Software Requirements Specification

for

House Buying Guide

**Version 1.0 approved**

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**Meatballs**

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**Revision History**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Date** | **Reason For Changes** | **Version** |
| Corliss | 9/9/20 | Updated use cases | 2 |
|  |  |  |  |

# Introduction

## Purpose

The purpose of this document is to provide a detailed description for the House Buying Guide system. It will explain the goals and features of the system, what the system will do and how it will react to external stimulus. This document is intended for both stakeholders and developers of the system and will serve as the main point of reference for its development.

## Document Conventions

*<Describe any standards or typographical conventions that were followed when writing this SRS, such as fonts or highlighting that have special significance. For example, state whether priorities for higher-level requirements are assumed to be inherited by detailed requirements, or whether every requirement statement is to have its own priority.>*

## Intended Audience and Reading Suggestions

This document is intended for developers, project managers and documentation writers of the app. The SRS provides a detailed requirements specification for the app and lays the framework for the project development. All system functionality required for the project is listed in *Section 4 (System features)* and *Section 5 (Other nonfunctional requirements)* and must be followed accurately for product development. Additional terms

## Product Scope

The house buying guide is a comprehensive guide for discovering private property sales in Singapore. This system is designed to provide an accessible way of obtaining information about the private property market and would assist prospective buyers and sellers of private property in making more informed choices. With the use of the URA private property sales API, the app provides users with accurate information about historical private property sales, thus bridging the information gap in the housing market. A financing guide allows users to check for their eligibility of buying a house.

## References

The development of this system is closely tied and referenced to housing guidelines in Singapore. Given the complex regulations in place for buying a house, extra attention has been placed towards creating a robust system for users, especially in terms of providing a financing guide. Our main sources of reference are listed below:

1. Buying Property. (n.d.). Retrieved September 13, 2020, from https://www.ura.gov.sg/Corporate/Property/Residential/Buying-Property

1. Phang, S. Y., & Helble, M. (2016). Housing policies in Singapore.

1. Acquiring Private Property. (n.d.). Retrieved September 13, 2020, from https://www.hdb.gov.sg/cs/infoweb/residential/living-in-an-hdb-flat/acquiring-private-property

# Overall Description

## Product Perspective

With a focus on private property, the house buying guide serves as an additional information source in addition to other house buying guides in the property market. While the Singapore government releases information about housing sales, current guides available such as propertyguru or HDB’s API is inadequate in bridging the asymmetric information in the housing market. Evidently, the URA private property API, that returns data in json format is clearly not a user friendly way for the general public to obtain information required.

## Product Functions

*<Summarize the major functions the product must perform or must let the user perform. Details will be provided in Section 3, so only a high level summary (such as a bullet list) is needed here. Organize the functions to make them understandable to any reader of the SRS. A picture of the major groups of related requirements and how they relate, such as a top level data flow diagram or object class diagram, is often effective.>*

This system involves the two main functions of a Search historical data use case which provides historical data based on user search criteria and a Request financing guide use case that suggests financing decisions for a user.

Private housing data is taken from URA’s Private Residential Property Transactions API and consists of the past three years of private housing data as of the retrieval date. The database will be refreshed monthly to keep up to date with private property transactions.

