Starcross Construction Inc.

SRS: The Overall Description (Product Perspective, Product Functions, User Characteristics, Constraints, Assumptions and Dependencies, Apportioning of Requirements)

The Overall Description

The system should be easy to understand and use for all employees, including those with limited technical expertise. Intuitive navigation, clear instructions, and a user-friendly interface are essential for the program. It also must consistently perform its intended functions accurately and reliably. It should handle large volumes of data without errors and provide accurate calculations for salary and work time. Data security is also essential when it comes to building the system as it is crucial to protect sensitive employee information. Appropriate measures like encryption, user authentication, and access control to ensure data confidentiality and prevent unauthorized access should be taken into account.

The time-in-time-out system needs to work seamlessly across different platforms, including IOS, Android, and Windows, to ensure that employees can access it from their preferred devices. Lastly, the system should adhere to relevant legal and regulatory requirements, including labor laws, employee consent, and data protection regulations.

2.1 Product Perspective

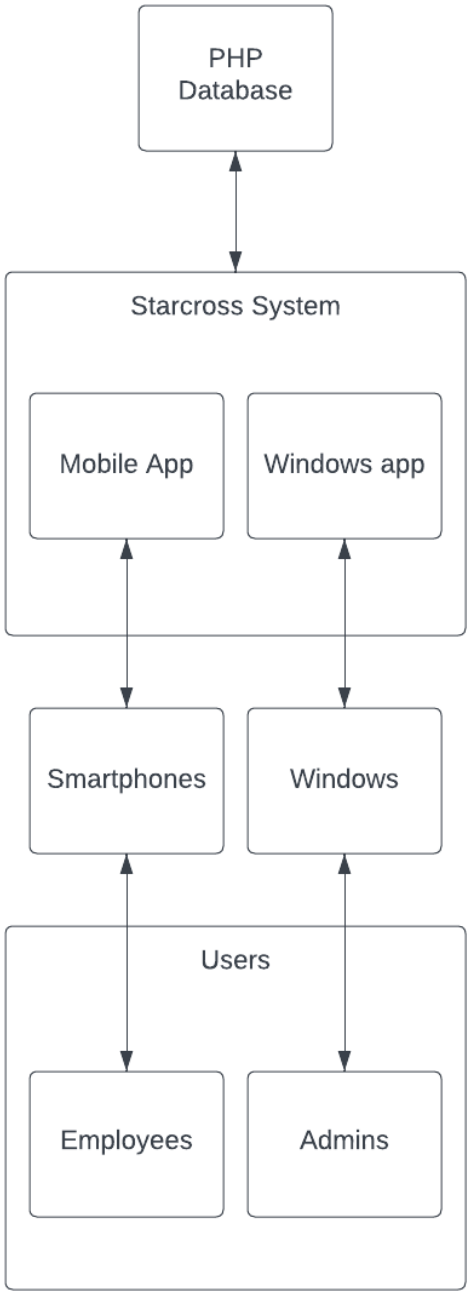
The Starcross Construction Inc. System is a standalone program that is responsible for timekeeping and payroll calculations. An example of a similar system would be the app Clockify which has the following features:

1. Kiosk
2. Timer app
3. Timesheet
4. Auto tracker

5. See real-time activity in the Team Dashboard
6. Create an Attendance report to record the availability
7. Make a Summary report to look into estimated vs. tracked time
8. Produce a Detailed report to get all details on performance
9. Create a Weekly account to check who hasn't logged work hours

Meanwhile, the Starcross system, although similar, has differences in its features:

1. Login system
2. View running time (worker hours)
3. Database Exporting Capabilities
4. Adjustable break time
5. Rosterview of employees
6. Project site Geolocation Tracking (Geofencing)
7. Random working time checks
8. Time-in / Time-out button
9. Overtime request button
10. Mailbox (Notifications)
11. Support / Help button (Admin support)
12. Emergency Button
13. Location request (app tracking)
14. Advertising ID request



2.1.1 System Interfaces

- Google Play Services
    - The Google Play Services is mainly used for location tracking. This feature however is still in question with regards to the permissions of

the said service to Huawei devices since the mentioned devices are prohibited from using the Google services.

