Method Selection and Planning

Team 27 - BlackCat Studios

Jack Vickers, Hubert Solecki, Jack Hinton, Sam Toner, Felix Seanor, Azzam Amirul Bahri

Software engineering methods
For this project, we have decided to use the Scrum method of development. We've chosen this method because we believe it would be the most efficient for us and enable us to get a lot of work done in a short period of time. We divided our team of 6 into a development and documentation team, each consisting of 3 members. We have had regular team meetings as a whole team and have also had separate meetings for each internal team. In these, we discussed what has been done since the last meeting (the beginning of a sprint) and what needed to be done before and during the next meeting.

Software development approach
As a team, we decided to follow a risk-driven approach based on the spiral software development approach. Rather than having system prototypes, each iteration (scrum sprint) for us consisted of completed sections of deliverables and implemented features of the game.
During the first iteration, we gathered requirements from our customer and then outlined the plan to split the team, so that documentation and development could be done simultaneously. We wanted development to be started early on so that we had more time to work on the game to attempt to reduce the risk of not completing the required features.
We chose this approach rather than a more structured approach so that we could work on certain tasks as we needed to and could go back to previous tasks/ iterations if we realised that we missed anything or if any issues or major risks were identified.

Development and collaboration tools
- IntelliJ IDEA is the IDE that we chose for the development of our project. We've decided to use this because it has Git features and Intellisense and it is lightweight.
- We are using libGDX for the game engine because it is free, open source and works on a variety of platforms, which is important since our customer wants our game to work on Windows, Linux, and Mac systems. Plus, we are also considering the fact that our project could be continued by another group for assessment 2 so also chose this because the use of this engine is not too complicated and would also have been used by other teams already. This engine also has a lot of documentation which was useful for understanding how to use it.
- We used GitHub for version control so that features can be implemented by different team members and then merged. We each have our own individual development branches to work from.
- There is a SiteDevelopment branch which is used to deploy a GitHub pages website which is the "public face" of the project. This contains weekly progress updates and links to all the deliverables needed for assessment 1. We chose to use GitHub pages for the website so that it would be easy for another team to take over for assessment 2. To do this, they could clone the entire github repository and build the website from the SiteDevelopment branch.
- The website has been made using material for MkDocs, which assists with making a professional-looking static site from markdown documents. It allows the website to be deployed easily to github.

- Google docs and sheets have been used for documentation since they offer version control functionality which allows us to return to previous versions of documents if anything goes wrong. These also allow us to work on documents simultaneously on different devices. This was important for quick completion of deliverables.
- Plantuml.com has been used to create sequence, state, class, package and use case diagrams.
- Echeung.me has been used to make CRC Cards for every class.
- Discord has been used for communication and meetings during the Christmas break.
- We are developing the game on windows laptops

Alternative approach and tools considered

- We considered using the waterfall approach for our project. This required each member to come together and start doing each part of the project one at a time. This may have been more time consuming and possibly have required more meetings. We needed to use the most efficient approach in our opinion and that was why we chose the risk-driven approach.
- As for the tools, we considered using the Eclipse IDE as it is the most widely used tool to build a project. To make our project more unique and easily adaptable, we chose IntelliJ IDEA.
- JMonkey engine was another engine that we considered using. It has a community but it is not very well established and their documentation is not very structured and not as professional as libGDX.

The team's approach to organisation

We decided to separate into groups, and delegate the responsibilities of each section. As a group, we decided to nominate Hubert as group leader, as he had a clear understanding of the project and a good plan to complete the project. We also designated Felix as lead developer as it was clear he understood java to an advanced level and would be able to use this knowledge to vet the code and aid with finding bugs. Felix was assisted by Sam Toner and Jack Hinton as backup developers.

As the website was a lot of work, we decided we needed a website leader, and for this we designated Jack Vickers, who consistently updated the website with weekly team updates throughout the project.

