Analysis Of Alternatives

Terms of reference

In this project, as a team, a number of decisions that will help make the project run smoothly and efficiently have been made. These decisions include selecting an IDE that works on each team member's operating system of choice, as well as selecting a programming language that is best for the task at hand and that each team member has at least some knowledge in.
For the IDE the team has chosen Atom, as it works well with our chosen languages, JavaScript, HTML, and CSS. A number of other programming languages were considered, including Python, Java and C++.
In regards to the programming IDE used for different components of the project, it was decided that the team would utilize whichever most appropriately fit the chosen language.
For databases, MySQL, Oracle 12c, and Maria DB were considered, and the pros and cons were analysed.
For team communication, various platforms were considered, and decisions were made based upon which were the easiest to learn and use; this analysis included Zoom, Facebook Messenger, WhatsApp, and Email.

When deciding which options to choose, several selection criteria were used; these criteria were:

- Team member experience
  - How well do each of the team members know the desired platform, language, or database? Will they be able to easily learn or use the tool required?
- Cost
  - How much does it cost to use the tool? Do we have the required funding for the tool? Can the team get the required funding? How long will it take members to learn enough to meaningfully contribute to the project.
- Ease of implementation
  - How easy is it to implement the end product using the chosen tools? For example, if we choose python how easy is it to implement the required end product?
- Appropriateness
  - Similar to ease of implementation, appropriateness refers to whether or not the chosen tool is appropriate for what the team is designing, e.g. you wouldn’t use a hammer to saw a plank of wood
- Runs on all team members OS
  - This was used as a criteria for the chosen IDE, ensuring that the IDE chosen was able to run on each team member’s operating system. If it could not, then one or more team member would be unable to work on the project

Body

Coding languages and IDEs considered

In this project, the team considered a variety of coding languages to find the best suited for the clients needs and to meet the predetermined criteria.
The team collectively had minimal experience with C++, meaning it would have taken a considerable amount of time for all team members to be able to make meaningful contributions to the code. Despite this, C++ is great for web development and with the proper abilities would be easy to implement.
While some team members had experience with Java, it was found that it was not optimal for web page design and it would have taken a large portion of time available for other members to learn enough Java to be able to contribute to the project. Java is not optimised for web page design and would prove far more difficult that other languages.
Python was the next language that the team considered. When compared to Java the team found that all members of the team had some experience with the language as such the cost timewise of learning the language amongst the team would have been comparatively less when compared to Java. Similarly to Java however, it is not easy to implement a simple, workable GUI and is bad for webpage design.
The final language we considered was Javascript due to the team's overall competence with it. The time team members would have to spend learning the language collectively to make meaningful contributions would be comparatively less than other languages. Furthermore, Javascript is optimised for web app development and has an easy interplay between HTML and CSS. Based on each member's overall experience with Javascript and its utility in the project the team decided that it would be the best language to use.

	Experience	Cost	Appropriateness	Ease of implementation
C++	Minimal	The time taken to learn would be extensive. No associated monetary costs.	Optimal for web page design	Comparatively easier to implement
Java	Minimal	The time taken to learn would be extensive. No associated monetary costs.	Not optimal for web page design	Difficult to implement
Python	Adequate	Minimal time taken in learning. No associated monetary costs.	Not optimal for web page design	Difficult to implement

Javascript	Adequate	Minimal time taken in learning. No associated monetary costs.	Optimal for web page design	Comparatively easier to implement

The first IDE that the team considered was Pycharm. Each of the team members have an appropriate amount of experience with Pycharm to fully utilise it and the software runs on each team member's OS. While Pycharm can support Javascript, the full version must be paid for to run commercially. All team members have a considerable amount of experience with Atom which is also compatible with all member's OS. Atom is free to download and can host Javascript without additional costs. As a result Atom was chosen as the IDE that will be used.

	Experience	Cost	Runs on all team members OS	Can host the chosen language
Pycharm	Adequate	A payment is required to develop Javascript commercially	Criteria met	In order to receive the full range of support for Java script we would need to buy the full version
Atom	Adequate	No cost associated	Criteria met	It can host Java script with no added costs.