- MySQL XAMPP
    - MySQL XAMPP is the database management system that was used in this project. The values within the database are interchangeable or editable through accessing phpMyAdmin. This will contain all the data within the proposed system such as the time of hours worked by certain employees, overtime requests, etc.

2.1.2 Interfaces

First, the group designed the Admin application with ease of use in mind. It features a GUI page that contains each functionality such as geofencing, payroll control, support for workers, and mailbox. For the worker mobile application, ease of use and simple to understand UI is also our goal in designing the application. It was designed to be easy to use so that workers using the application every time they work would not have a hard time understanding how the application works. The app should be interfaced in a way that it could be easily accessed and understood by the general public when it comes to how it works.

2.1.3 Hardware Interfaces

Since the program is built for mobile devices, it should be able to run on any Android device. One problem that the group found for this project is that there is a limitation when it comes to the use of Huawei phones since Google services banned Huawei, or in better words, removed their services from Huawei devices. This could be a problem when it comes to the workers since some of them could be using Huawei, and it is not humane to force the workers to use different brands of smartphones.

2.1.4 Software Interfaces

In this project, the program that will be used by the Administrators requires the computer to be installed with the .NET Framework 4.8 version. This is installed in order to avoid errors or bugs whenever the user opens the said program. When the group was building the design for the Administrator window, building errors were unavoidable when the program was run in older versions. Although it could be different for the actual application when exported and from the debugging process, it is much better to install the framework just to avoid errors.

2.1.5 Communications Interfaces

The database of the program will be run with the help of MySQL with the use of the XAMPP program to get the server running. The Google Play services for location tracking will also be integrated with the database since it will be used to record the current location of the workers, mainly used to track whether the workers are within the vicinity of their workplace. The group utilized the MySQL database since it is a free open-source database management system. But if the project were to be improved, then using cloud databases or web services would be a better fit and there will be less restrictions.

2.1.6 Memory Constraints

Upon testing the application, the amount of memory being used specifically, the RAM is around 70 MB - 76 MB. Considering the smartphone devices nowadays, the RAM usage of 70 MB - 76 MB is easily achievable since the components are getting upgraded while also getting cheaper as technology grows. And with that, it can easily be said that the memory constraint when it comes to RAM usage or memory usage should not be a problem. The following testing of the RAM Usage is as follows:

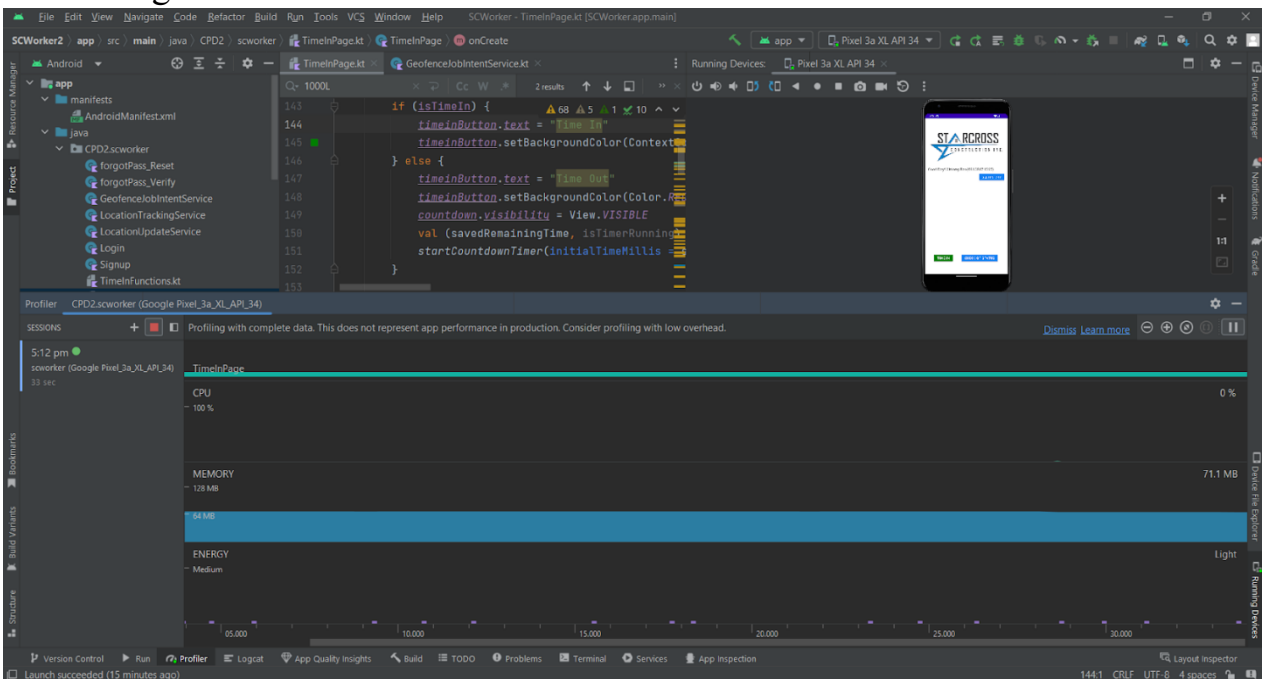


Figure 1. RAM Usage Testing in Android Studio (App is idle, using 71.1MB)

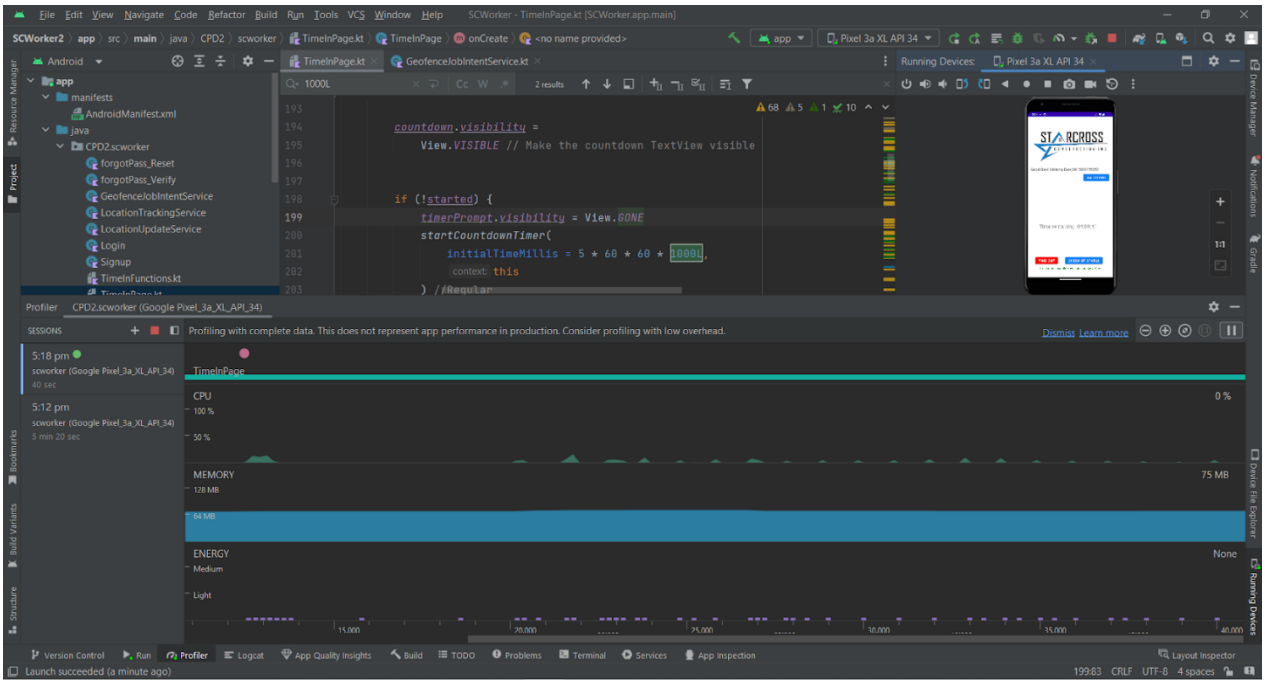


Figure 2. Time-in is pressed, both timer and services are running (75MB)