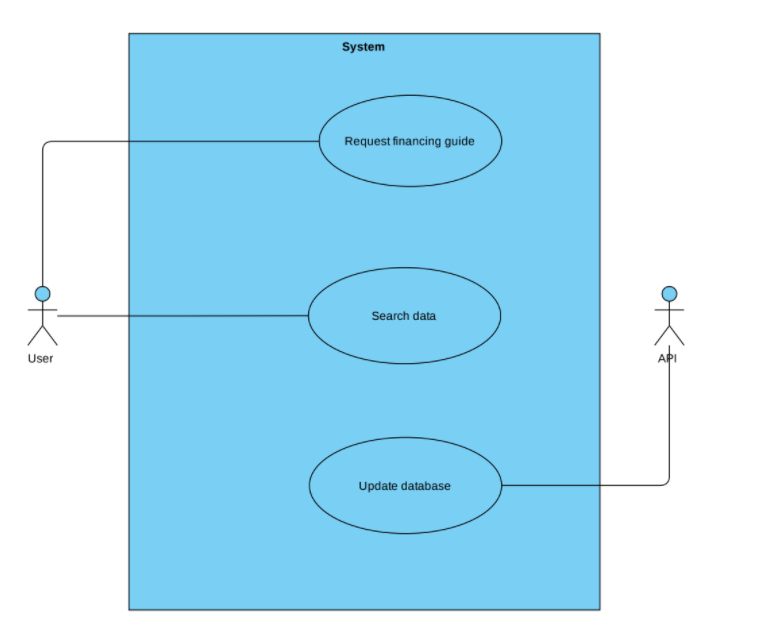


Figure 1 Use Case Model

The house buying guide has two main actors, the user and the URA private property transactions API. The user communicates with the system directly, and is able to access both major functions of Request financing guide and Search historical data easily. This ties in to the quick access vision of the system, wherby users are able to get their intended information in an efficient way. The system also makes requests to the API to gather the recent and accurate data about private property transactions monthly, to ensure the accuracy of information provided.

## User Classes and Characteristics

*<Identify the various user classes that you anticipate will use this product. User classes may be differentiated based on frequency of use, subset of product functions used, technical expertise, security or privilege levels, educational level, or experience. Describe the pertinent characteristics of each user class. Certain requirements may pertain only to certain user classes. Distinguish the most important user classes for this product from those who are less important to satisfy.>*

## Operating Environment

*<Describe the environment in which the software will operate, including the hardware platform, operating system and versions, and any other software components or applications with which it must peacefully coexist.>*

## Design and Implementation Constraints

*<Describe any items or issues that will limit the options available to the developers. These might include: corporate or regulatory policies; hardware limitations (timing requirements, memory requirements); interfaces to other applications; specific technologies, tools, and databases to be used; parallel operations; language requirements; communications protocols; security considerations; design conventions or programming standards (for example, if the customer’s organization will be responsible for maintaining the delivered software).>*

## User Documentation

*<List the user documentation components (such as user manuals, on-line help, and tutorials) that will be delivered along with the software. Identify any known user documentation delivery formats or standards.>*

## Assumptions and Dependencies

*<List any assumed factors (as opposed to known facts) that could affect the requirements stated in the SRS. These could include third-party or commercial components that you plan to use, issues around the development or operating environment, or constraints. The project could be affected if these assumptions are incorrect, are not shared, or change. Also identify any dependencies the project has on external factors, such as software components that you intend to reuse from another project, unless they are already documented elsewhere (for example, in the vision and scope document or the project plan).>*

# External Interface Requirements

## User Interfaces

*<Describe the logical characteristics of each interface between the software product and the users. This may include sample screen images, any GUI standards or product family style guides that are to be followed, screen layout constraints, standard buttons and functions (e.g., help) that will appear on every screen, keyboard shortcuts, error message display standards, and so on. Define the software components for which a user interface is needed. Details of the user interface design should be documented in a separate user interface specification.>*

## Hardware Interfaces

*<Describe the logical and physical characteristics of each interface between the software product and the hardware components of the system. This may include the supported device types, the nature of the data and control interactions between the software and the hardware, and communication protocols to be used.>*

## Software Interfaces

*<Describe the connections between this product and other specific software components (name and version), including databases, operating systems, tools, libraries, and integrated commercial components. Identify the data items or messages coming into the system and going out and describe the purpose of each. Describe the services needed and the nature of communications. Refer to documents that describe detailed application programming interface protocols. Identify data that will be shared across software components. If the data sharing mechanism must be implemented in a specific way (for example, use of a global data area in a multitasking operating system), specify this as an implementation constraint.>*

