Status Report

Mid-Year Project Status Report

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Table of Contents

1. [Executive Summary 2](#_Toc483429273)
2. [Project Description 2](#_Toc483429274)
3. [Project Overview 2](#_Toc483429275)

[Project Objectives](#_Toc483429276)

[Project Scope](#_Toc483429277)

[Project Approach](#_Toc483429278)

[Major Milestones](#_Toc483429279)

[Project Deliverables](#_Toc483429280)

1. [Addresses to Recommendations 3](#_Toc483429281)

[Proposal Changes](#_Toc483429282)

[Resources Provided](#_Toc483429283)

[Framework Suggestions](#_Toc483429284)

[Questions](#_Toc483429285)

[Conduction and Presentation Suggestions](#_Toc483429286)

1. [Project Proposal Variations 4](#_Toc483429287)
2. [Project Status Summary 5](#_Toc483429288)

[Current Work](#_Toc483429289)

[Issues](#_Toc483429290)

1. [Team Reflection 8](#_Toc483429291)
2. [Member Contributions 8](#_Toc483429292)

# Executive Summary

# Project Description

This project is a Research and Development project assigned by the Computing and Information Sciences Faculty of Auckland University of Technology (AUT). Dr. Robin Hankin, a lecturer at AUT, proposed the project on behalf of the Auckland Mathematics Association (AMA), who are key stakeholders in the project.

Dr. Hankin has asked that we provide an in-depth feasibility study and at least a presentable prototype for a real-time online scoreboard to be used during MATHEX events run by AMA. This scoreboard would be used alongside the current pen-and-paper system, and aims to improve the experience that audience members have during the event, by allowing them to view the scores of each team as the competition is underway.

The feasibility study, along with all other project documentation, should provide enough information that another group of students could carry on with the project at a later date. The prototype can be presented to AUT faculty to show evidence of our development skills, as well as provide a working version of the solution for the AMA’s consideration.

# Project Overview

## Project Objectives

Our project objective is to create and implement a Real Time Online Scoreboard System into the Casio MATHEX competition within 1 year and at a cost which does not exceed $20,000.

## Project Scope

Our project scope has two major sections. The first section aims to produce a feasibility report which investigates whether the production and implementation of the scoreboard within the one year time frame is achievable. If the feasibility report reveals that the project cannot be completed in a year then we will also produce a Project Roadmap which details the project processes and tasks necessary to design, create and implement the scoreboard successfully into the MATHEX competition in case of project hand off.

The second section aims to produce the hardware and software for the Real Time Online Scoreboard system. This system will improve the attendee and participant’s experience by making it easier to keep track of the competition’s scores as well as streamline the judging process. Initially, however, a prototype for the system will be produced which will attempt to showcase and incorporate as many of the client’s requirements as possible.

## Project Approach

Following the System Development Life Cycle we are still currently in the planning phase of our project. We completed the Concept/Initiating phase early on by gathering requirements from our client.

Our planning phase involves creating a feasibility study, which is a major deliverable requested by the client, thus we are spending extended time on it to ensure it is of high quality. We have no set methodology for this stage, as we only have one deliverable to produce that requires many different components.

Currently we are following good agile practices around communication, version control and quality assurance. As well as utilising tools to aid us in these areas, such as Slack and GitHub. The GitHub project boards have been particularly useful for tracking tasks, and the repository provides a place to share all the notes we have gathered on different parts of the feasibility study.

It can be found here: https://github.com/Hayley-Belle/R-D

Once we have completed the feasibility study, we will be using Feature Driven Development to handle the design, coding and testing of the prototype that is to be developed.

## Major Milestones

## Project Deliverables

Possible project deliverables include:

* Real Time Online Scoreboard application or website. May be a prototype.
* Hardware which can set up a local Wi-Fi network. May contain additional components such as Wi-Fi extenders.
* Feasibility Report.
* Project Roadmap.

Project deliverables may change after the feasibility report is produced.

# Addresses to Recommendations

## Proposal Changes

A number of changes were made to the proposal based on the feedback we received, where any clarifications were needed or mistakes were found, we followed these up with corrections. More details about the changes made to the proposal can be found in the following section.

