

*Snake*  
**Project Management Report**  
**Group 12**

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# Inception Phase

We chose to work with the Snake Project. The first day we voted and the team voted for Snake. Other suggestions were for the banking system but the majority wanted to develop a game. We set out to make a game that was functionally similar to other snake style games, but hopefully with some novelty to it.

## 1.1 Project Vision

We noticed that there is a lack of good retro games on the market. We saw a good opportunity to build a fun and easy to use snake game.

## Positioning

### Problem Statement

For	Retro game enthusiasts and gamers.
Who	Lacks a good retro game.
Snake	Is a classic video game.
That	Easily accessible and fun to play
Unlike	Google Snake, which is boring.
Our product	It's adding nice retro graphics, and more game modes.

### Product Position Statement

The problem of	There are no fun snake games.
affects	Developers, users, competitors, investors and publishers.
the impact of which is	People are bored and there is no one playing snake games anymore.
a successful solution would be	People will have more fun in their spare time and therefore be more productive, leading to a more complex and better world and make people happier.

## Stakeholder Descriptions

Name	Description	Responsibilities
User	The user of the game.	The users ensure demand for our product. Users motivate the developers to make the game.
Developers	The developing team that is making the game.	Make sure they deliver the needed product.
Competitors	Competing companies that develop similar games.	Make competing games to counter lost market shares if the developed product is successful.
Investors	Financially invests in the project.	Bankrolls the project and makes sure there are enough resources to complete the product. Stands to lose money if the project fails.
Publishers	Publishes the finished product.	Publishes and markets the product for a share of the profits.
Supervisor (TA)	The developers' supervisor that guides them and gives feedback on their work.	Make sure that the developers are on the right path and deliver a good product.
Examiner	Assigns developers a comprehensive task with constraints such as deadlines for finished project and presentation as well as abstract requirements of the assigned project.	Grades the developers based on their management, quality of project and supervisor's opinion.

## User Environment

- The game is a single player game and this will not change.
- A single game usually lasts from 1 second up to 15 minutes.
- The game can be played on any computer that supports java and has a keyboard.
- Java is needed for the program to run.

# Product Overview

## Needs and Features

Need	Priority	Features	Planned Release
Minimum Viable Product	1	Progress Tracker, Main Menu, Movement, Food, Scene, Collision, Growth	2022-12-15
Added Functionality	2	Pause/Resume, Scoring, Better Graphics	2022-12-30
Game Modes	3	Scene Size, Obstacles, Change Direction	2023-01-9

## Requirements

### Functional Requirements

The system shall run without crashing.

The system shall keep a persisting score list that carries information about the top scores between sessions.

The system shall have a main menu that the user initializes the game from.

The system shall have a main menu that the user can view previous scores from.

The system shall have a functioning movement system for the snake.

The system shall have a system that randomly generates food and places it on the screen.

The system shall allow the snake to grow by eating the food on screen.

The system shall increase the score when the snake eats the food on screen.

The system shall display a scene with set boundaries that the snake moves within.

The system shall track collision so that the game can end if the snake hits the boundaries.

## Quality Requirements

The system should allow the user to pause and resume the game.

The system should have a graphical user interface that is good looking.

The system should allow the user to choose different game modes.

The system should run on different operating systems.

The system should be entertaining.

The system should be able to start a new game in less than 5 minutes.

## 1.2 Tools

The digital tools we used in this project are:

Gitlab, ClickUp, Draw.io, Google Spreadsheet, Google Docs, Discord, DesignCap and Canvas.

The link to the GitLab project:

<https://git.chalmers.se/joelcel/snake>

## 1.3 Team contract

### Rules for Cooperation

Explanation	How will we handle this?
<b>Division and execution of work</b> e.g. Areas of responsibilities (how will you divide the work?) Deadlines (how will you ensure that you meet deadlines?)	Everyone puts in 20 hours a week  Deadlines will be strictly followed, any problems with meeting the deadlines should be informed in the group in advance so that we can solve the problem in time.
<b>Meetings</b> e.g. Time and place (how often will you meet?) Procedures (how will you organize the meetings?) Presence at meetings (are all meetings compulsory?) Missing meetings (what's the procedure if you have to miss a meeting for some reason?) Late arrival (is it ok to be late? If so, how late?)	Meetings will happen twice a week, with some flexibility to call extra meetings etc. Online discussions in our discord server.  Meetings are compulsory and we expect everyone to be there. Missing meetings is acceptable with a valid reason (sickness etc.).  Everyone needs to respect set meeting times to their best ability.  We start the meetings at a set time even if not everybody is there.
<b>Team decisions</b> e.g. How will these be made? Majority? Consensus?	We go with majority decision The leader will work as a tiebreaker

<b>Handling of documents and files e.g.</b> How, who? Versions (how will you keep track of these?) Other tools to use?	GitLab will be the main storage of the project source code. Google docs will be used for documentation of the project. Jira Software will be used as the main Project Management Software. Lucid will be used for graphical work (UML's etc.)
<b>Attitudes</b> Working together (how will we behave towards each other?) Active contribution (how will we ensure this takes place?) Languages (which languages are acceptable? When?)	All communication is in English. Everyone should act respectfully towards their colleagues. Safe work environment. Everybody has different levels of knowledge, ask for help and don't judge.
<b>Holidays</b>	From December on, all meetings are conducted remotely. We are planning for a holiday break week from 24th December to 2nd January.
<b>Communication norms</b>	Meetings at the start of the week. Do not expect a response before: 8AM and after: 5PM. Discord for communicating of campus Check Discord regularly (at least once in the morning, once at the end of the day)
<b>Expectations</b>	We work together on campus and from home.  You are expected to comment on the code.  Everyone tries their best to follow the course material and schedule. Everyone participates in all aspects of the work. Update the time spent on tasks at the end of the week or when we are finished with a task.
<b>Leadership</b>	We strive to work with the agile leadership model. <ul style="list-style-type: none"> <li>1. The manager should be there for the team, not because they want to tell others what to do. They should not give orders.</li> <li>2. Manage people's ambitions according to what they are interested in doing.</li> <li>3. Take responsibility, don't blame others.</li> <li>4. It's why you are doing something that matters, not how.</li> <li>5. Don't micromanage the team, trust in their ability to do the work.</li> </ul>

<b>Conflicts</b>	Step 1: Address the problem as soon as possible. Step 2: Talk to the group leader or someone in the group. Step 3: Talk to a teacher.
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## Ambition

We want to deliver a fun and functional snake game. Our ambition is to meet all the requirements and objectives of the course. We strive to learn as much as possible in the subject of program management and teamwork.

### Personal Ambition Level

Name	Moderate / high / very high	Courses or any other conflicts during project
Joel Celén	High	UX/RE
Manely Abbasi	High	UX/RE
Mohamad Khalil	High	UX/RE
Joel Mattsson	Very High	UX/RE
Utkarsh Singh	Very High	UX/RE
Felix Humleby	Very high	UX/RE
Lucas Carlsson Holter	High	UX/RE

## 1.4 Project plan

### Scope

The scope of the project is to develop and deliver a functional retro snake game which is easy to use to the user, and completes all functional requirements. After completing the functional requirements we will work on the extra features and try to complete them in the given periods of time which is 10 weeks. If we feel like we do not have the time, we will cut some of the quality requirements.

### Stakeholders

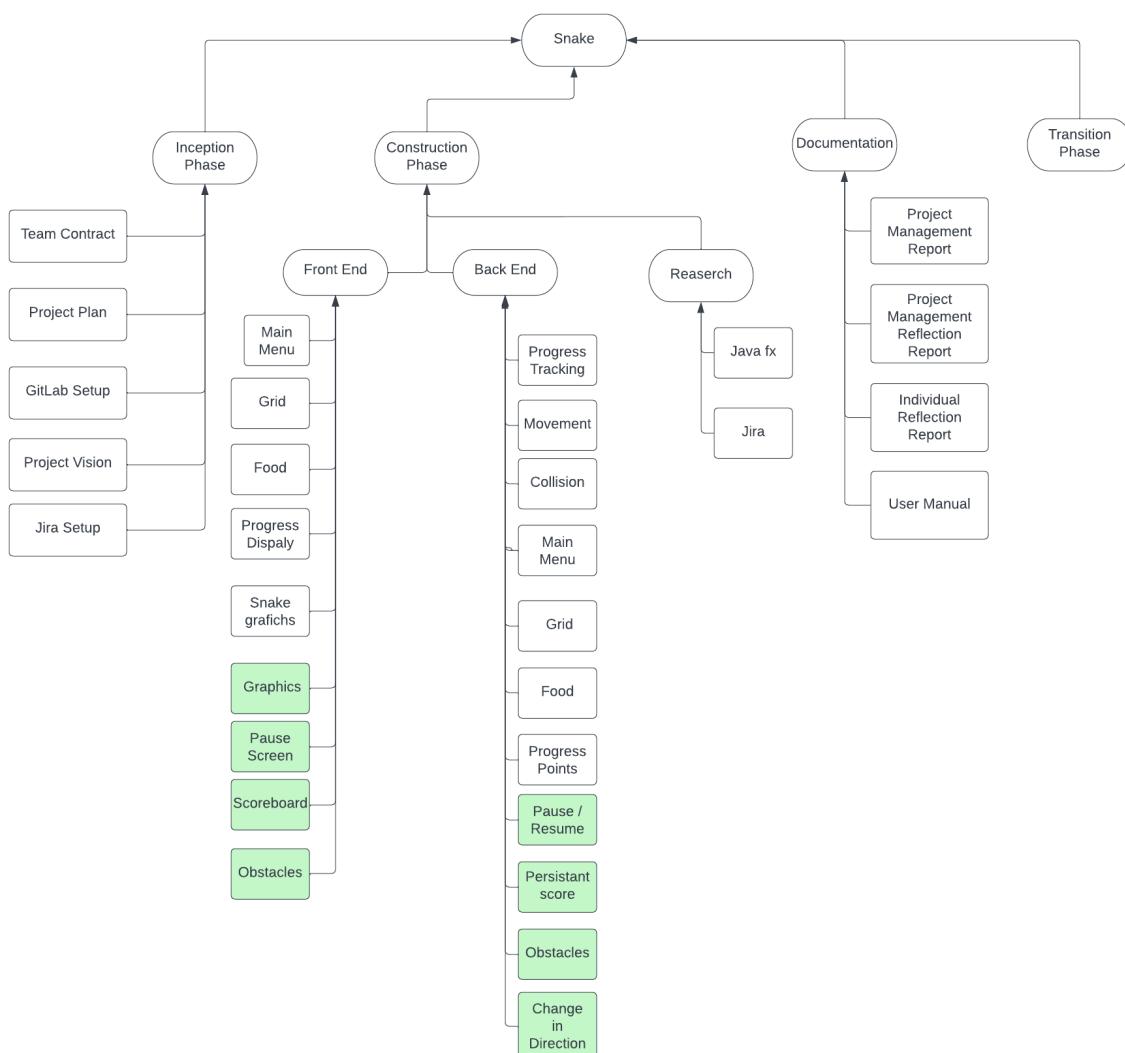
Users, developers, publishers, investors, competitors, supervisor and examiner

### Conops

Users will be able to navigate the main menu of the game through the cursor, the user will be able to control the snake's movement through the arrow keys on the keyboard; At the start of the game the snake will consist of one unit; if the snake collides with food it will grow by one unit; if the snake collides with itself or the walls the user will lose the game.

### WBS diagram

The green boxes represent the extra features that we are going to do if we have extra time left and after we have completed our MVP (Minimum Viable Product).



## GANTT Chart

This is our initial GANTT chart. We are planning to use a web-based tool called ClickUp in the coming weeks to make planning more efficient. We color coded the different phases to make it clear what tasks belong to what phase.

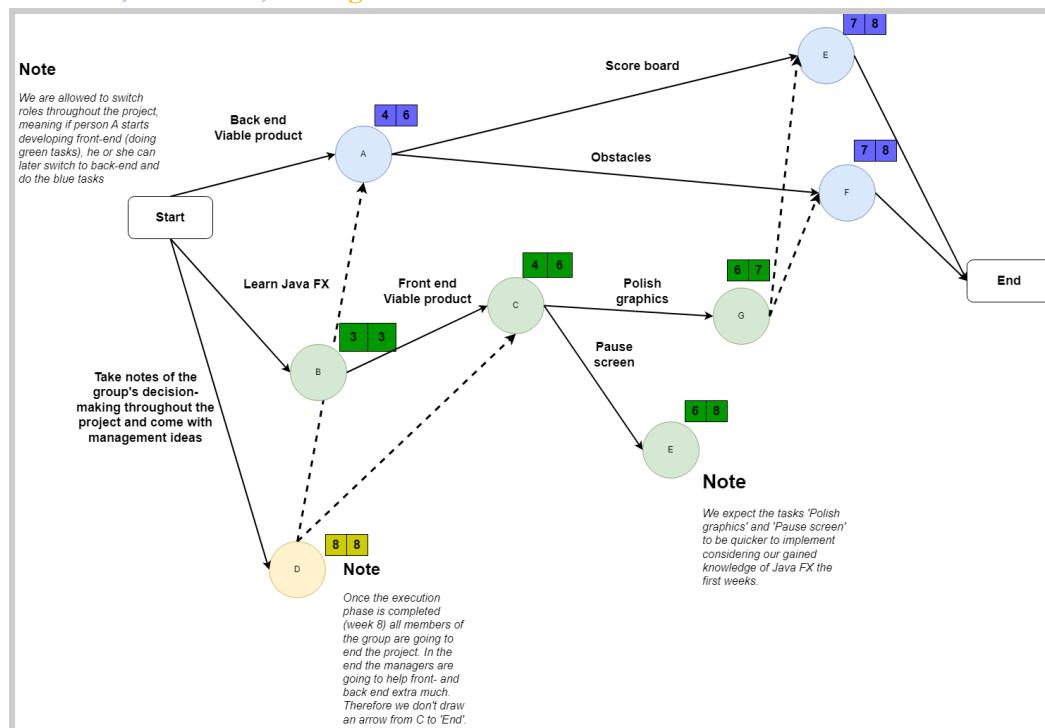
### Inception Phase, Construction Phase, Research, Documentation, Transition Phase

Code:	Task	1	2	3	4	5	6	7	8	9	10
100	<b>Inception Phase</b>										
110	GitLab Setup										
120	Team Agreement										
130	Project Vision										
140	Project Plan										
200	<b>Construction Phase</b>										
210	1) Front End										
211	1.1) Main Menu										
212	1.2) Grid										
213	1.3) Basic graphics										
214	1.4) Progress Display										
215	1.5) Additional graphics										
216	1.6) Pause Screen										
217	1.7) Persistent Scores										
218	1.8) Obstacles										
220	2) Back end										
221	2.1) Progress Tracking										
222	2.2) Movement										
223	2.3) Collision										
224	2.4) Food										
225	2.5) Main Menu										
226	2.6) Grid										
227	2.7) Progress Display										
228	2.8) Pause Function										
229	2.9) Persistent Scores										
2201	2.10) Obstacles										
2202	2.11) Change directions										
230	3) Merge front end with back end										
300	<b>Research</b>										
310	3.1) Java fx										
320	3.2) Jira										
400	<b>Documentation</b>										
410	Project Report										
420	Reflection Report										
430	Individual Reflection Report										
440	User Manual										
500	<b>Transition Phase</b>										

## PERT Diagram

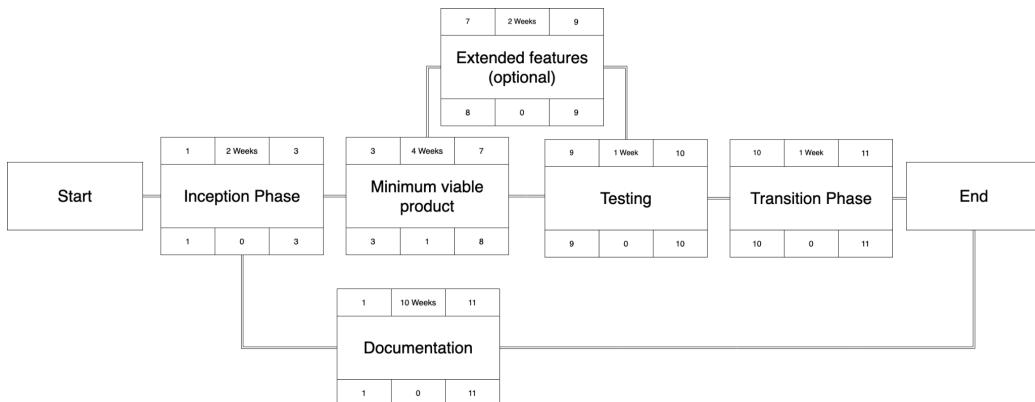
We divided ourselves into three smaller teams based on the categories of fundamentals in this mini project. In the diagram below the tasks for each sub-team are separated by colors:

### Back end, Front end, Management

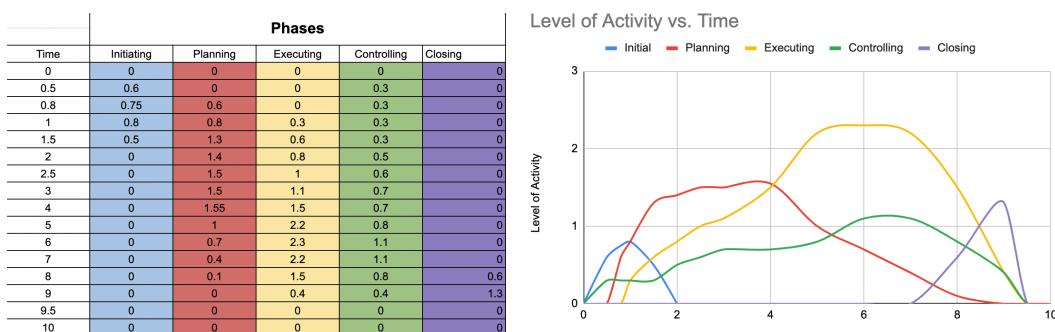


## CPM

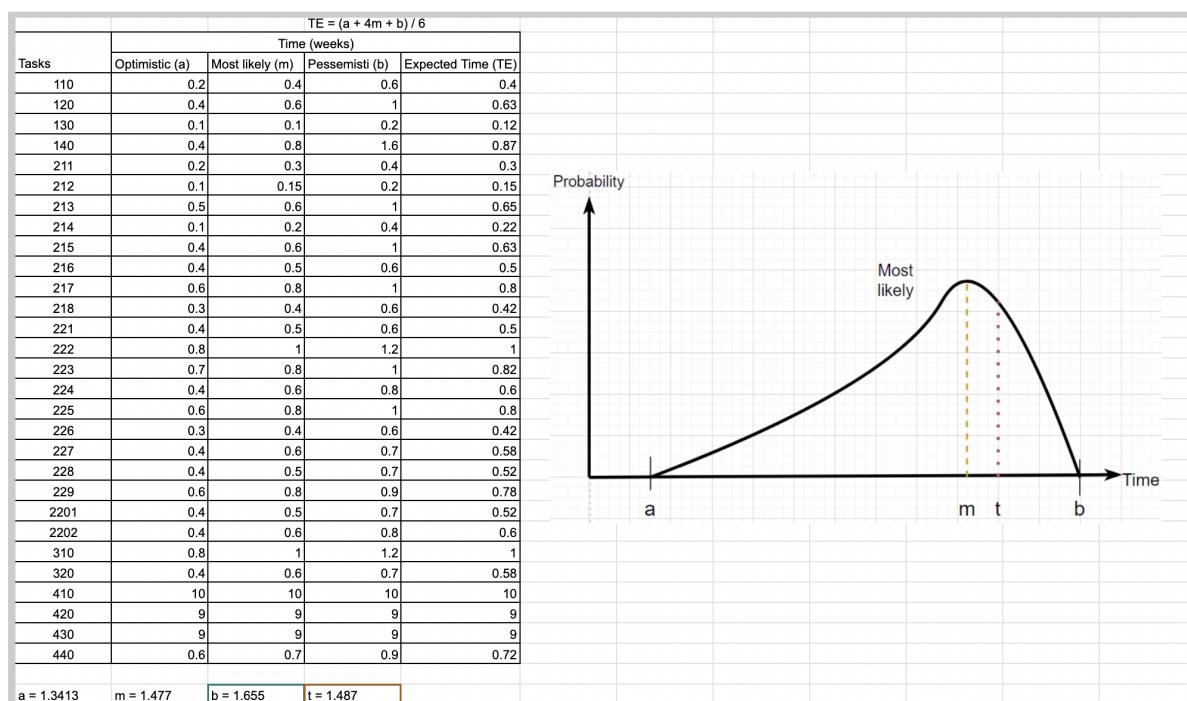
The critical path in our CPM is the documentation path. We have another possible critical path if we choose to implement extended features, but these are optional.



