HelpMe Mobile Application Proposal

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Contents

Executive Summary

In 2015, the Singapore government launched SkillsFuture, a national effort to help Singaporeans develop skills relevant to the future, fostering a culture that supports lifelong learning. After seven years, Singapore has developed a community with skills both relevant to the economy and everyday needs or interests. During the COVID-19 pandemic there has been a rise of reliance on remote collaborative technology where physical meetings or meet ups are no longer necessary.

Most applications in the market aim to sell products or find long-term employment for users. But there does not exist an extensive and user friendly application that caters to users that offer and request for services without third party involvement. Services can be from all categories ranging from pet sitting to plumbing work. The project HelpMe will be a mobile application that enables customers and contractors to collaborate on a single, user-friendly platform for services. Users will be able to create profiles that showcase their skills and portfolio. Users will be able to both request and offer services from or to the community. Services will be user defined, users will decide on the prices and description of given services. Other users on the application can then accept these service requests or offers. The application aims to deliver the most user friendly environment for Users to collaborate with zero platform fee.

Statement of Problem

The SkillsFuture initiative has enabled the Singaporean community to learn a vast variety of skills. There exists a diverse pool of people in the country that has developed skills ranging from house repair to baking but with no platform to provide these services. The current solutions in the market either require users to pay a platform fee or do not have the proper infrastructure to showcase the user's services. On the other hand, people needing these services also do not have a platform to request. Currently, individuals need to source for services online, with companies often not revealing the price of these services. Applications such as Carousell and Facebook do not link service providers to consumers and vice versa.

According to a 2021 newsletter by the Singapore Department of Statistics, Covid-19 has caused many people in the food and beverage industry, and especially in the catering business, to lose their jobs. That has led to an increased number of job seekers at the current time. With inflation on the rise, as shown in the Singapore Consumer Price Index of July 2022, people who did not need to work before found themselves needing to look for short-term work to support themselves and their families. The app will help to connect such people with potential employers.

Objectives

This document proposes to create a mobile application that bridges contractors with customers. HelpMe aims to comprise of the objectives as follows:

1) User interface that allows for users to request a service and offer a service,
    a) Customers will be able to post requests for services and respond to posted services.
    b) Contractors will be able to post services and respond to requests for services.
2) Service request and/or offer page that provides sufficient information such as price and region,
    a) The service request page includes the price the customer is willing to pay, region (if applicable) and a small paragraph with details of the job.
    b) Contractor should be able to take up or dismiss the request.
    c) The offer page should only be shown to customers for browsing.
    d) The offer page will show all contractors and their ratings for the job that the customer has selected.
        i) Customers can view more information on the contractor by selecting their profile.
        ii) Customers should be able to sort the search results of the offer page according to rating, category and/or location.
    e) Customers should be able to book their desired service contractor from the offer page or the profile description page.
3) Comprehensive profile description showcasing skills and past portfolios and reviews for contractors,
    a) The profiles of the contractors should include their name, their phone number, list of the services they provide and the jobs completed for each service, and the average rating that past customers have for their finished task.
    b) The jobs completed can include the time taken, date of completion and a short paragraph written by the contractor that describes the job done.
    c) Users can also choose to link their LinkedIn or Instagram as part of their profile portfolio.
4) Notification system to inform users of real-time service requests or service offers,
    a) The notification should appear in the activity or notifications centre of the user's mobile phone.
5) Login system for users to keep their information and receive notifications from the application.

Technical Approach

The application will be developed on Android studio, the project will be adopting an object oriented loosely coupled approach. The table below are the identified needs of the customer along with implementation details.

Table 1: Customer needs approach and remarks

Customer Needs	**Approach**	**Remarks**
Account - Secure Log in/Log out - Profile customisation - Account registration - Account recovery	- All accounts will be hosted on the Oracle cloud server. - Profile customisation will be located within the application's profile. - Both account registration and recovery will be on the application's log in page,	- Accounts hosted on the cloud server allows for immediate access to the database by administrators. - All creation/ changes to the profile will be stored in the server database.
User request and offer services	- Buttons would be available for the request of service and for the offering of service. - Users will be able to post descriptions for each request, including price, date and general location of the job. - Users will be able to post descriptions for	- Functions that are shared between both modes can be reused to reduce unnecessary complexity and duplicated work. - The aim of the description is to provide enough essential information for each job such that users will be able to use the sorting and filtering functions to easily meet requirements. - A user may request for services as well as provide services
Search, filter, post and accept services	- Users can post services they can provide and services they require - Users can search for services provided or services required, and sort them in order of ratings. They can also filter items by location or categories - Users can accept services	- Users can easily find services they want

	they choose	
Notification System	- Application will notify users via notification panel if there are responses to the posted item.	- A customer will be notified if a contractor answers their request, while a contractor will be notified if a customer accepts their application or books their services