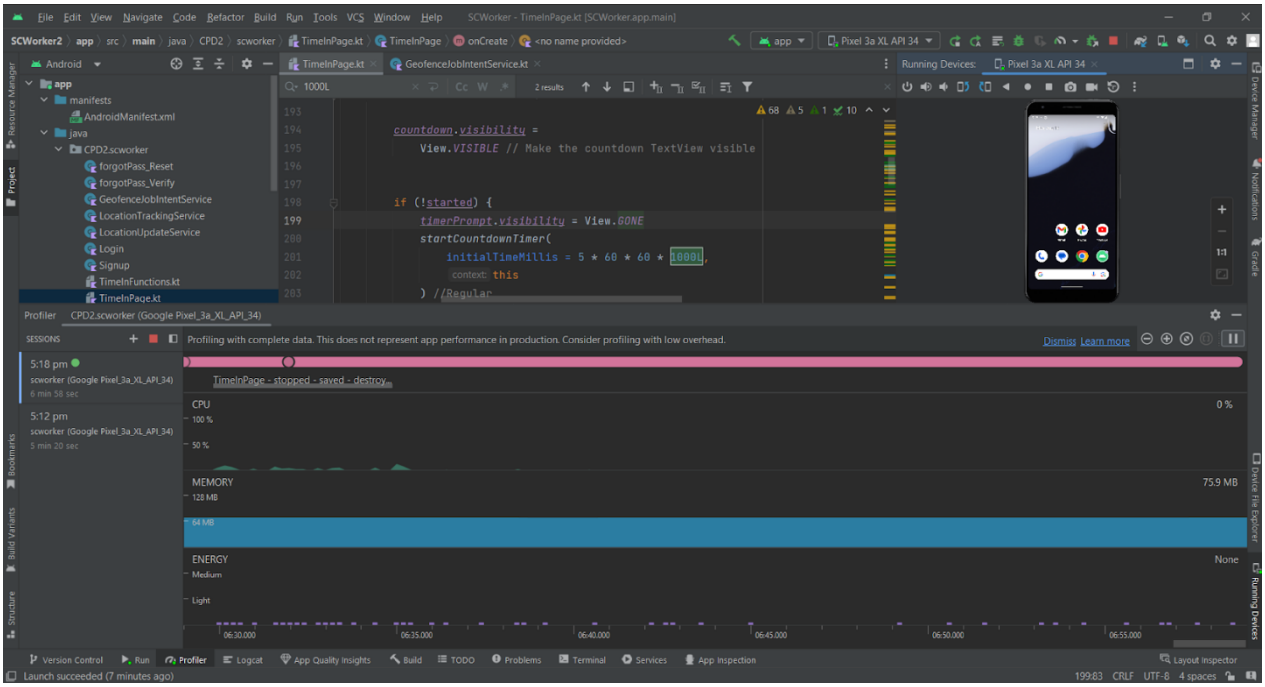


Figure 3. RAM Usage when application is turned off but services are still running (75.9MB)

