Michigan Technological University

College of Computing

Computer Science Department

CS3141 Team Software Project

Spring 2022

Elevator Down?

Section: R01

Team #: 1

Role#	Student name	position
5	Brayden Coyer	Scrum master
3	Vincent Barfield	Developer
2	Nat Anderson	Developer
4	Conner Bodell	Developer
1	Wes Alberg	Developer

Instructor:

Serein AL-Ratrout

Abstract

Our project is a web/mobile application which will record Michigan Tech students reports on whether or not a elevator is functioning. There will be QR codes posted at each elevator on campus which can be scanned and will direct the user either to our application or website. There will also be an in app system that will let the user report on an elevator without needing the QR code. Staff of the university will also be able to loginto the application with a admin user to clear the amount of reports for an elevator. Waterfall process model was followed during the project development and the implementation was realized by use of object-oriented Android studio and Java technologies.

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Chapter1

Specification

1.1 Introduction

One issue we are trying to solve on campus is the awareness of elevators being down and the effect that it has on people's daily schedules. Students might potentially waste time waiting for an elevator that is out of order, or having to find a different way to class if an elevator is their only option. Our app aims to make everyone's day-to-day life more streamlined by providing a map and list view of elevators that are currently down(not working) on campus. It will also alert maintenance when a user flags an elevator as down.

1.2 Problem Statement

When our team first started talking we realized that several of our team members have all had a similar inconvenience regarding elevators. Many of us have experienced walking up to an elevator that was "out of order" without any notification. Whether this was in the dorms or in some other buildings on campus, you were forced to change your route. This is the problem that we hope to solve with our app, by providing information on the current operational status of all elevators on campus. This could also help people that are wheelchair-bound or have other disabilities that prevent them from using the stairs effectively to be able to plan their trip around the elevators.

1.3 Aim and Objectives

Aim:

The aim of our project is to increase the time available to each Michigan Tech Student by providing a service which helps them to avoid the inconvenience of non-functional elevators. We will do this with a website and accompanying mobile application which allows users to report non-functional elevators. It will also provide data to the maintenance department if they wish to use our tool for reporting. Both of these aims will be automated without the need for admin intervention except in edge-cases.

Objectives:

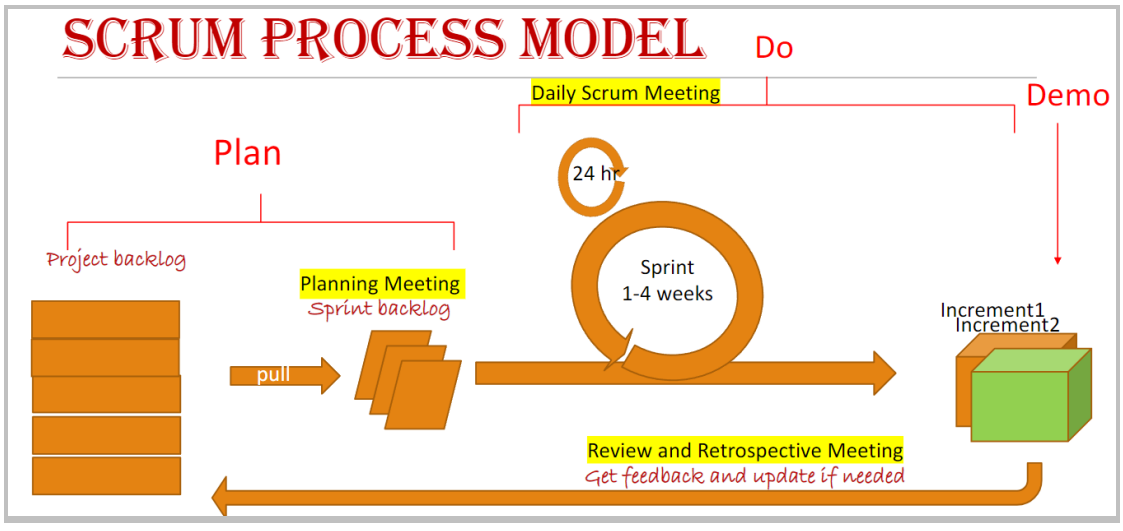
- To put scannable QR codes at all elevators
- To create a website and application which will scan these QR codes
- To report a downed elevator when the QR code is scanned
- To compile the downed elevators in an aggregate report
- To allow access to/ send reports to maintenance about non-functional elevators

1.4 Stakeholders

Some of the stakeholders for this project are Michigan Tech Students that will be using our application. Other stakeholders for this project are the students in Software processes and management that are advising us in this project, which would be Nate Allsop and Noah Casco.

1.5 Methodology

The methodology that we are going to use for this project is SCRUM Agile. This methodology lets us start out with a very minimal idea of what we want to accomplish with the application. But then we can grow it throughout the duration with incremental deliveries. Our project will be run in sprints, which will be in two week intervals. We will then start with creating a backlog with all the tasks that we see that need to get done eventually throughout the project. We will then rank the items in the backlog based on importance and how long the task will all take. At the beginning of each sprint we will carefully decide which items to extract from the backlog and place them into our task list for this sprint. We will then move the items on a SCRUM board to show how complete they are and eventually mark them as complete. Each day, during the sprint we will meet for a quick 10 minute meeting where each team member will discuss what they've accomplished, what they are working on, and if we have any issues. At the end of the sprint we will also have a longer meeting where each team member will demonstrate what they worked on over the course of the sprint. We will continue to do this for 4 sprints which will mark the end of the project and all the items in the backlog will be gone and finished. Below is a picture that outlines our methodology more clearly.