## Communications Interfaces

*<Describe the requirements associated with any communications functions required by this product, including e-mail, web browser, network server communications protocols, electronic forms, and so on. Define any pertinent message formatting. Identify any communication standards that will be used, such as FTP or HTTP. Specify any communication security or encryption issues, data transfer rates, and synchronization mechanisms.>*

# System Features

## Search data

4.1.1Description and Priority

Retrieve resale/private sale data according to user input parameters (location, property type, floor range, tenure, land area, price range (total), sale type, project name), with parameters displayed according to user’s intended purpose

4.1.2Stimulus/Response Sequences

1. User selects option to *search historical data*, and may select to search as a buyer or seller
2. If buyer is selected, System displays parameters of location, property type, sale type, land area, floor range and price range(total).
3. If seller is selected, System displays parameters of location, property type, project name, land area, floor range and tenure.
4. System requests the input of at least one parameter to filter historical data
5. **User** enters at least one search parameter to filter historical data
6. System searches through the **Server database** for historical data matching input criteria
7. If price range is not given as input criteria, system calculates average price of all houses matching search criteria and displays it to **User**
8. If price range is not given as input criteria, system displays a quarterly moving average graph price graph of houses that match the search criteria over the last three years to **User**
9. System displays search results to **User** in order of closest match to search criteria, with the closest match highlighted

4.1.3Functional Requirements

REQ-1The system must allow the user to input parameters of location, property type, sale type, land area, floor range and price range(total) if user is a buyer.

REQ-2The system must allow the user to input parameters of location, property type, project name, land area, floor range and tenure if user is a seller.

REQ-3 The system must search the database and return private housing sale results that matches the search criteria precisely.

REQ-4If price range is not given, the system must calculate an average price of all houses sold that matches the search criteria and display it to the user.

REQ-5If price range is not given, the system must calculate a quarterly moving average price of all houses sold that matches the search criteria over the past three years and display it to the user.

REQ-6 The system must display all search results found in the dataset.

REQ-7Each search result must display the location, property type, project name, land area, floor range, tenure, sale type, price.

REQ-8 By default , the system must determine the closest match results via standard deviation from search parameter inputs and display search results in order of descending closest match.

REQ-9 The system must allow the user to change order of display of search results by date, price in ascending or descending order.

REQ-10The system must accept location in street name and postal code and convert it to the required postal district input to be made for a request to the API.

REQ-11 If the system cannot find data matching search criteria selected in API, the system must display an error message “No matching results”, and prompt the user to enter another set of criteria.

## Request financing guide

* + 1. Description and Priority

Provides an estimated housing budget for the user based on personalised user input.

* + 1. Stimulus/Response Sequences

1. **User** selects option to *request financing guide*
2. System requests users to fill in a form on personal details
3. User inputs information of residency, monthly fixed income, monthly variable income, cash towards down payment, CPF ordinary account, property type, repayment duration, age, maximum bank loan, interest rate, other loans, other home loans, car loan, minimum credit payment, number of loans and number of properties.
4. System calculates and displays to User the maximum affordable house price.
   * 1. Functional Requirements

REQ-1The system must ensure the user has filled in all inputs in the form before making a calculation for house budget for the user.

REQ-2 The system must calculate a maximum house price the user can afford based on the inputs given by the user.

REQ-3 The system must calculate the house budget for the user based on a 60% total debt servicing ratio, a 25% minimum down payment and a 5% minimum cash payment

**4.3 Update dataset**

4.3.1Description and Priority

Makes a request to the API to store the past three years of private housing data into the system’s SQL database.

REQ-12 If the API is not accessible, the system must display an error message “Server offline” and return the user to the homepage.