Azzam Bahri was nominated as the lead for requirements, as he showed a clear understanding and enthusiasm towards it. He was assisted by Hubert Solecki and Jack Vickers as requirements backup and everyone else collaborated on it. This was a greatly beneficial organisation, as it allowed for the group to remain caught up, and make sure everything was going smoothly, while simultaneously having a sense of leadership within the section, guiding the documentation in the correct way. Using similar roles, Hubert, Azzam and Jack Vickers led and monitored the methods section and planning, as we believed it was closely linked to requirements, and everyone else in the group helped work on it, while being guided. This meant we would be able to achieve both quite quickly.

Sam Toner, Felix Seanor and Jack Hinton, worked together on the architecture documentation, with help from the rest of the group, working together and checking everyone was achieving what was required, and working together to understand the UML diagrams, producing them quickly and efficiently. Finally, Hubert Solecki, Azzam Bahri and Jack Vickers worked on risks, with Jack Vickers leading the risk analysis, and Hubert and Azzam assisting. They were helped by the rest of the group, developing a list that was studied closely by everyone involved throughout the project, to avoid any risks occurring.

We ensured there were always backups, and there was always someone to take over any part of the project in the event of anything going wrong, leading to a bus factor of 4 for most of the project. The bus factor of the website is lower than the rest, as it was a minor part of the project, with a bus factor of 2.

In the final 2 weeks of the project, the whole team worked on programming so that the game would be completed on time. The documentation team were given specific features to implement: Jack Vickers implemented the pause menu, Hubert implemented the start menu and Azzam implemented the Highscores screen.

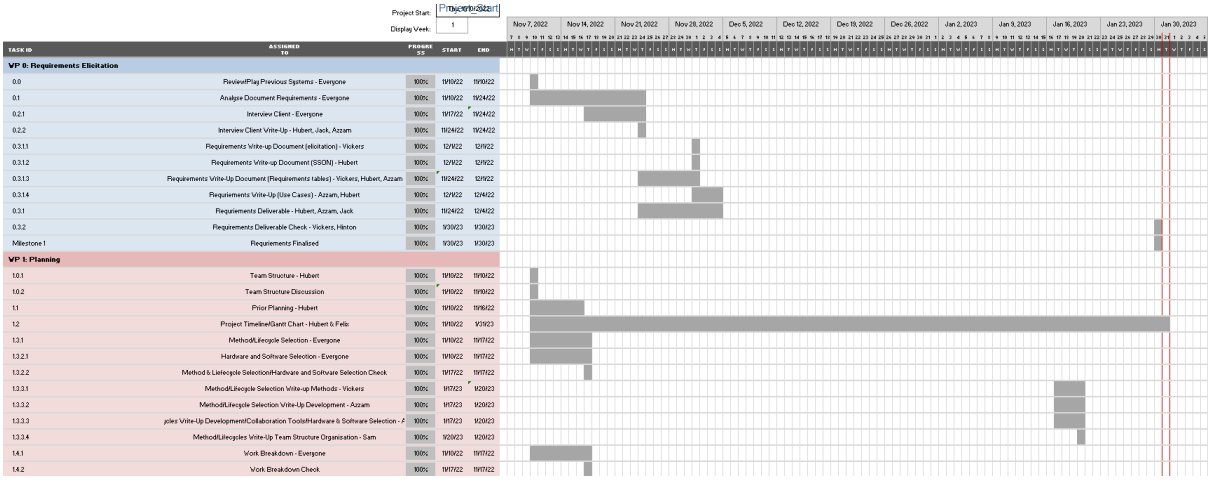
Role	**Name**
Team Lead	Hubert Solecki
Team Lead Backup	Felix Seanor
DevOps Lead	Felix Seanor
DevOps Backup	Sam Toner, Jack Hinton
Requirements Lead	Azzam Bahri
Requirements Backup	Hubert Solecki, Jack Vickers
Risks Lead	Jack Vickers
Risks Backup	Hubert Solecki, Azzam Bahri
Website Lead	Jack Vickers
Methods and Planning Lead	Azzam Bahri
Method and Planning Backup	Jack Vickers, Hubert Solecki
Architecture Lead	Jack Hinton
Architecture Backup	Sam Toner, Felix Seanor

