IM3080 Design and Innovation Project (AY2022/23 Semester 1)
Individual Report

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Group No: Group 1

Project Title: Carpooling Application, NyMe

Contributions to the Project (1 page)

- **Group Leader,** it is my task to oversee the group members, delegating tasks and splitting the 10 souls into 3 sub teams namely UI/Planning, Frontend and Backend to suit each member skillsets and preferences. I have been in contact with the professor in charge and been conducting weekly presentations regarding the progress of the software with him.

- **Map functionality and Coordinate-based shortest path algorithm,** I am in charge of making all map components as well as the algorithm for ranking the route quality based on distance. This includes the components used to make the screens namely button, search bar and card component to show each route.

  Furthermore, I implemented a function to get coordinates, name of the place, time and distance to the coordinates with aid of Google API.

- **Screen navigation,** linking screens are a part of the responsibility I am involved in. I have to make sure all variables are passed between screens without fail with the use of Stack Navigation and Tab Navigation component.
- **Notification,** notification system within the app is also one of the duties I have. Notification system is responsible for reminding the user, both driver and rider, about the incoming schedules.
- **Finalising report and presentation,** overlooking the overall report and presentation structure.

Reflection on Learning Outcome Attainment

Reflect on your experience during your project and the achievements you have relating to at least two of the points below:

(a) Engineering knowledge
(b) Problem Analysis
(c) Investigation
(d) Design/development of Solutions
(e) Modern Tool Usage
(f) The Engineer and Society
(g) Environment and Sustainability
(h) Ethics
(i) Individual and Team Work
(j) Communication
(k) Project Management and Finance
(l) Lifelong Learning

Point 1: Engineering Knowledge

Along the development of the project, we have gained insight of how the geological data is stored and processed, the application of search algorithms as well as adapt the existing algorithms to best suit our own constraints and usage. In the case of finding the best route, using either A-star, Depth-First search or Breadth First search yield the better result than using heuristic search that we implemented but the cost and time they take to achieve an outcome is exponentially more than what we can tolerate, thus heuristic search which yields the result in a acceptable margin is a way forward for us.

Point 2: Problem Analysis

I, along with my team, learn how to break down a huge problem into smaller parts that can be solved by not just one but many. One example is the issue of passing variable around different screens, one might opt to a global variable, but that design pattern can sprout out multiple errors once there are more screens, or the use of AsyncStorage which is similar to global variable but with error free, but that also taxes with higher delay when retrieving the information. We have to come to a compromise, listing out pros and cons of each solution, and adjusting the design of the app to best suit them.

Point 3: Modern Tool usage

React native is one of the most popular modern software developing framework, I have experienced a different framework philosophy of community-based content whereby majority of key functions such as notification and map are constructed by third party rather than the framework developer.
I had a chance to use GitHub in the real developing environment where there are a lot of coders working on the same project which eventually resulted in merge conflict. Along the way, I have learnt how to best resolve these issues by assigning different developers to work on different system or different file entirely.

Point 4: Individual and Teamwork

This project really pushes myself to my limit, managing a team of ten for the first time to make an app in the framework that is unknown to me, with tools that feel foreign to me, is extremely

pressuring on my mental health as well as physical. I separate the team into 3 sub teams to reflect the type of work they are responsible for namely UI/Planning, Frontend and Backend. I found out that a certain degree of autonomous has more positive effect in term of creativity and progress.

Point 5: Communication

Getting your idea across 10 people is a challenging task, just by ordering around never works out, the complex ideas and architecture of the software often confused the teammates. However, a quick prototype of a component, let's say a map screen, in the most primitive version aids greatly with clarification. Hence, I have concluded that by showing some visual examples, it is a much more effective way of conveying the idea.

Point 6: Investigation

Often time in the project, we encountered numerous errors. In this project, we utilised solely JavaScript as our working language. It is widely known that JavaScript comes with dynamic type variables, this has been plaguing our project since the early period of development. I did consider the possibility of including TypeScript, JavaScript with type variables, to the project but it came to the dilemma of learning a new language or using what we know carefully, I decided to go with the latter option since the time required to master a new language even if it is very similar is considerable. I have realised that many of errors both runtime and compile are the result of either different variable type or different naming convention. This points out to me that just a tiny matter of naming plays a very important role in the project development.