# Other Nonfunctional Requirements

## Performance Requirements

## The system must respond within 5 seconds once search inputs are given by user.

## All average price calculation must be rounded off to 2 decimal places.

## Moving average price graph must include all prices of matched private houses sold within each quarterly period

## Moving average price graph must not provide a point on the graph if less than 20 houses were sold in that quarter.

## The system must not display a moving average price graph if less than 200 houses match the search criteria even if price range was not included in the search.

## The system must allow users to view search results via a default closest match in descending order.

## The system must allow the user to view search results via a descending or ascending date order.

## All dates must be returned in dd/mm/yy format.

## The system must convert address or postal code of house given to postal district.

## The system must display the postal district, address and postal code of the private house sold under the location detail in the search result.

## The system must do all financial calculations based on average interest rate provided by Singapore banks on housing loans.

## The system must return private housing search results containing sale type, location, property type, tenure, floor level, price sold (total), land area and price per meter square.

## The system must provide a return calculation on price per meter square = price sold (total)/land area.

## Safety and security Requirements

## The system must not record any search queries entered by the user.

## The system must not record any personal details entered by the user in the form for a financing guide.

## Software Quality Attributes

* + 1. The server database must be refreshed on 15th of every month by batch drop.
       1. *“Unable to update server database”* must be displayed upon failing to successfully retrieve new dataset and update database.
       2. *“No updates”* must be displayed if there is no new dataset found.
       3. *“Server offline”* must be displayed upon querying all empty database
    2. The system must return the same output provided the same input parameters every time unless there is an update to the server database after refresh.
    3. Full system functionality must be restored within 5 minutes of a system reboot.
    4. All messages and information displayed must be in English.

**McCalls model of quality assurance**

## Business Rules

*<List any operating principles about the product, such as which individuals or roles can perform which functions under specific circumstances. These are not functional requirements in themselves, but they may imply certain functional requirements to enforce the rules.>*

# Other Requirements

*<Define any other requirements not covered elsewhere in the SRS. This might include database requirements, internationalization requirements, legal requirements, reuse objectives for the project, and so on. Add any new sections that are pertinent to the project.>*

**Appendix A: Glossary (Data dictionary)**

|  |  |
| --- | --- |
| **Term** | **Definition** |
| **Actors** | |
| User | A buyer or seller of private housing |
| API | URA private housing API |
| **Search Parameters:** | |
| Sale Type | Type of sale for the housing (New sale/Subsale/Resale) |
| Project Name | Building/Estate name |
| Location | Address, postal district or township |
| Property Type | Type of private housing (Strata Detached/Strata Semi-detached/Strata Terrace/Detached/Semi-detached/Terrace/Apartment/Condominium/Executive Condominium) |
| Floor Range | Storey range at which housing is located |
| Tenure | Lease information, tenure left on property to nearest month |
| Land Area (m2) | Area of property in meter square |
| Price Range (Total) | Price of property in dollars |
| Price Range ($psm) | Price of property in dollars per meter square |
| **Financial Parameters:** | |
| Residency | Singaporean, permanent resident or foreigner |
| Monthly fixed income | Basic monthly salary and any additional fixed income a user earns |
| Monthly variable income | Additional income user receives above their monthly fixed income |
| Cash towards down payment | Liquid cash user has set aside for house purchase |
| CPF ordinary account | Amount in CPF account set aside for house purchase |
| Repayment duration | Duration user plans to purchase house by (0-3 months, 4-6 months, 7+ months, not sure) |
| Total debt service ratio | The portion of users’ gross monthly income that goes towards repaying the monthly debt obligations |
| Minimum downpayment | Minimum cash amount buyer has to provide to qualify for a housing loan |
| Minimum cash downpayment | Minimum cash amount buyer has to pay to buy a house |

**Appendix B: Analysis Models**

*<Optionally, include any pertinent analysis models, such as data flow diagrams, class diagrams, state-transition diagrams, or entity-relationship diagrams*.>

**Appendix C: To Be Determined List**

Source: http://www.frontiernet.net/~kwiegers/process\_assets/srs\_template.doc