1.6 Tools

For this project we plan on using Android Studio to develop the application for both Android and Apple phones. The only hardware that is necessary to the user will be a phone with an internet connection. Within the app, we plan to use a Google API to help users locate the elevators.

1.7 High-Level Business Requirements

Functional Requirements

- The app displays a list view of all elevators on campus including elevator status.
- Status has two metrics. One is the number of users reporting an elevator as non-functional. The second is verification of the elevator's status by maintenance/administrators.
- The app displays a map view of all elevators on campus with a color indicating elevator status.
- The app will allow regular users to report elevators not working.
- The app will allow administrator's to submit a verified report that an elevator is not working.
- App users will have to have an google account.
- App administrators will have to create an account and will have more options within the app.
- QR codes corresponding to elevators will direct users to our website/application to submit reports.

Non-functional requirements

- The app must be accessible via the internet.
- The app must consider protection from spam/maliciously excessive queries.
- The app must adhere to some level of security in regard to considering account/login information
- The app must undergo frequent updates regarding the visibility of "downed elevator flags"
- The app must be scalable in the sense that elevators can be added/removed from the list.

1.8 Product backlog

Key: 1 is highest priority & effort is in hours

Priority	User Story	Tasks	Estimated effort	Sprint
1	As a user I want to login to the application so that I can report elevators that are down	Be able to sign into the application Be able to sign in with google through the application	25	1
1	As a user I want to be able to report elevators that are down on the application so I can help other people save time	Be able to report an elevator is down in the application Be able to scan a QR code that will automatically report that elevator is down	22	2
2	As a user, I want to view the status of elevators because this will save me time	Be able to view the status of all elevators and how many reports there are Be able to easly tell which elevators are down with color indicator next to the elevators	20	3
3	As a user, I want to view and switch between a list or map of all elevators with their their status so I know if any elevators are down that I interact with	Be able to switch between a list view and a live map of where I am and where the elevators are and if they are down or not	10	4
4	As an administrator, I want to report that elevators are down so that users can see the elevators status	Be able to, as an admin, clear an elevators reports because it was fixed or flag it as officially down if its being fixed	10	4

Chapter 2

Analysis and Design

Chapter 3

Implementation

The following report is a good example that you can follow for implementation please refer to pages 25 - 30, and here is another example for your reference.

Chapter 4

Validation

For Chapter 4 (Validation): here you need to write about the process of checking that your software system meets specifications and requirements so that it fulfils its intended purpose, and to confirm or to prove the accuracy of your project.

Write about your testing and validation; **level of testing** you had, unit testing, integration testing, validation testing and acceptance testing. Did you have **manual or automated** testing or both? specify the part(s) that have automated testing and part(s) that have manual testing, and **What is your oracle?**

Write the test cases for valid and invalid **input** (please see Week3 Automated Testing/ slide 11),

then confirm that no errors in the code and the application is able to operate in required condition (OS, web browsers) and you have created the code correctly.

For validation and acceptance testing write who tested your system? MTU students? computer science student? other department students? your group only? other college students? public users? How many students/users? How many times? could they use it easily or did they make mistakes?

Chapter 5

Limitations and Future Work

For Chapter 5

Limitations: address everything that the project left, if some project backlog items/ features/ requirements have not been implemented then mention them in this part with an explanation/justification why you couldn't implement them (Time constraints the time was not enough, some developers were unavailable, because of COVID19, or tool limitation ....etc.). Many students tend to feel that presenting the limits of their work makes work weaker. on the contrary, approaching this section shows maturity for the academic universe, and writing about them actually strengthens your work by identifying any problems before reviewers/readers find them.

Future work : if the limitations can be addressed in the future then add this in here in future work, moreover, if you believe this project can be extendable (add more features/ more parts) that the project is worth extending to a Final Year Project (FYP) by you or other students or can be adopted and extended by industry as a product so you can give directions for that in future work.

Chapter 6

Conclusion

For Chapter 6 (Conclusion),: write what you have concluded.

Examples:

I solved many problems in the project…

This application/project/system was applied to improve the learning process.

The results of this project showed that system significantly facilitated the students' learning process.

The system is useless, acceptable, usable, beneficial or maybe enjoyable and why do you believe that.

References

(Include any references to external documents or materials (for example, tutorials the team will be using, literature , web references or links to documentation of third-party tools you will use) here.

The references should be properly numbered and correctly used in the text.

The Reference section should be in the following fashion:

References

Journal, Magazine/ Newspaper Article

[1] Author, "Title," *Journal name,* p. pages, year.

Book

[2] Author, Book Title, publisher, year.

Internet Web page:

[3] Author, "Name of the Web Page," [Online]. Available: URL. [Accessed Date].