to explore
 - i) The system must be able to show a map that displays the neighborhood's public transport and amenities
 - (1) The system must allow users to display filtered information on the map
 - (a) MRT station
 - (b) Schools
 - (c) Bus stops
 - (d) Malls
 - (e) Highway
- b) The system will show text information regarding the neighborhood

5.3. BTO information calculator

- a) System must validate that all required fields have been filled up.

- b) User must provide all the information for calculation purposes
 - i) System must prompt the user to select age.
 - (1) Age value is reset to the minimum required age if the input age is below 21 for married couples and below 35 for singles. An invalid input message is displayed.
 - (2) Age value is reset to the minimum required age if the age is above 65. An invalid input message is displayed.
 - ii) System must prompt the user to input the monthly gross salary
 - (1) Value has to be an integer bigger or equal to 0.
 - (2) Value resets to 0 if the input is negative. An invalid input message is displayed.
 - (3) Value resets to 0 if the input is greater than 12000. An invalid input message is displayed.
 - iii) System must prompt the User to select the option “Yes” or “No” for Married.
 - iv) System must prompt the User to input his/her amount of personal savings
 - (1) Value has to be an integer bigger or equal to 0.
 - (2) Value resets to 0 if the input is negative or empty.
 - v) System must prompt User to input monthly expenses
 - (1) Value has to be an integer bigger or equal to 0.
 - (2) Value resets to 0 if the input is negative or empty.
 - vi) System must prompt the User to input CPF Balance
 - 1. Value has to be an integer bigger or equal to 0.
 - 2. Value resets to 0 if the input is negative or empty.
 - vii) Information to include:

- (1) Age
- (2) Married
- (3) Gross Monthly
- (4) Monthly Expense
- (5) Disposable Income
- (6) CPF
- (7) Savings
- viii) System must calculate the disposable income automatically by subtracting from the gross monthly and monthly expenses
- c) Calculator must be able to show the buying power for houses based on the user inputs
- d) Calculator must show the down payment required for the property.
- e) Calculator must show the recommended renovation cost.
- f) Calculator must be able to calculate how much the user needs to save up if they decide to use cash as a downpayment.
- g) Calculator must be able to calculate how much the user needs to save up if they decide to use CPF as a downpayment.
- h) Calculator must be able to show the breakdown of the different grants that the user is eligible for.
- i) The BTO information calculator must display grant information.
- j) The BTO information calculator must display a renovation guide.

5.4. Mortgage Calculator

- a) The user must enter property price
Value has to be an integer bigger or equal to \$50000.

- b) The user must enter the deposit amount

Value has to be an integer bigger or equal to \$1000.

- c) The user must enter the interest rate

Value has to be an integer bigger or equal to 0.1%.

- d) The user must enter loan tenure in years

Value has to be an integer bigger or equal to 5.

- e) The calculator must be able to calculate the compounded interest

- f) The calculator must be able to show the monthly rate to pay

5.5. Property

- a) The system must be able to show the estimated price range of other properties

- b) The system must be able to show the prices of different flat types. The flat types include:

- i) 2-room flexi
- ii) 3-room
- iii) 4-room
- iv) 5-room
- v) 3-gen room flexi

- c) The system must be able to show a map that displays the nearby public transport and amenities of the BTO property

- i) The system must allow users to display filtered information on the map

(1) MRT stations

(2) Schools

(3) Malls

(4) Highways

5.6. Interface with other systems

- a) The system must be able to retrieve the latest BTO information from self-developed API(web scraping) from <https://homes.hdb.gov.sg/>
- b) The system must be able to retrieve the list of MRT's information from firebase
- c) The system must be able to retrieve the list of School's information from firebase
- d) The system must be able to retrieve the list of MRT stations information from firebase
- e) The system must be able to retrieve the list of Malls information from firebase
- f) The system must be able to retrieve the list of Highway information from firebase

6. Other Nonfunctional Requirements

6.1 Performance Requirements

- The system must be able to display a page to the user within 2 seconds.
- The system must be able to be maintained with little to no downtime
- The performance depends on the user's network speed
- Fast responsive time in navigating the website to prevent any latency

6.2 Safety Requirements

- No personal information of the user is stored. Hence no risk of data loss or damage. All data retrieved and input by the user will be deleted once the session is closed.

6.3 Usability requirement

- The system must strive for consistency.
- A consistent sequence of actions is required for similar situations.
- Consistent and easy-to-use visual layout must be used in the application (e.g. labels, fonts, and colours)
- The system must offer informative feedback.
- To provide necessary feedback to the user when invalid inputs are detected.
- To display an appropriate error message when a certain process fails

6.4 Software Quality Attributes

- The system must meet 99.9% uptime.
- The system must provide up-to-date information regarding the properties, refreshed every 24 hours.

- The system must provide up-to-date information regarding available grants, and refresh every 24 hours.
- The system must scrape facilities data from <https://blog.seedly.sg/hdb-bto-august-2022-launch/>

7. Other Requirements

1) BTO Information calculator

- The system will return an invalid message if any fields are missing/invalid..
- The user must provide all the information for calculation purposes
- The calculator must be able to show information based on estimated income for that particular house
 - ❖ Price format must be in “S\$” for property housing (example S\$1650000)
 - ❖ Price format for per square feet must be in “S\$” and two decimal places of accuracy (e.g. S\$2357.14)

2) Format for information to be processed

- Location
 - ❖ Distance format must be in “Km” and two decimal places of accuracy (example 3.12Km) if the distance $\geq 1000\text{m}$
 - ❖ Distance format must be in “m” if the distance $< 1000\text{m}$