## 1.5 Project budget, Inception phase plans



A visual presentation of our estimated effort ( $Y$ ) during each iteration ( $X$ ).



This means that the probability of us completing the tasks in the planned pessimistic-time is higher than finishing them in optimistic time.

## 1.6 Iteration / end of phase assessment / review

At the beginning of this iteration we had two meetings where we discussed questions together, but in the last week we added one additional meeting in order to construct all our desired graphical diagrams before the mandatory submission deadline. All in the group agreed that the iteration went according to plan because we managed to do everything that we said we would do during the iteration phase.

An issue we encountered was that we realized one day before the deadline that we were further away from the finish line than we actually thought, meaning it became stressful at the end to stick to the initial plan. This taught us that we need to monitor our progress in relation to time as well as our plan, so that we next time can identify that we are behind the schedule earlier, which will give us more time to work with - in favor of our stress-levels and performance - to come up with a new plan based on our current situation to get us back on track again. Other things we learned during this phase were as follows.

Clear structure and goals to accomplish in a meeting makes it more clear what to do, which allows us to divide the tasks in a better way making our work more effective and productive. In the picture below is an example of our management that made this possible. It's not always the best case to do everything together as a group. In the beginning of the inception phase we did everything together, but later on when we worked independently we realized our potential of getting work done within a shorter period of time.

When dealing with many documents it easily becomes messy. Therefore, we created a document that contains all the necessary links, making them more accessible.

After constructing the diagrams we realized that a visual representation of our plannings prevents misconceptions of the work procedure and our goals. For instance, all in the group agreed to make time for optional requirements but we did not know at what exact week we would start working on this. If we never made the diagrams someone might have thought we would be done with the minimal viable product at the 5th iteration while someone else expects the optional requirements to be existent in our prioritization at the 8th iteration. This would cause everyone to adjust their working pace in accordance with their perception, which ends with an increased probability of a group not living up to their initial milestones or expectations.

Considering the significant difference of our productivity when doing tasks with the entire group versus splitting into smaller groups, we decided to create fixed sub-teams (management, front end, back end) based on what part of the project to have responsibility for that is meant to last for a longer period of time, ideally the duration of the entire project. During this particular iteration we actually created these sub-teams, but the positive impact of this decision made us take it to the next level, where we assigned each manager a specific field to be extra good at (risk- and cost management and monitor and control). The two other sub-teams did not get any expert roles due to the following reasons:

- **Front end:** Since our previous courses didn't cover JavaFX their only task the upcoming iteration is to research and learn how to use it.
- **Back end:** From our point of view, there were not any favorable ways of assigning fields for this team to get individual experts for the upcoming iteration.

On the other hand, we could divide the back end team into experts so that one has responsibility for everything associated with the movement of the snake (move snake, collisions, obstacles, ...), whereas the other one's expert area is everything except the movement such as the logic of the menu, progress display and collect food. We did not go with this idea because we believe it would work as constraints and therefore limit our potential. It would simply be an additional thing to keep in mind in the procedure of developing code. From another perspective this is a more structural way of working allowing us to instantly know who to ask if something isn't working - which is a common occurrence when coding - and whose responsibility it is to come up with a solution for it within the boundaries of the deadlines. Note that this proposition is a potential change of management within this sub-team in another iteration in the future that will occur if our monitoring for the back end team points toward that they are slacking.

# Elaboration phase

## Iteration 3

### 3.1 Iteration 3 and increment plans

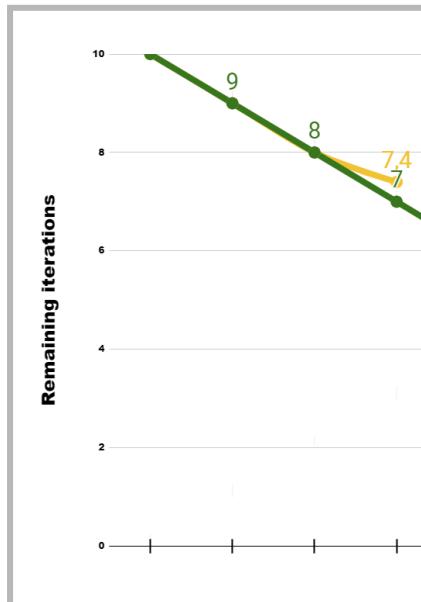
The management team started the week with constructing a questionnaire to send to the other sub-teams with the intention of facilitating the managers' work to summarize the whole group's opinions. The alternative to this approach is that the managers have to take notes at the end of the current iteration at the same time as the group is discussing. This would require the managers to interrupt the discussion to make sure they have written down bullet points covering the group's experiences at a sufficient level, which would destroy our flow and hence be time consuming. In turn, this would result in our planning being limited in terms of ambition from every aspect of the project (management → documentation, planning → code → final product).

During this iteration our plans for frontend were researching java fx and for backend the plan was to start working on the minimum viable product. The plans for management were researching risk management, monitoring and control and cost management for this week's iteration, besides writing the increment plans and assessments.

### 3.2 Monitor and Control

In the top-to-bottom burndown chart below, the yellow line displays our actual effort and we need to follow the green representing the effort we plan to dedicate in order to follow our initial plan. The X-axis is measured in iterations, and the Y-axis highlights the number of remaining iterations of work separating us from our finished product including every single optional feature from the project plan.

- **Actual effort**
- **Expected effort**



Notice that the yellow line ends at 7.4, while the expected effort for this week is 7. This indicates that we didn't complete 100% of this iteration's plans because we currently have 7.4 of our planned iterations left instead of only 7. The explanation to why we are 7.4 iterations behind is based on the slight postponement of the front-end team's task concerning learning about JavaFX, combined with the unexpected cancellation of the risk management lecture, which caused a change of plans for the management team.

Below is an additional demonstration of the group's expected progression versus our actual created by the tool "DesignCap" to get a better understanding of how far behind our schedule we actually are, and to eventually identify the reason why our progression is worse than expected.

### Completed tasks

A 'task' in this context is a mission that involves actually working on the project. Attending TA-sessions isn't classified as working on the project, since we get feedback instead of modifying something in the project that is being graded. We consider coding and writing text in PMR or PMER as a 'task'.

- **Front end:** 0.7 / 1 (approximation of the knowledge gained this iteration versus expected)
- **Back end:** 2 / 2 (snake movement, grid)
- **Management:** 3 / 4 (increment plan, questionnaire, assessment review, risk management)

**Expected:** (7 / 7) = 100%

**Actual:** (5.7 / 7) = 81.4%

(white area is the sum of our total unfinished tasks)



An observation of our time spent during this iteration conveys the lack of hours spent on the project. We expected everyone to spend 20 hours a week resulting in a total of 140 hours, but in reality we spent 120 hours resulting in an average of 17 hours for each person:

Iteration	3
Joel Mattsson	6
Utkarsh Singh	-3
Manely Abbasi	-7
Joel Celén	0
Felix Humleby	-2
Lucas Carlson Holter	-7
Mohammad Khalil	-5

There is a correspondence between the hours spent and the percentage / number of tasks completed

Formula:  $|(\text{entity for actual work} / \text{entity for expected work}) - 1| * 100$

Formula gives percentage of specified entity remaining to achieve expected entity

Note: We came up with this formula before the lecture about monitor and control was held, where we discovered SPI. This formula has the same purpose as SPI: To measure the team's efficiency based on tasks completed and hours spent

Actual	Expected	Percentage remaining	Interpretation
120	140	$ ((120 / 140) - 1  * 100) = 14,3$	This corresponds to us working 14,3% less than our initial agreement of 20 hours for each person.
5,7	7	$ ((5,7 / 7) - 1  * 100) = 18,6$	This indicates that we need to complete 18,6% more of the tasks to fulfil the goal of this iteration

It's obvious that any group is more likely to complete more tasks if they spend more time trying to solve them. However, a retrieval of the relationship between these two variables for a particular team combined with monitoring them on a frequent basis enables a team's awareness of their current state of team dynamics. For instance, if a team spends insanely many hours while only solving a few tasks the productivity, or in other words, the management or team dynamics is bad. Therefore it's important to monitor a team's time spent versus its performance.

The fact that the percentage remaining to achieve expected tasks is greater than the percentage remaining for hours ( $18.6\% > 14.3\%$ ) means that we spent more hours in relation to the number of actual tasks that were completed. Ideally, every team is striving to have less work (number of tasks) remaining in relation to the time spent remaining, because it means that the team dynamics and hence their productivity is good. Since the proportion of expected tasks remaining is greater than the hours, this is an area of improvement for our group.

### **3.3 Iteration 3 Assessment/Review**

The expected work for frontend was research JavaFX to gain the knowledge necessary for a smooth start next iteration and it was partially completed. The reason was technical issues due to substantial change of IDE since the learning materials were updated and to mitigate this to not happen in the future we will make room for unexpected delays when planning.

The expected work for the backend team this iteration was snake movement and back end grid framework which was completed. They did not encounter any time consuming issues. Our confidence of using git is a major contributing factor to our ability of delivering the requested tasks of the plan in the upcoming iterations where harder coding tasks awaits

The management team planned tasks this iteration was questionnaire, risk-, cost- and monitor and control- management which was all completed but the risk management. This was due to the risk management lecture being canceled and it isn't mandatory to include it in this iteration. Next iteration we will complete the risk management.

Generally speaking, the entire group got to see the lessons learned from the previous iteration about our enhanced performance when independently dividing ourselves into smaller teams from a new perspective. A week ago we noticed the positive side of not doing everything together, unlike this week where we all of a sudden in the meeting at the end of the iteration got to know each sub-team's actual progression. In other words, it's harder to keep track of what everyone is doing when dealing with sub-teams, in contrast to all doing everything together. Therefore, we learned that it's fundamental for a team to talk to each other more about the project. In the future we will strive to be more agile by paying more attention to the communication so that everyone has an approximate idea of how it's going for each sub-team to avoid negative progression-surprise at the end of an iteration that is hard to recover from.

# Construction Phase

## Iteration 4

### 4.1 Iteration 4 and increment plans

The team started the week with a GitLab workshop, presented by the backend team. The frontend team was unable to do proper research on JavaFx last week and has requested an extension. This may delay their iteration 4 tasks. The backend team is on track and will try to complete their tasks for this iteration on time. If they finish, they will either move on to other tasks or assist the management team in any way necessary. The management team will focus on fixing issues and implementing suggestions from the T.A this week, and if all goes well, they will also work on the iteration 3 report.

For this iteration, the plans for the subteams are as follows:

- **The management team** will complete the risk table for the iteration and finalize the project management report. They will also create a table that includes the tasks, expected hours, and actual hours to easily monitor and control progress.
- **The backend team** will work on collision, food, and progress tracking, and deliver their tasks with testing at the end of iteration 4.
- **The frontend team** will deliver the main menu with testing at the end of iteration 4.
- 

### 4.2 Risk Management plan

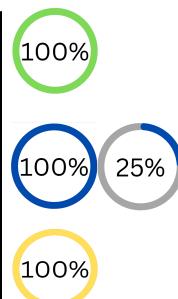
Risk	ID	Name	Owner	Source	Description	Analysis					Strategies	Notes	Assigned To	Contingent action	Risk management procedure
						Qualitative	Quantitative	Qualitative	Severity of Impact	Probability of Occurrence					
Description of the risks	ID	Short description	The person who handles the risk	The category under which the risk falls	Long description	The level of impact on the project	Likelihood of Happening	Severity of Impact	Probability of Occurrence	Risk Rating	Based on the strategies defined on the previous table, rank the risk based on the priority of the strategy	Action to take if the risk happens	Action to take if the risk doesn't happen	The actions that have been taken	
Planning	R01	Unprepared difficulties in GitLab	Back-end and Front-end teams	Technical	Backend problems in GitLab leading to the possibility of delaying the tasks	High	Medium	3	90%	2.0	Mitigation	Make sure you have enough knowledge by reading tutorials or asking for help	Tell our TA about the problem and asking for help. Try to find a solution by reading documentation or asking for help	Hiring TAs or sessions with group members to help each other with GitLab or any other problem related to it	
Planning	R02	Lack of personnel	All members	External	User of the group members getting sick or having personal problems making them unable to work	Low	Medium	2	80%	1.0	Mitigation	Getting at least one person for each task so that they can be free for the other person if they are absent	Ask someone from other sub-teams for the task instead	Building the whole group so it has more people working in it and not multiple people working in the same place working	
Planning	R03	Conflict between group members	All members	External	Having disagreements or fights in the group	Medium	Low	3.0	20%	0.0	Avoidance	Being respectful towards each other and solving disagreements by talking to each other and not letting things go on for too long. Having a meeting once a week to prevent them from any big fights from happening	Tell the group manager or TA	Making a friendly and safe environment in the group	
PRD Report	R04	60 pages PRDR rule	All members	External	Not managing to fit the project management report in 60 pages	Low	Medium	2	4	0	Avoidance	Not including unnecessary text and focusing more on putting charts or tables	going through the report again and reading it to see what needs to be removed or added	going through the report again and reading it to see what needs to be removed or added	
Planning	R05	Lack of knowledge or skill	All members	External	Not having enough knowledge due to inclusion of getting someone else to learn something	High	High	4	80%	3.0	Mitigation	Doing research on our own before each iteration starts	Telling TA to share any documents that can be helpful or asking other group members to help	Telling TA to share any documents that can be helpful or asking other group members to help	
Planning	R06	Technical issues	Jean-Claude	Technical	Any possible issue leaving the code not to work	Medium	High	4	70%	2.0	Mitigation	Trying to gather knowledge by using or experimenting	asking our TA or other team members who have more experience to help	asking our TA or other team members who have more experience to help	
	R07	Inadequate monitor and control	Jean-Michel	External	Inadequacy of the team progressiveness leaving to a lack of control	Medium	Medium	2.0	3	1.0	Avoidance	Reviewing what you have done and what's left to do	going through all the things that should be done one by one	going through all the things that should be done one by one	

The Risk Management table shows what risks the team foresee for this project. We are monitoring both the risk of occurrence and the severity of them. We are using both qualitative- and quantitative risk analysis to rank the risks.

[x Risk Managemet Table.xlsx](#)

## 4.3 Monitor and Control

	Expected work	Actual work	Proportion of work completed
Front end	Main menu Scene visuals	Expected work	$2 / 2 = 1$
Back end	Progress tracking Food Collision Testing	Expected work + Time stepping movement	$5 / 4 = 1.25$
Management	Update burndown chart Tracking gantt chart Schedule performance index Risk table Cost and description table Documentation	Expected work	$7 / 7 = 1$



Expected tasks = 13

Actual tasks completed = 14

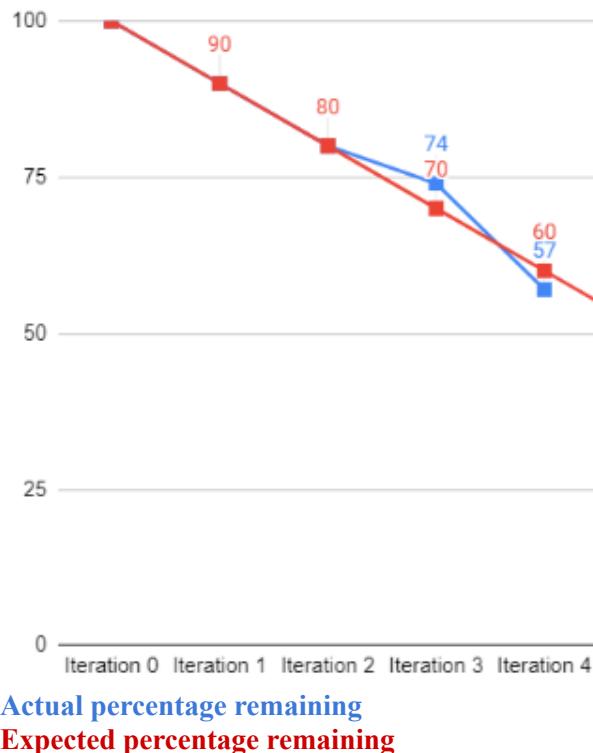
Progression = 8% ahead of schedule

Since we didn't consider the PMER as a task this iteration, the progression above isn't accurate. An inclusion of what we have done in the experience report so far, we are behind schedule. We estimate ourselves to be approximately 3% ahead of schedule in the project as a whole, when counting the remaining work in the PMER, which is shown in the burndown chart below:

### Burndown Chart

The Y-value has changed from "iterations of work left until the entire project is finished" to "percentage of entire project completion". To understand the Y-value from iteration 3, we would need to look at the number of expected tasks and compare it to our actual performance, which is a time-consuming process. Monitoring progress through this method would take up a lot of time that could be better spent on making progress on the project. By changing the Y-value to "percentage of entire project completion," it will be easier to understand and interpret the chart.

Design: Colors changed from yellow and green to red and blue. The lines are thinner and the shapes on the lines are quadratic instead of circular.



The progress of this burndown chart is dependent on the table of tasks above as well as our management in ClickUp which is shown below.

		STATUS	ASSIGNEE	START DATE	DUUE DATE
Iteration 4	JavaFX Research front end	COMPLETE	JM JA +4	6 days ago	Today
Iteration 4	Progress Tracking = back end mvp	COMPLETE	JCH	Nov 14	5 days ago
Iteration 4	Main Menu = front end mvp	COMPLETE	MK	6 days ago	2 days ago
Iteration 4	Scene Visuals = front end mvp	COMPLETE	JCH	6 days ago	2 days ago
Iteration 4	Collision = back end mvp	COMPLETE	LH	6 days ago	2 days ago
Iteration 4	Food = back end mvp	COMPLETE	MK	6 days ago	2 days ago
Iteration 4	Schedule performance index graph and documentation	COMPLETE	JM	2 days ago	Today
Iteration 4	Manual testing = back end front end	COMPLETE	LH JK	6 days ago	2 days ago
Iteration 4	ABC Progress graph	COMPLETE	JM	Today	Today
Iteration 4	Risk Management Table management	COMPLETE	MA	6 days ago	2 days ago
Iteration 4	Update burndown chart management	COMPLETE	JM		2 days ago
Iteration 4	Increment Plans for Iteration 4	COMPLETE	US	6 days ago	Today
Iteration 4	Tasks description and time table management	COMPLETE	JS	6 days ago	2 days ago
Iteration 4	Iteration 4 assessment/review management	COMPLETE	US JM JA		2 days ago
Iteration 4	Tracking Gantt Chart	COMPLETE	JM	4 days ago	2 days ago

## Tracking Gantt

The tasks, their durations in specified intervals and their completion is displayed to the left, and our progression in each iteration is shown to the right in the picture below. The progression to the right are displayed by colored boxes with four unique colors to separate each team's contribution to the project: **Entire team**, **Back end**, **Front end**, **Management** and transparent boxes that indicate a delay instantiated by a particular sub-team not being able to follow schedule. The yellow marked days within an iteration illustrate the mandatory meetings

WBS-NUMBER	TASKS	START ITERATION	END ITERATION	DURATION	PERCENTAGE COMPLETED	INTERCEPTION PHASE									
						ITERATION 1		ITERATION 2		ITERATION 3		ITERATION 4			
		M	T	W	T	F	M	T	W	T	F	M	T	W	T
<b>1 Interception Phase</b>															
1.1	Team contract	1	1	1	100%										
1.1.1	Project vision	1	2	2	100%										
1.2	Project plan	1	2	2	100%										
1.3	PERT diagram	2	2	1	100%										
1.4	CPM diagram	2	2	1	100%										
1.5	Estimation of phase effort diagram	2	2	1	100%										
1.6	Leadership notes	2	2	1	100%										
<b>2 Elaboration Phase</b>															
2.1	Snake movement	3	3	1	100%										
2.2	Grid	3	3	1	100%										
2.3	JavaFX	3	3	1	70%										
2.4	Research of management fields	3	3	1	100%										
2.5	Project Management Report	3	3	1	70%										
2.6	Project Management Experience Report	3	3	1	100%										
<b>3 Construction Phase</b>															
Iteration 4															
3.1	Collision	4	4	1	100%										
3.2	Food	4	4	1	100%										
3.3	Progress tracking	4	4	1	100%										
3.4	Testing	4	4	1	100%										
3.5	Main menu	4	4	1	100%										
3.6	Scene visuals	4	4	1	100%										
3.7	Monitor and control	4	4	1	0%										
3.8	Risk table	4	4	1	100%										
3.9	Cost and task description table	4	4	1	100%										
3.10	Documentation	4	4	1											
3.11	Schedule performance index	4	4	1											
3.12	Tracking gantt chart	4	4	1	100%										
3.13	Update burndown chart	4	4	1	100%										
3.14	Time stepping movement	5	5	1	100%										

*Iteration 3 isn't in the inception phase which the chart shows, we used a template to create this visualization and it isn't possible to move an iteration to another phase*

## SPI Graph

In the previous iteration, we came up with a similar formula ( $((\text{entity for actual work} / \text{entity for expected work}) - 1) * 100$ ) with the same purpose as 'Schedule Performance Index' (SPI). During the lecture we noticed that the SPI is easier to interpret, which caused us to replace our formula with this newly introduced method to keep track of our performance in relation to our planning. However, we came up with this formula with the same intention: to obtain a measure of our team dynamics.