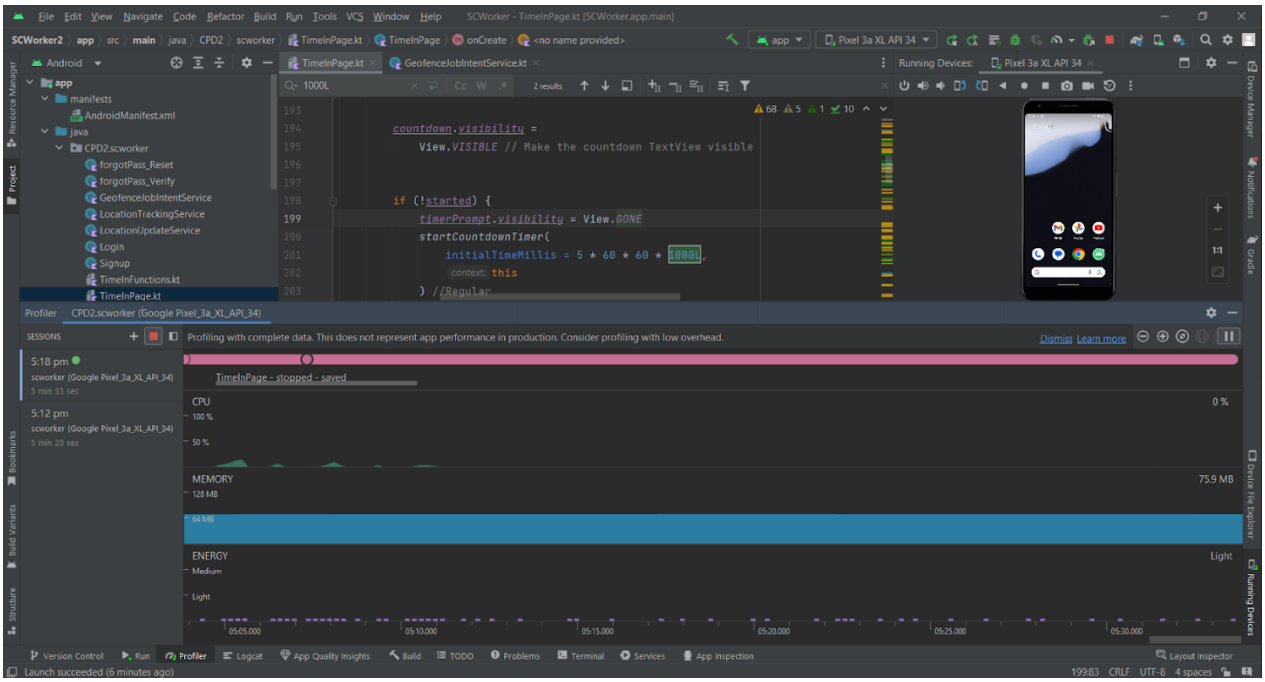


Figure 4. Application is running in the background while timed-in (75.9 MB)

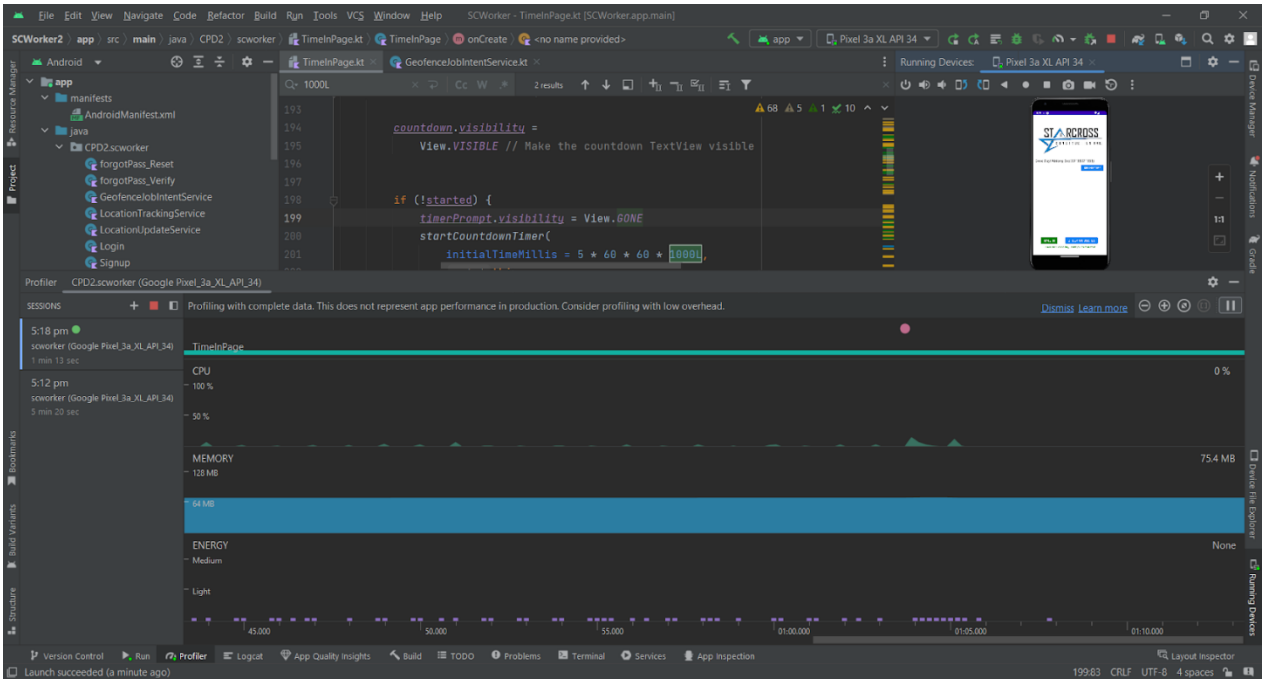


Figure 5. Time-out is pressed and stopped all services (75.4 MB)

