IM3080 Design and Innovation Project (AY2021/22 Semester 2)
Individual Report

Name: **Bapat Swapnil Manish** *(Team Leader)*

Group No: **2**

Project Title: **Kopimón**

Contributions to the Project

- Overall **project management**, **task allocation** among the team & **updating project tracking sheets** + other information **REGULARLY** and more responsibilities of **managing** all of the project's work.
- **Prototyped** early ideas of the game in **Adobe XD** for pre-development visualisation.
- Helped create a working **video call function** which has now been discarded temporarily from the game
- **Programmed** statistics boosting algorithm & status condition changes
- **Programmed** an improved battle system architecture based on status and speed
- **Performed** bug fixes and code optimisations on existing codes done by teammates
- **Programmed** the kopimon's turn-based move algorithm and move priorities code
- **Programmed** a NPC (Non-Player Character) into the game and adding functionality for item drop by NPC + interactions
- **Ideation** for game theme, sketching and designing of sprites (monsters, maps, etc)
- **Programmed** the 'catching kopimon' algorithm and 'run from battle' algorithm.
- **Mapping** of storyline nodes and **creating flowcharts** to envision it clearly to ease scene and game creation in Unity
- **Ideation** for **quests** and storyline that is to be completed by the user
- **Ideation** for story details and character research to aid character pixel art design
- **Sketched** and **created** the 3 main characters (**snakes, otters, lizards**) based on the story and other extra elements of the story
- **Guided** the team in the **ideation** and **designing** of **ALL scenes** – hometown, gardens by the bay, esplanade, outdoor hawker scene, indoor hawker scene, marina bay sands, multiplayer indoor scene
- **Researched** and **conceptualised** characters, animals, maps, etc. to fit the theme and storylines based on the flowchart
- **Created pixel art** for the game and learnt how to make it **interactive/cohesive**, and how to improve on it
- **Created** map layouts, **mock-ups**, **prototypes** and **displays** for reference use and layout for in-game assembly.
- **Designed animated** sprites for **characters** inside the game
- **Designed** the hawker scene (outdoors) and all designs and animations inside the scene.
- **Designed hawker centre building**, other buildings and **skyscrapers** around the entire game and map, **otter** character, **lizard** character, **2 snake characters**, **bird** character, **hawker centre food**, **hawker centre tables**, **road signs**.
- **Conceptualised** and **guided the team** in the **multiplayer integration** into existing game.
- **Created**, **conceptualised** and **designed** the **Marina Bay San**ds + **Gardens By The Bay scene**
- **Drew** and **designed** the individual elements such as **tiles**, **cars**, **Marina Bay Sands building**, **etc** for the scene
- Set up **GitHub repository** and managed uploading of project files and all other GitHub matters.
- **Created** and **designed** the **README page** and the **project website** (+ programmed its HTML/CSS)
- **Designed** the **Kopimón logo** and words (as seen on the GitHub README page).
- **Designed** final presentation slides and animations.
- Conceptualised **game promo video** and **poster design**.

Reflection on Learning Outcome Attainment

Reflect on your experience during your project and the achievements you have relating to <u>at least two</u> 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: **Project Management and Finance**

Other than having a capable team, the most important aspect of a project is its management. What do we mean when we say management? Project managers are key to problem solving and conflict resolution in an empathetic way, while providing an overall direction to the project. As a team leader, I feel tested in the best way possible in being an anchor for the project and being the guide for the rest of the team whenever we face problems, whenever there are disagreements, or even generation of solutions and working collaboratively on certain parts of the project. There were times during the project when the ideas and opinions were split amongst many people, and we could not come to a consensus on how to go about doing it or proceeding. In such situations, I stepped up to be a mediator and made sure everything that everyone felt was transparent and known to others in the group. This then allowed me to further set up anonymous and transparent polls to come to decisions. If the decision was still at a 50-50 split, I would then step in to make the final decision and explain my rationale as to why I feel it should be this way - and this was followed by everyone else having to be in agreement of my justification before we move on to the next topic of discussion and spring into action. I made sure that my priority was being empathetic towards my group mates and helping them out or sometimes taking over their work for them when they felt like they did not have time to had to attend to other important matters. This not only made sure that my group mates felt valued and cared for but also built trust between me and my group and they feel that they are able to trust me when it comes to making decisions and managing this project. I feel happy to say that I was successful in leading this team to create a game that we envisioned and that my team has the trust in me and values my experience.