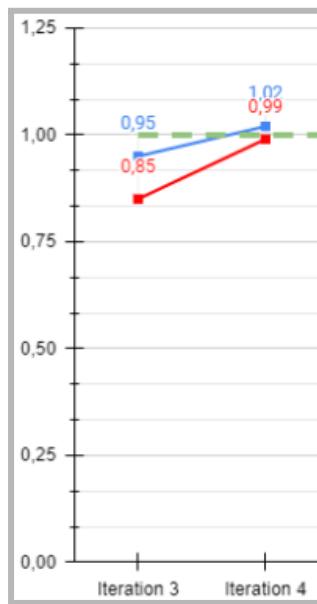
### Notes associated with the table below:

- Earned Value = Actual number of tasks completed / Expected number of tasks
- Planned Value = Actual total hours of entire group / Expected total hours
- Our default total hours is 140, but for this particular iteration we expected each one to spend 18 hours individually since a lecture was canceled. Note that we assume we will have more lectures during some week in the future to catch up, and in that iteration the expected hours will be more than 20 such that the average of all 10 iterations is a default of 20 hours expected from each person

*Schedule Performance Index = Earned Value / Planned Value*

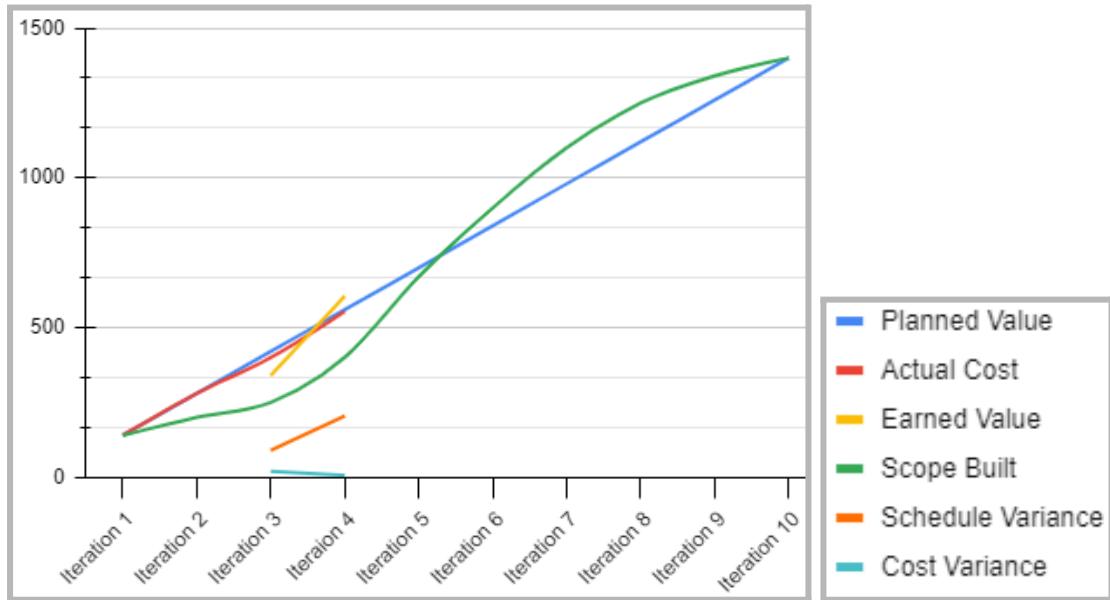
	Iteration 3	Iteration 4
Earned Value (EV)	5,7 / 7	14 / 13
Planned Value (PV)	120 / 140	133,5 / 126
Schedule Performance Index	0,95	1,02

- **SPI:** Calculated SPI. If it's greater than one (above the green dotted line in the graph below), our schedule and performance is good
- **Judgment line:** Is always equal to one, and was implemented for the sake of clarity to be able to quickly visually judge whether the group's SPI is good or bad
- **Proportion of hours spent:** Sum of hours spent in group / Expected total hours



As the graph shows, we improved since the last iteration since we spent more time than we did last week. In turn, the schedule performance index also increased, which serves as proof for the improved team dynamics. We also made the decision to add the red line with the intention of visualizing a correlation between the hours we spend versus the SPI. In this case, a remarkable improvement in both our hours spent and SPI is displayed in the graph above, which itself points toward the incorrect connection that the SPI increases as we spend more hours. For instance, assuming that everyone would spend 40 hours in one week, making the red line reach 2.0 ( $2 * 20 = 40$ ), this doesn't guarantee a productivity level higher than the one we obtained this iteration. When having a look at the definition of the SPI, it is dependent on the proportion of tasks completed as well as the hours spent. In summary, spending a larger amount of time doesn't necessarily translate to completing more tasks in relation to time, which determines the value of SPI.

## ABC Progress



As the pictures show, we spent less hours than expected in the third iteration in contrast to our effort in iteration 4, where we spent more hours than expected, which resulted in **Actual Cost** approaching **Planned Value**. However, the graph still indicates that we are sticking to our initial plan from the inception phase, since **Scope Built** is below **Planned Value** for the first 5 iterations. The fact that **Cost Variance** decreases from iteration 3 to 4 highlights our improvement of distribution of work, whereas the increase of **Schedule Variance** serves as proof for our progress of team dynamics. This is correlated with the increase of **Earned Value** caused by the sudden positive change of **Actual Cost**, which allowed us to complete a bigger proportion of the plan.

## Project Time Tracking

Iteration	3	4
Joel Mattsson	6	7
Utkarsh Singh	-3	-0.5
Manely Abbasi	-7	-3
Joel Celén	0	0.5
Felix Humleby	-2	6.5
Lucas Carlson Holter	-7	-0.5
Mohammad Khalil	-5	-2.5

## 4.4 Iteration 4 assessment/review

	Expected work	Actual work	Reason to actual work	Lessons learned
<b>Front end</b>	Main menu Scene visuals	Expected work	The sub-team spent more hours catching up with the JavaFX research delay from the previous iteration, in combination with the tasks not requiring much time.	Realized the dependency between front end and back end. In the future these teams will work more closely and synchronized.
<b>Back end</b>	Progress tracking Food Collision Testing	Expected work + Time stepping movement	The expected work took less time than estimated, and therefore they started with the next feature.	Handling conflicts in git and to start with the next iteration's tasks once the planned work for the current iteration is done.
<b>Management</b>	Update burndown chart Tracking gantt chart Schedule performance index Pie charts Risk table Tasks description table Documentation	Expected work	Divided the tasks based on expertise.	Writing everything in a way that is easy to understand and not make complicated tables/charts.

There were no conflicts and the iteration went as planned, despite the delays of last iteration's planning. When having a look at what actually is required from us in this course, we came to the conclusion that we should have more managers and less coders. The previously three sub-teams were now merged into two teams (note that if the coding needs help Joel C, as a previous front-end member, can help in that department):

- **Development:** Mohamad, Lucas and Felix
- **Management:** Joel M, Utkarsh, Manely and Joel C

# Iteration 5

## 5.1 Iteration 5 and increment plans

At the end of iteration 4 we decided to make some changes to our sub-teams since there is a lot of documentation to be done. Therefore, Joel Celén shifted from the Front End sub-team to Management. Also, we came to the conclusion to rotate sub-team members so that each member can contribute in all parts. Regardless of the delay, the front end sub-team came back on track.

The back end sub-team is maintaining a good pace and even ahead of their plans. Likewise, the Management sub-team is also on track and planned to start to work on PMER from this iteration. In the mandatory meeting on monday, it was decided that the coding sub-teams explain the code with a working MVP to the management sub-team and make contribution in coding for later, much easier. We held a vote in the team about the new team manager and Joel Celén was selected. Joel Mattsson was elected Communications Manager and will be the main person to communicate with Nicole.

**The development team** is supposed to complete the progress display basic graphic, pause function, obstacles and change direction function along with merging. Furthermore they are also supposed to deliver the tasks along with the testing at the end of the iteration 5.

**The management team** is supposed to update the risk table for Iteration and create the risk matrix. Will start with the PMER and will also finalize the project management report for the iteration along with making a table which will contain the tasks description, expected hours and actual hours. This table will help the management team to monitor and control easily with all the details at one place.

## 5.2 Risk Management

### 5.2.1 Risk Management Table:

Missions	ID	Risk	Owner	Sources	Description	Analyze				Strategies	Meas	Assigned To	Contingent action	Risk management prevention	Active Status	
						Qualitative	Quantitative	Sensitivity of Impact	Probability of Occurrence							
Description of the risk	Risk ID	Short description	The person who handles the risk (the person that the risk affects)	The category under which the risk falls	Long description	The level of impact on the project	The chance of it occurring	How severe the risk is between 1-10	The percentage of the risk occurring	This is a qualitative valuation using the previous risk rating	Based on the strategy marked on the qualitative risk analysis table above this row	Actions for each strategy	Action to be taken if risk happens	The actions that have been taken	If the risk is active or inactive	
Development	R01	Unexpected influence in UI/UX	Manuela Almås	Technical	Subtext problems in UI/UX leading to the possibility of delaying the code	High	Medium	5	50%	2.5	Mitigation	Make sure you have enough knowledge by working in smaller teams	Tell the UI/UX about the problem and ask them to prioritize the tasks that are most important to fix before releasing the application	Loving UI/UX members with prior experience in UI/UX design and knowledge of how to fix the problems other than UI/UX	Active	
Team	R02	Lack of personnel	Manuela Almås	Internal	One of the group members getting sick or having personal problems having trouble to work	Low	Medium	2	20%	1	Mitigation	Looking at least two people for each task so that you can fit in for the ones present if one doesn't show up	Management Team	source from other sub teams to fill the task instead	Dividing the whole group into two smaller groups to make sure that multiple people working in the same area	Active
Team	R03	Conflict between group members	Manuela Almås	Internal	Having disagreement or fights in the group	Medium	Medium	2.5	30%	3.5	Avoidance	Having meetings to increase understanding and clarify disagreements to prevent conflicts from happening	Management Team	Tell the group manager or TA the reason for conflict to handle it	The team agrees to take turns in every meeting to avoid conflicts in case of conflicts	Active
PM Report	R04	Too much data for PMR	Manuela Almås and Joel Celén	External	Not managing to fit the risk in the management report in 8-10 pages	Low	Medium	2	40%	4.4	Avoidance	Making sure the text and diagrams that you add fit in the constraints and the point	Management Team	going through the correct steps and making some changes like removing unnecessary parts	We are creating unnecessary text and focusing more on creating new and focused text	Active
Planning	R05	Lack of knowledge or skill	Manuela Almås	External	Not having enough knowledge due to barriers preventing us from understanding the requirements	Medium	Medium	3	50%	1.5	Mitigation	Doing research on our own before each function starts	Management Team	making our TA's share any documents that are needed for each function and the risks involved to help	Active	
Development	R06	Technical issues	Joel Celén	Technical	Unpredicted issues with the code or any related software	High	Medium	4	70%	2.8	Mitigation	Gather knowledge by asking others or experimenting	Development Team	telling the TA's other team members who have had experience for help	Active	
Management	R07	Inexperienced monitor and control	Joel Mattsson	External	Inexperienced of the team's progression leading to get informed about what needs to be done	Medium	Medium	2.5	30%	0.75	Avoidance	Reviewing what you have done and what is left to do	Management Team	Going through the risks to see what should be done and what is left to do	Active	
Team	R08	Lack of Communication	Manuela Almås and Joel Celén	Internal	Some team members have different working styles or ways of communicating, not everyone speaks the same language or has the same way of thinking	Medium	High	5	80%	1.8	Mitigation	Make sure everyone uses the same language to communicate and that they understand each other	Management Team	going through the risks to see what should be done and what is left to do	We are in the process of learning the working language as English. We are trying to find a common language that everyone can understand and agree with	Active
Team	R09	Overexposure	Joel Celén	Internal	Different interests of the group might cause different interests in certain areas and general or in a specific area	Medium	Low	2.5	20%	0.5	Mitigation	Talk with the team before the project is initiated and make sure that everyone is interested in the project	Management Team	bring up in a meeting and discuss the interests of the team and what they are interested in doing first, speak to be 10.	Active	
Planning	R10	Unspecified Overhead	Joel Celén	Internal	Delays in the project may lead to the team needing to work overtime	High	Low	4	10%	0.8	Awareness	Find out what the project needs to do, we need to spend some of our project time and work on the tasks that are not specified	Management Team	Explain the amount of time that we have planned for this task. Cut off time if necessary	We made sure to put in some slack time in the timeline	Active
Planning	R11	Remote Work	Manuela Almås and Joel Celén	Technical	A member of the team working remotely might experience difficulties with their internet or computer working properly	Medium	Medium	3	80%	1.5	Awareness	Make sure to properly document all meetings	Management Team	We will do our best to make sure that the team members can work well without any difficulties	Active	
Team	R12	Member Leaving Team	Manuela Almås and Joel Celén	External	A team member decides to not continue working on the project for any reason	High	Low	5	50%	0.5	Awareness	Explain the tasks that the member was supposed to do to the rest of the team	Management Team	Aim to be first to create a contingency plan	Active	
Development	R13	User Management Change One	Joel Celén	External	The user gets modified or upgraded by the user management	High	Low	4	6%	0.2	Awareness	Accommodate user management change requests	Management Team	Accommodate user management change requests	Active	

We updated the Risk Management table to include new risks foreseen by the team. We added the “Active Status” column to make it easier to see which risks are active or not.

Risk Managemet Table.xlsx

### 5.2.2 Risk Management Matrix:

Iteration 5		Likelihood of Occurrence		
		LOW	MEDIUM	HIGH
Impact	LOW	R02 RR:1.0 R04 RR: 0.8		
	MEDIUM	R09 RR: 0.5  R05 RR:1.5 R11 RR: 1.5 R07 RR:0.75 R03 RR:0.5	R08 RR: 1.8	
	HIGH	R13 RR:0.2 R12 RR: 0.5 R10 RR: 0.6	R06 RR:2.8 R01 RR:2.5	

 = Acceptable risks. 
  = Prioritized risks. 
  = Unacceptable risks.

We introduced the Risk Management Matrix to show what risks we are focusing on this week and which ones we are accepting. The Risk Rating (RR), is calculated in the Risk Management table and arranged in descending order in each matrix. The green matrices indicates that the risks placed in them are risks that have no significant impact on the project, we therefore use the “Acceptance” strategy to handle them. The orange matrices indicate the risks that have significant impact on the project, we either use “Mitigation” or “Avoidance” strategies to handle them. The red matrix indicates risks that are not acceptable to the team, if a risk shows up here we need to try and mitigate these risks as the very highest priority.

## 5.3 Monitor and Control

Tasks below - Every picture under this header that displays our progression - Dependent on the table below

	Expected work	Actual work	Proportion of work completed
<b>Development</b>	Merge MVP PMER Research Basic graphics Persistant Scores Progress display	Expected work	$5 / 5 = 1$
<b>Management</b>	ABC progress graph SPI graph Risk table Risk prioritization Burndown chart Gantt chart Increment plans PMER Research  <b>UNFINISHED TASKS:</b> Assessment/review PMER  <b>EXTRA TASKS:</b> Optimal SPI boundaries ABC graph description - Iteration 4 Make PMR more compact and concise	Expected work - <b>UNFINISHED TASKS + EXTRA TASKS</b>	$11 / 10 = 1.1$

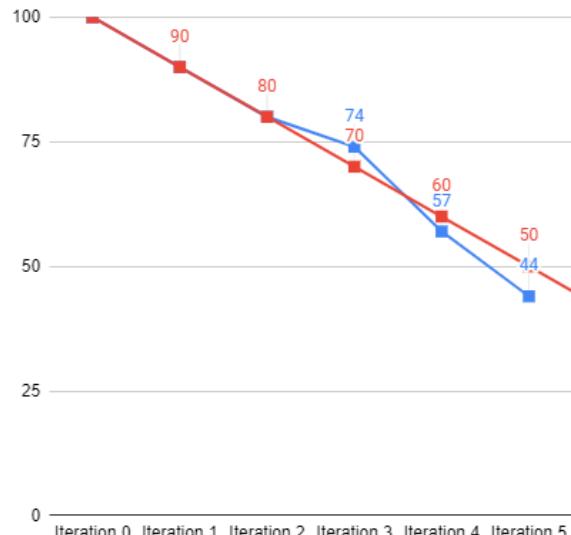


Tasks completed this iteration: 16/15

The table of tasks above is synchronized with our management of tasks in ClickUp. This is to show the different ways we are tracking the amount of tasks that we complete each iteration.

According to this picture, the expected work for the experience report and assessment/review this iteration wasn't completely finished. This means that we will postpone the completion of these to the upcoming iteration, which creates a delay in our schedule. However, the table of tasks presented before this ClickUp picture states that we completed three tasks which we did not account for (extra tasks), resulting in us doing more than the initial iteration plan from the perspective of completion in terms of the number of tasks.

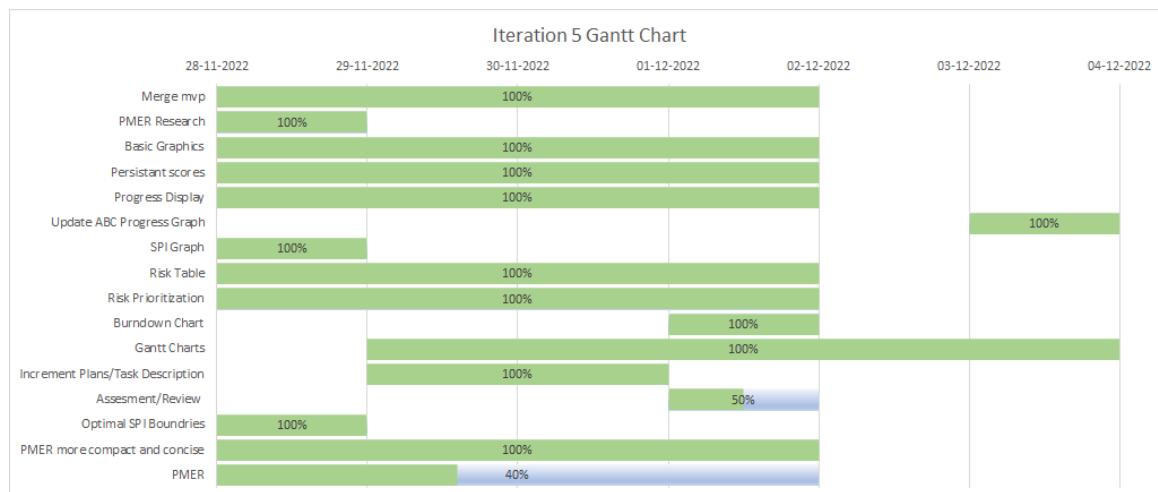
With that said, despite our failure of completing the planned tasks for this particular iteration, the extra tasks we spontaneously came up with, which all were completed, compensates for this. Due to this fact, the charts below are all pointing toward an improvement that covers different aspects of the project. In the burndown chart below, we can therefore see that our progression looks better than what it did the previous iteration:



We accomplished our plans for this iteration from both the aspects of management and development. At the same time we have much work to do in the experience report considering the few iterations left. However, since the start of this iteration we let one member switch from the coding team to the management. This enables us to spend more time on this report.

Iteration	3	4	5
Joel Mattsson	6	7	9.5
Utkarsh Singh	-3	-0.5	-0.5
Manely Abbasi	-7	-3	-2
Joel Celén	0	0.5	-2
Felix Humleby	-2	6.5	-1
Lucas Carlson Holter	-7	-0.5	-0.5
Mohammad Khalil	-5	-2.5	-2

The time table above is also the reason to the positive green appearance of the gantt chart below



## SPI graph - Measurement of team dynamics and maturity

In comparison with what we had the last iteration, this graph now also contains the cost variance as well as each line's optimal value, with the purpose of facilitating the process of interpreting the graph. The optimal values are displayed as dotted lines, and we aim for their corresponding line to get closer as the iterations as well as the team's maturity increases. Below are two essential in-depth descriptions of calculations used in the new SPI graph.

Cost variance:

In contrast to using the mean of everyone's hours we use the expected hours as the target mean, by virtue of conveying the difference of our hours and ambition. Optimally we want everyone to spend 20 hours a week, which would result in a cost variance of 0. In other words, the smaller the variance is, the better distribution of work the team has.