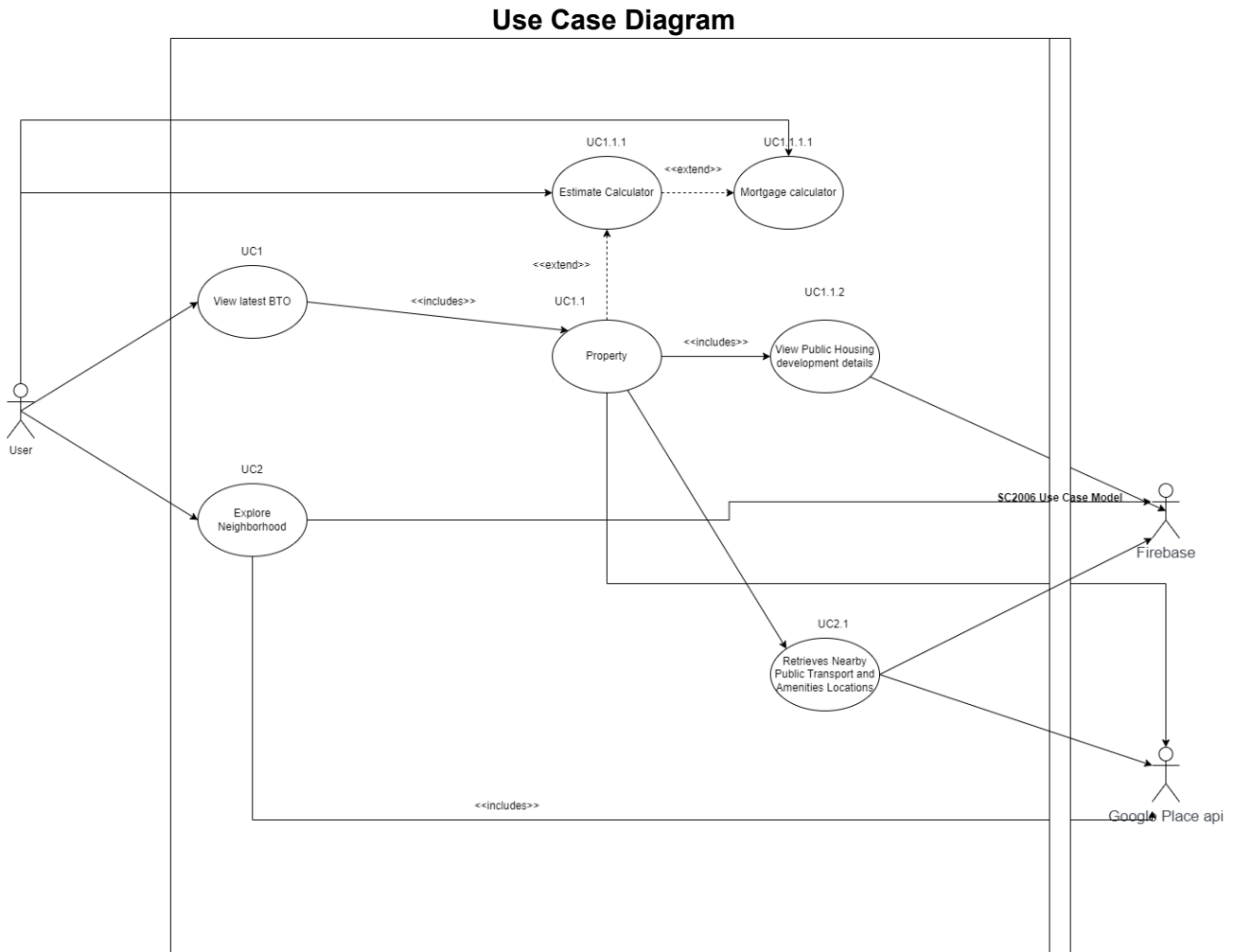
Appendix A: Glossary

<u>Term</u>	<u>Definition</u>
User	A user is a person who is using the application to find the desired property and make calculations
System	System refers to the BTO web application
BTO	Build to order (BTO) is a real estate development scheme enacted by the Housing and Development Board
Property	Refers to the selected property by the user
Resales Flat	HDB flats that are currently owned by someone else. They have already been lived in for at least the Minimum Occupation Period (MOP), which is typically five years
Property Location	The coordinates that the selected property is located
Bedroom	Refers to the number of bedrooms by a particular property
Price	Refers to the total cost of a property
Price Rate	Refers to the cost of the property by per square foot price
Distance	Refers to the distance from point A to point B in kilometers (Km)
Profit	The forecasted profit when investing in this property
Age	The number of years a user has lived
Status	Marital status is the legally defined marital state.

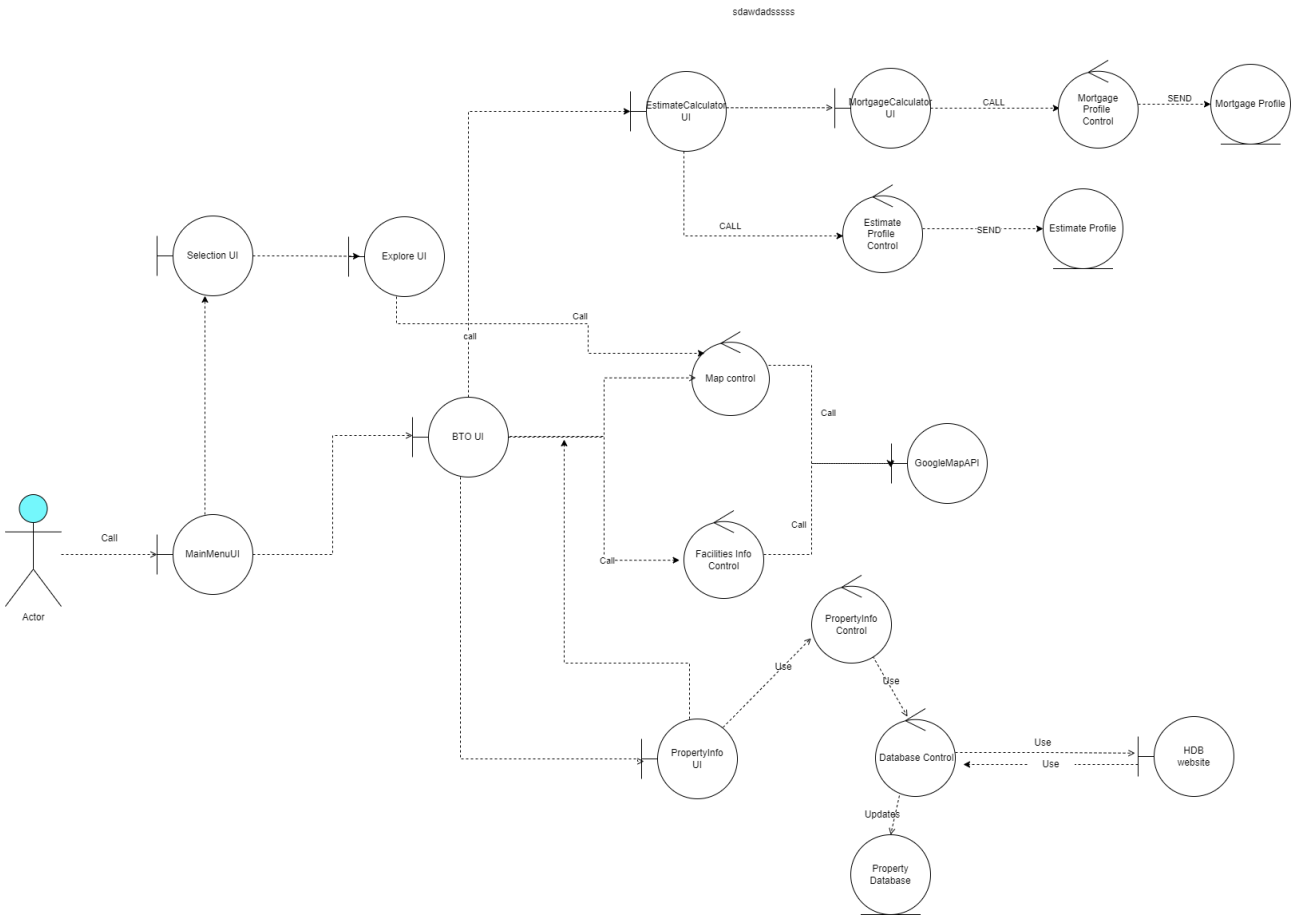
Gross Monthly Salary	The gross monthly salary that the user earns per month before taxes and other deductions
Ordinary Account Balance	Refers to the Ordinary Account Balance (CPF OA), which can be used for housing, insurance (such as the Dependents' Protection Scheme), investment and education.
Monthly Expense	The monthly expense spent by the user per month
Mortgage	A legal agreement by which a bank, building society, etc. lends money at interest in exchange for taking the title of the debtor's property, with the condition that the conveyance of title becomes void upon the payment of the debt.
Mortgage Calculator	Calculator to estimate the monthly repayments for mortgage
Interest rate	The amount charged over and above the principal amount by the lender from the bank
Loan Tenure	The amount of time you are given to repay your loan
Cash Saving	Saving is the portion of income not spent on current expenditures.
Neighborhood	Refers to the different area neighbourhoods of Singapore, e.g. Choa Chu Kang, Ang Mo Kio etc
MRT Station	Location where the MRT stops for people to get on/off the MRT
School	Educational establishments/ institutions for children
Explore	Explore refers to clicking the map to view the surrounding neighbourhood using street view map

Housing Grants	Are given to lower-income and middle-income families to help make their home purchases more affordable.
Recommended Renovation Cost	Estimation of how much a user should spend on renovation
Downpayment	An initial payment made when something is bought on credit.
BTO Information calculator	Give an estimate on how much purchasing power an individual has based on income and the breakdown of purchasing a BTO