Technology Consideration

- Visual Paradigm software for UML diagrams
- WikiMedia for storing documents
- Version Control System (GitHub)
- Java
- Android Studio for app development
- Firebase which provides Backend-as-a-Service

System Architecture/Platform

The project makes use of Android Studio.

The following diagram shows the software architecture of the application.

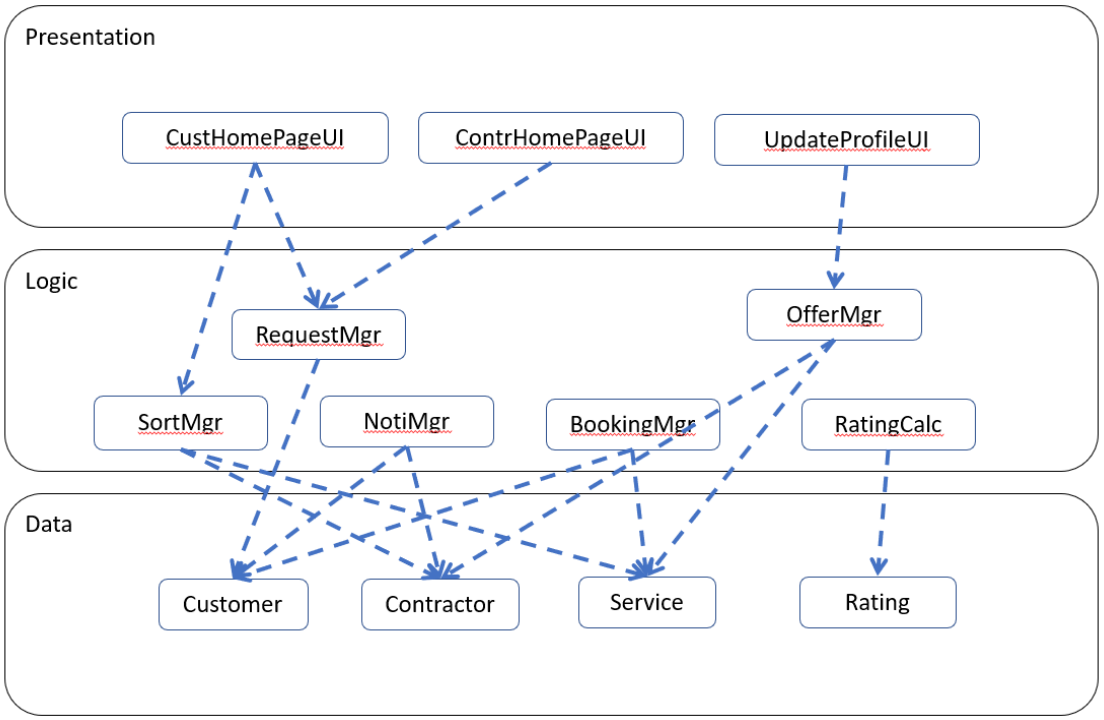

Diagram 1: Software Architecture of HelpMe

There will be three broad sections: presentation, logic and data. The presentation section deals with how the application will appear to the user. The logic section represents the control classes that handle the inputs from the user or the database and perform actions. The data section consists of the entities like Customer, Contractor and Service. Each entity consists of more information on the instance of that entity.