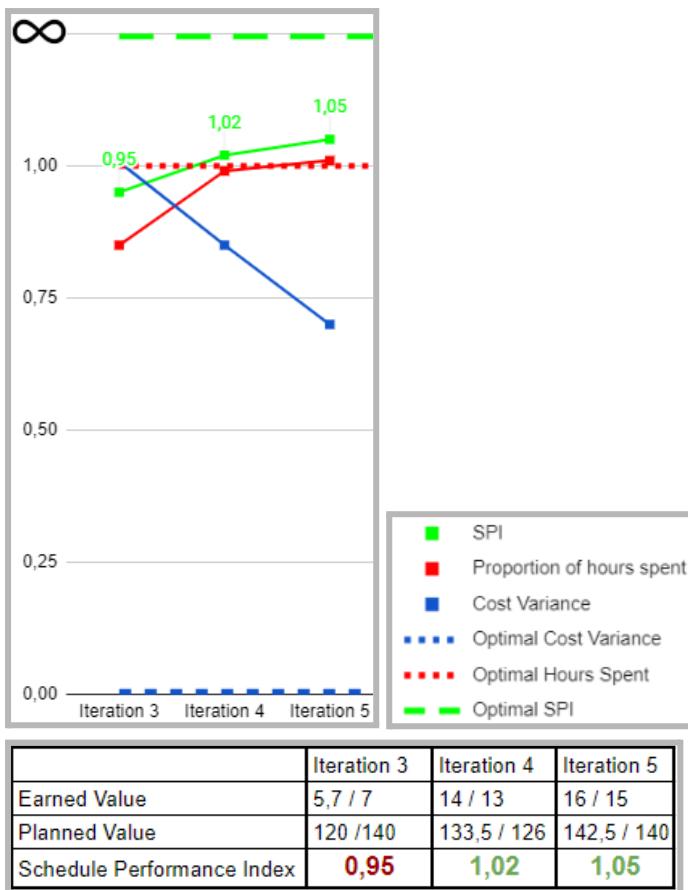
Formula that "simplifies" the cost variance value in accordance with the graph:

(Cost variance value in graph = (((Actual cost variance value of current iteration)<sup>0.5</sup>) / 5))

This formula is applied on [Cost Variance](#) and brings its value of the current iteration closer to the "main" values of the graph ([Proportion of hours spent](#), [SPI](#)) which allows a more detailed and clear view of the graph (Google Spreadsheet zooms out in parallel with the numerical difference of values → Big difference of values equals a view impossible to read details from). For instance, our cost variance in the third iteration was 25.33. Since the numerical difference between 25.33 and the SPI value (approximately 1 in graph) is big, we won't be able to see the small details shown in the graph below that makes conclusions about correlations possible.

In other words, the purpose of this formula is to enhance the view while not changing the numerical relationships between the cost variance values. We are essentially multiplying the actual cost variance value with a factor X with the objective of reducing the absolute distance between the new obtained value with the other values in the graph. The formula can therefore be simplified with the numerical method:  $25.33 * X = 1.007 \Leftrightarrow X = 1.007 / 25.33 = 0.0398$ . Conclusion:  $((A^{0.5})/5) = A * 0.0398 = J$  where A is the original cost variance value and J is the value in the graph.

The values in Earned Value are based on the table of the tasks, ClickUp and Gantt chart shown earlier.

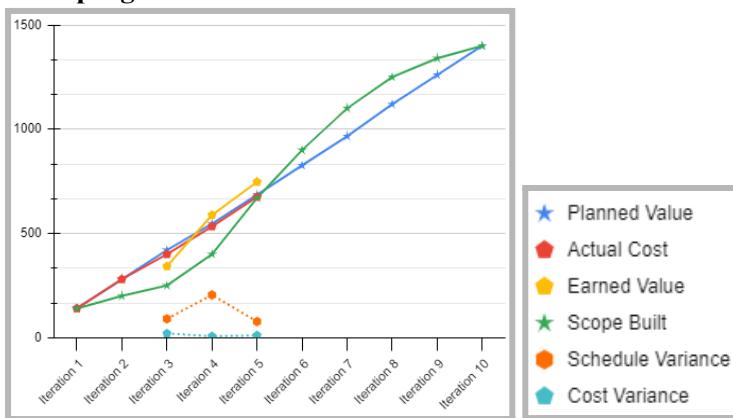


Calculation for this iteration's cost variance:

- Actual cost variance = 17.58
- Value in graph =  $17.58 * 0.0398 = 0.7$

The fact that the blue line decreased significantly since the previous week shows our improvement of distributing the work.

### ABC progress



- The cost variance → Decreases from iteration 3 to 4 - Corresponds with SPI graph above
- The cost variance (difference between actual cost and planned value) is
- Earned value increases - Correlates with burndown chart, table of tasks, ClickUp and Gantt chart

In summary, the two graphs that monitor our hours show how we approached the planned number of hours and even went a few hours beyond in accordance with the time tables. As for the organization and completion of tasks, the table of tasks with pie charts, ClickUp picture and Gantt chart are synchronized because they are all agreeing that we didn't completely finish two specific tasks for this iteration, while also displaying 16 tasks in total. Considering the table of tasks with pie charts tells us that we completed 16/15 tasks this iteration, the continued positive progression is correlated in the burndown chart. The only issue with the correspondence of our monitoring for this iteration is that the evolution of our cost variance from the 4th to this iteration looks different. In the ABC progress graph above this value increases, in contrast to the content of the SPI graph. Due to our spontaneous modification of reducing the expected hours for each individual from 20 to 18 in the previous iteration ,we expected 126 total hours instead of 140, the cost variance decreased. We also have to consider the fact that we for this iteration didn't make this exception and expected 20 hours from everyone. This caused an inconsistency in this variable's values for these two particular iterations since its definition in the ABC progress graph is the difference between actual and expected hours (and we modified the expected hours).

### 5.3 Assessment/Review

Iteration 5	Expected work	Actual work	Description of actual work	Lessons learned
Development	Basic Graphics Progress Display Pause Function Presistant Scores Obstacles Change Direction Merging MVP	Basic Graphics Progress Display - Presistant Scores - - Merging MVP Basic food generation	We changed the goals for the week during our work because we realized that we for example needed the foodgeneration before we implemented the score. In short, we did not achieve all our planned goals but we did other important stuff outside of the planning as well.	We learned a lot about how to integrate different pieces of code and how javaFX interacts with java.
Management	Updating Risk Management Table Risk Management Matrix Increment plans Iteration 5 task and description Gantt progress chart Burndown chart ABC Progress SPI graph ClickUp Experience Report	Expected work	We added one more member in the management team to be able to stick to our plan	We learned that we should make the various charts and graphs more specific to each iteration. We learned that we need to work more activley with ClickUp to make it easier for the team to clearly see whats currently going on in the project. We learned that we need better structure for team meetings, therefore we decided to make a "meeting template".

#### Changes for next iteration

Better organization in ClickUp

Instead of making an estimation of time that we will spend in the Friday meetings, everyone will update their own time spent until a specified time every Sunday. Then let everyone else know if they managed to solve an additional task that will be added for the particular iterations' progress.

At this specific time, the ones responsible for the charts will update them in accordance the hours we spent

We will cut down the number of tools in the monitor and cost department and only keep the ones that we feel are necessary and show our progress the best

# Iteration 6

## 6.1 Iteration 6 and increment plans

This week the managers decided to contribute to the development part. The managers will take control of simple tasks and will try to complete them on time. The development is on track and they will also help the management team to help in contributing in the development part. In iteration 5 the development team was done with the MVP of our game and now they will work on additional features of our game. The management team could not complete one task in iteration 5 which was the Project Management Experience Report. They will try to complete the same in this Iteration. Since the management team also has to contribute in the development part, there is a possibility that they might not complete their tasks for this iteration.

**The development team** is supposed to complete the scoreboard, pause screen, game over screen, adding types of food. Furthermore they are also supposed to deliver the tasks along with the testing at the end of the iteration 5.

**The management team** is supposed to update the risk table for Iteration 6 and also update the risk matrix. Will finalize the project management report for the iteration 6 along with making a table which will contain the tasks description, expected hours and actual hours. This table will help the management team to monitor and control easily with all the details at one place.

## 6.2 Risk Management plan

### 6.2.1 Risk Management Table:

ID	Risk	Owner	Identify		Analyze		Planning					
			Sources	Description	Qualitative		Strategies	Notes	Assigned To	Contingent action	Risk management prevention	Active Status
					Impact	Likelihood of Occurrence						
R01	Unexpected difficulties in GitHub	Manely Abbasi	Technical	Sudden problems in GitHub leading to the possibility of damage or destruction of the code.	High	Medium	Mitigation	Make sure you have enough knowledge by watching tutorials or asking others for help.	Development Team	Tell our TA about the problem and asking for help. Keeping a back-up code somewhere other than GitHub.	The actions that have been taken having GitHub sessions with group members who are more experienced in GitHub and teaching them members.	If the risk is active or inactive
R02	Lack of personnel	Manely Abbasi	External	One of the group members getting sick or having personal problems making them unable to work.	Low	Medium	Mitigation Acceptance	Putting another two people in for each task so that they can fill in for the other person if they are absent.	Management Team	Someone from other sub-team do the task instead.	dividing the whole group into two sub-groups, but very there are multiple people working in the same context	Active
R03	Conflict between group members	Manely Abbasi	Internal	Having disagreements or fights in the group.	Medium	Medium	Avoidance	Being a peaceful towards each other and solving disagreements by talking and as soon as possible to prevent from any fight from happening.	Management Team	Tell the group manager or TA	We send conflict handling into the team agreement to make sure everyone knows what to do in case of conflict.	Active
R04	Too much data for PMR	Manely Abbasi and Joel Celen	External	Not managing to fit the project management report in 60 pages.	Low	Low	Acceptance	Making sure that the test and diagrammatic parts go into the report is consistent and to the point.	Management Team	going through the report again and making sure that the removing tests or charts.	We are not including unnecessary test and focusing more on putting charts or tables	Active
R05	Lack of knowledge or skill	Manely Abbasi	External	Not having enough knowledge due to lectures getting cancelled or not learning project.	Medium	Medium	Mitigation	doing research on our own before each iteration starts	Management Team	asking our TA to share any documents that can be helpful or asking other group members for help	We dedicated the first iteration of construction phase to doing research on various subjects needed for the project.	Active
R06	Technical Issues	Joel Celen	Technical	Unexpected issues with the code or any related software.	High	Medium	Mitigation	gather information by asking others or experimenting	Development Team	asking our TA or other team members who have more experience for help	We made sure that every team member working on the code have the same version of the code.	Active
R07	Inaccurate monitor and control	Joel Matteson	External	Misinterpretation of the team's progression leading to an incorrect picture of how the work there is to be done.	Medium	Medium	Avoidance	reviewing what you have done and what is left to do	Management Team	going through the things that should be done and starting to work on them one by one	We made sure to be several basis for monitor and control so that we can pick the ones that we have greater confidence in the estimates.	Active
R08	Lack of Communication	Manely Abbasi and Joel Celen	Internal	The team members fail to communicate with each other and lack of communication. Not all members are native English speakers and some members have language misunderstandings.	Medium	High	Mitigation	Make sure everyone uses the same language and make sure that the working language is agreed upon. If someone does not understand your question, ask them to explain further.	Management Team	Aking questions if you did not understand the task or some other thing. If someone is not able to answer your question, ask them to repeat what you asked them to explain further.	We wrote in the team contract that the working language is English. We agreed on using Google Hangout to communicate within the group.	Active
R09	Uneven Expectations	Joel Celen	Internal	Different members of the group might have different expectations on how much work should be done and what is expected on a specific task.	Low	Low	Acceptance	Talk with the team before the project is initialized and make sure that the team members have the same expectations clear.	Management Team	Bring it up in a meeting and discuss the issue with the team. If not comfortable with doing that, speak to the TA.	We made sure to include every team members individual interests and expectations in the team contract.	Active
R10	Unexpected Overdue	Joel Celen	Internal	Delay in the project may lead to the team needing to work overtime or it will affect the final grade due to the assessment.	Medium	Low	Acceptance	If we realize that the project gets severely delayed, we all have to spend extra time to finish the project and work on the project instead.	Management Team	Reserve the amount of free hours that was planned to be used for the project. Cut out unnecessary work.	We made sure to put in some slack in the timeline.	Active
R11	Remote Work	Manely Abbasi and Joel Celen	Technical	A member of the team working remotely might experience issues with their internet or computer working properly.	Low	High	Acceptance	Make sure to properly document all meetings.	Management Team	Makes sure all meetings are available online so that the team member can follow what is happening in the group.	We made sure to use Discord to communicate, this ensures that everyone can participate even if they are not here in person.	Active
R12	Member Leaving Team	Manely Abbasi and Joel Celen	External	A team member decides to not continue working on the project for any reason.	Medium	Low	Acceptance	Update the tasks that the member was supposed to do to other members of the team.	Management Team	Ask TA or Prof. Green for a contingency plan	We made sure that all members of the team has some rudimentary knowledge of all parts of the project so that we can divide the tasks among us.	Active
R13	Upper Management Changes the Project	Joel Celen	External	The project gets modified or canceled by the upper management.	High	Low	Acceptance	Ask upper management for instructions on how to proceed.	Management Team	Accommodate upper managements change requests.	We made sure to stay updated with Caraveo so that we can update the tasks in the course as soon as possible.	Inactive
R14	Unexpected issues with Maven	Lucas Carlsson Holter	Technical	The team face unexpected issues when trying to install the project over to Maven.	Low	High	Acceptance	Make sure that Maven runs well, otherwise it will affect the project without using Maven.	Lucas Carlsson Holter	If something to Maven does not work out, we will skip it.	We made sure not to give integration of Maven as a task to the team members, if they do not work out we just skip it.	Active
R15	Compatibility Issues	Felix Hunkley	Technical	The code that is written is not compatible with already existing code.	Low	Medium	Acceptance	Make sure all code is written in sequence branches on GitHub. Make sure the new code is compatible with the already existing code.	Lucas Carlsson Holter	Refactor/design the code until it works well with already existing code.	We have made sure that all members that are not part of the development tasks to prevent confusion.	Active
R16	Misinterpretation of Requirements	Joel Matteson	Internal	The team or members of the team does not have a good comprehension of what needs to be done and what is the purpose of certain requirement.	Medium	Low	Acceptance	Make sure all team members are well aware of the requirements given in the project.	Joel Matteson	The manager that has interpreted the task in a wrong way should either re-do their work if possible, or make sure to have the need iteration.	We got all the requirements in a matrix available to all team members and communicated to them so that they can interpret the requirements correctly. The team to track our progress.	Active

6.2.1. For iteration 6 we introduced 4 new risks as shown in the Risk Management Table. We changed the Impact/Occurrence of several risks. We removed the quantitative part of the Risk Analysis. We updated the Risk Management Prevention column so that all risks have a corresponding description.

X Risk Managemet Table.xlsx

## 6.2.2 Risk Change Table

Iteration 6		
ID	Risk	Reason For Change
R04	Too much data for PMR	We assessed the project progress and the number of pages that we have left in the report seems plenty to fit the 60-page limit, we therefore down prioritized the risk.
R09	Uneven Expectations	We reasoned that the closer the project gets to finalisation, the more the team goals gets synchronized. Therefore we down prioritized the risk.
R10	Unexpected Overtime	Because we are on track with the project and the majority of the tasks are implemented, we assess that the risk of unexpected problems leading to overtime is lessened. We therefore down prioritized the risk.
R11	Remote Work	We had our first team member working from abroad. We realized that the impact is not as high as we initially thought, but that the occurrence is more likely. We therefore change the priority.
R12	Member Leaving Team	Because we are on track with the project and the majority of the tasks are implemented, we assess that the impact of a team member leaving the team would be less severe at this stage. We therefore down prioritized the risk.
R13	Upper Management Changes the Project	We were told by "Upper Management" that the project would definitely not be changed or cancelled. Therefore we set the risk as inactive.

6.2.2. For iteration 6 we introduced the Risk Change Table. The risk ID and name correlates to their counterparts in the Risk Management Table. Under the column “Reason For Change” we describe why the risk has changed for this particular iteration.

## 6.2.3 Risk Management Matrix:

Iteration 6		Likelihood of Occurrence		
		LOW	MEDIUM	HIGH
Impact	LOW	R04 R09	R02 R15	R14 R11
	MEDIUM	R16 R10 R12	R03 R07 R05	R08
	HIGH		R01 R06	

= Acceptable risks. = Prioritized risks. = Unacceptable risks.

6.2.3. For iteration 6 we updated the Risk Management Matrix to reflect the changes in priority of risks and include the new risks. We expanded the scope of the unacceptable risks and prioritized risks. This is reflected in the new colors of the matrix.

## 6.2.4 Risk Management Summary

For the Risk Management Table (*RMT*), model 6.2.1, we decided to remove the “Milestones” column. We felt that it was not necessary to monitor the risks and it did not give any other useful information. We also removed the quantitative analysis part in the *RMT*. We were told by Prof. Gren that this kind of analysis is not very helpful for our project since we are not dealing with actual costs. We agree with this assessment and feel like the qualitative part is more than enough to help us prioritize the risks.

For Iteration 6 we felt the need to justify and reflect over how the risks change from iteration to iteration. We therefore designed the Risk Change Table (*RCT*), model 6.2.2. We will both list changes in priority, or if the status of a risk goes from active to inactive or vice versa. We think this will help us keep track of the changes over time and provide the traceability that is needed in the project.

For the Risk Management Matrix (*RMM*), model 6.2.3, we went through the risks to see if any priorities had changed, then we updated the *RMM* to reflect those changes. As the project progresses the impact of some risks will go down because we have completed a larger part of the tasks. We also chose to redesign the colors of the matrix to better reflect the impact on the project.

## 6.3 Monitor and Control

### 6.3.1 ClickUp: Presentation of task-management

A ClickUp board showing a completed iteration. The board has three columns: OPEN (0), IN PROGRESS (0), and COMPLETE (6). The COMPLETE column contains six tasks, each with a small icon, a title, a due date, and a status bar indicating completion. The tasks are:

- Snake: Game Over screen - completed yesterday by dev team, iteration 6.
- Snake: Basic Food Generation - completed 6 days ago by dev team, iteration 6.
- Snake: Adding Types of Food - completed 6 days ago by dev team, iteration 6.
- Snake: Research maven - completed Nov 28 by dev team, iteration 6.

Each task also includes a '+ ADD SUBTASK' button.

6.3.1.1. *The development sub-team successfully completed 6/6 tasks this iteration.*

A ClickUp board showing a completed iteration. The board has three columns: OPEN (0), IN PROGRESS (0), and COMPLETE (14). The COMPLETE column contains four tasks, each with a small icon, a title, a due date, and a status bar indicating completion. The tasks are:

- Snake: Updating Risk Management Table - completed 6 days ago by iteration 6, management.
- Snake: Update Risk Matrix - completed 6 days ago by iteration 6, management.
- Snake: Update Risk Management Experience Report - completed 6 days ago by iteration 6, management.
- Snake: End of Iteration Meeting Agenda - completed 6 days ago by iteration 6, management.

Each task also includes a '+ ADD SUBTASK' button.

6.3.1.2. *The management sub-team successfully completed 14/11 tasks this iteration.*

Both of these pictures of tasks combined give us a definitive perception of the productivity as well as planning of the entire group versus our expectations. There were three tasks ('PMER - Iteration 2', 'End of Meeting Agenda' and 'Risk Management Experience Report') that were not in the increment plans, making them extra tasks that we completed beyond our planning.