Appendix B: Analysis Models

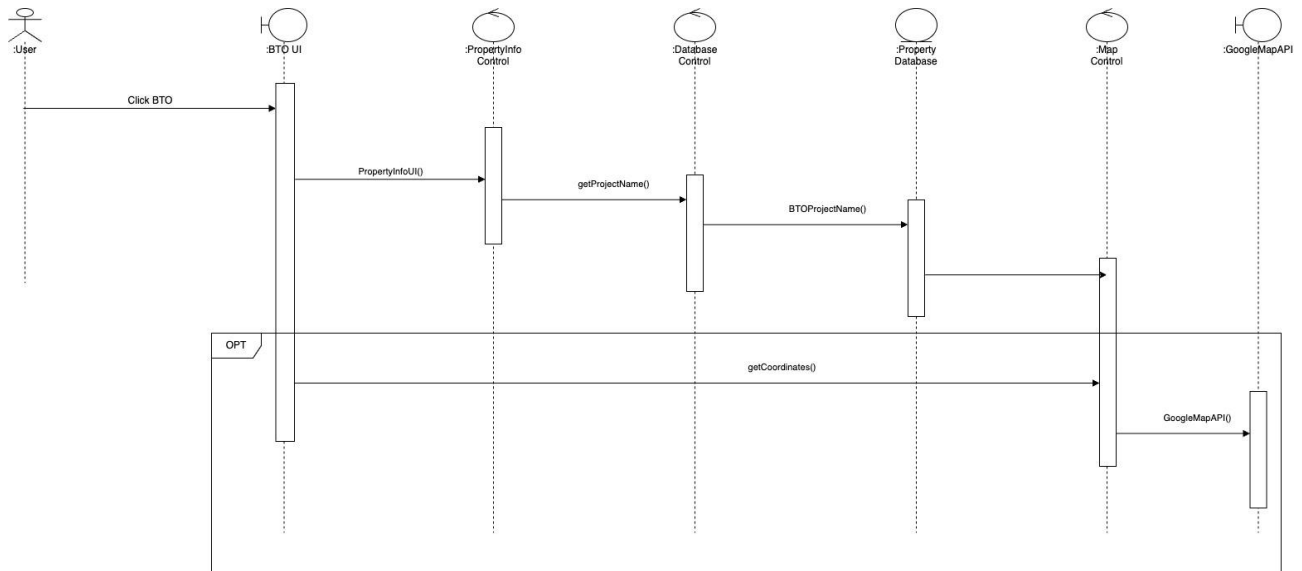


Boundary Class Diagram

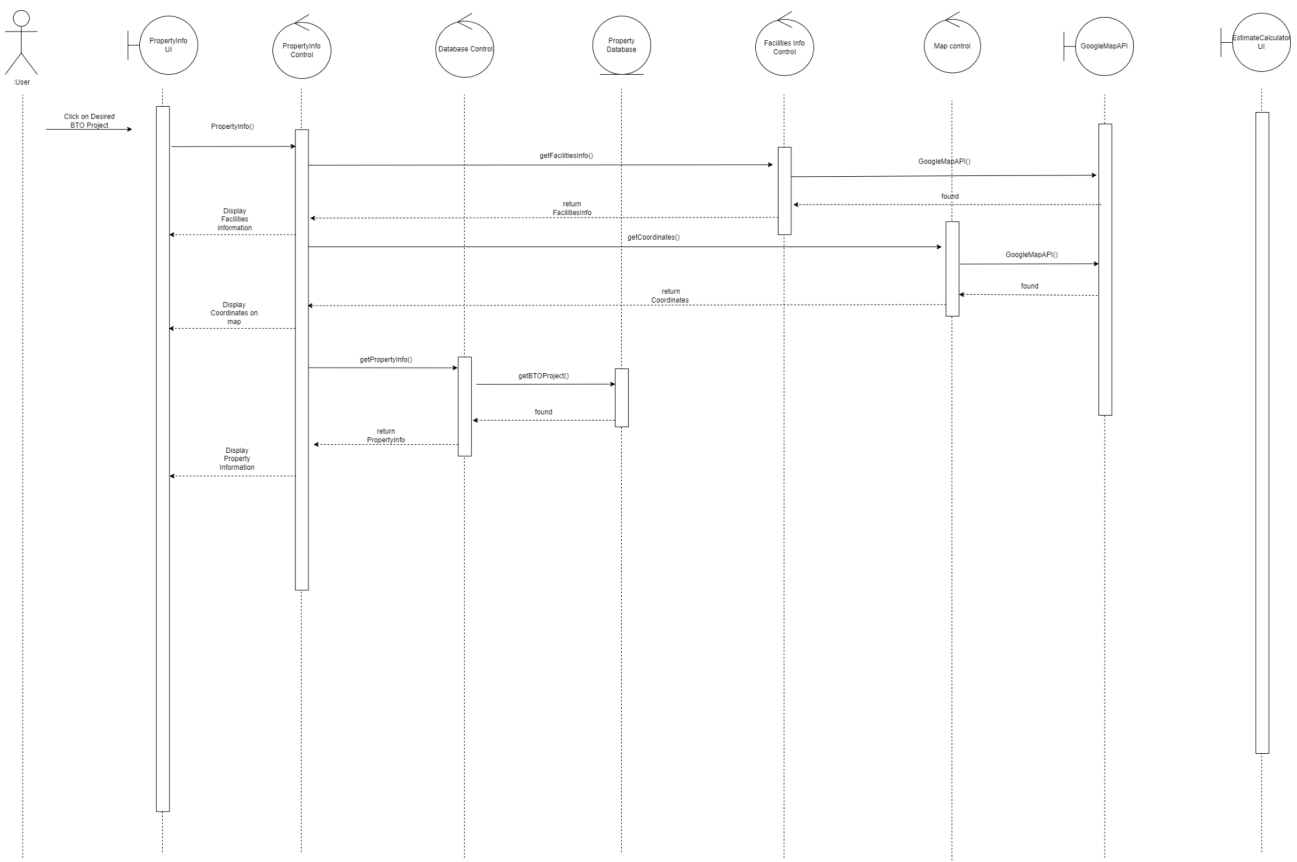


Sequence Diagram Main Flow

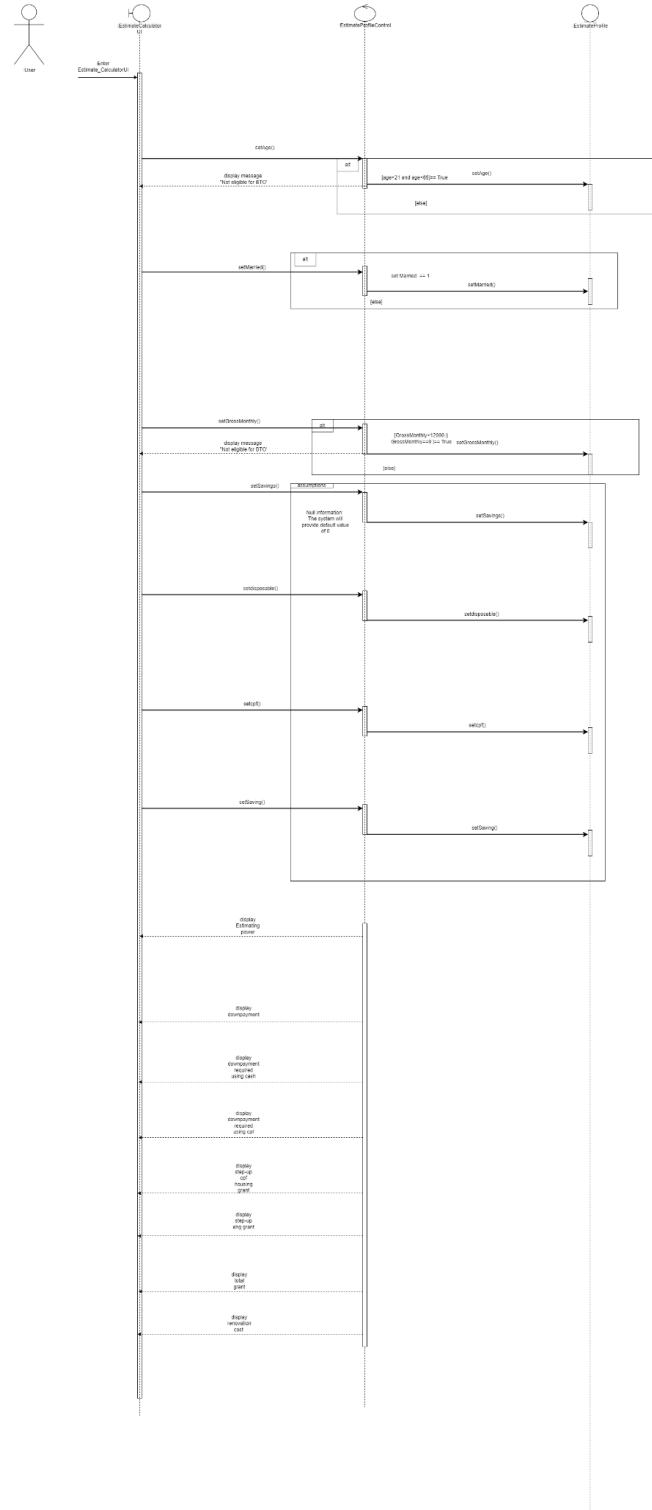