How the plan evolved overtime

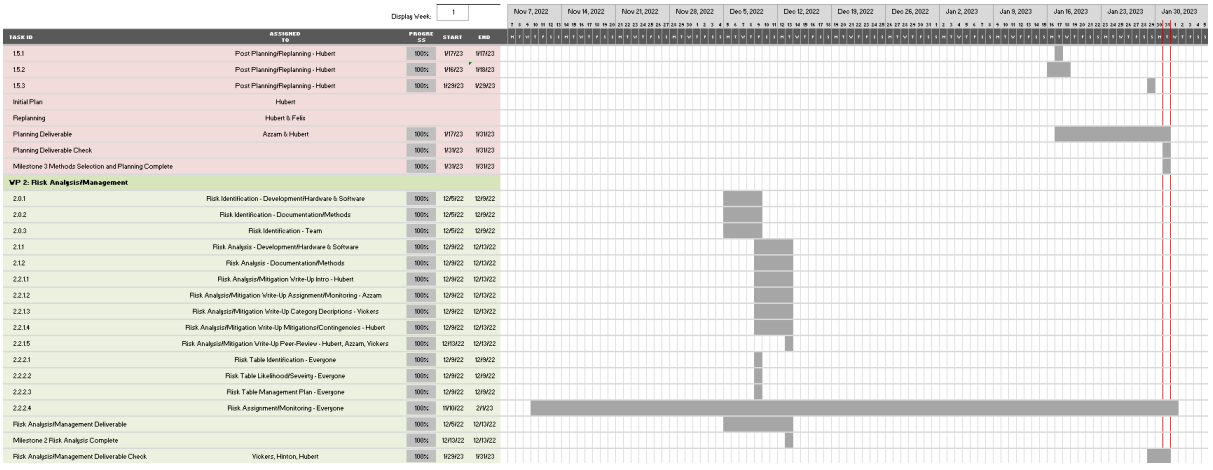
At the start of the project, the team was meeting one/two times a week and worked on tasks that had been discussed and recorded on the project Gantt Chart as well as work packages and milestones. Over the Christmas break, we had fewer meetings as an entire team and had smaller meetings in our internal teams instead which were held over Discord. After exams at the start of term, we had meetings almost every day until the submission of the project. We decided to do this because we knew that there was still a lot of work to get done and that a lot of communication was needed to get things done.

After an initial plan at the start of the project that lasted till December, we had to reevaluate and replan for the December holidays to ensure deliverables were getting finished. Additionally, we encountered times where we had to extend deadlines due to certain risks we encountered that are registered in the weekly updates on our website. Lastly, we had two further replans. One after exams to ensure we could finish the project and the game in time for the deadline, and the other in the last few days covering the final parts of the project to finish.