### 6.3.2 Percentage of Task Completion

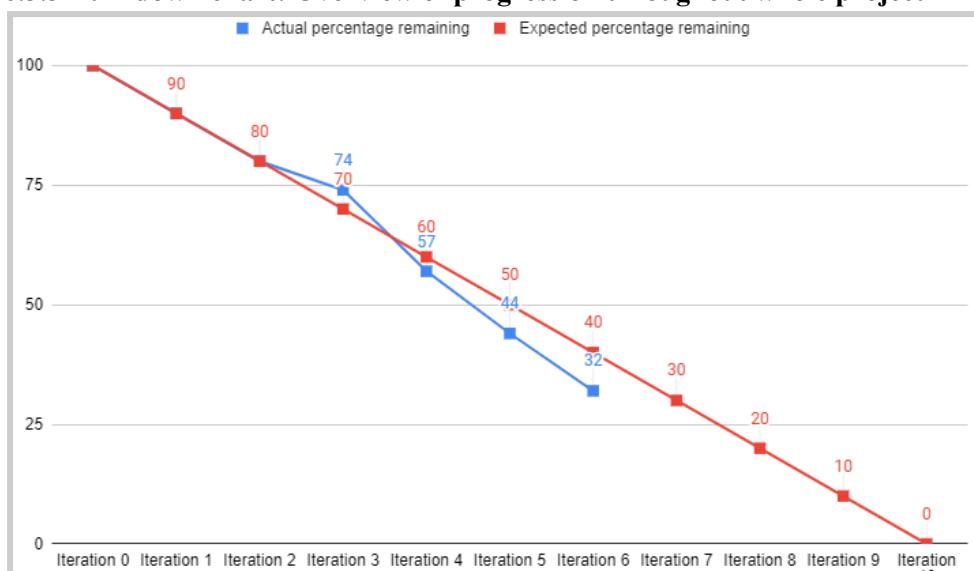
	Expected work	Actual work	Proportion of work completed
<b>Development</b>	Research Maven Game Over Screen Scoreboard Progress display Basic Food Generation Add Types of Food	Expected work	$6 / 6 = 1$
<b>Management</b>	SPI graph Risk table Risk prioritization Burndown chart Increment plans Assessment / Review PMER - Iteration 6 PMER - Iteration 5 Monitor and control correlation texts and summary Time table with specific tasks and estimations Time table with individual difference  <b>EXTRA TASKS:</b> PMER - Iteration 2 End of Iteration Meeting Agenda Risk Management Experience Report	Expected work + <b>EXTRA TASKS</b>	$14 / 11 = 1.27$



As the pictures depicting our organization in ClickUp point toward, 20 / 17 tasks were completed this iteration.

Percentage of task completion:  $20 / 17 = 1.18$

### 6.3.3 Burndown chart: Overview of progression throughout whole project



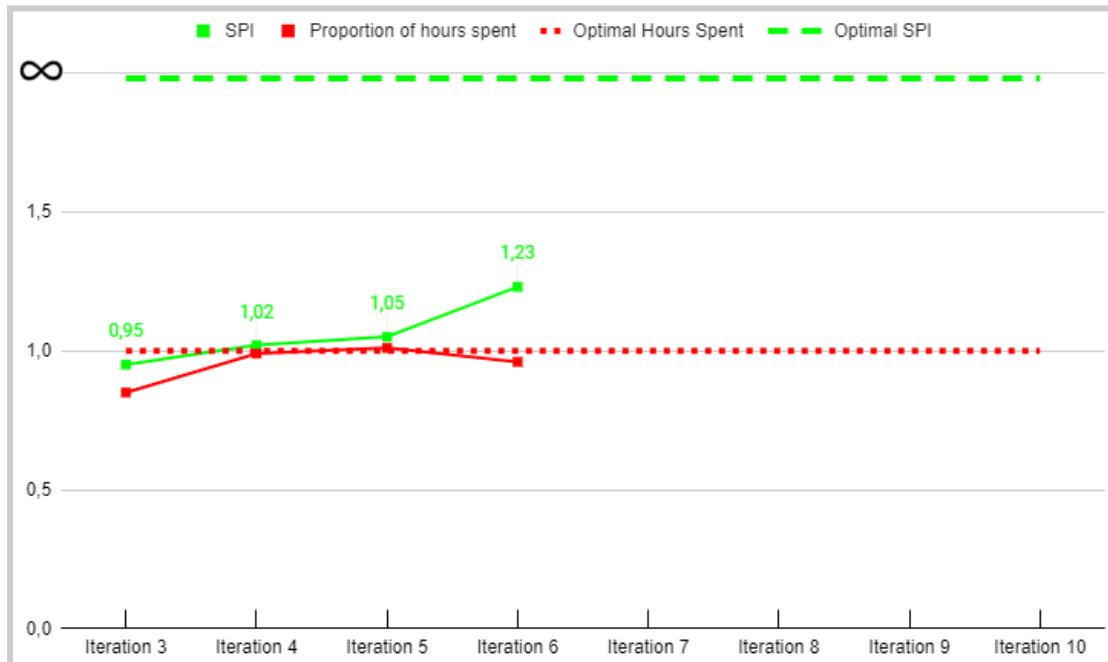
#### 6.3.3. The Burndown Chart with the updated progress for Iteration 6.

Considering we completed 18% more than expected this iteration illustrated in the table above, the positive progress continues in this burndown chart. If we would have a task completion of 100% instead of 118%, we would have 34% ( $44 - 10$ ) of the work remaining. Consequently, it's reasonable that the percentage displayed is slightly lower than 34.

### 6.3.4 SPI graph: Measurement of team dynamics and maturity

SPI = EV / PV	Iteration 3	Iteration 4	Iteration 5	Iteration 6
Earned Value (EV)	5,7 / 7	14 / 13	16 / 15	20 / 17
Planned Value (PV)	120 / 140	133,5 / 126	142,5 / 140	135 / 140
Schedule Performance Index (SPI)	0,95	1,02	1,05	1,23

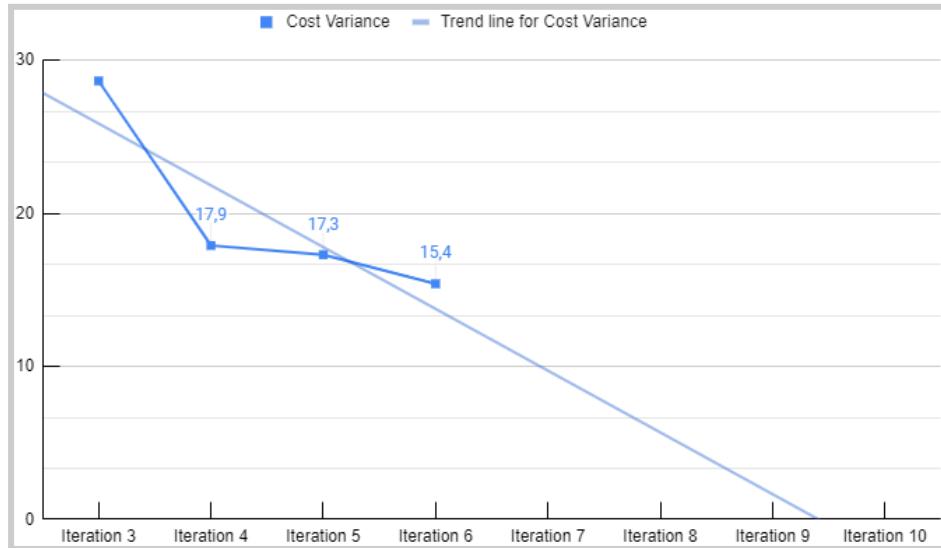
6.3.4.1. The Earned Value (20 / 17) is retrieved from ClickUp and the table of percentage completed above. The Planned Value (135 / 140) is retrieved from the time table above.



6.3.4.2. The SPI Graph with the updated values for Iteration 6.

A contributing factor to the drastic change of SPI this iteration is that we registered more precise and specific tasks in ClickUp, which resulted in a greater number of tasks completed. In parallel, this increased the Earned Value -as shown in the table above -, and hence the SPI. Ultimately, we still improved since the 5th iteration by virtue of our reduced hours spent while maintaining a satisfying percentage of completion of the planned tasks.

### 6.3.5 Cost variance: Complementing factor to SPI graph measuring level of communication



6.3.5. This iteration we introduced the separate Cost Variance Graph.

We decided to exclude the cost variance simplifying formula that we used in the previous iteration and put the factor in a separate graph to make it less confusing for the reader. Since the trend line is approaching 0, our distribution of work, and hence communication continuously improves each iteration. This improvement also affects our productivity, and is mainly the reason for the excellent SPI shown above.

### 6.3.6 Time table: Individual differences from expected hours

Iteration	3	4	5	6
Joel Mattsson	6	7	9.5	5.5
Utkarsh Singh	-3	-0.5	-0.5	-4.5
Manely Abbas	-7	-3	-2	-3
Joel Celén	0	0.5	-2	4
Felix Humbley	-2	6.5	-1	-3
Lucas Carlson Holter	-7	-0.5	-0.5	-2
Mohammad Khalil	-5	-2.5	-2	-2

6.3.6. The time table for Iteration 6 with the updated hours for all team members.

According to this table, it's the first iteration where no one's hours is marked with red, meaning that the difference between our actual hours and the 20 expected hours is less than 6. As shown in the cost variance graph above, the general trend for each individual is approaching 0 in this table.

### 6.3.7 Monitor and Control: Summary

In conclusion, in ClickUp we have 20 completed tasks tagged as "iteration 6", where 3 tasks initially weren't in the increment plans. This is synchronized with the table of tasks with pie charts because it states that the percentage of tasks completed for this iteration is  $(20 / 17) = 118\%$ . This is integrated in the burndown chart by multiplying the expected percentage of progress with 1.18 and subtracting it with the percentage from the previous iteration  $(44 - (10 * 1.18) = 32)$ . The combination of values from our percentage of completion and the time table presenting actual and expected hours spent are used to calculate the Schedule Performance Index, which was significantly higher than usual in this iteration. The table of actual versus expected hours also tells us that we spent 5 hours less than expected, which explains why the red line Proportion of hours spent is slightly below its optimal value of 1 in the SPI graph. The cost variance graph is associated with the time table of individual differences from expected hours, where we made an improvement since the 5th iteration because no one had a red difference, even though the majority of us were in the yellow area instead of the green one unlike the last iteration. Generally speaking, every aspect of our monitoring this week points toward a success both in terms of progression of work and team maturity.

## 6.4 Iteration Review/Retrospective

### 6.4.1 Backlog

Backlog Iteration 6		
Task	Original Iteration	Outcome
Iteration 5 PMER Update	5	Pushed to Iteration 7
Iteration 5 Assessment/Review	5	Resolved
Design	6	Pushed to Iteration 7
Pause Screen	6	Pushed to Iteration 7
Pause Function	6	Pushed to Iteration 7

6.4.2. For iteration 6 we introduced a Backlog Table (BT) to make it easier to visually represent what tasks are currently in the backlog at the time of the Iteration Review/Retrospective. The task name corresponds to the name we use in ClickUp. Under “Original Iteration” we list the iteration where the task should have been completed. Under “Outcome” we list what happens to the task. If it was resolved during the current iteration we give it the tag “Resolved”, if not we give it the “Pushed to” tag followed by the iteration.

For this iteration we had 5 tasks in the backlog. The task “Iteration 5 PMER Update” is about 90% done, there is some formatting work to be done but the information is there. The tasks “Design”, ”Pause Screen” and “Pause Function” were all pushed forwards because of time constraints.

### 6.4.2 Iteration 6 Task Progress

Iteration 6		
Team	Expected Work	Actual Work
Development	<ul style="list-style-type: none"> <li>- Progress Tracking</li> <li>Game Over Screen</li> <li>Basic Food Generation</li> <li>Adding Types of Food</li> <li>Researching Maven</li> <li>Design</li> <li>Pause Screen</li> <li>Pause Function</li> </ul>	<ul style="list-style-type: none"> <li>Scoreboard</li> <li>Progress Tracking</li> <li>Game Over Screen</li> <li>Basic Food Generation</li> <li>Adding Types of Food</li> <li>Researching Maven</li> <li>-</li> <li>-</li> <li>-</li> </ul>
Management	<ul style="list-style-type: none"> <li>Update Burndown Chart</li> <li>Update SPI Chart</li> <li>Update Risk Matrix</li> <li>Update Risk Table</li> <li>End of Iteration Agenda</li> <li>Iteration Review</li> <li>Update PMR</li> <li>Iteration 5 PMER</li> <li>Update Monitor &amp; Control</li> <li>Iteration 5 Review</li> </ul>	<ul style="list-style-type: none"> <li>Update Burndown Chart</li> <li>Update SPI Chart</li> <li>Update Risk Matrix</li> <li>Update Risk Table</li> <li>End of Iteration Agenda</li> <li>Iteration Review</li> <li>Update PMR</li> <li>-</li> <li>Update Monitor &amp; Control</li> <li>Iteration 5 Review</li> </ul>

6.4.2. Revised Task Table (TT) from Iteration 5. Updated to reflect this iteration's tasks.

The development team spent more time than estimated this iteration on the “Researching Maven” task. This is why 3 of the other tasks were put in the backlog for Iteration 7, see model 6.4.2. The “Scoreboard” task was originally planned for Iteration 7 but was completed earlier, since it is coupled with the “Progress Tracking” task.

### 6.4.3 Next Iteration Planning

4 TASKS		STATUS	ASSIGNEE	START DATE	DUE DATE
Design	= dev team iteration 7	IN PROGRESS	MA, LCH	4 days ago	Dec 16
Pause Screen	= dev team iteration 7	IN PROGRESS	FH, LCH, MK	4 days ago	Today
Pause Function	= dev team iteration 7	IN PROGRESS	LH	Nov 28	Dec 2
Change Direction	= dev team iteration 7	IN PROGRESS	LH, JM	Nov 28	Dec 2

#### 6.4.3.1. The planned tasks for the development team, Iteration 7.

7 TASKS		STATUS	ASSIGNEE	START DATE	DUE DATE
Updating Risk Management Table	iteration 7 management	IN PROGRESS	MA, JC	Mon	Dec 16
Update Risk Matrix	iteration 7 management	IN PROGRESS	MA, JC	Mon	Dec 16
Task Description/Increment Plans	iteration 7 management	IN PROGRESS	US, LCH, MK	Mon	Dec 16
Iteration 6 PMER Update	iteration 7 management	IN PROGRESS	LH, JM	Mon	Dec 16
Update Risk Change Table	iteration 7 management	IN PROGRESS	JC, JA	Mon	Dec 16
Iteration planned tasks percentage of completion table and pie charts	iteration 7 management	IN PROGRESS	JM	Sun	Sun
Iteration 6 Task description/ Increment Plans	iteration 7 management	IN PROGRESS	US	4 days ago	Tomorrow

#### 6.4.3.2. The planned tasks for the management team, Iteration 7.

Expected Risks for Iteration 7		
ID	Description	Team Members
R01	Unexpected difficulties in GitLab	LCH, MK, FH, MA, JM
R02	Lack of personnel	JC, JM
R05	Lack of knowledge or skill	LCH, MK, FH, MA, JC, JM
R06	Technical Issues	JM
R07	Inaccurate monitor and control	US, JM
R08	Lack of Communication	LCH, MK, US, FH, JC, JM
R10	Unexpcted Overtime	LCH, MK, FH, MA, JM
R11	Remote Work	US
R14	Unexpected issues with Maven	LCH, MK, FH
R15	Compatibility Issues	LCH, MK, FH, MA, JM
R16	Misinterpretation of Requirements	JM

6.4.3.3. For iteration 6 we introduced the Expected Risks Table (ERT), to make it easier to track next iterations risks. The ID and Description is the same as the RMT counterparts. Under “Team Members” the initials of the team members who have made the assessment that they might encounter the specific risk for the coming iteration.

We discussed what tasks we need to complete for the next iteration in order to complete the majority of the coding part of the project. We also specified together what risks we might encounter during the next iteration, see ERT, model 6.4.3.3.

#### **6.4.4 Sub-Team retrospective**

Management Team:

This week we spent a lot of time on structuring the different documents that we have to hand in. We made a template for the Project Management Report and a structure for the end of iteration meetings that follows good Agile practices. We feel that we have really good tools to help us monitor the different parts of the project but not a good way to display them to our stakeholders. That is why we felt the need to make a structured template for the PMR that everyone follows. For the coming iteration we decided to focus on keeping the documentation structured in the same way so that the end result will look cohesive and consistent.

Development Team:

In the beginning of the week we finished the score functionality so that it is displayed on the screen whilst playing. Then we implemented a game over screen, score board and basic food generation. We also migrated the project to maven. This took a lot more time than we had expected so some tasks that were planned for this week had to be pushed to iteration 7. Even though we didn't finish all our tasks we still feel that we are on track to finish the project on time. Maven will help us save time since it should download all dependencies automatically so that everyone in the team can contribute easier to the code. For the upcoming iteration we will focus on getting the last important features of the game done so that we can iron out the last kinks before the end of the project.

#### **6.4.5 Entire Team retrospective**

As a team we discussed how much time we should spend on more extra features for the project. We all agreed that it is time to cut some features out and finish up the logic for the game. From now on we will focus on the finishing graphical parts of the game, and getting the remaining tasks done that correlates to the things we are currently missing for a higher grade in the course. The team communication has worked really well the last couple of iterations and we intend on continuing the same kind of meeting structure.

#### **6.4.6 Previous weeks retrospective**

Last iteration we discussed that we need to use ClickUp more for the planning of each iteration. Things like putting the right tags on the tasks and writing time estimations for the tasks in the task description. The team has really focused on this for the current iteration and it is working a lot better. There are huge benefits for the management team to have all the required information gathered in one place. There is still room for improvement, but overall we have done a much better job with this than in the previous iterations.

# Iteration 7

## 7.1 Iteration 7 and increment plans

The whole team decided that we would complete our project in this iteration with all the extra features and go on a vacation for Iteration 9. The development team helped the managers to contribute in the development part and also completed their tasks for Iteration 6 which means that they are on track and should be fine for this iteration. The management team despite contributing in the development part in the past iteration are on track. Some managers were not able to contribute in the development part the past iteration therefore they are going to do the same this iteration and might lead to a possibility that they might not complete the designated tasks.

**The development team** is supposed to implement some extra features. The extra features include a pause screen, change in direction when the snake eats, fixing the design. The development team is also supposed to refactor the code with all the testing required.

**The management team** is supposed to update the risk table for Iteration 7 and also update the risk matrix. Will finalize the project management report for the iteration 7 along with making a table which will contain the tasks description, expected hours and actual hours. This table will help the management team to monitor and control easily with all the details at one place.