Sequence Diagram view latest BTO



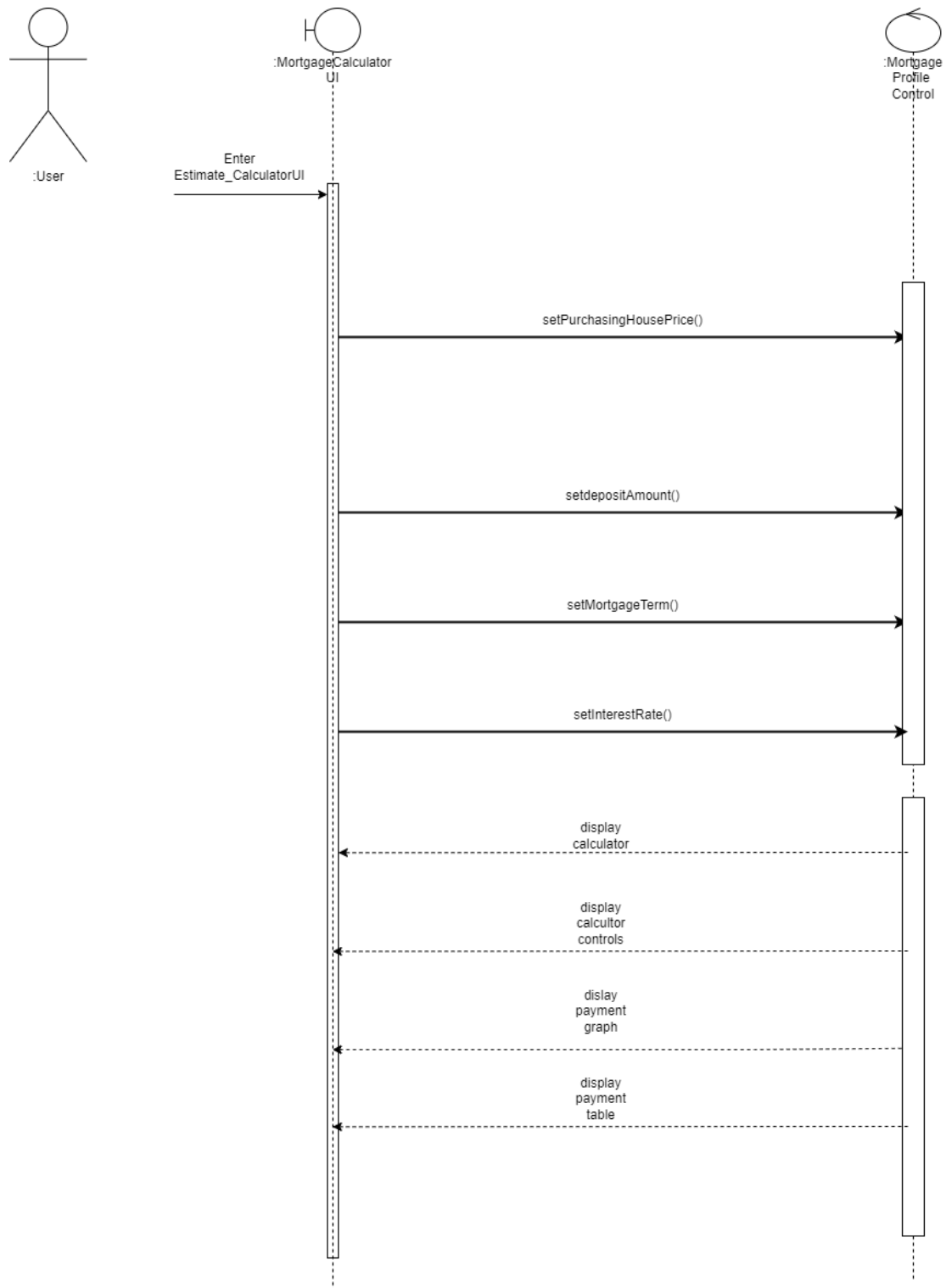
Sequence Diagram Property



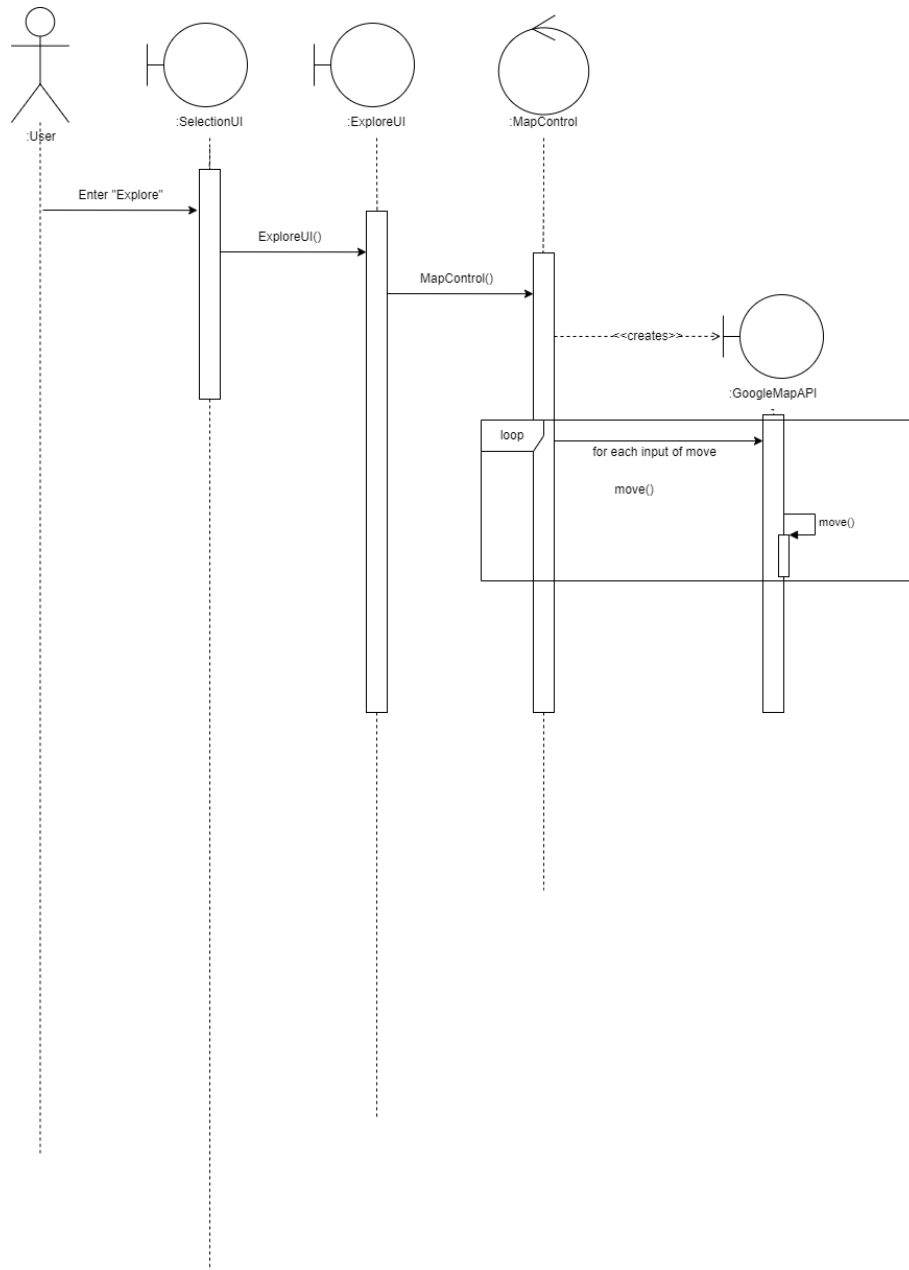
Sequence Diagram BTO Information Calculator



