Requirements Specification

Group 11 – 2XB3 – Helping the Homeless

Revision History:

April 13: Updated to reflect current project state

The Domain

The main purpose of the product is to help people struggling with homelessness reliably find the optimal shelter in their area. By developing this product, we need to establish a certain level of reliability to aid the homeless community continuously.

There are a few databases we need to reference regularly to ensure we provide a reliable service. We need to predict the capacity of nearby shelters to ensure we recommend one that is not at capacity. We can accomplish this by using the "Daily Shelter Occupancy" that is released by the city of Toronto. The second database to be used is the City of Toronto Municipal Addresses which is necessary to find the latitude and longitude for the user's current location that they input into the product. This database is also used to find latitude and longitude of the shelters and cooling centers so that they could be compared to current user address and a distance could be calculated. The last database that needs to be used is the "Air Conditioned Public Places and Cooling Centers," which is also released by the city of Toronto. This also ensures that we recommend a reliable location for the people looking for a suitable location.

There are a few stakeholders involved in the project, including the homeless community, the city, and the shelters themselves. The homeless community will be the main beneficiaries of the service, as they are directly affected. The city will be affected as they need to acclimate to the homeless community moving around more frequently and going to different shelters. Also, the shelters themselves will be affected as some of them would be operating at a higher capacity when previously they were not. If a shelter has been operating at a lower capacity, it would be recommended more often, evening out the load on all shelters.