## 7.2 Risk Management plan

### 7.2.1 Risk Management Table:

ID	Risk	Owner	Identify		Analyze		Planning					
			Sources	Description	Qualitative	Impact	Likelihood of Occurrence	Strategies	Notes	Assigned To	Contingent action	Risk management prevention
Risk ID	Short description	The person who is responsible for the risk	The category under which the risk falls	The level of impact on the project	The chance of occurring	Based on the strategies mentioned in the risk matrix, write down the appropriate strategies	Actions for each strategy	The team (member) that is most likely to handle the risk	Action to be taken if the risk happens	The actions that have been taken	If the risk is active or inactive	
R01	Unexpected difficulties in GitLab	Manely Abbasi	Technical	Sudden problems in GitLab leading to the possibility of damage or destruction of the code.	Medium	High	Mitigation	Make sure you have enough knowledge by watching tutorials or asking for help	Development Team	Tell our TA about the problem and asking for help. Keeping a back-up code somewhere other than GitLab	having GitLab sessions with group members who are more experienced in GitLab and teaching other members	Active
R02	Lack of personnel	Manely Abbasi	External	One of the group members getting sick or having personal problems making them unable to work.	Low	Medium	Mitigation Acceptance	Putting at least two people for each task so that there is always someone else for the other person if they are absent	Management Team	Someone from other sub-team do the task instead	dividing the whole group into two sub-groups, that way there are multiple people working in the same context	Active
R03	Conflict between group members	Manely Abbasi	Internal	Having disagreements or fights in the group.	Medium	Medium	Avoidance	Being respectful towards others and solving disagreements by letting as soon as possible and not holding grudges. Make sure to prevent from any big fights from happening	Management Team	Tell the group manager or TA	We write conflict handling into the team agreement to make sure everyone knows what to do in case of conflict	Active
R04	Too much data for PMR	Manely Abbasi and Joel Celin	External	Not managing to fit the project management report in 60 pages.	Low	Low	Acceptance	Making sure the text and diagrams are clear and the presentation is consistent and to the point.	Management Team	going through the report again and making some changes like removing texts or charts	We are not including unnecessary text and focusing more on putting charts or tables	Inactive
R05	Lack of knowledge or skill	Manely Abbasi	External	Not having enough knowledge due to lack of experience in learning property	Low	High	Mitigation	doing research on our own before each iteration starts	Management Team	telling our TA to share any documents that can be helpful for the other group members for help	We dedicated the first iteration of the project to teach the other group members various subjects needed for the project	Active
R06	Technical Issues	Joel Celin	Technical	Unexpected issues with the code or any related software.	High	Medium	Mitigation	gather knowledge by asking others or experimenting	Development Team	asking our TA or other team members who have more experience for help	We made sure that every team member working on the project has the same version of Java and JavaFX	Active
R07	Inaccurate monitor and control	Joel Mattsson	External	Misconception of the team's progression leading to an incorrect understanding of the progress made.	Medium	Medium	Avoidance	reviewing what you have done and what you left to do	Management Team	going through all the things that should be done and starting to work on them one by one	We made sure to have several tools for monitor and control so that we can pick the ones that we feel gives us the best results and is effective	Active
R08	Lack of Communication	Manely Abbasi and Joel Celin	Internal	The team members are communicating poorly or through the right channels. Not being able to communicate with each other which can lead to misunderstandings.	Medium	High	Mitigation	Make sure everyone uses the same software to communicate. Make sure that the team members are using the same speakers which can lead to better communication with each other.	Management Team	Asking questions if you did not understand something or if you have any questions. Create a safe environment where everyone can communicate freely	We wrote in the team contract that the team members should communicate as much as possible and use Dicord for communication within the team	Active
R09	Uneven Expectations	Joel Celin	Internal	Different members of the group might have different expectations of how much work should be done in general or on a specific task.	Low	Low	Acceptance	Talk with the team before the project is started to make sure everyone has the same expectations	Management Team	Bring it up in a meeting and discuss the issue with the team members. Make sure everyone is on the same page with what is expected	We made sure to include every team member in the decision-making process and expectations in the team contract	Inactive
R10	Unexpected Overtime	Joel Celin	Internal	Delays in the project may lead to the team needing to work overtime or if any unexpected issues arise.	Medium	Medium	Acceptance	If it makes the project go severely delayed, we all have to spend more time working on the project to make up for the lost time.	Management Team	Revolution the amount of extra features that was planned to go into the project. Cut off unnecessary work	We made sure to put some slack in the timeline	Active
R11	Remote Work	Manely Abbasi and Joel Celin	Technical	A member of the team working remotely might experience issues with their internet or computer working properly.	Low	High	Acceptance	Make sure to properly document all meetings	Management Team	Make sure no meeting is private while the team members can follow what is happening in the group	We made sure to let our Discord to communicate, this ensures that everyone can be part of the discussion even if they are not here in person	Active
R12	Member Leaving Team	Manely Abbasi and Joel Celin	External	A team member decides to not continue working on the project for any reason.	Medium	Low	Acceptance	Divide the tasks that the member was assigned to by the other members of the team.	Management Team	Ask TA or Prof. Give me contingency plan	We made sure all the members of the team have some authority knowing of all parts of the project and can take over the tasks anyone	Active
R13	Upper Management Changes the Project	Joel Celin	External	The project gets modified or cancelled by the upper management.	High	Low	Acceptance	Ask upper management for instructions on how to proceed.	Management Team	Accommodate upper management change requests	We made sure to stay updated with Canva so that we can start implementing the course as soon as possible	Inactive
R14	Unexpected issues with Maven	Lucas Carlsson Holm	Technical	The team face unexpected issues when trying to move the project over to Maven.	Medium	Medium	Acceptance	Make sure that Maven runs well, otherwise, it might not work without Maven.	Lucas Carlsson Holm	If translating to Maven does not work out, we will skip it.	We made sure to give instructions of how to move the project over to Maven if it does not work out	Active
R15	Compatibility Issues	Felix Humbley	Technical	The code that is written is not compatible with already existing code.	Low	Medium	Acceptance	Make all code to write in separate branches on GitLab. Make sure the new code is compatible with the already existing code.	Lucas Carlsson Holm	Refactor/redesign the code until it works well with already existing code	We made sure to have some redundancy in the code to prevent compatibility issues	Active
R16	Misinterpretation of Requirements	Joel Mattsson	Internal	Weak/faulty understanding of what needs to be done to achieve certain requirements or standards	Medium	Low	Acceptance	Make sure all team members is well aware of the requirements given in this project.	Joel Mattsson	The member that has interpreted the task in a wrong way should either re-do their work or explain to the team what they understood	We got all the requirements in a matrix available to all team members and communicate with each other and everyone in the team to track our progress	Active

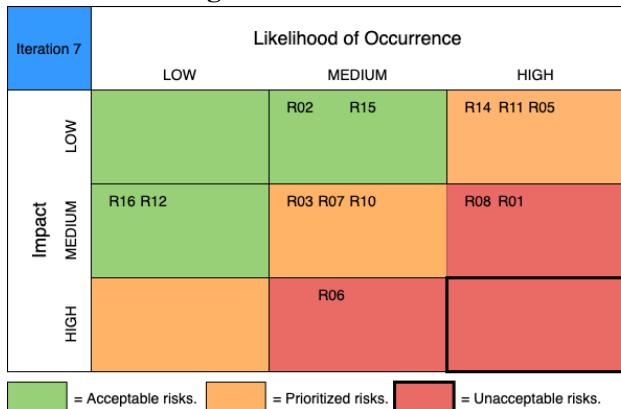
7.2.1. For Iteration 7 we changed the Impact/Occurrence of several risks based on the projected risks discussed in Iteration 6 Review. We set R04 & R09 to inactive.  Risk Management Table.xlsx

## 7.2.2 Risk Change Table

Iteration 7		
ID	Risk	Reason For Change
R01	Unexpected difficulties in GitLab	Since a lot of team members have expressed this risk for Iteration 7 we chose to set occurrence to high. Because we are done with large parts of the code already, we decided to downgrade the risk to medium.
R04	Too much data for PMR	Since we have over 20 pages to spare in the PMR, we assessed that there is no real reason why we would have problems fitting the information in the 60 page limit.
R05	Lack of knowledge or skill	Since a lot of team members have expressed this risk for Iteration 7 we chose to set occurrence to high. Since a lot of the manager team is going to do some coding this week we set the occurrence to high. Since the coding parts are not that advanced we set the impact to low.
R09	Uneven Expectations	Since the project has progressed to a point where a majority of the work is done, we chose to put this risk as inactive.
R10	Unexpected Overtime	Since some of the team members have expressed this risk for Iteration 7 we chose to set occurrence to medium. This is our last week of coding, we felt that there might be some unexpected tasks occurring during the week.

7.2.2. For Iteration 7 we updated the RCT to reflect what risks the team are anticipating for the current iteration.

## 7.2.3 Risk Management Matrix:



7.2.3. For Iteration 7 we updated the RMM to visualize what risks the team needed to monitor for the current iteration.

## 7.2.4 Risk Management Summary

For Iteration 7 both Felix Humbleby and Mohamad Khalil from the development team joined in on the Risk Management Meeting. We discussed the models that we use for each iteration and how to work with them in an effective way. We felt that by integrating the development team in the management process we are able to more effectively monitor the progress and risks since more people have the understanding of how the work is compiled and reported.

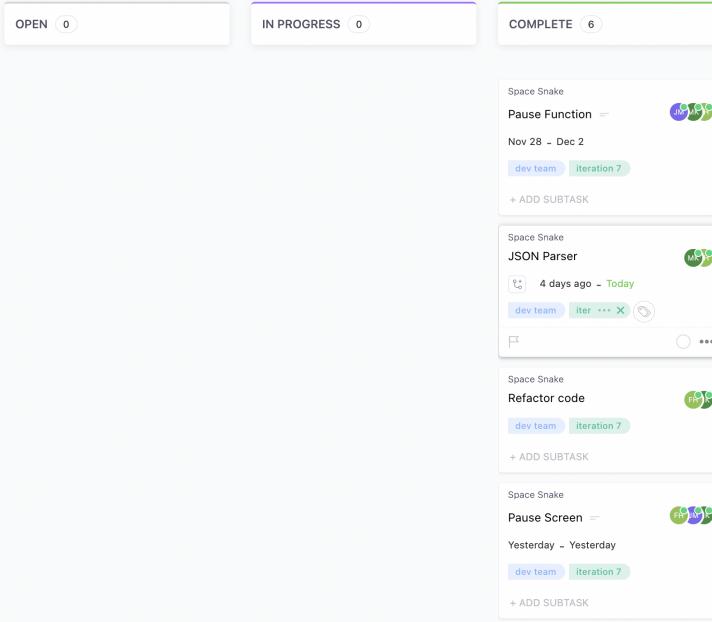
Last iteration we introduced the Expected Risks Table, model 6.4.3.3, to better understand the risks that we are expecting as a team. We focused on incorporating the information gained from the ERT into the Risk Management Table, model 7.2.1. In this way our active risks better represent the risks that the team is facing in the current iteration.

For Iteration 7 we saw a trend of some risks being picked by a majority of the team members, which is reflected in the RCT, model 7.2.2. Since we are trying to rotate tasks between the sub-teams we see communication and knowledge risks are at a higher occurrence. There is also a trend of impact of risks getting lowered, this is connected to the fact that the project is in the final stages.

For iteration 7 we did not do any design changes to the Risk Management Matrix, model 7.2.3. We feel like this model displays the information that we need it to display. The RMM continues to be a very good way to easily prioritize the risks anticipated.

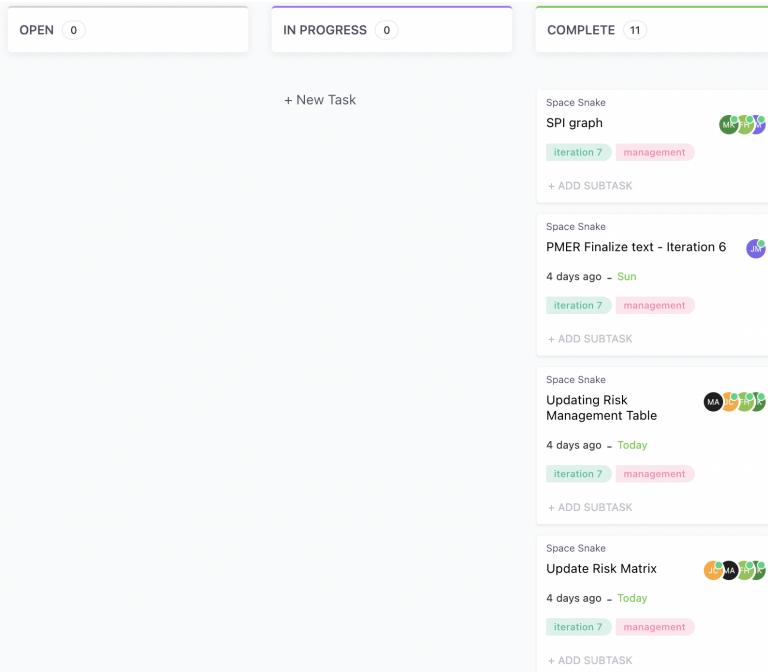
## 7.3 Monitor and Control

### 7.3.1 ClickUp: Presentation of task-management



#### 7.3.1.1. The Kanban board for the development team, Iteration 7.

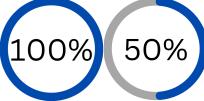
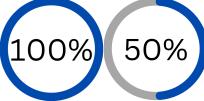
The development sub-team successfully completed 6/4 tasks this iteration, where two tasks ('Refactor code and Song playlist') weren't in the increment plans, making them extra tasks that we completed beyond our planning.



#### 7.3.1.2. The Kanban board for the management team, Iteration 7.

The management sub-team successfully completed 11/11 tasks this iteration. Both of these pictures of tasks combined give us a definitive perception of the productivity as well as planning of the entire group versus our expectations. We completed 17 tasks but planned for 15.

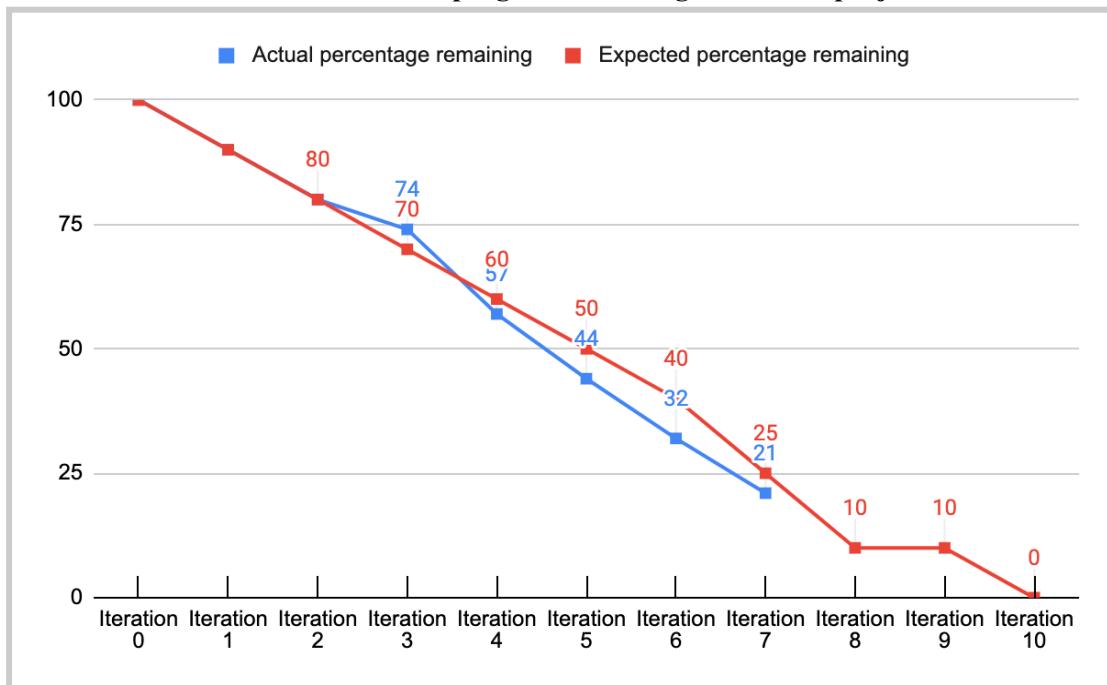
### 7.3.2 Percentage of task completion

	Expected work	Actual work	Proportion of work completed	
<b>Development</b>	Design Pause Screen Pause Function JSON Parser <b>EXTRA TASKS:</b> Refacotr code Song playlist	Expected work + <b>EXTRA TASKS</b>	$6/4 = 1.5$	 
<b>Management</b>	SPI graph Risk table Risk prioritization Burndown chart Increment plans Assessment / Review PMER finalize text - iteration 6 PMER - iteration 7 Finalize PMER - iteration 6 Finalize PMER - Iteration 3 Percentage completion table with pie charts Monitor and Control graph descriptions and summary	Expected work	$11 / 11 = 1$	

7.3.2. As the pictures depicting our organization in ClickUp point toward, 17 / 15 tasks were completed this iteration.

Percentage of task completion:  $17 / 15 = 1.13$

### 7.3.3 Burndown chart: Overview of progression throughout whole project



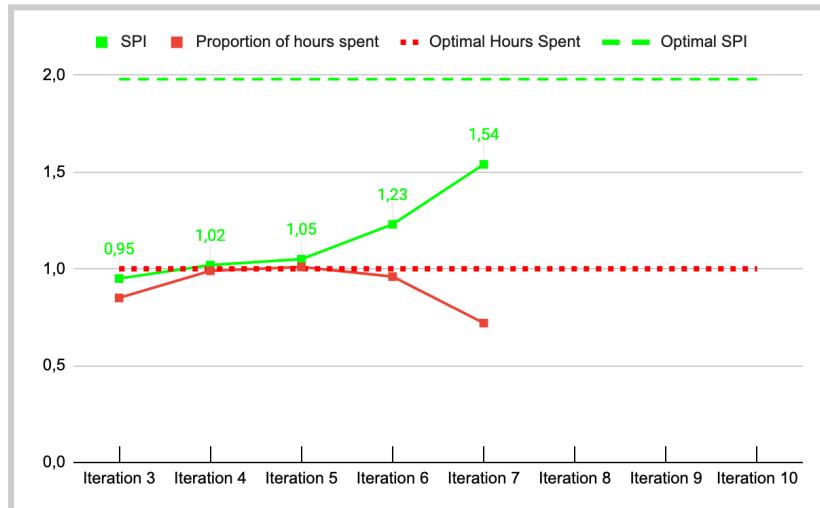
7.3.3. Updated Burndown Chart with the progress in Iteration 7. The chart was adjusted this iteration to account for the fact that we are planning for a vacation week in Iteration 9.

Considering we completed 13% more than expected this iteration illustrated in the table above, the positive progress continues in this burndown chart. If we would have a task completion of 100% instead of 113%, we would have 22% of the work remaining. Consequently, it's reasonable that the percentage displayed is slightly lower than 22.

### 7.3.5 SPI graph: Measurement of team dynamics and maturity

SPI = EV / PV	Iteration 3	Iteration 4	Iteration 5	Iteration 6	Iteration 7
Earned Value (EV)	5,7 / 7	14 / 13	16 / 15	20 / 17	18 / 16
Planned Value (PV)	120 / 140	133,5 / 126	142,5 / 140	135 / 140	102 / 140
Schedule Performance Index (SPI)	0,95	1,02	1,05	1,23	1,54

7.3.5.1 The Earned Value (18/16) is retrieved from ClickUp and the table of percentage completed above. The Planned Value (102 / 140) is retrieved from the time table above.



7.3.5.2. The SPI graph with the adjusted values for Iteration 7.

A contributing factor to the drastic change of SPI this iteration is that some people were sick this iteration and were unable to work that much but we still managed to complete more tasks than planned. In parallel, this decrease in the Earned Value ,see *model 7.3.5.1*, is due to illness in the team. Ultimately, we still improved since the 6th iteration by virtue of our reduced hours spent while maintaining a satisfying percentage of completion of the planned tasks.

### 7.3.6 Time table: Individual differences from expected hours

Iteration	3	4	5	6	7
Joel Mattsson	6	7	9,5	5,5	0
Utkarsh Singh	-3	-0,5	-0,5	-4,5	-8
Manely Abbasi	-7	-3	-2	-3	-3
Joel Celén	0	0,5	-2	4	-8
Felix Humleby	-2	6,5	-1	-3	1
Lucas Carlson Holter	-7	-0,5	-0,5	-2	-20
Mohammad Khalil	-5	-2,5	-2	-2	0

### 7.3.7 Monitor and Control: Summary

In conclusion, in ClickUp we have 17 completed tasks tagged as Iteration 7, where 2 tasks initially were not in the increment plans. The combination of values from our percentage of completion and the time table presenting actual and expected hours spent are used to calculate the Schedule Performance Index, which was significantly higher than usual in this iteration. The table of actual versus expected hours also tells us that we spent 38 hours less than expected, which explains why the red line Proportion of hours spent is below its optimal value of 1 in the SPI graph, *model 7.3.5.2*. This big difference in hours actually spent and expected can be explained simply by teammates being sick this week which were unfortunate but we manage to get a lot done anyways. Generally speaking, every aspect of our monitoring this week points toward a success both in terms of progression of work and team maturity.

## 7.4 Iteration Review/Retrospective

### 7.4.1 Backlog

Task	Original Iteration	Outcome
Design	6	Resolved
Pause Screen	6	Resolved
Pause Function	6	Resolved

7.4.1. The backlog has been updated for Iteration 7. All the tasks in the backlog were resolved in Iteration 7.

For this iteration we had 3 tasks in the backlog. The tasks “Design”, “Pause Screen” and “Pause Function”. We managed to resolve all of these tasks this iteration, which means that the backlog is empty going into Iteration 8.

### 7.4.2 Iteration 7 Task Progress

During iteration 7 we noticed that we were still not using JSON in any part of our program, so we decided to implement it for storing the scoreboard data. We also moved the Scoreboard from the menu screen to the game overscreen and we also added a few songs to the game that plays while the game is running.

We realized that adding another mode for switching directions is a bit complicated and time consuming, so we just opted for adding a music player which would play songs for the modes that are currently present in the game instead.

### 7.4.3 Next Iteration Planning

4 TASKS		STATUS	ASSIGNEE	START DATE	DUE DATE
Start Menu Scene Design	= dev team iteration 8	IN PROGRESS	FH MA	2 days ago	Fri
Songlist radio	= dev team iteration 8	IN PROGRESS	JM	2 days ago	Fri
Maven Adjustments	= dev team iteration 8	IN PROGRESS	LH	2 days ago	Fri
Work on Snake new Default Skin	= dev team iteration 8	IN PROGRESS	US JK	2 days ago	Fri

7.4.3.1. The planned tasks for the development team, Iteration 7.

7 TASKS		STATUS	ASSIGNEE	START DATE	DUE DATE
Update PMER Iteration 7	= iteration 8 management	IN PROGRESS	FH JK	2 days ago	Fri
Updating Risk Management Table	= iteration 8 management	IN PROGRESS	JC MA	2 days ago	Fri
Update Risk Matrix	= iteration 8 management	IN PROGRESS	MA JM	2 days ago	Fri
Update Risk Change Table	= iteration 8 management	IN PROGRESS	JC JM	2 days ago	Fri
Refactor PMR	= iteration 8 management	IN PROGRESS	JC H JK	2 days ago	Fri
Update PMER Iteration 8	= iteration 8 management	IN PROGRESS	LH	2 days ago	Fri
Finalize PMR Iteration 7	= iteration 8 management	IN PROGRESS	JC MA JS JM	2 days ago	Today

7.4.3.2. The planned tasks for the management team, Iteration 7.

Expected Risks for Iteration 8		
ID	Description	Team Members
R01	Unexpected difficulties in GitLab	US, JM, MK, MA
R02	Lack of personnel	FH, LCH, MK, JC
R04	Too much data for PMR	LCH, JM, MK
R05	Lack of knowledge or skill	LCH, MK, MA
R06	Technical Issues	US, JM
R08	Lack of Communication	LCH, JM, MK, JC
R10	Unexpcted Overtime	FH, LCH, MA
R11	Remote Work	US, LCH, JM, MK, JC
R15	Compatibility Issues	MA

#### 7.4.3.3. *The expected risks for Iteration 8.*

Most risks anticipated for Iteration 8 comes from team members moving to other parts of the project that they might not have done as much of before. We have also had pretty major issues with sickness so R02 reflects that fact.