Point 2: **Modern Tool Usage**

Being able to adapt to and use *'modern tools'* is key in any project to ensure its competency and success. Creating, selecting and applying appropriate techniques, resources and modern engineering and IT tools was a key aspect of this project. We decided to use Unity as the base software for our game development as it is one of the most popular 2D and 3D game development platforms in the world - allowing us to create the 2.5D graphics that our game is built with. On top of that, we used Google Firebase as a base to store our back-end data such as key user information like *'username'* and *'password'* in a secure manner, therefore also allowing us to implement features such as *'password reset'*. Furthermore, we used the Photon Unity Networking framework for the integration of the multiplayer function as it is used by many major players in the game creation scene in this world and has unparalleled cross-platform functionality and support. I was successfully able to learn and use these key tools in the creation of the 'Kopimón' game and ensure high levels of code efficiency as well as perform algorithm optimization on various parts of the code for the best possible results. I also implemented the use of Github as a way of collaboratively working on the project on top of the existing Unity Collaborate service as Github is the industry leader in this area. Github allows us to effortlessly pull files and push changes to the server and allows us to create "readme" pages, guides and more for people to see and understand the project as well as potentially fork the repo and open pull requests to collaborate and build on top of the project.

Point 3: **Problem Analysis**

In every project, you are bound to run into problems be it the initial idea or during the coding, designing and implementation stages. During the programming of this game and its features, we did run into problems such as certain mechanisms not working the way we intended them to. We also had a very hard time integrating multiplayer functionality into a game which had already been programmed with the intention of being single-player and having programmed all functions as a single player code. However, we designed frameworks that we were able to then call and customize in the Unity interface without having to recode similar functions so that we can add new functions faster in the future. We came together as a team to analyse the problems that we were facing with multiplayer integration and proceeded to debug and solve the issues and have the multiplayer working. Another key thing that I had to analyse was that the problem at hand was also to create a game for that is suitable and easy to understand for all ages and is contextualized to Singapore. This

required a lot of analysis on popular Singapore contexts, happenings, locations, quirks and more! This analysis allowed me to further better create a game around a Singapore theme and make sure that it can be easily followed and played by anyone.

Point 4: **Lifelong Learning**

I genuinely believe that a project that plays a part in enabling and motivating you to continue learning for the rest of your life is crucial and shows its effectiveness in teaching you lessons, new values, new skillsets and also putting you in challenging situations in order to grow well as a project leader and a teammate at the same time. I felt challenged as a leader to strive to do my best not just as someone who's in-charge of this project but also someone who cares about the learning and progress of my teammates as well. I wanted to create this project and enable everyone to use their strengths to make this game successful. Thus, I let everyone choose the aspects of the game they wanted to work on, enabling transparency in the contributions to the project as well as the right to choose. This allowed them to feel motivated and excited when working on their parts and allowed me to preserve positive and healthy relations with everyone in the team. I also encouraged people to work on parts of the project they wish to learn, attempt, or get better at. This allowed my team and myself to pick up new skills while continuing to do what we already know and are good at. This behavior allowed me to promote a healthy habit of lifelong learning in myself and more importantly, the entire team so that they can take away the positives from working on this project and apply them in their future works.

Point 5: **Engineering knowledge**

I felt that the application of engineering knowledge in this project from past engineering project modules such as 'IM2073 Introduction to Design & Project' and 'IM2001 Software Engineering' was crucial in forming the base plan and acting as a guide on what steps need to be taken in this project when it comes to project management, planning and creating user flows. IM2073 gave me the technical exposure to skills such as game development, web programming and database initialisation. IM2001 equipped me with skills such as timeline planning techniques in project management, user flow creations, entity diagrams and more. I was able to translate and apply these skills learn in these 2 modules into this game development project. It allowed me to be more

efficient in my tasks as an individual and a team and also have a good foundation in game development in C# language due to the prior knowledge learnt from IM2073.

Point 6: **Individual and Team Work**

It was very important that I am always motivated as a team leader so that I am able to motivate others. At the same time, it is very important that I do my work as an individual while also collaborating with the rest of the team. This project allowed me to learn to work better in a team, while employing the good ethics and values such as empathy, generosity, integrity, and servant leadership. I learnt how to do the work I am in-charge of diligently as well as lend a helping hand to those around me that may need help with their work if they face any problems as well as having to put in the extra work and hours at night to get work done if somebody is facing external issues and is unable to complete their work due to other commitments outside the project. Over time as the team progressed in the project, I was able to see the team come together to effectively have transparent and efficient discussions while providing constructive feedback to each other in order to improve team efficiency and productivity during meetings and working sessions.