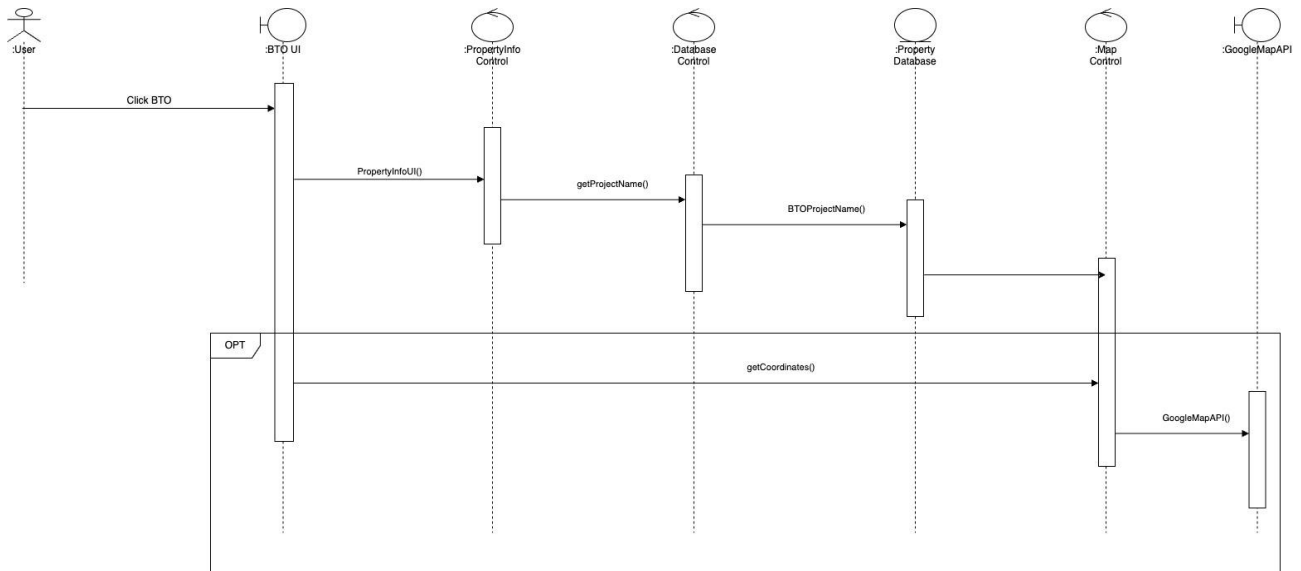
Sequence Diagram Mortgage Calculator



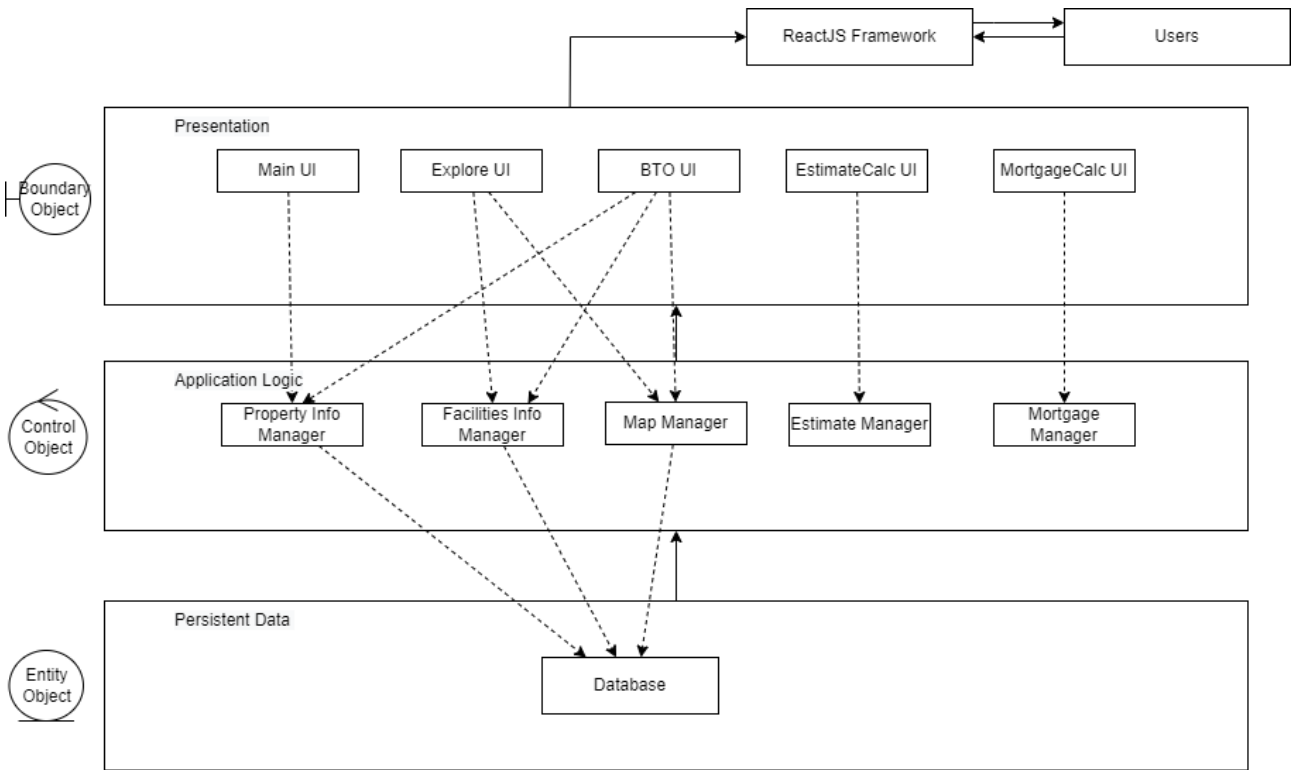
Sequence Diagram Explore Neighbourhood