Databases Considered:
For this project, the databases considered were MySQL, Oracle 12c and MariaDB. The advantages and disadvantages of renowned database management systems were considered in deciding which one to pursue. The predominant factors that were considered were ease of use, availability to support and suitability to the requirements of the projects - with an emphasis of cost and the team budget. Overall it was decided that the most suitable database system would be MariaDB.

Pros	**Cons**
MySQL	
- Free for developers (MySQL Community Edition)	- Support for the free version must be paid for

- Provides a lot more functionality than other databases, especially free ones - Is designed with a focus on the web and the cloud - It is an open source database	- Does not perform as well when scaled to perform larger operations - Functionality is very dependent on add ons
Oracle 12c	
- Very stable and reliable software - Robust management tools - Group familiarity: some team members have used Oracle 12c - Accessible for free through Monash - Their large community base means there is a lot of support and documentation available to users	- Is costly, which is a significant factor given our limited budget and the existence of free alternatives - Can be slow when implementing into the web application
MariaDB	
- Has a free offering to users - The system is relatively stable - Is an open source database - Reading to memory and writing are very fast operations on MariaDB - Simple and relatively easy to use	- Can be slow when processing large amounts of data - Lack of advanced and complex functionality - Support must be paid for and is comparatively harder to find compared to other database servers.

Team Communication:
The team has identified communication to be essential for the project to operate coherently and efficiently - and as a major factor in risk mitigation.

It was decided that Facebook Messenger would be used as the team's primary platform for communication. It was already unveiled that team members already use it on a daily basis so it seemed appropriate to adopt Messenger. The manner in which small details of information can easily be communicated to everyone efficiently makes it perfect for daily updates on the team's progress. Not only does it give frequent updates, but allows the team to schedule meetings in advance and ask questions outside the scope of the designated meeting times. If required, messenger can be used for group audio and video calls. The only downside to it is that it can become convoluted with irrelevant messages and important information may become diluted and perhaps even missed.

For a more formal setting, Zoom will be used for virtual face-to-face meetings. The benefits of having screen sharing functionality which allows visual prompts to be displayed while discussion occurs. It also mimics the more formal meetings that can no longer occur

in-person due to the current COVID restrictions. An added bonus is that all team members are already familiar with its functionality and using the software.

WhatsApp was also considered, however it was rejected in favour of messenger. Whilst it is a convenient way to send instant messages to other members, it essentially mirrors the functionality of Facebook messenger and not everyone has the same familiarity with it as messenger.

Overall it was decided that Facebook Messenger would be used on every other day, or when required to give the team small and informal updates on the progress of sprints and even raise queries and problems that may occur. Zoom will be used on a weekly basis as a more formal meeting environment, which will be used to discuss weekly objectives and discuss the progress on the assignment in more detail. Email may be used if required to communicate more formally - however it will not be used unless the team later requires it.

Recommendations

The key factors in decision making for this project were decided to be maximising output quality, producing a reliable system while minimising budget, and time commitments and constraints.

A coding language all team members were familiar with was therefore selected, JavaScript, for which a free platform, Atom, will be used. The use of a free IDE will minimize the budget, and using a language that many team members were already familiar with allows less time to be spent learning, and more on creating a shippable product. Additionally, as the client has asked for a web based system, using JavaScript will improve output quality, as the amount of programming on web servers with JavaScript is vast, allowing for easy research and help with issues that may arise.

A database will be required in completing the deliverables of the project, namely in the storing of member and group allocations, then associated data in the form of comments, chat, and submitted documents.
Through consultation and discussion with more experienced developers, MariaDB has been chosen to be able to store and access data for the product. It is free, which allows the team to minimise the budget, but also has support that can be paid for if the implementation or accessing becomes difficult or goes awry.

Given the team has chosen a modified scrum approach, constant communication between members is vital for maximising quality of results and completion. Thus, a system such as facebook messenger that can be used at any time to give updates to team members in sufficient detail is necessary. Additionally, being able to easily view messages from any device and location, provided an internet connection, is a simple and effective way to stay connected, and involved in the project.