#### 7.4.4 Entire Team retrospective

We decided to not work in our subteams this iteration because we needed to work on different parts of the project so the management team focused mostly on programming and the development team focused mostly on the management part. To get this to work effectively we sat down and mixed the groups so if someone in development needed help with the management we could just ask our teammates and so on. This made the transition smooth and we saved a lot of time doing this.

Some of our members faced sickness this week which made us think more about how we can improve communication between each other, especially remotely. This is also important since many of our members will be away in the next iteration, so communication will be a vital aspect in getting work done for the remaining time. We resolved this by some people joining in on meetings via discord and working from home.

#### 7.4.5 Previous weeks retrospective

Last week we discussed cutting some of the extended functionality for the game and starting to close out the project. We did just this and now the code is mostly done, there are still some smaller implementations that need to get done in Iteration 8. We also briefly discussed how our communication has worked really well the last couple of iterations, this has been an issue for Iteration 7. The main problem has been that major parts of our team have either been sick or otherwise working remotely. For Iteration 8 we really need to focus on our communication, we need to make sure to check our Discord channels even if we are not at campus and keep ourselves updated with the progress of the project.

# Iteration 8

## 8.1 Iteration 8 and increment plans

We initially decided to go on a vacation this iteration but we had a lot of work to do so we are planning to work for the whole iteration. We are planning to complete all the work and finalize the reports and go on the vacation in Iteration 9. Some managers are going to contribute to the development and will add some extra features. We are also planning to close most of the risks in this week only.

## 8.2 Risk Management plan

### 8.2.1 Risk Management Table:

ID	Risk	Owner	Analyze		Planning							
			Qualitative		Strategies	Notes	Assigned To	Contingent action	Risk management prevention	Active Status		
			Impact	Likelihood of Occurrence								
R01	Unexpected difficulties in GitLab	Marilyn Abbasi	Technical	Sudden problems - GitLab leading to the possibility of damage or destruction of the code.	Medium	High	Mitigation	Make sure you have enough knowledge to handle the risk or asking for help	Development Team	Tell our TA about the problem and asking for help. Keeping a back-up code somewhere other than GitLab	having GitLab instances with group members who are experienced GitLab and leaving other members alone	Active
R02	Lack of personnel	Marilyn Abbasi	External	One of the group members getting sick or having a family emergency causing them unable to work	Low	High	Mitigation Acceptance	Putting at least two people for each task so that they can fit in for the other tasks if they are absent	Management Team	Someone from other sub-team do the task instead	dividing the whole group into two sub-groups, that way there are multiple people working in the same context	Active
R03	Conflict between group members	Marilyn Abbasi	Internal	Having disagreements or fights in the group.	Medium	Low	Avoidance	being respectful towards others and addressing disagreements by taking as soon as possible and addressing it to prevent from any big fights from happening	Management Team	Tell the group manager or TA	We wrote conflict handling into the team charter, so that everyone knows what to do in case of conflict	Active
R04	Too much data for PMR	Marilyn Abbasi and Joel Ceben	Internal	Not managing to fit the project management report in 60 pages.	Medium	Medium	Acceptance	Making sure that the test and diagnosis that go into the report is consistent and fits the point	Management Team	going through the report again and making sure no changes were removed from the chart	We are not including unnecessary text and focusing more on putting charts or tables	Active
R05	Lack of knowledge or skill	Marilyn Abbasi	External	Not having enough knowledge due to unforeseen events.	Low	High	Mitigation	doing research on our own before each iteration starts	Management Team	asking our TA to share any documents that will be useful for asking other group members for help	We dedicated the final iteration of the project to learning new skills on various subjects needed for the project	Active
R06	Technical issues	Joel Ceben	Technical	Unexpected issues with the code or any related software.	Low	Medium	Mitigation	gather knowledge by asking others or experimenting	Development Team	asking our TA or other team members who have more experience for help	We made sure that every team member working on the project has some knowledge of Java and JavaScript	Active
R07	Inaccurate monitor and control	Joel Matteson	External	Misconception of the team's progression leading to incorrect priorities and tasks that need to be done.	Medium	Low	Avoidance	mentioning what you have done and what is left to do	Management Team	going through all the things that should be done and starting to work on them one by one	We made sure to fix the several tools for monitor and control so that we can pick the ones that we know work best for us and make better estimates	Inactive
R08	Lack of Communication	Marilyn Abbasi and Joel Ceben	Internal	The team members communicate poorly or through the right channels. Not being able to understand what the speakers are saying can lead to misinterpretations.	Medium	High	Mitigation	Make sure everyone uses the same software to communicate. Make sure that the team members are using the same language when communicating with each other	Management Team	Advising speakers to speak louder if someone in the group speaks the same native language as the speaker	We work in the same context but the risk is now merged with the communication risk, so only using Discord for communication which is the main reason for the risk	Active
R09	Uneven Expectations	Joel Ceben	Internal	Different members of the group might have different expectations on how much work needs to be done on a specific task.	Low	Low	Acceptance	Talk with the team before the project is initiated and make sure that expectations are clear.	Management Team	Bring it up in a meeting and discuss the task with the team to make sure everyone with doing that, speaks to the task	We made sure to include every team member in the communication of the expectations in the team context	Inactive
R10	Unexpected Overtime	Joel Ceben	Internal	Delay in the project may lead to the team needing to work overtime or if we underestimate the time for the task assessment.	Medium	Medium	Acceptance	If we realize that the project gets severely delayed, we will have to spend more time on the task and make sure to work on the project instead.	Management Team	Reschedule the project if some tasks that were planned to go into the project got unnecessary work.	We made sure to put in some slack in the schedule	Active
R11	Remote Work	Marilyn Abbasi and Joel Ceben	Technical	A member of the team working remotely might experience issues with their internet or computer working properly.	Low	High	Acceptance	Make sure to properly document all the requirements for the project.	Management Team	Make sure all meetings are available online so that the team member follows what is being reported in the group	We made sure to use Discord to communicate, this ensures that everyone can see what is being discussed and what is not here in person	Active
R12	Member Leaving Team	Marilyn Abbasi and Joel Ceben	External	A team member decides to not continue working on the project for any reason.	Medium	Low	Acceptance	Divide the tasks that the member was supposed to do to other members of the team.	Management Team	Ask TA or Prof. Green for a contingency plan	We made sure that all members of the team have some familiarity knowledge of all parts of the project in order to take over the tasks needed from us	Inactive
R13	Upper Management Changes the Project	Joel Ceben	External	The project gets modified or cancelled by the upper management.	High	Low	Acceptance	Ask upper management for instructions on how to proceed.	Management Team	Accommodate upper management change requests.	We made sure to stay updated with Campus news so that we can see any changes in the course as soon as possible	Inactive
R14	Unexpected issues with Maven	Lucas Carlson Holter	Technical	The team faces unexpected issues when trying to run the project over to Maven.	Medium	Low	Acceptance	Make sure that Maven is set up otherwise move on with project without using Maven	Lucas Carlson Holter	If transitioning to Maven does not work out, we will fall back to Gradle	We made sure to use the interpretation of Maven a huge deal of importance to the project. If one or even not all just fall back	Active
R15	Compatibility Issues	Felix Humbley	Technical	The code that is written is not compatible with already existing code.	Low	Low	Acceptance	Make sure the code is written in a reasonable way so that it is compatible with already existing code.	Lucas Carlson Holter	Refactor/restructure the code until it works with already existing code.	We have made sure that all members that are involved in the project are aware of the guidelines in their development tasks to prevent compatibility issues	Active
R16	Misinterpretation of Requirements	Joel Matteson	Internal	Insufficient understanding of what needs to be done based on the requirements or ambitions	Medium	Low	Acceptance	Make sure the team members is well aware of the requirements given in the project	Joel Matteson	The member that has interpreted the task in a wrong way should either re-read the requirements or provide the task to the next function	We put all the requirements in a shared document and color-coded to make it easy for everyone in the team to track its progress	Inactive

8.2.1. For Iteration 8 we updated the table to reflect the team's assessments of this iteration's risks.

X Risk Managemet Table.xlsx

### 8.2.2 Risk Change Table

ID	Risk	Reason For Change
R02	Lack of personnel	Occurrence changed to high because most of the team members assessed to encounter this risk.
R03 R14 R15	Conflict between group members Unexpected issues with Maven Compatibility Issues	Occurrence changed to low since only one member or less in the team assessed to encounter these risks.
R04	Too much data for PMR	The content of the links were much larger than we originally expected. We therefore set this risk to active again.
R06	Technical Issues	Impact changed to low since all code that is vital for the project is done.
R07 R12 R16	Inaccurate monitor and control Member Leaving Team Misinterpretation Requierments	Set to inactive because we do not foresee this risk happening in the project anymore.

8.2.2. The RCT is updated to show the reasoning for the change in priority for Iteration 8. For this iteration we decided to merge several tasks in the same row if they have the same reason for change.

### 8.2.3 Risk Management Matrix:

Iteration 8		Likelihood of Occurrence		
		LOW	MEDIUM	HIGH
Impact	LOW	R15	R06	R11 R05 R02
	MEDIUM	R03 R14	R10 R04	R08 R01
	HIGH			

 = Acceptable risks. 
  = Prioritized risks. 
  = Unacceptable risks.

8.2.3. For Iteration 8 we updated the RMM to visualize what risks the team needed to monitor for the current iteration.

### 8.2.4 Risk Management Summary

For Iteration 8 Joel Mattsson worked with the risk management team to complete the charts and graphs. Since many team members were either sick or working remotely in Iteration 7 we saw a spike in the risks associated with that. The RCT, *model 8.2.2*, shows that the trend for this iteration is that many of the risks were set to either a lower priority or set to inactive since the project is nearing its end. Overall we have focused on linking the different tools of the risk management part to make them more comprehensive and show a clearer picture to our stakeholders.

## 8.3 Monitor and Control

### 8.3.1 ClickUp: Presentation of task-management

The screenshot shows a ClickUp board with three columns: OPEN (0), IN PROGRESS (0), and COMPLETE (14). The COMPLETE column contains four tasks:

- Space Snake Iteration 8 task description table/increment plans (Status: In Progress, Due: 4 days ago - Sun, Iteration: Iteration 8)
- Space Snake Maven Adjustments (Status: In Progress, Due: 4 days ago - Today, Iteration: Iteration 8)
- Space Snake Songlist radio (Status: In Progress, Due: 4 days ago - Today, Iteration: Iteration 8)
- Space Snake Update PMER Iteration 8 (Status: In Progress, Due: 4 days ago - Today, Iteration: Iteration 8)

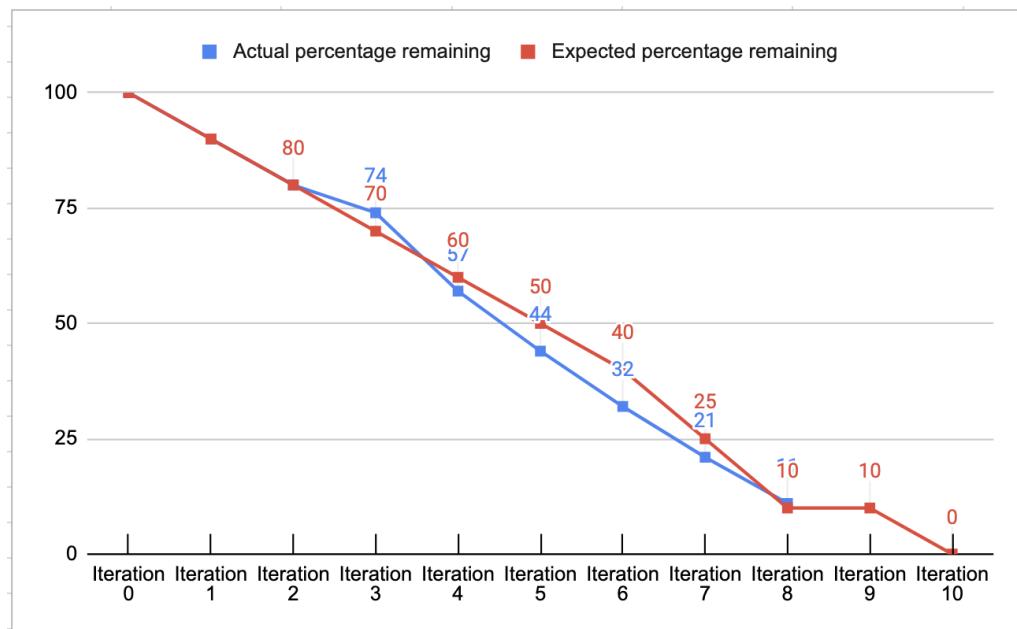
Each task has a '+ ADD SUBTASK' button.

8.3.1. We managed to successfully complete 14/14 tasks this iteration.

### 8.3.2 Percentage of task completion

Percentage of task completion:  $14 / 14 = 1$ .

### 8.3.3 Burndown Chart

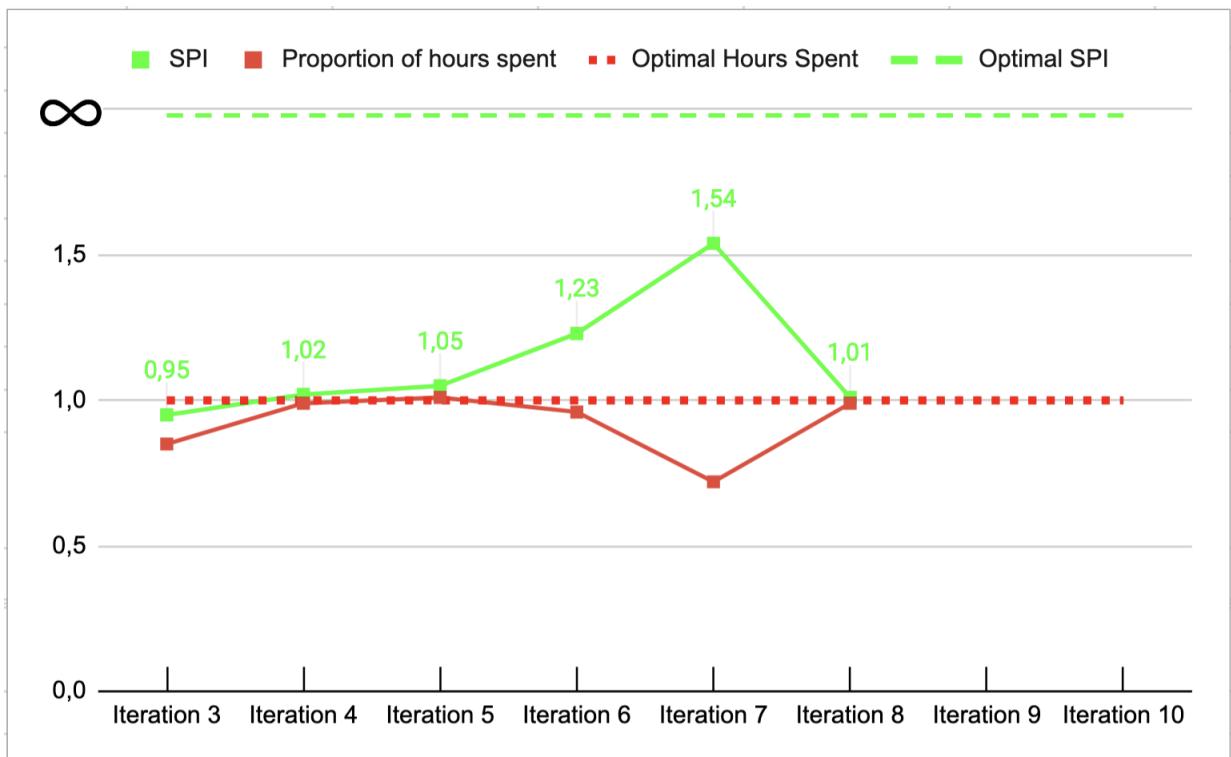


8.3.3. For iteration 8 we completed all tasks we set out to complete. The Burndown Chart is adjusted to reflect this progress.

### 8.3.4 SPI graph: Measurement of team dynamics and maturity

SPI = EV / PV	Iteration 3	Iteration 4	Iteration 5	Iteration 6	Iteration 7	Iteration 8
Earned Value (EV)	5,7 / 7	14 / 13	16 / 15	20 / 17	18 / 16	9/9
Planned Value (PV)	120 / 140	133,5 / 126	142,5 / 140	135 / 140	102 / 140	139/140
Schedule Performance Index	0,95	1,02	1,05	1,23	1,54	1,01

8.3.4.1. The Legend for the SPI Graph. Updated to show the progress of Iteration 8.



8.3.4.2. SPI Graph has been updated to reflect Iteration 8's progress.

### 8.3.5 Time table: Individual differences from expected hours

Iteration	3	4	5	6	7	8
Joel Mattsson	6	7	9.5	5.5	0	0
Utkarsh Singh	-3	-0.5	-0.5	-4.5	-8	0
Manely Abbasi	-7	-3	-2	-3	-3	1
Joel Celén	0	0.5	-2	4	-8	-1
Felix Humleby	-2	6.5	-1	-3	1	0
Lucas Carlson Holter	-7	-0.5	-0.5	-2	-20	-1
Mohammad Khalil	-5	-2.5	-2	-2	0	0

### 8.3.6 Monitor and Control: Summary

In Iteration 8 Joel Celén joined the monitor and control management team to assist with the graphs and charts. In conclusion, in ClickUp we have 14 completed tasks tagged as “iteration 7” which were all the tasks we planned for this iteration. We also saw a big improvement in work balance this iteration because we all worked very close to how much we were supposed to this week which shows that the planning has improved.

## 8.4 Iteration Review/Retrospective

Since we are planning to have Iteration 9 as a holiday week, everything discussed about the next iteration will be referring to Iteration 10.

### 8.4.1 Backlog

There were no tasks in the backlog going into Iteration 8, and there were no tasks put in the backlog going into Iteration 10. We therefore chose not to include the graph of the backlog since it is empty.

### 8.4.2 Iteration 8 Task Progress

All work was done as planned, this iteration was focused on management and the Project Management Report. Since the coding is now done we are going to move on to the Transition Phase in Iteration 10.

### 8.4.3 Next Iteration Planning

13 TASKS		STATUS	ASSIGNEE	START DATE	DUUE DATE
■	User Manual = entire team iteration 10	IN PROGRESS	J C S M A	Today	Fri
■	Merging = iteration 10	IN PROGRESS	F H J M K	Today	Wed
■	Software Artefacts = iteration 10	IN PROGRESS	F H M J H M	Today	Wed
■	Finalize PMR = iteration 10	IN PROGRESS	J C M	Today	Fri
■	Finalize PMER = iteration 10	IN PROGRESS	J C F H M K	Today	Fri
■	Demo Preparation = entire team iteration 10	IN PROGRESS	J C F H M K	Today	Fri
■	Finalize Individual Experience Report individual iteration 10	IN PROGRESS	J C F H M K	Today	Fri
■	Update Monitor and Control = iteration 10	IN PROGRESS	J M	Today	Fri
■	Update Risk Management = iteration 10	IN PROGRESS	J C	Today	Fri
■	End of Phase Review = entire team iteration 10	IN PROGRESS	J C F H M K	Today	Wed
○	PMER - Iteration 1 iteration 10	IN PROGRESS	J C F H M K	Today	Wed
■	PMER - Iteration 4 iteration 10	IN PROGRESS	J C F H M K	Today	Thu
■	PMER - Iteration 10 iteration 10	IN PROGRESS	J C F H M K	Today	Thu

8.4.3.1 For Iteration 10 everyone is working with documentation. Therefore there are no tags that say management or dev team.