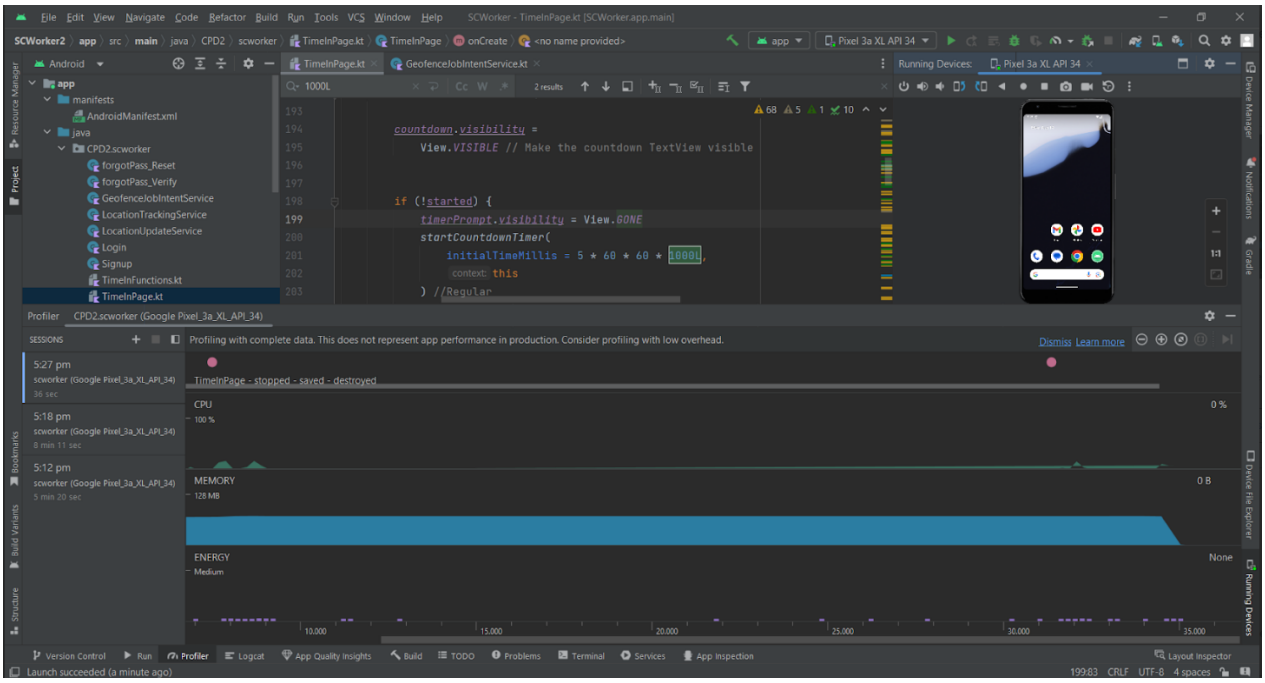


Figure 6. Application completely turned off (0 MB RAM Usage)

When it comes to the file size of the whole program, it is safe to say that the user should allot at least 50MB of the storage space of the phone. The whole program does not consume big storage spaces, but to ensure that the program runs correctly, it is better to have a little more storage space. Allotting more storage space will also reduce the lag or delay within the phone of the user as a whole.

