METHOD SELECTION AND PLANNING

Group 3

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Software Engineering Methods and Tools

In selecting our software engineering methods, our team meticulously evaluated various methodologies to ensure optimal project management and team collaboration. After careful consideration, we chose Agile Scrum as our framework due to its renowned flexibility and adaptability, which align well with the dynamic nature of our project. Agile Scrum's iterative approach allows us to respond swiftly to changing requirements and effectively prioritise tasks, ensuring incremental value delivery throughout the development process.

We opted for Agile Scrum over other methodologies such as eXtreme Programming (XP) and Waterfall due to its suitability for our project's scope and requirements. While XP emphasises coding and testing in short iterations, Agile Scrum provides a more comprehensive framework for managing the entire development lifecycle. Waterfall's sequential approach was deemed unsuitable for our project's evolving requirements and dynamic nature.

To support our Agile Scrum methodology, we carefully researched and selected a range of development and collaboration tools. GitHub serves as our primary version control and code collaboration platform, offering seamless collaboration and robust version tracking capabilities. Trello, with its Kanban board feature, facilitates task management and progress tracking, enabling us to visualise our workflow and prioritise tasks effectively. Discord serves as our communication channel for virtual collaboration, supplemented with bots to streamline project status updates and synchronise team efforts.

Although we considered alternative project management tools such as Kanbanchi Task and Project Management in Google Drive, we ultimately decided against their implementation. This decision was influenced by the seamless integration of Trello with Discord, which facilitates efficient communication and task management within our team.

In terms of project planning and visualisation, we utilise PlantUML for generating Gantt charts and Lucidchart for creating architecture diagrams. These tools enable collaborative visualisation and documentation, essential for effective communication and decision-making within the team. The use of PlantUML ensures that version history can be saved in GitHub, allowing easy access for all team members.

For game development, we employ LibGDX as our framework due to its robust tools and libraries for cross-platform game development. We utilise IntelliJ IDEA as our integrated development environment (IDE) for its comprehensive set of features and

tools, complemented by Liam's prior experience with it. While other game development libraries such as LWJGL were considered, LibGDX stood out for its versatility and suitability for our project's requirements. Similarly, IntelliJ IDEA's features and tools align well with our development needs, further justifying our choice.

Overall, our selection of software engineering methods and tools reflects a careful consideration of our project's requirements, team dynamics, and desired outcomes, ensuring efficient project management and successful collaboration.

Team Organisation

Our team operates with defined roles inspired by the Scrum framework [1], promoting effective collaboration and accountability throughout the project:

- **Development Team:** Sammy and Liam form the core development team, engaging in pair programming to ensure continuous code review and knowledge sharing. This approach enhances code quality and team cohesion, both in-person and virtually.
- **Product Owner (Sammy):** Sammy leads as the Product Owner, aligning the team's work with customer requirements and making final decisions on project direction.
- **Scrum Master (Lucy):** Lucy serves as the Scrum Master, enforcing Scrum principles and supporting the team in overcoming obstacles. With Trello's Kanban board, Lucy facilitates task prioritisation and deadline adherence, ensuring smooth project execution. Lucy also coordinates other project components, such as music and art.

While we allocated tasks on a weekly basis, we recognised the importance of remaining responsive to changing project needs and individual team dynamics. Our aim was to strike a balance between structured task allocation and the agility required to accommodate evolving requirements and team member capacities.

Within the Agile Scrum framework, task assignment is typically guided by the backlog of tasks prioritised by the Product Owner [2]. However, we adapted this approach to suit the specific needs of our project. Rather than strictly adhering to predefined task assignments for each sprint, we embraced adaptability in our task allocation process.

During our sprint planning meetings, we collaboratively identified and prioritised tasks based on the project's current objectives and priorities. While we aimed to allocate tasks for the upcoming week, we remained open to adjusting assignments based on emerging needs or insights gained during the sprint.

Our approach to task assignment was underpinned by the principles of transparency, inspection, and adaptation inherent in Agile Scrum [3]. We maintained clear communication channels within the team to ensure that everyone was aware of their roles and responsibilities. Regular sprint reviews and retrospectives allowed us to reflect on our progress, identify areas for improvement, and adapt our task allocation process accordingly.

Project Plan

Given that the project is being undertaken by a small team, located on site, with a product that is both small and novel to the developers, extensive upfront planning is counter productive, instead the team aim to produce smaller plans for each iteration of the software as the team learns more about the tasks they will face as they progress. As such the tasks and deliverables may have multiple revisions which will be reflected in their IDs:

W3 Tasks

ID	Description	Dependencies	Due Date
T1	Setup environment		29/02
T2	Draw Sprites		07/03
T3	Display map and locations	T2,T1	09/03
T4	Import Bitmap of sprites	T2,T1	10/03
T5	Add music	T1	14/03
T6	Implement movement	T3,T4	14/03
T7	Implement bounding boxes	T3,T4	16/03
T8	Implement interactions with locations	T6,T7	17/03
T9	Implement score counter	T8	17/03
T10	Implement day counter		16/03
T11	Implement Ending	T9,T10	18/03

Deliverables:

ID	Name	Tasks	Description
D1	Codebase	- Setup environment - Display map and locations on screen - Import Bitmap of sprites - Bounding Boxes functionality - Implement movement for character - Implement interactions between character and locations - Implement score counter - Implement Day counter - Implement Music - Implement Ending	The game itself
D2	Architecture	- Create Use case Diagram - CRC cards - Create Sequence Diagrams - UML class diagrams	Document containing the overview of the structure of the code
D3	Requirements	- Create Requirements elicitation system - User Requirements - System Requirements - Requirements referencing system	Document containing the requirements
D4	Risk Assessment	- Compilation of risks - Adding mitigation and ownership - Outline risk management process	Document containing anticipated risks.
D5	Method Selection & Planning	- Gantt Chart - Work Breakdown structure - Weekly snapshots - Roles and responsibilities - Resources to be used	Document containing plans for the project.