Expected Risks for Iteration 10		
ID	Description	Team Members
R02	Lack of personnel	MA, US
R04	Too much data for PMR	JC, JM
R08	Lack of Communication	LCH, MK, MA, US, FH
R10	Unexpcted Overtime	FH, LCH, MA, JC, JM
R11	Remote Work	US, LCH, JM, MK

8.4.3.2. *For Iteration 10 the team is anticipating these risks.*

Now that the coding part of the project is done we decided that it is time to move to the Transition Phase of the project. The upcoming Iteration is going to be spent on writing the final documentation, reviewing the whole process and closing out the project. The anticipated risks for Iteration 10 mainly regard the fact that most of the team will work remotely.

#### 8.4.4 Iteration 8 Retrospective

Since the coding part of the project is now finished, the last iteration is going to be spent on completing all the documentation and reviewing the project as a whole. We experienced that good communication is very important for a successful project, even though we worked remotely we managed to do the things expected because we communicated more efficiently. The planning of this week was much better which resulted in us working approximately 20 hours each this week.

What we need to focus on in the last iteration is the structure of all the documentation. We continue to have really good tools that we by now feel confident in using, we just need to focus on how to convey that information in a structured manner.

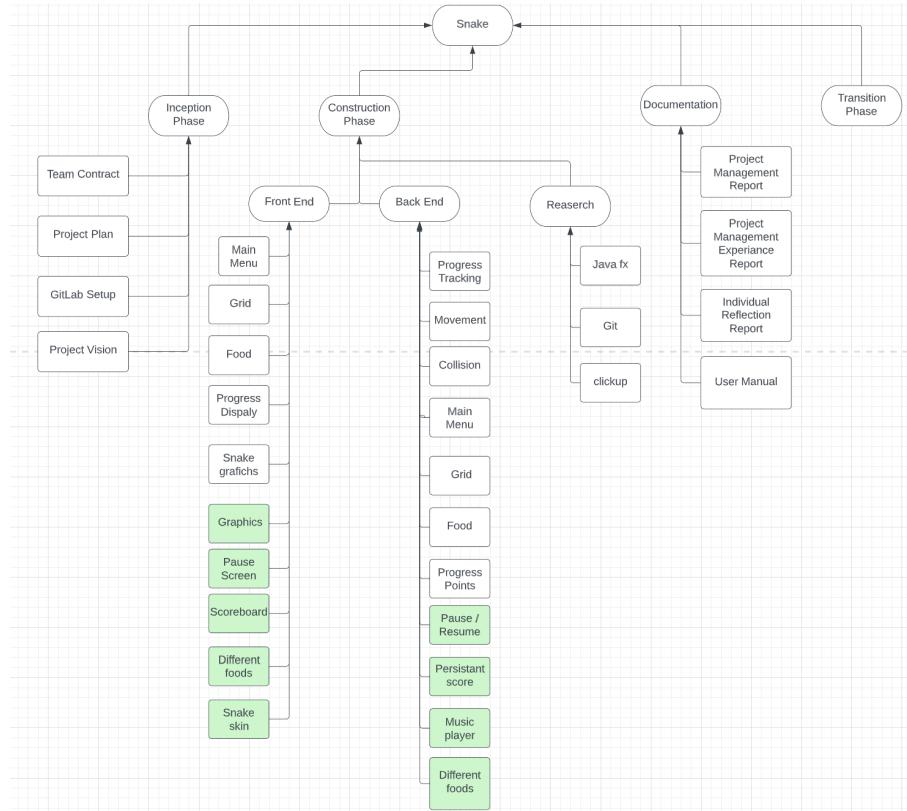
#### 8.4.5 Previous weeks retrospective

Last iteration we discussed the importance of having good communication within the team. Since most of our group members were working remotely or were sick, the communication was not the best for Iteration 7. The result of the lacking communication was that some tasks were not done as well as they could have, and we needed to spend more time after the fact to correct these mistakes. The communication for this week has worked much better as stated above, now we just need to keep that same level of communication going into the last iteration.

# Transition phase

## Iteration 10

The Project plan has had some revision as we have done some things differently than we planned from the beginning.



We have used Click Up instead of Jira as our management tool and also researched Git. Development wise, we decided not to add obstacles and change direction when eating foods. Instead we added a music player and a game mode where there are different types of food that give different amounts of points when eating. The MVP and original scope of the project has not changed.

### 10.1 Iteration 10 and increment plans

Iteration 10 is the last iteration for our project. We are going to finalize all our reports and we are going to close the whole project. We are going to have a meeting to decide on who is going to demonstrate the project and we will also create the presentation in that meeting. Since the development team is done with the development part, they are going to conduct a workshop this week so that the other team members can understand the code, and answer the questions they have.

## 10.2 Risk Management Plan

### 10.2.1 Risk Management Table

ID	Risk	Owner	Sources	Description	Analyze		Planning					
					Qualitative		Strategies	Notes	Assigned To	Contingent action	Risk management prevention	
Risk ID	Short description	The person who is an expert on the risk	The category under which the risk falls	Long description	The level of impact on the project	The chance of it occurring	Based on the qualitative matrix, write down the appropriate strategies	The team (member) that is most likely to handle the risk	Action to be taken if the risk happens	The actions that have been taken	If the risk is active or inactive	
R01	Unexpected difficulties in GitLab	Mandy Abbasi	Technical	Sudden problems in GitLab leading to the possibility of damage or destruction of the code.	Medium	High	Mitigation	Makes sure you have enough knowledge by watching tutorials or asking for help	Development Team	Tell our TA about the problem and asking for help. Keeping a back-up code somewhere other than GitLab	having GitLab sessions with group members who are more experienced in GitLab and teaching other members	Inactive
R02	Lack of personnel	Mandy Abbasi	External	One of the group members getting sick or having personal problems making them unable to work.	Low	Low	Mitigation Acceptance	Putting at least two people for each task so that if one person is absent, there is another person if they are absent	Management Team	Someone from other sub-team do the task instead	dividing the whole group into two sub-groups, that way there are multiple people working in the same context	Active
R03	Conflict between group members	Mandy Abbasi	Internal	Having disagreements or fights in the group.	Medium	Low	Avoidance	Being responsible for conflicts and solving disagreements by taking as soon as possible and making sure that no one prevent from my fight by talking to them before it happens	Management Team	Tell the group manager or TA	We wrote conflict handling into the team agreement to make sure everyone knows what to do in case of conflict.	Inactive
R04	Too much data for PMR	Mandy Abbasi and Joel Celin	Internal	Not managing to fit the project management report in 80 pages.	Medium	Low	Acceptance	Making sure that the text and diagrams that go into the report is relevant and to the point	Management Team	going through the report again and making some changes like removing texts or charts	We are not including unnecessary text and focusing more on putting charts or tables	Active
R05	Lack of knowledge or skill	Mandy Abbasi	External	Not having enough knowledge due to unforeseen events.	Low	High	Mitigation	doing research on our own before each iteration starts	Management Team	asking our TA for help or asking other group members for help	we dedicated the first iteration of construction phase to doing research on various subjects needed for the project	Inactive
R06	Technical Issues	Joel Celin	Technical	Unexpected issues with the code or any related software.	Low	Medium	Mitigation	gather knowledge by asking others or experimenting	Development Team	asking our TA or other team members who have more experience for help	We made sure that every team member working on the code have the same version of Java and Jenkins	Inactive
R07	Inaccurate monitor and control	Joel Mattsson	External	Misconception of the team's programming skills and lack of accurate picture of how much work there is to be done.	Medium	Low	Avoidance	reviewing what you have done and what is left to do	Management Team	going through all the things that should be done and what needs to be worked on to get the job done	We made sure to by several tools for monitor and control the work of the team and we feel great on the highest accuracy in the work	Inactive
R08	Lack of Communication	Mandy Abbasi and Joel Celin	Internal	The team members fail to communicate properly or through the right channels. Not being able to understand what speakers are saying can lead to communication misunderstandings.	Medium	Medium	Mitigation	Makes sure everyone uses the same software to communicate. Make sure that the communication is clear and understandable. Create a safe work environment where questions are encouraged	Management Team	Asking questions if you did not understand the task or something else. If someone is speaking in a language you do not understand, ask them to explain further	We wrote in the team contract that the working language is English. We agreed on only using English when communicating within the group.	Active
R09	Uneven Expectations	Joel Celin	Internal	Different members of the group might have different expectations of what work should be done in general or on a specific task.	Low	Low	Acceptance	Talk with the team before the project starts to make sure that everyone has the same expectations clear	Management Team	Bring it up in a meeting and discuss the issue with the team. If no consensus with regards to what is expected, speak to the TA.	We made sure to include every team member individual ambitions and expectations in the team contract	Inactive
R10	Unexpected Overtime	Joel Celin	Internal	Delays in the project may lead to the team needing to work overtime if we underestimated the initial time assessment.	Medium	Medium	Acceptance	If we realize that the project gets severely delayed, we will have to spend some of our planned time off and work on the project instead	Management Team	Reschedule the amount of tasks features that will plan to go into the project. Cut out unnecessary work	We made sure to put some slack in the timeline.	Active
R11	Remote Work	Mandy Abbasi and Joel Celin	Technical	A member of the team working remotely from home or from another location (internet or computer working property).	Low	Medium	Acceptance	Make sure to properly document all meetings.	Management Team	Make sure all meetings are available online so that everyone can join and follow what is happening in the group	We made sure to use Discord to communicate. By ensuring that everyone can be present for a meeting even if they are not here in person.	Active
R12	Member Leaving Team	Mandy Abbasi and Joel Celin	External	A team member decides to not continue working on the project for any reason.	Medium	Low	Acceptance	Divide the tasks that the member was supposed to do to other members of the team.	Management Team	Ask TA or Prof. Green for a contingency plan	We made sure that all members of the team are aware of the responsibilities of all parts of the project so that we can divide the tasks among us	Inactive
R13	Upper Management Changes the Project	Joel Celin	External	The project gets modified or canceled by the upper management.	High	Low	Acceptance	Ask upper management for instructions on how to proceed.	Management Team	Accommodates upper management change requests.	We made sure to stay updated with Canva so we can see any changes in the source as soon as possible.	Inactive
R14	Unexpected issues with Maven	Lucas Carlsson-Holter	Technical	The team faces unexpected issues when trying to move the project over to Maven.	Medium	Low	Acceptance	Make sure that Maven is well, otherwise move on project without using Maven.	Lucas Carlsson-Holter	If transitioning to Maven does not work, we will use SBT	We made sure to give integration of Maven a huge deal of importance to the project. If it does not work out we just skip it.	Inactive
R15	Compatibility Issues	Felix Hündorf	Technical	The code that is written is not compatible with the existing code.	Low	Low	Acceptance	Make sure all code is written in a compatible way with the existing code. Make sure that code parameters are compatible with the already existing code.	Lucas Carlsson-Holter	Refactor/redesign the code until it works with already existing code.	We have made sure that all members that are not part of the development team is gathered in a meeting to discuss and prevent compatibility issues.	Inactive
R16	Misinterpretation of Requirements	Joel Mattsson	Internal	Inadequate understanding of what needs to be done to achieve certain requirements or ambitions	Medium	Low	Acceptance	Make sure all team members is well aware of the requirements given in this project.	Joel Mattsson	The member that has interpreted the task in a wrong way should either re-do their work if possible, or if not, then ask the TA to be the mediator.	We put all the requirements in a matrix available to all team members and constantly update the matrix and keep the team to track our progress.	Inactive

10.2.1. For Iteration 10 we have set many risks to inactive since they are no longer anticipated by the team. The RMT is updated to reflect these changes.

### 10.2.2 Risk Change Table

Iteration 10		
ID	Risk	Reason For Change
R01 R06 R14 R15	Unexpected difficulties in GitLab Technical Issues Unexpected issues with Maven Compatibility Issues	Status changed to inactive. All these risks are connected to the coding part of the project, since the code is done these are no longer a risk.
R03 R05 R09	Conflict between group members Lack of knowledge or skill Uneven Expectations	Status changed to inactive. No team member indicated that they might encounter these risks in Iteration 10.
R02 R04	Lack of personnel Too much data for PMR	Occurrence changed to low because few team members assessed to encounter this risk.
R08 R11	Lack of Communication Remote Work	Occurrence changed to medium since some team members assessed to encounter this risk.

10.2.2. For Iteration 10 the RCT has been updated to reflect the changes in anticipated risks.

### 10.2.3 Risk Management Matrix

Iteration 10		Likelihood of Occurrence		
		LOW	MEDIUM	HIGH
Impact	LOW	R02	R11	
	MEDIUM	R04	R08 R10	
	HIGH			

 = Acceptable risks. 
  = Prioritized risks. 
  = Unacceptable risks.

10.2.3. The Risk Management Matrix has been updated to reflect the anticipated risks for iteration 10.

### 10.2.4 Risk Management Summary

For Iteration 10 most of the risks could be closed. Since we are in the transition phase all the risks regarding the code have been set to inactive, see *model 10.2.1*. The risks that are left active are the ones that regards communication in the team and the fact that all our work this week is about closing out the project. Documentation is going to be the main bulk of this iteration's tasks and therefore communication between group members is especially important.

Lack of personnel is another risk of this iteration, since some members of the team have other obligations, re-exams. We chose to put this particular risk as low occurrence since we anticipated this when we planned for the iteration. Although we anticipated this risk there is still a risk that the rest of the team needs to work overtime since this is the final week before the deadline of the project.

## 10.3 Monitor and Control

### 10.3.1 ClickUp: Presentation of task-management

The image displays a grid of task cards from ClickUp, all of which are marked as 'COMPLETE' with a count of 13. The tasks are categorized under 'Snake' and include:

- Software Artefacts
- Finalize Individual Experience Report
- Update Risk Management
- Finalize PMR
- Update Monitor and Control
- Merging
- Finalize PMER
- PMER - Iteration 10
- User Manual
- Demo Preparation

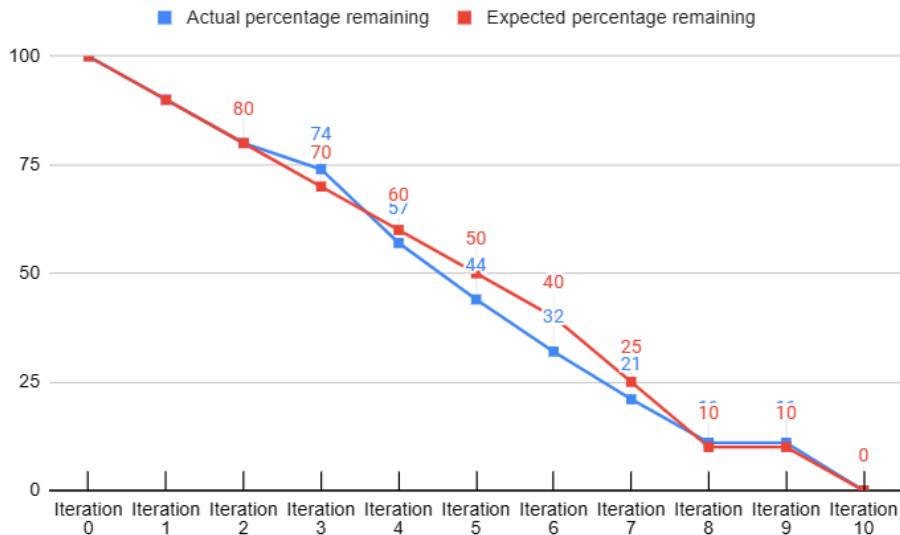
Each card includes details such as the date (e.g., 3 days ago, Yesterday, Today), the team involved (e.g., entire team, iteration 10), and a '+ ADD SUBTASK' button.

10.3.1. We managed to successfully complete all tasks to finish the project.

### 10.3.2 Percentage of task completion

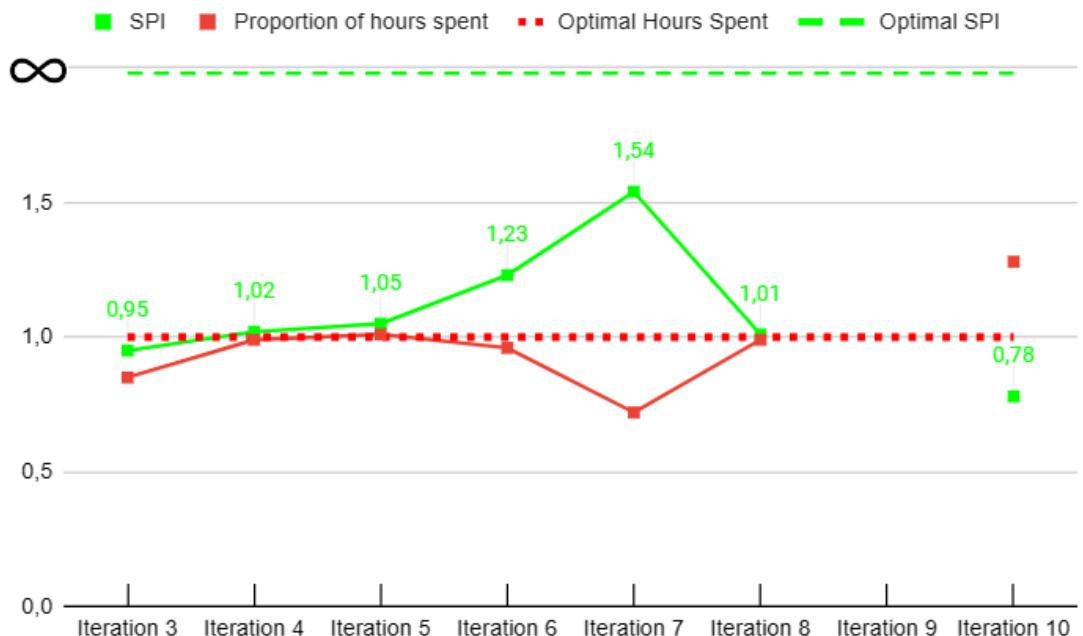
Percentage of task completion:  $14 / 14 = 1$ .

### 10.3.3 Burndown Chart



10.3.3. For iteration 10 we completed the project. The Burndown Chart is adjusted to reflect this.

#### 10.3.4 SPI graph: Measurement of team dynamics and maturity



SPI = EV / PV	Iteration 3	Iteration 4	Iteration 5	Iteration 6	Iteration 7	Iteration 8	Iteration 9	Iteration 10
Earned Value (EV)	5,7 / 7	14 / 13	16 / 15	20 / 17	18 / 16	9/9	0/0	13 / 13
Planned Value (PV)	120 / 140	133,5 / 126	142,5 / 140	135 / 140	102 / 140	139/140	0/0	179,5 / 140
Schedule Performance Index	0,95	1,02	1,05	1,23	1,54	1,01	N/A	0,78

10.3.4.2. SPI Graph has been updated to reflect Iteration 10's progress.

#### 10.3.5 Time table: Individual differences from expected hours

Iteration	3	4	5	6	7	8	9	10
Joel Mattsson	6	7	9,5	5,5	0	0	0	19,5
Utkarsh Singh	-3	-0,5	-0,5	-4,5	-8	0	0	-9
Manely Abbasi	-7	-3	-2	-3	-3	1	0	-2
Joel Celén	0	0,5	-2	4	-8	-1	0	18
Felix Humleby	-2	6,5	-1	-3	1	0	0	-2
Lucas Carlson Holter	-7	-0,5	-0,5	-2	-20	-1	0	8
Mohammad Khalil	-5	-2,5	-2	-2	0	0	0	7

#### 10.3.6 Monitor and Control: Summary

We had taken into account the fact that two members had to do a re-examination which prevented them from putting in the default hours expected. Other members had to step in and take over the project for it to move forward. Overall, we successfully completed the project on time.

## **10.4 Iteration Review/Retrospective**

### **10.4.1 Backlog**

There were no tasks in the backlog going into Iteration 10.

### **10.4.2 Iteration 10 Task Progress**

All work was done as planned, this iteration was mainly focused on finalizing all aspects of the project and reflecting on the process of working on it.

### **10.4.3 Iteration 10 Retrospective**

The most important thing we've learned as a group is the importance of communication. We've learned how to communicate effectively throughout different circumstances, for example when one or more members of the group are sick, or when members are away for other reasons.

We have also learned that everyone should be more in the know about all parts of the project. The reason for this is because it makes it easier to take over for someone when they're sick, or away for other reasons. It's also helpful for everyone to know about all parts of the projects since the people working on a specific part can then ask the rest of the group for help in an easier way. It also removes some bottlenecks later in the project when every member needs to make sure to have knowledge about all parts.

### **10.4.4 Previous weeks retrospective**

Last Iteration we discussed how the team needed to focus on communication to make sure that all parts of the project would be done in time. We knew going into the final iteration that communication was to play a vital part since we had team members that were unavailable to work in the first part of the iteration, and that we had other members of the team that were still not on campus. We managed to uphold good communication though planning the meetings strictly and always staying updated on Discord. We managed to complete all the tasks that we set out to do and the project was successfully completed.