Lambda Operators

Proposal Document

Team Members

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Executive Summary

Our team was looking to choose a project that solved a problem that directly affected us and will affect many other University of Auckland (UOA) students. If a course lacks markers, it can significantly increase the time students have to wait before getting their results back. In many situations, students will hand in multiple assignments and repeat similar mistakes because they have not received the feedback necessary from previous assignments. Our team feels strongly drawn to this problem, and we wish to create and design an innovative solution.

The main objective of this project is to develop an efficient and user-friendly web-based tool for organising markers. Our team will create a platform that will streamline the application and selection process of students to become markers, enhance the communication between coordinators and students, and provide an algorithm that will greatly assist in the selection of candidates.

Our solution involves creating a web application to host three main views: the students, the course coordinator, and the marker coordinator. The student's view will consist of well-advertised course orders, which students can apply to become markers. As part of the application process, students must submit a UOA transcript. The tool will then use an algorithm to automatically filter out the applicants and assist the marker coordinator in the selection process. The other two views are meant to bridge the communication gap between course coordinators, marker coordinators, and students.

Lambda Operators is made up of five highly skilled and motivated computer scientists in their final year of study. We are highly committed to undertaking a project addressing a critical challenge at UOA. Each member brings on a diverse skill set, including internship experiences, extensive extra-curricular projects, and a specialisation in algorithms, making our team perfectly suited for this project.

Upon completing this project, our web-based marking tool will significantly enhance the efficiency and effectiveness of the marking application and selection process. This tool will benefit UOA by optimising the marker selection process and making it easier for students seeking those marking roles. However, most importantly, it will benefit the life of students attending the university by having on-time marking. Our solution will impact academia at UOA by delivering a practical solution to a persistent issue.

Background and Rationale

The current process for allocating markers to courses in the Computer Science faculty at the University of Auckland is tedious and time-consuming. Each semester, one marker coordinator communicates with course coordinators about how many markers they require for their course and sends out emails to students studying computer science asking them to apply. Hundreds of students apply each semester. The marker coordinator manually looks through all their applications, comparing applicants based on the GPA they got in their desired course, and chooses the successful candidates.

There are many issues with the current system of marker allocation. Firstly, manually comparing so many applicants is very time-consuming. If the process was automated, the marker coordinator would save a lot of time. It is also a complicated process because it is done through emails. Applications can easily be missed, as the marker coordinator receives many emails unrelated to marker allocation every day. There is no easy way to see and compare all the applicants for each course. Filtering by course code does not fix the issue because emails from all semesters will show up, and spelling errors/human errors may also cause an application to be missed.

Course coordinators may also forget to reply to the marker coordinator's emails, further prolonging the marker allocation process.

Our project aims to solve these issues by creating a web-based tool for organising markers. This will allow the marker coordinator to input courses that require markers in one place, and see the top candidates based on an algorithm that automatically compares them. Finding the best markers will be much faster with the help of an algorithm than by manually comparing students.

Specific Aims

The specific aims of this project are to reduce the workload of both applicants and marker coordinators and to centralise the entire application process into one platform.

1. **Centralisation of the application process:**

Due to the lack of a better process, students may receive multiple emails from multiple marker coordinators; paired with the numerous emails students receive daily, it's very easy for students to overlook these requests, resulting in poor applicant rates for coordinators.

A versatile and enticing platform for applicants:

- MarkerMatch's appearance and interface will be akin to a job search board (i.e., Seek, Indeed). Interested students are able to view all open positions and apply for them, just like they would if they were applying for jobs, ensuring a familiar experience that encourages students to apply.

- By designing MarkerMatch to resemble a job board, students are also exposed to courses they may not have originally considered as a course they'd like to mark, potentially leading to more applicants for less-popular courses.

An easy-to-use course creation process:

- Marker coordinators can easily add courses through a marker coordinator dashboard, which is completely separate from the student dashboard.
- Course details are customisable. Marker coordinators can specify the marker capacity of the course, add an optional thumbnail and add deadlines.