Project Management

The project will be done in the following phases:

1) Planning:
    a) Time allocated: 2 Weeks,
    b) Description: In this phase, the team will discuss the approach to tackle the project. The team will identify estimated budget, resources, task assignment, limitations and priorities. The team also finalises the proposed use case diagram.
2) Concept Development:
    a) Time allocated: 2 Weeks,
    b) Description: The project team drafts the various UML diagrams related to the structure of the application. Class diagram and use case diagram and sequence diagram will be finalised in this phase. The team also starts developing the base structure of the application
3) System-Level Design:
    a) Time allocation: 2 weeks
    b) Description: Systems and subsystems will be developed with modules and implementations being the priority.
4) Detailed Design:
    a) Time allocation: 2 Weeks
    b) Description: Front-end will refine the look and feel of the application and back-end will ensure usability.
5) Testing and Refinement:
    a) Time allocation: 3 Weeks
    b) Description: QA team will run several rounds of tests, testing the application according to ISO standards. The application will be refined in each round of tests.
6) Responsibilities and duties:
    a) Project Manager: Overall delivery of product, ensuring the project meets the different timeline objectives. Has an active channel with the customer for updates and feedback.
    b) Lead Developer: Overall technical lead, responsible for technical aspects of product release

c) Front-End Developer: Mobile app front-end programming. Participate in the entire SDLC, generating work products including documentation, source code, unit and integration tests
d) Back-End Developer: Server, application and database programming. Participate in the entire SDLC, generating work products including documentation, source code, unit and integration tests
e) QA Manager: Overall product and process quality, implementation of QA processes
f) QA Engineer: Devise test plans, conduct tests
g) Release Engineering/ Manager: Create baselines and build and integrate changes for delivery. Manage releases of prototypes
h) To be able to complete this project in an efficient manner, Diagram 2 illustrates how the time will be allocated for the different stages of the project. HelpMe's planning portion will last for 2 weeks, followed by concept development of 2 weeks. Next, the designing will start off with system-level and then with the more detailed coding. The last 2 weeks will be used to repeatedly test and improve the build of the app.

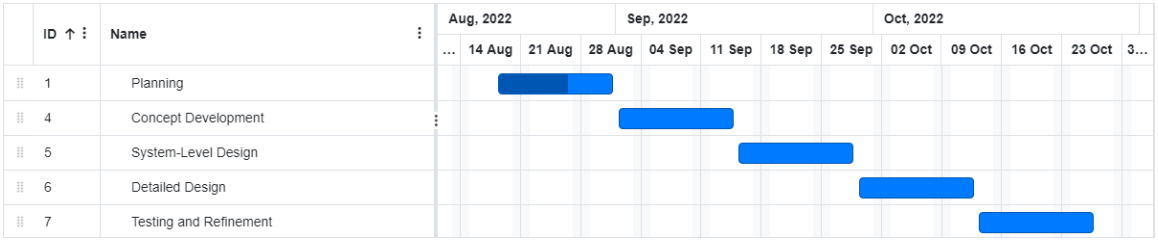

Diagram 2: Projected Gantt chart for the project

Deliverables

Think2 will complete and deliver the Android application named "HelpMe" at the end of Lab 5. The Sponsor will receive the following items in detail:

1. HelpMe Application with detailed specification sheet including the following features:
    a. Account creation, login/ logout functionality
    b. User Profile with ratings
    c. Account switching between Contractor and Normal User
    d. Service Request/ Service Offer
    e. Service details
    f. Transaction details and status
2. Test Cases and Requirements Test Coverage report
3. Full source code with documentation
4. Project Report
5. Database system
6. User friendly training instructions

Budget

The table below is the estimated cost for developing the project. The Salary reflected is for the total duration of development. Computers for development of the project will be required along with an android phone to run the application. The database will be run by Oracle with a yearly upkeep cost of $15,000. This database is required for storage of user data, this database will be able to withstand the projected growth of the user base for the next five years. The team will be working within NTU offices for the project duration. An emergency fund of $1000 will also be required for daily transportation needs to and from NTU.

Table 1: *Requested items and funds for initial design*

Item	Supplier	Quantity	Unit Price	Total
Project manager		1	$30,000.00	**$30,000.00**
Project team members		6	$3,000.00	**$18,000.00**
Computers	Dell	7	$1,000.00	**$7,000.00**
Android Phone	Samsung	2	$600.00	**$1200.00**
Database	Firebase	1	$15,000.00	**$15,000.00**
Office rental	NTU	1	$6,000.00	**$6,000.00**
Transportation	Taxi	1	$1,000.00	**$1,000.00**
			TOTAL	**$78,200.00**

Communication and Coordination with Sponsor

The project manager will coordinate formal physical meetings with the Sponsor held bi-weekly on Thursdays 0830hrs to 1030hrs. The project manager will update the Sponsor regarding any issues or processes pertaining to the development, such as changes, improvements, approvals and goal setting. The information will then be disseminated to the rest of the team by the project manager.