Gantt Chart



TASK ID	ASSIGNED TO	PROGRESS	START	END
VP 0: Requirements Elicitation				
0.0	Review/Play Previous Systems - Everyone	100%	11/10/22	11/10/22
0.1	Analyze Document Requirements - Everyone	100%	11/10/22	11/24/22
0.2.1	Interview Client - Everyone	100%	11/17/22	11/24/22
0.2.2	Interview Client Write-Up - Hubert, Jack, Azzam	100%	11/24/22	11/24/22
0.3.1.1	Requirements Write-up Document (elicitation) - Vickers	100%	12/1/22	12/1/22
0.3.1.2	Requirements Write-up Document (SSDN) - Hubert	100%	12/1/22	12/1/22
0.3.1.3	Requirements Write-Up Document (Requirements tables) - Vickers, Hubert, Azzam	100%	11/24/22	12/1/22
0.3.1.4	Requirements Write-Up (Use Cases) - Azzam, Hubert	100%	12/1/22	12/4/22
0.3.1	Requirements Deliverable - Hubert, Azzam, Jack	100%	11/24/22	12/4/22
0.3.2	Requirements Deliverable Check - Vickers, Hinton	100%	1/30/23	1/30/23
Milestone 1	Requirements Finalized	100%	1/30/23	1/30/23
VP 1: Planning				
1.0.1	Team Structure - Hubert	100%	11/10/22	11/10/22
1.0.2	Team Structure Discussion	100%	11/10/22	11/10/22
1.1	Prior Planning - Hubert	100%	11/10/22	11/16/22
1.2	Project Timeline/Gantt Chart - Hubert & Felix	100%	11/10/22	1/31/23
1.3.1	Method/Lifecycle Selection - Everyone	100%	11/10/22	11/17/22
1.3.2.1	Hardware and Software Selection - Everyone	100%	11/10/22	11/17/22
1.3.2.2	Method & Lifecycle Selection/Hardware and Software Selection Check	100%	11/17/22	11/17/22
1.3.3.1	Method/Lifecycle Selection Write-up Methods - Vickers	100%	1/17/23	1/20/23
1.3.3.2	Method/Lifecycle Selection Write-Up Development - Azzam	100%	1/17/23	1/20/23
1.3.3.3	ycles Write-Up Development/Collaboration Tools/Hardware & Software Selection - A	100%	1/17/23	1/20/23
1.3.3.4	Method/Lifecycles Write-Up Team Structure Organisation - Sam	100%	1/20/23	1/20/23
1.4.1	Work Breakdown - Everyone	100%	11/10/22	11/17/22
1.4.2	Work Breakdown Check	100%	11/17/22	11/17/22



TASK ID	ASSIGNED TO	PROGRESS	START	END
1.5.1	Post Planning/Replanning - Hubert	100%	1/17/23	1/17/23
1.5.2	Post Planning/Replanning - Hubert	100%	1/18/23	1/18/23
1.5.3	Post Planning/Replanning - Hubert	100%	1/29/23	1/29/23
Initial Plan	Hubert			
Replanning	Hubert & Felix			
Planning Deliverable	Azzam & Hubert	100%	1/17/23	1/31/23
Planning Deliverable Check		100%	1/31/23	1/31/23
Milestone 2 Methods Selection and Planning Complete		100%	1/31/23	1/31/23
VP 2: Risk Analysis/Management				
2.0.1	Risk Identification - Development/Hardware & Software	100%	12/5/22	12/9/22
2.0.2	Risk Identification - Documentation/Methods	100%	12/5/22	12/9/22
2.0.3	Risk Identification - Team	100%	12/5/22	12/9/22
2.1.1	Risk Analysis - Development/Hardware & Software	100%	12/9/22	12/13/22
2.1.2	Risk Analysis - Documentation/Methods	100%	12/9/22	12/13/22
2.2.1.1	Risk Analysis/Mitigation Write-Up Intro - Hubert	100%	12/9/22	12/13/22
2.2.1.2	Risk Analysis/Mitigation Write-Up Assignment/Monitoring - Azzam	100%	12/9/22	12/13/22
2.2.1.3	Risk Analysis/Mitigation Write-Up Category Decriptions - Vickers	100%	12/9/22	12/13/22
2.2.1.4	Risk Analysis/Mitigation Write-Up Mitigations/Contingencies - Hubert	100%	12/9/22	12/13/22
2.2.1.5	Risk Analysis/Mitigation Write-Up Peer-Review - Hubert, Azzam, Vickers	100%	12/13/22	12/13/22
2.2.2.1	Risk Table Identification - Everyone	100%	12/9/22	12/9/22
2.2.2.2	Risk Table Likelihood/Severity - Everyone	100%	12/9/22	12/9/22
2.2.2.3	Risk Table Management Plan - Everyone	100%	12/9/22	12/9/22
2.2.2.4	Risk Assignment/Monitoring - Everyone	100%	1/18/23	2/2/23
Risk Analysis/Management Deliverable		100%	12/5/22	12/13/22
Milestone 2 Risk Analysis Complete		100%	12/13/22	12/13/22
Risk Analysis/Management Deliverable Check	Vickers, Hinton, Hubert	100%	1/29/23	1/31/23