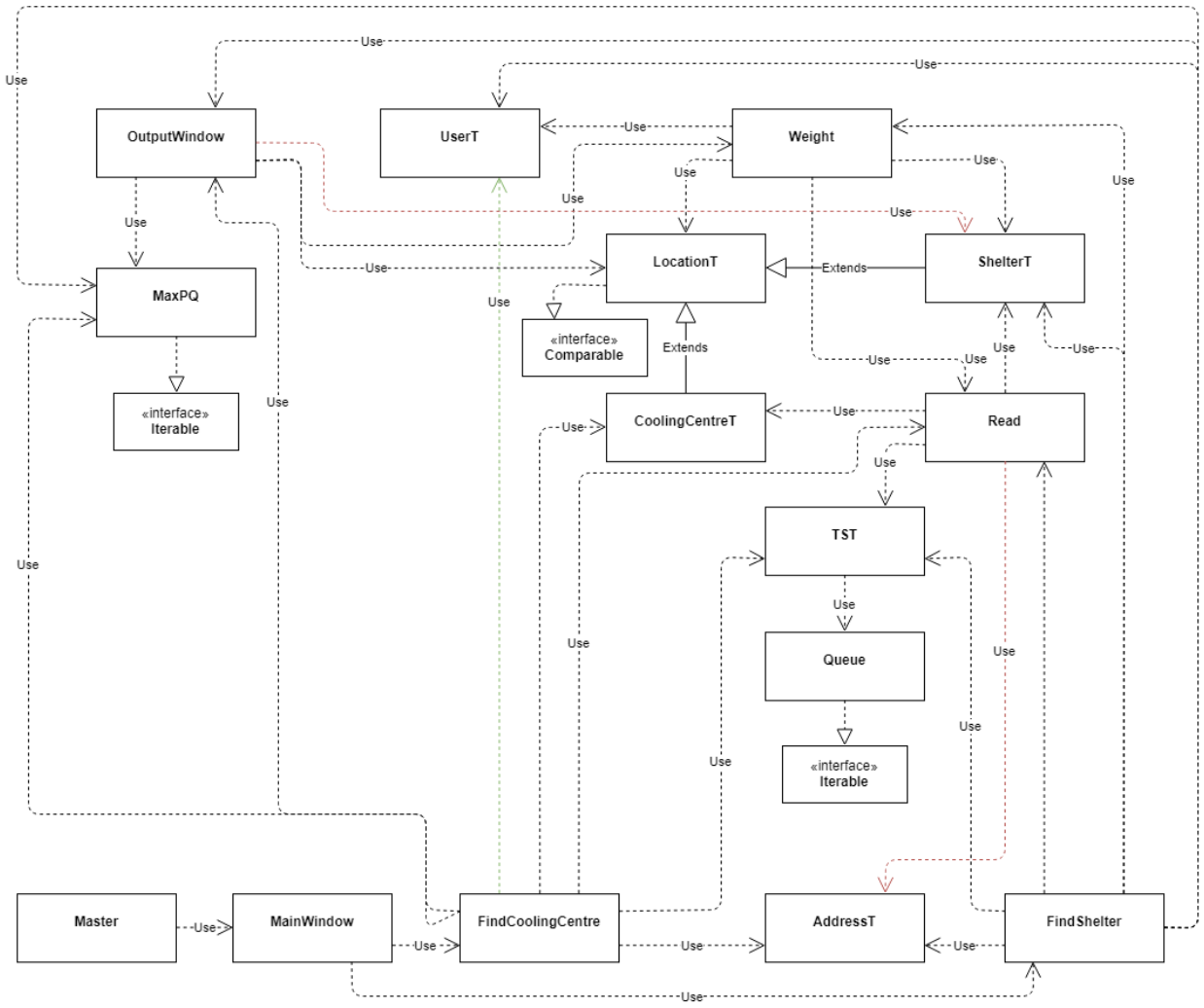
Functional Requirements

The program will take an input of the user type (male, female, family, coed, youth) and current location. The shelters will then be filtered based on valid user. Then, each shelter will be assigned a weight based on user type, historical capacity, and location. The highest weighted shelter will then be displayed with google maps directions to its location, with the option to select the next best. A similar process will be employed for handling cooling shelters.

Modules

GUI – Take user inputs and display output
Read - Read input datasets and format them so that they are usable
Weight - Assign a weight to data based on the following criteria
Data Structures – MaxPQ, TST, and Queue used for storing and accessing data
ADTs – ADTs for Shelters, Locations, Cooling Centers, Users

Below is a use-case diagram to show in more details the modules and how they are related.



Non-Functional Requirements

There are a variety of non-functional requirements that need to be considered. These will be expanded upon and added to as more research is done and the project is further understood.

Reliability

The software system being designed is not of critical importance so the reliability of it does not have to be incredibly high. The product is more one which will aid and enhance people's lives, not something that will be solely relied upon. However, it should still have a high level of reliability to be useful as a product, especially regarding the accuracy of results discussed in the next section.

Accuracy of Results

This is the most essential non-functional requirement because the help that the software will provide to people struggling with homelessness is the basis of this project. If the results, that is the location of the best homeless shelter based on the parameters are not accurate, then the software will lead people astray and it would provide no value to the users.

Human-Computer Interface Issues

Since the main users of the product will be people struggling with homeless, the interface would have to be extremely simple and easy to understand to cater towards people from a variety of different backgrounds. There should be very little the user has to do to find the closest shelter. Another possible issue that may come up is integrating Google Maps into the application in a way that looks good.

Portability Issues

Ideally, the product will work like a website that people will be able to access. This will then be able to be accessed anywhere with Internet.

Product Speed

For the product to be most effective, it will have to execute and run quickly without being slow as a slow solution will frustrate users and cause them not to use the product.

Understandability

The product must be clear and easy to use, and the output of it, that is a Google Maps direction to the best shelter must be easily understood and interpreted.

Scalability

The product must be able to meet the rest of the functional and non-functional requirements as the datasets grow larger. As more shelters, cooling centers, and municipal addresses are added, the product will continue to work as designed.

Requirements on the Development and Maintenance Process

To ensure the product is functional and provides accurate and reliable recommendations for shelters, different testing approaches and quality control procedures will be required. One such testing procedure is testing during the sprints. This acts as an advantage because testing procedures when they are finished leaves fewer individual modules to test during the final stages of development. Other forms of testing will also be implemented both in the development stage and after it. These testing methods will be used to ensure both the functional and non-functional requirements of the implementation are met. An example of one of these testing methods is black box testing. This will be used to test the robustness, correctness and reliability of the program and its functions. Additionally, tests will be used to ensure that the end user of the product is able to use it properly as an unusable product would not be helpful to those who need it.

Once the software development process is finished and the product has launched, our team will begin to focus on maintenance. As a result, some changes will be required to ensure that the application is working as intended. The most likely changes are changes to the datasets so both the data provided, and recommendations made to the user are accurate. For example, the datasets for cooling centers and homeless shelters are essential as these are locations that will be recommended to the users. If outdated data is used the application could recommend a location to the user that no longer exists. If these data sets were to update it would be necessary to update the application in order to update the data sets used for the program. Additionally, updates would be required to remove any bugs or errors from the final product.