Weekly conference calls via Zoom will be held on Mondays 1830hrs to 2030hrs. The objective of this meeting is for progress updates and goal realignment with the development team. The Sponsor or liaison attendance is encouraged but not essential. The minutes of this meeting will be disseminated to the Sponsors before the Bi-Weekly meetings.

Team Qualifications

Project Manager, Quek Xuan Hao is an undergraduate studying in NTU currently pursuing a Bachelor of Engineering in Computer Science. Xuan Hao had previously completed module CZ2006 where his team successfully developed an application to display and guide users to the nearest Electric Vehicle charging station. Experiences and skills include but are not limited to Python/ C/ Java and the process of software development.

Lead-Developer and Back-end Developer, Antoine Tran is a Year 3 undergraduate student currently in exchange from Switzerland. He was involved in various programming projects from undergraduate courses at EPFL, his home university. He was a teaching assistant in a project based course consisting of building an itinerary planner for bike trips. He has experience writing code in Java, Scala, Python and C, making him comfortable with both object oriented and functional programming.

Front-end Developer, Chen Kian Leong is a Year 3 undergraduate student currently pursuing a Bachelor of Engineering in Computer Science. Chen was involved as the main front-end developer to come up with User Interface and Flow of an Fitness Application GitFit - A fitness planner application designed in a team of 5 showcasing various features of identifying user nearby workout facilities, designing a user weekly workout plan, and provide recommendations to meet user fitness goals. He has experience in software such as Figma and Vue.js.

Back-end Developer, Li Jin Xuan is a Year 3 undergraduate student at NTU pursuing a Bachelor of Engineering in Computer Science. He was involved in a web application project that aims to streamline the process to connect students/parents with any readily available information of the schools in Singapore. Through it, he has gained knowledge in certain frameworks, tools available to ease development (e.g. Backend-as-a-Service) and the typical development process in Software Engineering.

QA Manager, Siti Nur Umm'aira Phang, is a Year 3 undergraduate in NTU pursuing a Bachelor of Engineering in Computer Science. Siti was involved in the conceptualisation, implementation and testing of a website that aims to make finding rental units easier for the public. She has been involved in both the black and white box testing of the website which helped ensure no errors were brought to the end user.

QA Engineer, Tanya Banerjee, is a Year 3 undergraduate student at NTU pursuing a B. Eng. degree in Computer Science. She was a part of the project for the CZ2006 module where she helped to create a webpage for a website to find nearby healthy living facilities (e.g. gyms, parks, healthy eateries). She was also involved in white box testing and writing the documentation.

Release Manager, Ong Chun Guan Marcus is a Year 3 undergraduate in NTU pursuing a Bachelor of Engineering in Computer Science. Marcus Ong was previously involved in the creation of the WeSeller website which is a platform that enables users to browse and compare a variety of housing estates posted by estate agents. Through those projects, concepts and skills, such as Object Oriented Programming and System Architecture, were polished and demonstrated.

References

Qua, K., Yeo, M., Lee, J. and Chua, K., 2021. *Impact of COVID-19 on the Retail and Food & Beverage Services Sectors*. [pdf] Singapore Department of Statistics. Available at: <https://www.singstat.gov.sg/-/media/files/publications/industry/ssn121-pg1-5.ashx#:~:text=F%26B%20Services%20Sectors%20in%202020,-The%20Retail%20and&text=Excluding%20Motor%20Vehicles%2C%20retail%20sales,in%202020%20(Chart%201)> [Accessed 31 August 2022].

Singapore Department of Statistics. (2022). *Singapore Consumer Price Index, Jul 2022* [pdf]. Retrieved from https://www.singstat.gov.sg/-/media/files/news/cpijul2022.ashx

Appendix A
Résumés of Team Members

One-page resumes of the team members are available at this link :

Resumes