## Resources Provided

Many of these resources currently provide more information than we are prepared to utilize, as we will only be using one solution, it would be poor time management to upskill in areas that will be of no use to the project. Once the feasibility study is completed, we will have selected a single solution, and upskill in the areas required to develop the system.

## Framework Suggestions

Each team member has taken parts of the feasibility study to work on, and has made use of any relevant resources to aid in researching potential solutions for the system. This involves getting a general summary of the usefulness and application of each of the recommended tools and services.

These provided a great baseline for us to make decisions about how the project will go ahead, and allows us to give several options, compare them and make the right decision. At this stage we are still working on these solutions, but we expect to have them completed soon so that a single solution can be selected.

## Questions

Most of the questions were points that required further clarification within the proposal. We have made edits to the proposal to better communicate the points we were conveying. More details about the changes can be found in the next section.

## Conduction and Presentation Suggestions

Some very good points were made.

We will be sure to send in a soft-copy to the supervisor of any prepared documents – unfortunately this was not an option earlier as we had not been assigned one.

We have better utilized GitHub, and are moving our Trello board over into the Project boards. We have upskilled to use TortoiseGit to upload our work to the repository.

We have good conduct in meetings, however the issue remains to get all team members to attend and we have a need to meet more frequently.

# Project Proposal Variations

# Project Status Summary

## Current Work

|  |  |  |  |
| --- | --- | --- | --- |
| Provisional Milestones | Semester | Proposed Finish Date | Actual Finish Date |
| Project Proposal | 1 | 30/03/17 | 30/03/17 |
| Project Proposal Presentation | 31/03/17 | 31/03/17 |
| Feasibility Evaluation | 26/05/17 | Incomplete |
| Project process analysis and review | 26/05/17 | 26/05/17 |
| Presentation to Client | 2/06/17 | - |
| Mid project progress review | 2/06/17 | - |
| Major Upskilling | 14/07/17 | Incomplete |

It can be seen above that so far we are behind schedule, as we underestimated the time it would take to complete the feasibility study, and also the workload for other papers during the semester. However, we are working hard to get on track and the feasibility study is well underway.

We also ended up doing some upskilling earlier than we expected, as we found it necessary in order to comprehend the tools and services we were recommended, as well as tools we are using to work on the project itself.

**Current Progress**

**Operational & legal feasibility**

**Operational Study**

In this study, we will be considering how the system will change and impact the MATHEX competition, its attendees and participants and how we will evaluate this. So far the study covers how we will review the after effects of the scoreboard on the competition by means of user survey and feedback, contingency strategies should the scoreboard fail to operate at the competition and how we will handle resistance from stakeholders and users. We also discuss several methods of implementation which will be dependent on how we want to approach it or on other factors such as costs or time.

**Legal Study**

In this study, we are investigating legal matters with focus being put on the legality surrounding the MATHEX Venue and the licenses for the products we will use to develop the scoreboard. For now, we have closely examined the venue’s terms and conditions and while we do not find any conflicts with actions we have planned to do, newer operations in the future may. It is important that we stay in close contact with our MATHEX venue liaison, Mala Nataraj and that we have recorded solutions in case that situation arises.

**Technical feasibility study**

**Infrastructure analyses and recommendations**

Significant research was put finding out what would be necessary to provide the application to users. We have being looking into required devices such as routers, wireless access points and DHCP servers to provide information of what will be needed in the venue. Also, questions were emailed to person in the venue to help understand their current equipment and terms of usage as well as limitations but there has not been any response yet. Furthermore, we have seeked help from either the supervisor and network engineer to assist us in this study. Our next step is to attempt contact with the venue person and explore AUT infrastructure for better understanding of networking and other arrangements.

**Hardware requirements**

Several advances have been achieved in this study. With assistance of the supervisor, PBTech sales person and persistent research we have managed to developed 3 solutions for the problem domain. So far, there are available quotations for hardware and better understand of our options. Our next tasks are to review our solution and address the below:

* Disaster management
* Cost to run the equipment’s.
* Maintenance
* Durability
* What happens if there is a sudden power outage?
* Overheating of the servers CAN cause fire, what would you do if anything as such happens?