Milestones:

ID	Description	Due Date
M1	Game Finished	21/03
M2	Art work finished	14/03
M3	All deliverables finished	21/03

Work Packages:

ID	Description
W1	Requirements elicitation from stakeholder
W2	Design
W3	Implementation
W4	Testing

W2 Tasks

ID	Description	Dependencies	Due Date
T1	Create Website		21/03
T2	Create Use Case diagrams		07/03
T3	Create CRC cards	T2	12/03
T4	Create Sequence Diagrams	T2	12/03
T5	Create UML class diagrams	T3	14/03

W1 Tasks

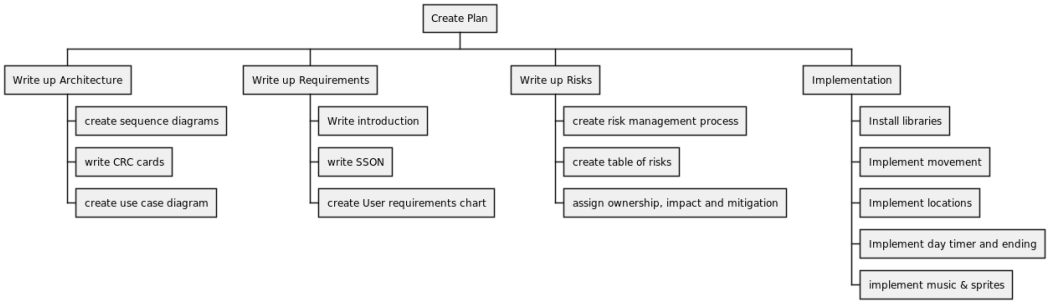
ID	Description	Dependencies	Due Date
T1	Draft Interview questions		27/02
T2	Customer meeting	T1	28/02
T3	Write up user requirements	T2,T4	07/03
T4	Write up user requirements method		21/03

W4 Tasks

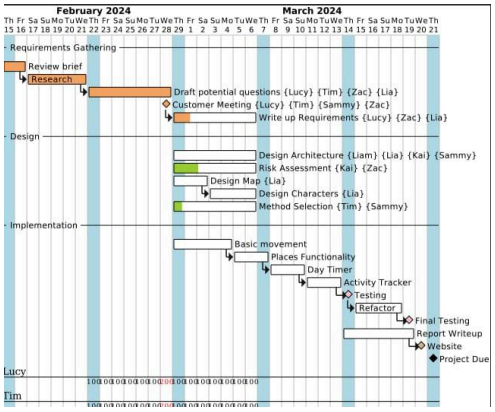
ID	Description	Dependencies	Due Date
T1	Decide which features require testing		14/03
T2	Design and carry out tests	T1	16/03
T3	Evaluate results and design fixes	T3	18/03

(Enlarged images linked & on website)

Work Breakdown Structure:



We'll use the issue tracker on github to organise rolling tasks and issues that will then be assigned to team members on the trello board. In this way the project can be micro-planned through the various stages of the agile process.



In order to mitigate the risk of a time overrun, all the critical parts of the project, the deliverables, have a float of at least a week. Namely two weeks for architecture, risk assessment, method selection and one week for implementation.
For every task shown on the Gantt chart the first team member listed is the team member assigned responsibility for that task. The team members primarily responsible for each deliverable are shown below:

Deliverable	Responsible team member	Additional team members
Website	Sammy	Lucy
Requirements	Zac	Lucy
Architecture	Lia	Zac
Method Selection & Planning	Tim	Lucy
Risk Assessment	Kai	Zac
Implementation	Liam	Sammy, Lucy

The plan remained very fluid throughout the execution of the project as team responsibilities, due dates and design ideas all shifted. Notably the team shifted towards having daily stand-ups as opposed to weekly meetings, this methodology closely mirrored the daily scrums described in Somerville [4]. Many tasks were pushed back as delays had cascading effects. Nonetheless the project was still completed on time thanks to the lengthy float associated with the implementation stage.

References:

[1] D. West, “Agile Scrum Roles,” *Atlassian*, 2019.
https://www.atlassian.com/agile/scrum/roles
[2] C. Harris, “Agile Scrum Artifacts,” *Atlassian*.
https://www.atlassian.com/agile/scrum/artifacts
[3] Atlassian, “Three Pillars of Scrum: Understanding Scrum’s Core Principles,” *Atlassian*.
https://www.atlassian.com/agile/project-management/3-pillars-scrum
[4] I. Sommerville, *Software Engineering*, 10th ed. Harlow: Pearson Education, 2016.