Sequence view public transport and facilities

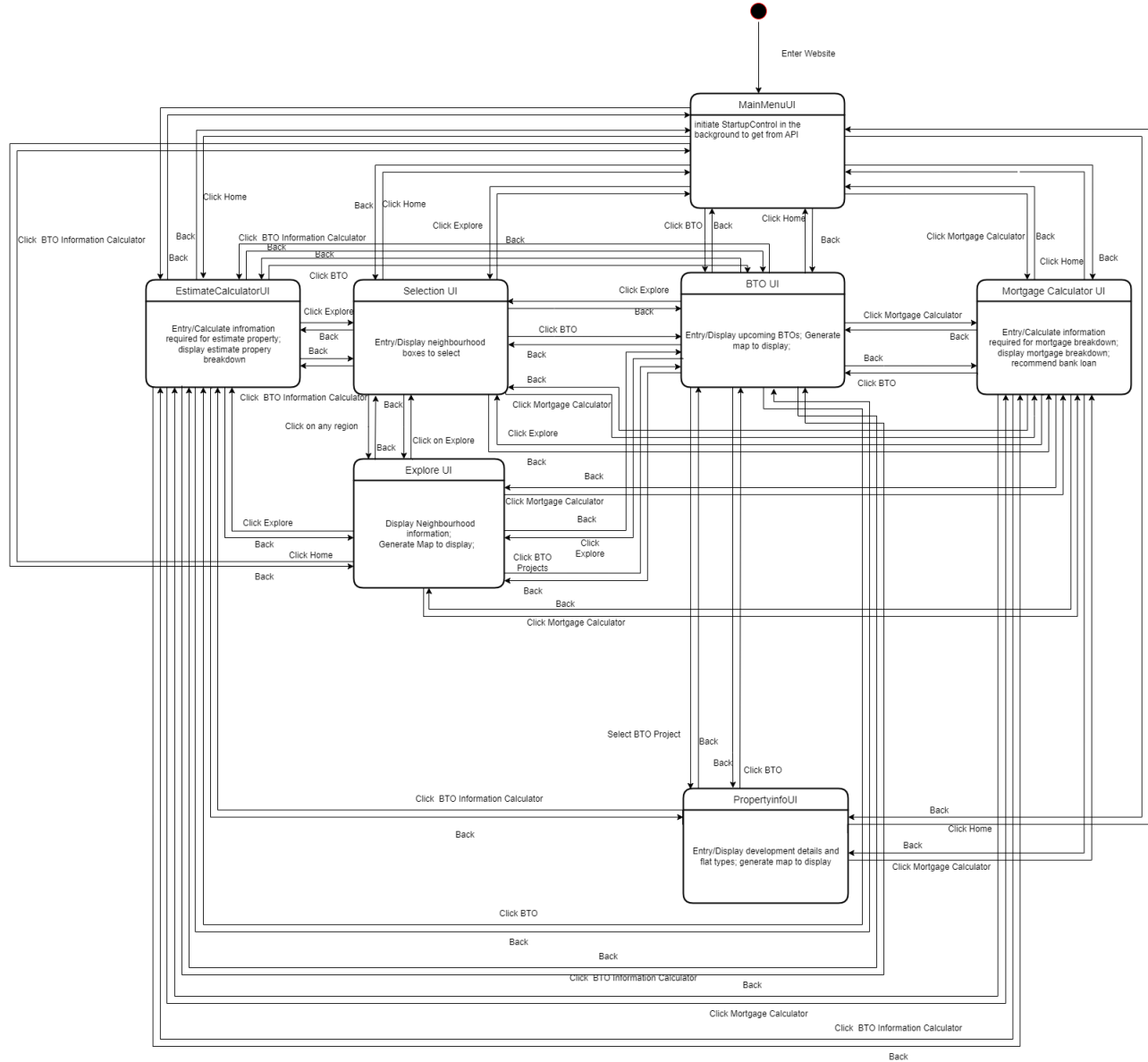


System Architecture Design

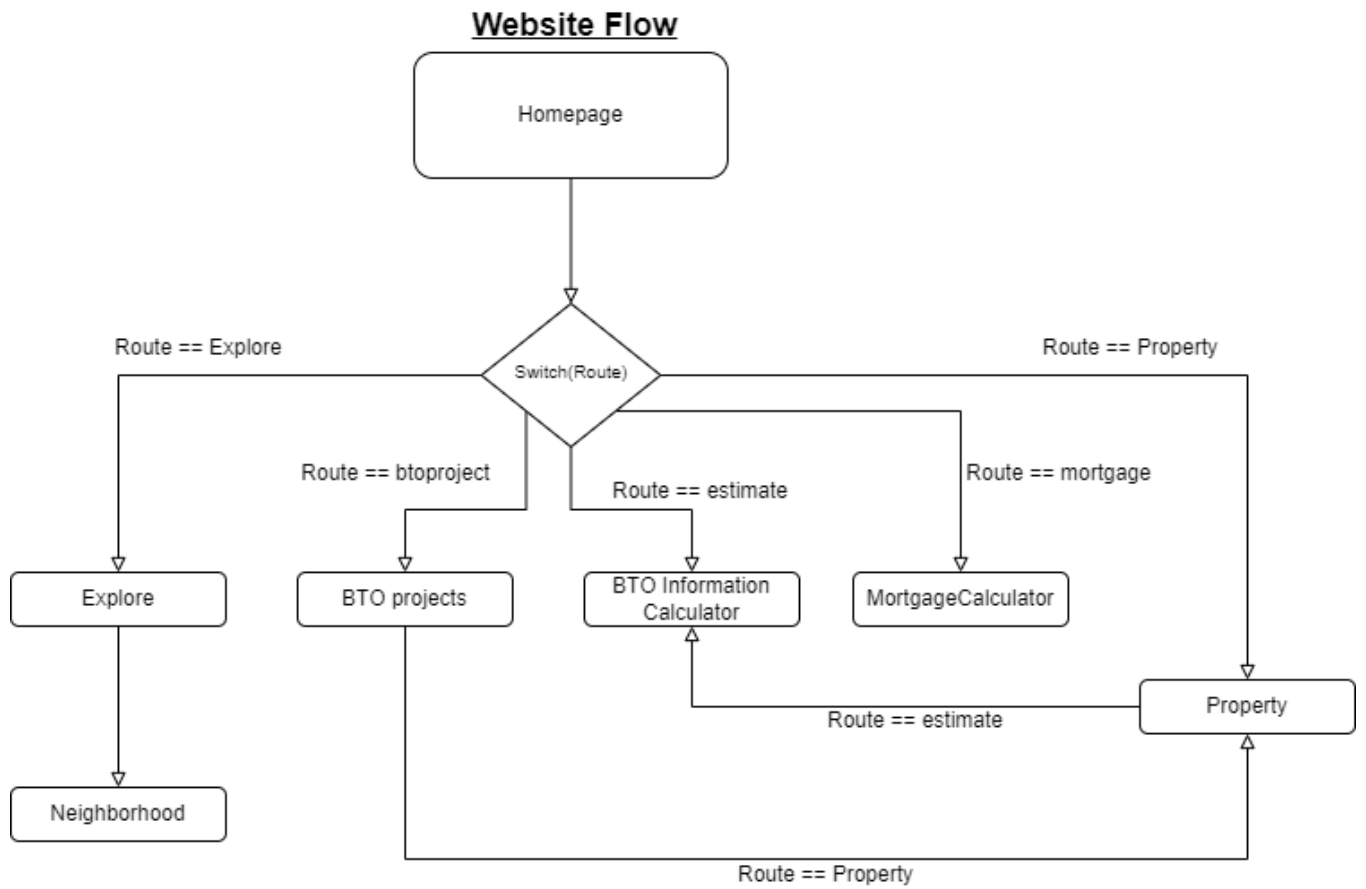


[illegible]