**Cloud Solutions**

We have reached the conclusion that there are two different approaches we can take for a cloud-based solution for this project.

The first is a series of static web pages for all necessary components of the system. A small database, consisting of one or two tables will store data. A user will access a web page which will send a request to the server, which pulls data from the database and displays it on the webpage. The judges will also be using a web page, but instead they will be sending requests for the server to transfer data into the database.

This solution requires that data about the competition is collected, such as what each question is worth in points, the teams and students who are participating. It may also be necessary to generate login credentials for judges to keep the database secure.

Technologies used for this solution are expected to be as follows:

Amazon S3: Web hosting.

Cloudflare: Web security and optimisation.

Amazon RDS: Database Engine

Languages Used: PostgreSQL, HTML and JavaScript OR Java(run on a Tomcat servlet).

Rationales for each technologies and languages chosen will be explored in the finished feasibility report, but generally, these technologies are all open-source, reliable, cheap (or free) and fast.

The second solution would be to develop an application that displays on the web, this application would need to have the same capabilities of the first, but it would also include ways for administrators to set up competitions. This application will take up significantly more data on the cloud server, but it will also be a dynamic way to set up competitions, as the front end will provide controls to create custom leaderboards.

Technologies used for this solution are expected to be as follows:

Amazon EC2(T2): Web hosting

Cloudflare: Web security and optimisation.

Amazon RDS: Database Engine

Languages Used: PostgreSQL, HTML and Java(run on a Tomcat servlet).

While this is a valid solution, it is unlikely achievable in the timeframe, and not entirely necessary for the project. There will be more detail about this in the feasibility report, in summary it is a recommended approach, however this is not the approach we will be taking because a simple prototype can easily be created and then built upon in future.

**Financial analysis**

There is a cost estimative available that will be updated for the solutions in development as they get completed. Now as the technical research is undertaken new quotations and assumption of prices are presented, therefore we expect to have this study complete as the technical study is completed.

**Resource & Schedule feasibility**

In project proposal, we outlined the time in which this project must be completed. Also, the requirements for the project address when we can build the system and how it should be implemented at first. Through the analysis of feedback and continued research, we now have a reasonable indication of the resources required. However, to finalize this study, we must complete the other studies to define resources and schedule requirements adequately.

## Issues

We are a team of developers that are yet to explore different technologies to solve problems, as we have mostly only been exposed to tools and services required by our studies. Learning about a few new tools is taking more time than we could have anticipated.

We wanted to organize a meeting with the MATHEX venue staff much earlier, however they have been away and we have not been able to get information from them yet.

There are many different potential solutions for the system, we are risking overlooking better solutions due to our limited knowledge on networking and infrastructure, as we are all software development majors.

There is a dependency on external sources, for instance to get quotations for hardware or to meet with AUT infrastructure team. Moreover, to be able to provide solutions and compare them we need to understand their benefits and downfalls, such require significant research.

Although the client is our main stakeholder we must consider other stakeholder’s conditions. For example, ASB stadium may have terms and conditions to use their network or to implement any new system, MATHEX may have their own system which also will have complications to use. These examples highlight that our research must consider all stakeholder’s requirements and conditions.

We have trouble all meeting at the same time due to several schedule conflicts, we miss out on benefits of face-to-face communication and sharing a workspace because of this.

# Team Reflection

To more quickly gain knowledge of certain tools and services, we should seek out people whom have experience with those technologies. They should be able to provide a more comprehensive guide to them that can be more easily translated into the project.

We should more persistently contact the venue and AMA, and ensure we have our questions well prepared and any follow up questions should be asked as soon as possible.

Perhaps we should get in touch with more networking and infrastructure experts, to gain their opinion on what approach we should take for the project. Perhaps presenting our findings to them before we pass them along to the client.

We need to set a weekly meeting time, and if not all members can be present, we should make an effort to call over Skype or be active in Slack chat during the meeting to ensure we know what is going on. Nightly communication over Slack may also be necessary, with more frequent updates on the work each member is currently doing.

# Member Contributions