TASK ID	ASSIGNED TO	PROGRESS	START	END
VP 3: Architecture				
3.0.0	Main Menu Architecture - Hubert	100%	9/17/23	9/20/23
3.0.1	Settings & Highscore - Jack Vickers, Azzam	100%	9/17/23	9/20/23
3.1	Whole Game Architechture - Felix Seanor	100%	12/17/22	9/20/23
3.2	Physics & Sound Sequence Diagrams - Sam	100%	12/17/22	9/20/23
3.3	Item & Workstation Sequence diagrams - Jack Hinton	100%	9/17/23	9/20/23
3.4	Package Libaries - Jack Hinton	100%	9/30/23	9/23/23
3.5	Meetings Requirements - Jack Hinton, Felix Seanor, Sam Toner	100%	9/20/23	9/22/23
3.6	Putting images on website - Jack Vickers	100%	9/25/23	9/23/23
3.7	Architectural write up - evergone	100%	9/17/23	9/23/23
3.8	CRC cards -evergone	100%	12/9/22	9/10/23
3.8.0	CRC cards for game engine, chefs - Felix Seanor	100%	12/9/22	9/10/23
3.8.1	CRC cards for leaderboard, game data game over - Azzam	100%	9/1/23	9/10/23
3.8.2	CRC cards for physics order menu - Sam	100%	12/9/22	9/10/23
3.8.3	CRC cards for workshops, Items, Combinations - Jack Hinton	100%	12/9/22	9/10/23
3.8.4	CRC cards for menu in MyGdxGame - Felix	100%	9/1/23	9/10/23
3.8.5	CRC cards for settings - Jack Vickers	100%	9/1/23	9/10/23
M.3.1	Document finished	100%	9/30/23	9/23/23
VP 4: Implementation - Front-End				
4.0	Settings - Jack Vickers	100%	9/21/23	9/25/23
4.0.0	Adding in buttons - Jack Vickers	100%	9/23/23	9/25/23
4.0.1	Menu Logic - Jack Vickers/Hubert/Azzam	100%	9/23/23	9/19/23
4.0.2	Muting Sounds - Sam	100%	9/24/23	9/23/23
4.1	Leaderboard - Azzam/Sam	100%	9/21/23	9/25/23
4.1.0	Reading and Writing to JSON - Sam	100%	9/23/23	9/24/23
4.1.1	Linking Leaderboard with main menu - Azzam	100%	9/24/23	9/19/23
4.1.2	Submiting Score - Sam	100%	9/23/23	9/29/23
4.1.3	Writing Text to screen - Azzam	100%	9/23/23	9/28/23
4.1.4	End Game Sequence - Azzam	100%	9/23/23	9/28/23
4.2	Sound/Visuals - Sam/ Jack Hinton	100%	9/23/23	9/28/23
4.2.0	Create Workstation Icons - Jack Hinton	100%	9/23/23	9/28/23
4.2.1	Create Item Icons - Jack Hinton	100%	9/23/23	9/28/23
4.2.2	Create World Textures - Jack Hinton	100%	9/23/23	9/28/23
4.2.3	Create Sound Effects - Sam Toner	100%	9/23/23	9/28/23
4.3	Main gameplay loop - Felix Seanor	100%	12/30/22	9/25/23
4.3.0	Intergrate Physics - Felix Seanor	100%	9/23/23	9/25/23
4.3.1	Integrate Workstations - Felix Seanor	100%	9/23/23	9/25/23
4.3.2	Customer Manager - Felix Seanor	100%	9/23/23	9/25/23
4.3.3	Customer Movement - Felix Seanor	100%	9/23/23	9/25/23
4.3.4	Seat Customer and then leave - Felix Seanor	100%	9/25/23	9/29/23
4.3.5	Create Customer Order - Felix Seanor	100%	9/25/23	9/29/23
4.3.6	Chef interactions - Felix Seanor	100%	9/25/23	9/29/23
4.3.7	Plag Sound sfx - Sam Toner Felix Seanor	100%	9/25/23	9/29/23
4.3.8	Create a order list - Sam Toner	100%	9/25/23	9/29/23