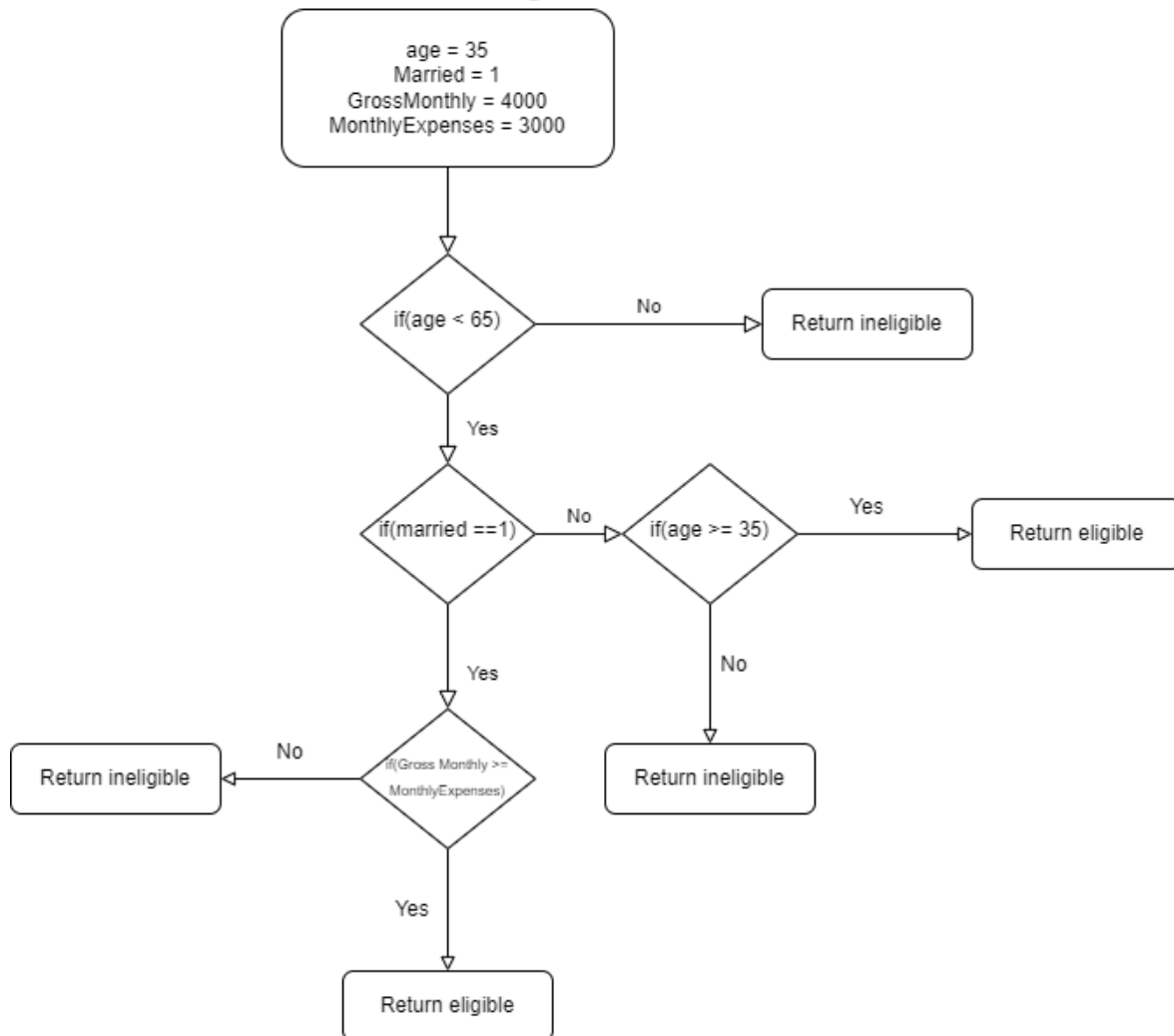
Dialog Map



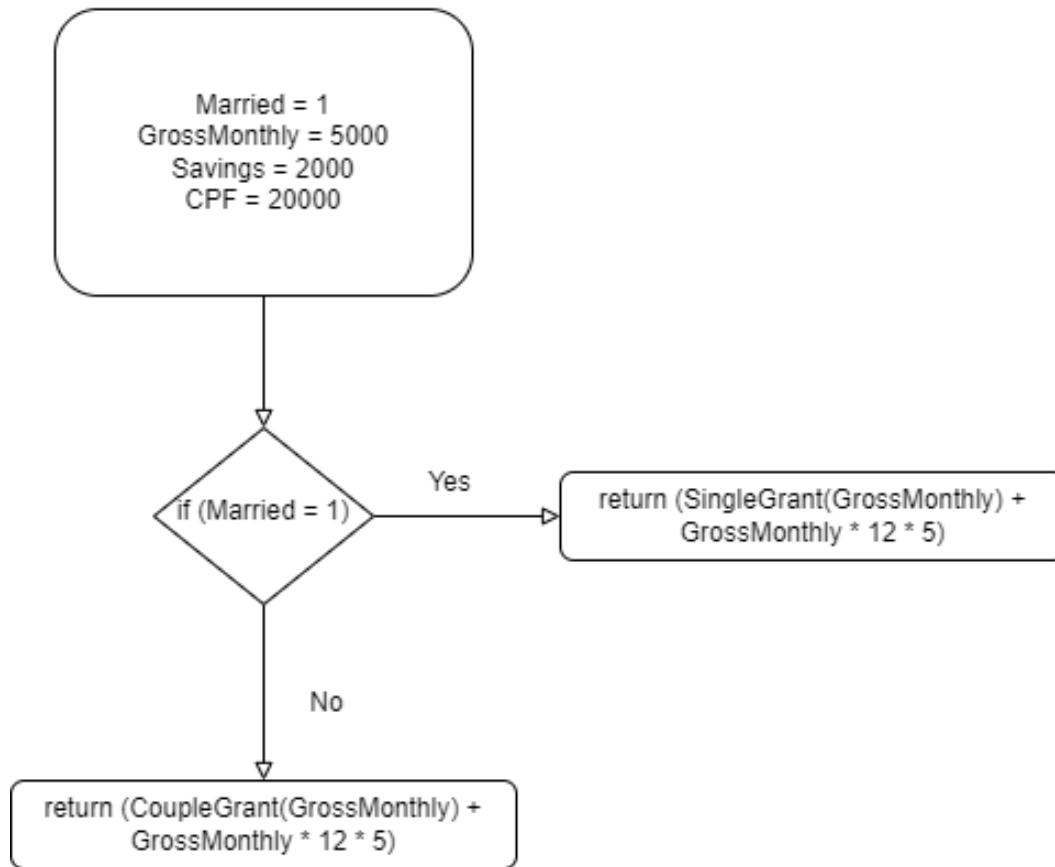
White Box Testing



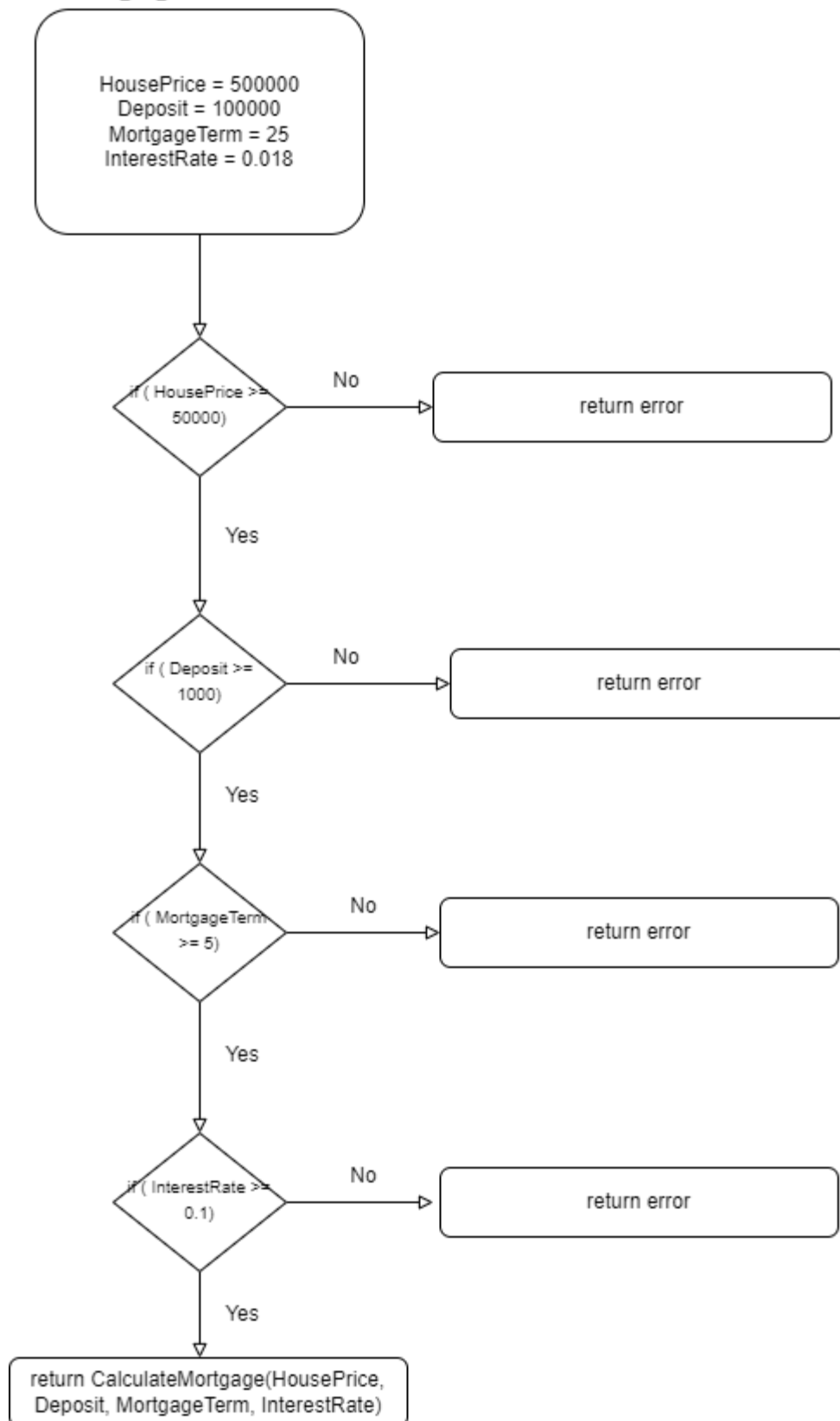
Estimate Calculator - Eligible Checker



Estimate Calculator



Mortgage Calculator



Black Box Testing

Estimate Calculator

S.No	Action	Inputs	Expected Output	Actual Output	Test Result
1	Calculate estimated buying power with valid credentials with age below 35	<ul style="list-style-type: none"> - Age =25 - Married Input Selected - Gross monthly = 4000 > Monthly Expense = 1000 - CPF input = 25000 - Savings = 20000 	<ul style="list-style-type: none"> - Eligible message Loaded onto page - Calculated buying power - Calculated required downpayment - Calculated Option 1 - Calculated Option 2 - Calculated Grants - Calculated Renovation Cost 	<ul style="list-style-type: none"> - Eligible message Loaded - Buying Power Calculated - Required Downpayment Calculated - Option 1 Calculated - Option 2 Calculated - Grants Calculated - Renovation Cost Calculated 	Pass
2	Calculate estimated buying power with valid credentials with age >= 35	<ul style="list-style-type: none"> - Age = 45 - Not Married Selected - Gross monthly = 4000 > Monthly Expense= 1000 - CPF input = 25000 - Savings = 20000 	<ul style="list-style-type: none"> - Eligible message Loaded onto page - Calculated buying power - Calculated required downpayment - Calculated Option 1 - Calculated Option 2 - Calculated Grants - Calculated Renovation Cost 	<ul style="list-style-type: none"> - Eligible message Loaded - Buying Power Calculated - Required Downpayment Calculated - Option 1 Calculated - Option 2 Calculated - Grants Calculated - Renovation Cost Calculated 	Pass
3	User is not eligible due to negative disposable income	<ul style="list-style-type: none"> - Age = 50 - Married input selected - Gross monthly = 3000 - monthly expense = 5000 - CPF input = 50000 - Savings = 20000 	<ul style="list-style-type: none"> - Ineligible message loaded onto page 	<ul style="list-style-type: none"> - Ineligible message loaded onto page 	Pass
4	User is not eligible due to age >= 65	<ul style="list-style-type: none"> - Age = 70 - Married input selected - Gross Monthly = 5000 - Monthly expense = 3000 - CPF input = 10000 - Savings = 20000 	<ul style="list-style-type: none"> - Ineligible message loaded onto page 	<ul style="list-style-type: none"> - Ineligible message loaded onto page 	Pass

5	User is not eligible due to age<35 and not married	<ul style="list-style-type: none"> - Age = 25 - Not Married selected - Gross Monthly = 5000 - Monthly expense = 3000 - CPF input = 25000 - Savings = 10000 	<ul style="list-style-type: none"> - Ineligible message loaded onto page 	<ul style="list-style-type: none"> - Ineligible message loaded onto page 	Pass
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Mortgage Calculator