2. **Reducing the workload for students and marker coordinators:**

Currently, marker coordinators have to sift through numerous emails that they may receive from applicants. Additionally, there are also numerous requirements that an applicant needs to become eligible for a marking position (must have taken the course, working rights, etc.), resulting in a manual checking process for marker coordinators. From an applicant's perspective, the need to answer redundant

questions such as “What grade did you receive in this course?” after uploading their academic transcript, is off-putting.

MarkerMatch aims to replace this process by streamlining this process, for both the marker coordinators and applicants.

Streamlining the application process:

- Applicants answer qualifying/eligibility questions and upload their academic transcript.

- MarkerMatch uses a proprietary transcript reader to convert the transcript into a list of grades the student received, which is attached to the application.

Automating the selection of markers:

- MarkerMatch feeds all applications through an algorithm after the application deadline, ranking all the applicants based on parameters such as GPA, grade received for the relevant course, etc.

- Prospective applicants who have specific considerations (i.e., having done a similar course in another university), are flagged for further review.

- MarkerMatch will notify the marker coordinator that the ranking is ready to view via email.

Effortless review of marker applicants:

- Markers coordinators are presented with a ranking of applicants on their dashboard to review after the algorithm’s processing. Marker coordinators can make changes to the ranking as they see fit.

- Upon confirmation that the ranking is suitable, the highest-ranked applicants (the number of these applicants depends on course capacity, specified by the coordinator), will be notified of their successful application via email.

Project Approach

With our project, we have decided on various tools and technologies to be utilised throughout the project. SQL is one that we have decided on as we are familiar with it; with many of us using it in our personal projects, as well as its capability to offer the performance required for our project. Our SQL server will be hosted on an AWS S3 bucket, which will provide object-based storage to be utilised for our project.

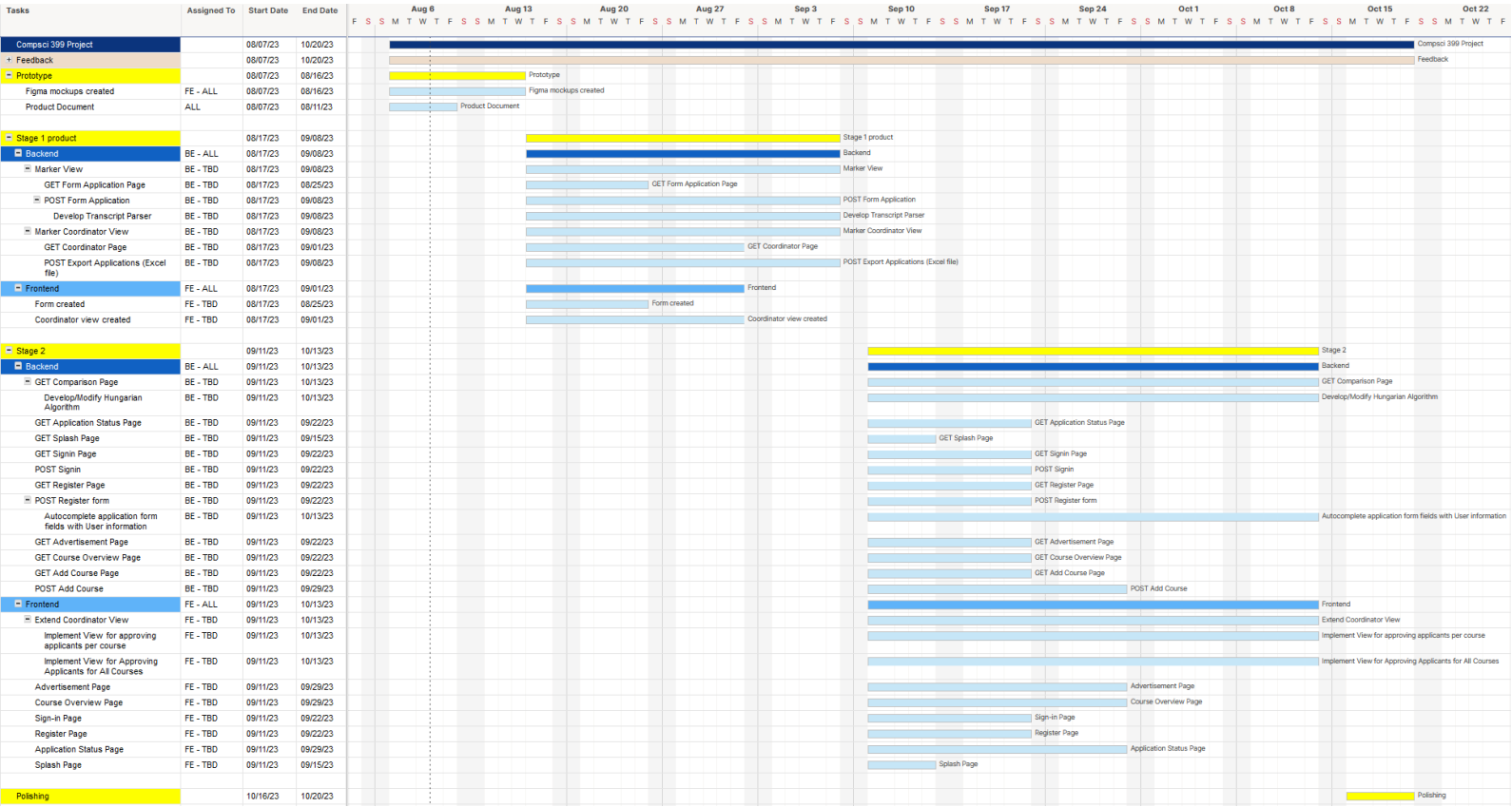
React will also be used for the front end, Node.js for the backend, and Express.js for the backend framework. To host our application, we will also be using Lambda and Amplify. Amplify has the benefit of having Figma-to-code integration; this allows us to efficiently expedite the frontend design and planning of the website via Figma.