4.4	Menu - Hubert	100%	9/21/23	9/25/23
4.5	Implementation write up	100%	9/21/23	9/29/23
M.4.1	Game done	100%	9/29/23	9/29/23
M.4.2	Menu systems all done	100%	9/29/23	9/29/23
VP 5: Implemenatation - Back-End				
5.0	Main Rendering Engine - Felix Seanor	100%	11/10/22	11/17/22
5.0.0	GameObject System- Felix Seanor	100%	11/11/22	11/12/22
5.0.1	Black Script Composition System- Felix Seanor	100%	11/12/22	11/13/22
5.0.2	Batch Rendering- Felix Seanor	100%	11/14/22	11/17/22
5.1	Collision - Sam Toner	100%	11/20/22	12/30/22
5.1.0	Static collisions - Sam Toner	100%	11/20/22	12/29/22
5.1.1	Dynamic Colliders - Sam Toner	100%	11/20/22	12/22/22
5.1.2	Collision Prevention - Sam Toner	100%	11/20/22	12/30/22
5.2	Items & Workshops - Jack Hinton	100%	11/20/22	12/30/22
5.2.0	ItemAbs - Jack Hinton	100%	11/20/22	11/21/22
5.2.1	StepsRecipes - Jack Hinton	100%	11/25/22	12/10/22
5.2.2	Workstations - Jack Hinton	100%	11/22/22	12/13/22
5.2.3	Combination Dictionary - Jack Hinton	100%	12/10/22	12/13/22
5.2.4	Item Factory - Felix Seanor	100%	11/20/22	11/24/22
5.4	Chefs and Pathfinding - Felix Seanor	100%	11/20/22	12/15/22
5.4.0	A* Pathfinding	100%	11/20/22	12/10/22
5.4.1	Inserting block locations from world space	100%	12/30/22	1/23/23
5.4.2	Animators	100%	12/30/22	1/23/23
5.5	Integration of parts	100%	1/10/23	1/19/23
M.5.1	Jacks Workstation and item demo	100%	12/13/22	12/13/22
M.5.2	Collisions Finished	100%	12/25/22	12/25/22
M.5.3	Complete Integration	100%	1/19/23	1/19/23
VP 6: Website				
6.0	Research Platforms	100%	11/10/22	11/17/22
6.1	Design - Front page and deliverables	100%	11/10/22	1/3/23
6.2	Weekly updates - Jack Vickers	100%	11/17/22	1/3/23
6.3	Put architectural diagrams on website - Jack Vickers	100%	1/26/23	1/3/23
6.4	Put use-case diagrams on website - Jack Vickers	100%	1/20/23	1/3/23
6.5	Put image attributions on website - Jack Vickers	100%	1/24/23	1/3/23
6.6	Added initial customer meeting section to website - Jack Vickers	100%	1/30/23	1/30/23
Milestone	Website Complete - Jack Vickers	100%	1/3/23	1/3/23
Deliverable - Website		100%	1/3/23	1/3/23

Above is the final snapshot of the Gantt Chart for the project. Please zoom in to view it better or view it on our website at the following link (under ‘Final Snapshot Of The Gantt Chart’). We have further described changes to it along with the risks we faced that caused these changes on our website. One example is the risk R10 (missing individuals from meetings), which minorly pushed back deadlines by a few days occasionally. These were mitigated by using online communication services such as Discord (live chat and screen share) to enable good communication and collaboration. Further work was completed when we were together in person again where we acknowledged changes and finalised them.