S.No	Action	Inputs	Expected Output	Actual Output	Test Result
1	Calculate the mortgage when the estimate deposit is equal to the purchasing house price	<ul style="list-style-type: none"> - Purchasing House Price = 150,000 - Deposit = 150,000 	<ul style="list-style-type: none"> - \$0 Amount to Borrow - \$0 Monthly Payment - \$0 Total Repaid - \$0 Total Interest Paid - 100% Deposit - Year Interest Paid = 0 - Total Interest Paid = 0 - Year Principal Repaid = 0 - Total Principal Repaid = 0 - Mortgage Balance = 0 	<ul style="list-style-type: none"> - \$0 Amount to Borrow - \$0 Monthly Payment - \$0 Total Repaid - \$0 Total Interest Paid - Year Interest Paid = 0 - Total Interest Paid = 0 - Year Principal Repaid = 0 - Total Principal Repaid = 0 - Mortgage Balance = 0 	Pass
2	Calculate the mortgage when the estimate deposit is greater than the purchasing house price	<ul style="list-style-type: none"> - House Price = 100,000 - Deposit = 150,000 	<ul style="list-style-type: none"> - Deposit greater than 100% - Negative values for: Amount to Borrow Monthly Payment Total Repaid Total Interest Paid Year Interest Paid Total Interest Paid 	<ul style="list-style-type: none"> - Deposit greater than 100% - Negative values for: Amount to Borrow Monthly Payment Total Repaid Total Interest Paid Year Interest Paid Total Interest Paid 	Pass

			Year Principal Repaid Total Principal Repaid Mortgage Balance	Year Principal Repaid Total Principal Repaid Mortgage Balance	
3	Calculate the mortgage when the estimate purchasing house price is greater than the estimated deposit	<ul style="list-style-type: none"> - Value of Deposit is greater than the value of Purchasing House Price based on the slider - House price = 500,000 - Deposit = 100,000 	<ul style="list-style-type: none"> - $\text{Deposit}(\%) = \frac{\text{Deposit}}{\text{House Price}}$ - Positive values for: Amount to Borrow Monthly Payment Total Repaid Total Interest Paid Year Interest Paid Total Interest Paid Year Principal Repaid Total Principal Repaid Mortgage Balance 	<ul style="list-style-type: none"> - $\text{Deposit}(\%) = \frac{\text{Deposit}}{\text{House Price}}$ - Positive values for: Amount to Borrow Monthly Payment Total Repaid Total Interest Paid Year Interest Paid Total Interest Paid Year Principal Repaid Total Principal Repaid Mortgage Balance 	Pass

Appendix C: To Be Determined List

<Collect a numbered list of the TBD (to be determined) references that remain in the SRS so they can be tracked to closure.>

Source:

http://www.frontiernet.net/~kwiegers/process_assets/srs_template.doc

<https://reactjs.org/docs/getting-started.html>

<https://styled-components.com/>

<https://react-charts.tanstack.com/>

<https://www.npmjs.com/package/@react-google-maps/api>

<https://www.npmjs.com/package/react-pro-sidebar>

<https://www.w3schools.com/w3css/default.asp>

<https://www.w3schools.com/js/default.asp>