Our team will be broken down into 2 teams, a frontend team and a backend team. Team members will be allowed to swap between teams so long as they let everyone know. The delegation of tasks will be an ongoing process and will be managed by each team according to our Gantt Chart.

One of the challenges that we anticipate we will face while completing this project is the scale of the project. We must ensure that we keep our aim at a reasonable level, and not advance the project too quickly. To mitigate this we have planned a 3 stage process for our project to follow, to ensure that the project is kept at a manageable level. Other challenges are time management for each team member based on their own differing schedules. As a team, we must be able to manage other courses and commitments, as well as this project. We plan to be able to have each team member prepared for project work, and if needed to inform the other members of their time constraints.

In order to help mitigate these challenges and to develop the project effectively, we will employ the usage of agile and scrum methodologies. Through agile principles such as delivering working software over comprehensive documentation, and being responsive to changing requirements, our team will be able to deliver a project where the stakeholder feels reassured that their requirements are being met.

Project Plan



[Click here for higher-resolution images]

Our key milestones are Yellow colour-coded for readability. Each key milestone has been broken down into major tasks, which have been Dark and Light Blue colour-coded, and minor tasks. This will allow us to track our progress towards completing the key milestone and simplify the delegation of responsibilities.

Our team will be broken into 2 flexible teams, the Frontend team and the Backend team. Team members will be able to swap between the teams depending on their preferences. These teams will be responsible for their respective major tasks. Each team will then be responsible for delegating minor tasks within their major task. We believe this is the best way to ensure that all of our team members get the opportunity to contribute equally to this project, to ensure our deadlines are being met and to ensure that there is accountability within the team.

Each major task is dependent on the previous major task being completed. We are starting with Stage 1. Stage 1 will introduce the application form and a basic marker coordinator view first. This is a solid foundation for us to build the website around,

as those 2 features are the core products. Once we are happy with the progress we have made, we will start moving to Stage 2, which will introduce additional features such as a splash page, an extended marker coordinator view and course advertising. We believe our work in Stage 2 will set us apart and will ensure the work we achieve will be viable for future academic semesters at the University of Auckland.

The minor tasks all begin at the beginning of each major task and end at different points throughout the major task. We are taking this approach as it allows us to be flexible in regard to when work begins. For example, if a team member has a lighter workload one week and would like to contribute additional features to our product, they can pick up a feature that a team member is not already working on but has been scheduled to begin at the beginning of the major task and get stuck into it. We believe that this approach will encourage team members to effectively manage their time and will allow us to be ahead of our set schedule, which will allow us leeway in the event an unexpected issue arises or we discuss a new feature our stakeholder would like to add to the final product.

Table of Authorship

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