2.1.7 Operations

Workers at Starcross Construction Inc. utilize the company's dedicated Android app to streamline their work processes. Upon downloading the app, workers establish their accounts and subsequently log in. Within the app, they input crucial work-related information, including project site details, start and break times. Using Google Play Services, the app effectively tracks the location of the workers, ensuring their presence at the designated workplace. The app proves instrumental in time management as it enables employees to conveniently time in and out, thereby recording their work hours and facilitating salary calculation. Additionally, workers have the convenience of requesting overtime through the app. Administrative staff benefit from comprehensive features as well. They can access insightful reports which include worker attendance which is also connected to salary data. Moreover, administrators hold the authority to grant or reject overtime requests. For data storage, the app relies on MySQL XAMPP. Although the app

offers compatibility with a broad spectrum of Android devices, it is not operational on Huawei phones. To function optimally, the app necessitates the presence of .NET Framework 4.8 on the administrator's computer. Resource usage is significant, with an estimated RAM usage of 70 MB - 76 MB and storage space of 50 MB.

2.1.8 Site Adaptation Requirements

In this company, there are field administrators that are involved directly within the construction sites. In order to track the workers properly, it is an option to have the program installed with their laptops if it is available. The installation of the administrator program will not take too much time since the file sizes are really small. The memory usage of the program itself is not that demanding as well, which means that the battery usage will not be extensive.

2.2 Product Functions

There are two different programs which are made for the administrators and the workers respectively. Both applications have their own functions and are enumerated as follows:

- Administrators
    - Overtime Requests and Approvals
    - Management
    - Payroll System
    - Location Flagging
- Workers
    - Time-in / Time-out System
    - Request Overtime
    - Location Tracking
- On both programs
    - Login
    - Signup
    - Forgot Password
    - Phone Verification with OTP (One-Time Password)

These functions cover a range of activities and features for both administrators and workers, allowing them to manage and interact with the system according to their roles and responsibilities. The payroll system is calculated based on the hours worked of the workers, which can now be tracked much easier due to

the data being recorded in the database. With those data stored in the database, it can be used to calculate the salary of the worker.

2.3 User Characteristics

Our users consist of the admins and the workers. The admins handle most of the time-in / time-out and payroll information while the workers are the ones being monitored by the admins. We developed the admin program for people with basic technical expertise. The design is simple but provides the admins with the information they need about each worker. For the application of the workers, we designed it with simplicity and ease of use. Not much technical expertise is needed for both designs as its UI design was developed for simplicity.

2.4 Constraints

First constraint that the group noticed was the permissions to use the Google Play Services on Huawei phones. Since Google is not accessible through Huawei devices and is not ethically correct to bypass such a system, the group thought to list it as a constraint or a limitation of the project.

Battery consumption is another constraint that the group thought of as something that could affect the user. Since location tracking, and in this case, geofencing, is quite demanding and uses a lot of battery, it is one constraint that is quite unavoidable. Similar to the services used nowadays such as Foodpanda, Grab, and more, location tracking is used in order for the riders to track the location and vice versa.

When the user gets disconnected from the system, the program will automatically time-out. This case is specified to scenarios where the worker loses battery life or loses battery connection. These are scenarios where it is uncontrollable since the program cannot be left running with the timer on to combat the exploitation of the time of hours worked. This is one constraint that the group thought of, wherein the solution will yield to manual supervision of the administrators or field administrators. One improvement that can be seen from this is that the administrators will now be notified whenever a worker suddenly timed-out.

Another constraint that the group noticed is that the program has not been tested when it comes to its scalability. Aside from that, the program is still not turned over to the company. Further issues will occur after turning over the project

and that is a constraint that the group will not be able to address.

2.5 Assumptions and Dependencies

The software will be used on Android devices that can access the Google Play Services and on devices with sufficient battery life to support location tracking. The program is simplified and is not easy to use. Therefore, the software is expected to be used by workers who are familiar with basic smartphone usage and the desktop program to be used by administrators who are familiar with basic computer usage.

2.6 Apportioning of Requirements

The following requirements are likely to be delayed until future versions of the software:

- Support for Huawei phones
- Improved battery life for location tracking
- Scalability for large numbers of users
- Integration with the systems of other companies

The last requirement mentioned is going to be a bit of a problem since everything in this project is hard-coded based on the Starcross Construction Inc. company. There will be a couple of edits or tweaks needed to be done by the company that will be adapting to the software. The remaining requirements are expected to be completed in the current version of the software. However, the specific features and functionality of these requirements may be subject to change based on the availability of resources and the priorities of the client.