**PLANNING AND EXECUTION IN THE PROJECT**

WhatsApp and Slack

Once the team is aware of their individual responsibilities, it is important to construct a supportive environment for communication in case we come across any difficulties in the tasks we have set. To do this we have set up WhatsApp and Slack groups. We can be in contact with each other any time, making it easier to create group solutions to potential problems someone may have between the scheduled meetings. Additionally, whenever anything is completed, we can keep each other informed of the progress.

Synced iCalender

In order to keep all group members informed we have synced our iCalendars to show available meeting times that do not clash with our personal schedules. We were able to find scheduled times for 3 formal meetings of at least 4 hours each as well as additional informal meetings if there are any pressing issues we need to discuss including face­-to-­face meetings and Skype video conferences; these meetings in addition to the timetabled workshop makes a minimum of 13 hours spent together where we can discuss workload distribution, milestones, issues to add, forks and merge requests (see Gitlab Milestones and Version Control). This organisation helps us to ensure that every team member is able to produce the work allotted to them in the given time provided between each stage and meeting with sufficient support from all other members.

The reasons why we have used a synced iCalendar are because it helps us to anticipate each team members commitments and work around these. Additionally, the flexibility of iCalendar allows us to add in any new commitments any of our team members may have as well as any extra meetings. The Figure shown below is a screenshot we have taken of our iCalendar showing our timetabled group meetings in green and all of our other commitments in various other colours. In the iCalendar interface it is easy for us to see when we all have free time for any additional meetings we may need to schedule.

Remote Pair Programming

Furthermore, to minimise coding errors we will be using a process called Pair Programming. In short, whenever we add to our codebase, there will be two team members acting using only one machine. One programmer will act as the 'driver' who makes decisions and controls the machine, while the other programmer acts as the 'observer' who checks that the code being written is legible, and, proofreads for any errors. The 'driver' and 'observer' roles can be swapped at any time. The benefits of this process are as follows: there will be fewer mistakes due to the peer proofreading, there will be greater efficiency because the roles can be swapped seamlessly if the 'driver' experiences mental fatigue, and, project knowledge and coding best practices are shared well between all team members.

We understand that there is a possibility that we will not always have the time to be physically together when building the codebase. To remedy this issue, we will be using a technology called TeamViewer; which is a screen sharing application which allows two people to remotely Pair Program. The benefit of TeamViewer is that it gives both team members control of the machine.

The figure below shows a screenshot of two of our team members using TeamViewer. As can be seen in the figure, both users have an individual mouse, and both have simultaneous control of the keyboard commands, so they can both contribute if necessary.

Gantt Chart

Gantt chart is a useful method that visually represents our upcoming tasks and processes that will take place during the development lifecycle. It organises our duties and actions that need to be taken in accordance to our interval planning event (See interval planning above). A Gantt Chart is a clear way of showing a list of tasks that we need to complete in order to reach a milestone in our project. It contains information such as estimated duration of a task, actual duration, start date and percentage of completion.

Using this tool our team will have a quick and easy way of organising themselves and keep a track of what tasks that we still need to complete to meet the requirements. The figure below shows a screenshot of the Gantt Chart that our team is using; the additional understanding will help our team maintain a consistent development speed, which means there will be no rushing at the end of the interval. This will keep a consistent high quality of all the work we produce as a team.

**Daily Scrums**

In terms of tracking work on the day to day we will use an Agile strategy known as Daily 'Scrums' or 'Stand-ups'. The daily scrum meeting facilitates regular opportunities for the team to synchronise their development on a project. This practice is a regular recalibration of the team's goals to check and reflect on the daily changes in progress. The scrums we will hold will be 15-minute meetings at the beginning of every day we will be working on the project where every participating member (including one elected 'scrum leader' per meeting) will stand in a 'U' shape around a whiteboard and answer a number of questions one by one by writing on the board:

What have you done since the last meeting?  
What will you achieve before the next meeting?  
What difficulties have you come across and how can they be removed?

These questions quickly give every team member a concise understanding of every other member's situation and a general understanding of the aggregate progress towards the interval goals. With the information shared in the scrum meeting team members are free to update issues, milestone progress and Gantt chart percentage completion of tasks (but this is usually the responsibility of the scrum master). In addition, we will be tracking the summaries of each of these meetings in ‘Hygger’ which is a free-­to-­use technology designed to help streamline the integration of information shared in scrum meetings into the development process.