Requirements [Version 2]

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Introduction

This document contains the requirements that we gathered for the Codenames project, as well as the scope of the project, a naming system introduced by Daniel and user stories. We have also an Activity Diagram done by Shahil and Sam, a Use Case Diagram done by Daniel and Alex, and some Personas done by Michael, Leo, and Anakin.

Scope

It is important to define the scope of the project so that it is clear to both the developer and client what functionality is included and what other functionality would only be included in the case of *scope creep*.

The scope of the project includes but is not limited to:

- The game mechanics.
- Local and online play.
- AI players.
- Some customisation options.
- PC and Mobile compatibility.

The scope of the project **does not** include:

- Online matchmaking (playing with strangers).
- Leader boards.
- Registering and storing player accounts/data.
- More than four players (for now).

As this is a Traditional-Agile hybrid project, it may be possible to extend the scope, though this may only be done when the sponsor has agreed and when almost all requirements are completed.

Abbreviations and Definitions

Requirements and specifications can be traced as follows with their number:

- FR. Functional Requirement
- NFR. Non-Functional Requirement
- FS. Functional Specification
- NFS. Non-Functional Specification
- *Italics* Low Priority Requirement/Specification

Example: NFR.2 means Non-functional Requirement 2.

Requirements Gathering and Elicitation

User Stories

The team wrote User Stories at start of the project to help us come up with initial requirements. Beside each user story is either a requirement that was created because of the user story or “out of scope” if the story was discarded (at-least until more important requirements are implemented).

> As a **casual player**, I want to **play on mobile** so that I can play **without investing too much time**. → FR.2

As a **busy player**, I want to **save the state of the game** so that I **do not have to play an entire game in one sitting.** → *FR.23*

As a **young player**, I want the game to have a **relatively small vocabulary** so that I can **recognize most of the words**. → FR.2

As an **experienced player**, I want to **match more challenging opponents online** so that I can **enjoy the play**. → *out of scope*

As an **outgoing player**, I want to **make friends online** so that I can **invite him/her to play next time.** → FR.14, FR.15

As a **diligent player**, I want to **have a record of every play** so that I can **learn from them in the future**. → *out of scope*

As a **remote player**, I want **there to be a multiplayer online mode** so that I can **play with my friends from different cities and countries.** → FR.14, FR.15

As an **elderly player**, I want **an option for the font size to be increased** so I can **read the text on-screen easily without having to squint**. → *NFR.5*

As a **picky player**, I want **an options menu** so that I can **customize things such as the volume of the sound effects and music**. I also want to be able to **give myself a nickname** so that **other players can see it in-game**. → FR.18

Functional Requirements

This project has a variety of requirements. The game rules have been deconstructed into the first 12 functional requirements below. The further requirements below have been selected to meet the demands brought by moving the boardgame onto the computer.

Low priority requirements are also included. These are to be completed if there is sufficient time during project development.

All high-priority requirements are also represented somewhere in the diagrams and tables (try CTRL-F + "FR.1 ").

Actors:

- Human Player
- AI Player
- Spy
- Spymaster
- ~~Team~~ *(Removed during Use Case Analysis)*

High Priority

Involving Game Rules:

1. All players (including the AI) should be able to play as either spy or spymaster.
2. The spymaster gives one word and a number (the number of related cards).
3. The spymaster can see the colours of all cards.
4. The colours of the cards are blank to the spies.
5. The spy can guess words.
6. If one team guesses the word incorrectly, their turn is over.
7. If one team guesses the correct number of words + 1, their turn is over.

8. If one team chooses to end their turn manually, their turn is over.
9. The players can be timed.
10. A team scores a point when a card is guessed correctly.
11. When a team picks all their coloured cards, that team wins.
12. When a team picks the bomb card, the other team wins.

More Generally:

13. The game should be playable locally.
14. The game should be playable online.
15. The player should be able to invite their friends with a link or a code.
16. The human player(s) should be able to select how many other AI players they would like.
17. There should be a chat box.
18. The player should be able to customize options.
19. The player should be introduced with a main menu.
20. The game should support 4 players (including AI and human players).

Low Priority

21. The AI should have difficulty levels.
22. The game should be playable on mobile devices.
23. The game state can be saved (when played locally).
24. The player should be able to observe an AI-only match.
25. The player should be able to get hints or advice.

Non-functional Requirements

These are additional requirements that are not activated by a specific user action. Though there is less of them, their importance should not be underestimated – especially (1) and (2).

High Priority

1. The game should be run on a web browser.
2. Computation should be quick.
3. The spymaster is not allowed to send more than one word in the chat box.
4. The spymaster is not allowed to send a word that is identical to a card.

Low Priority

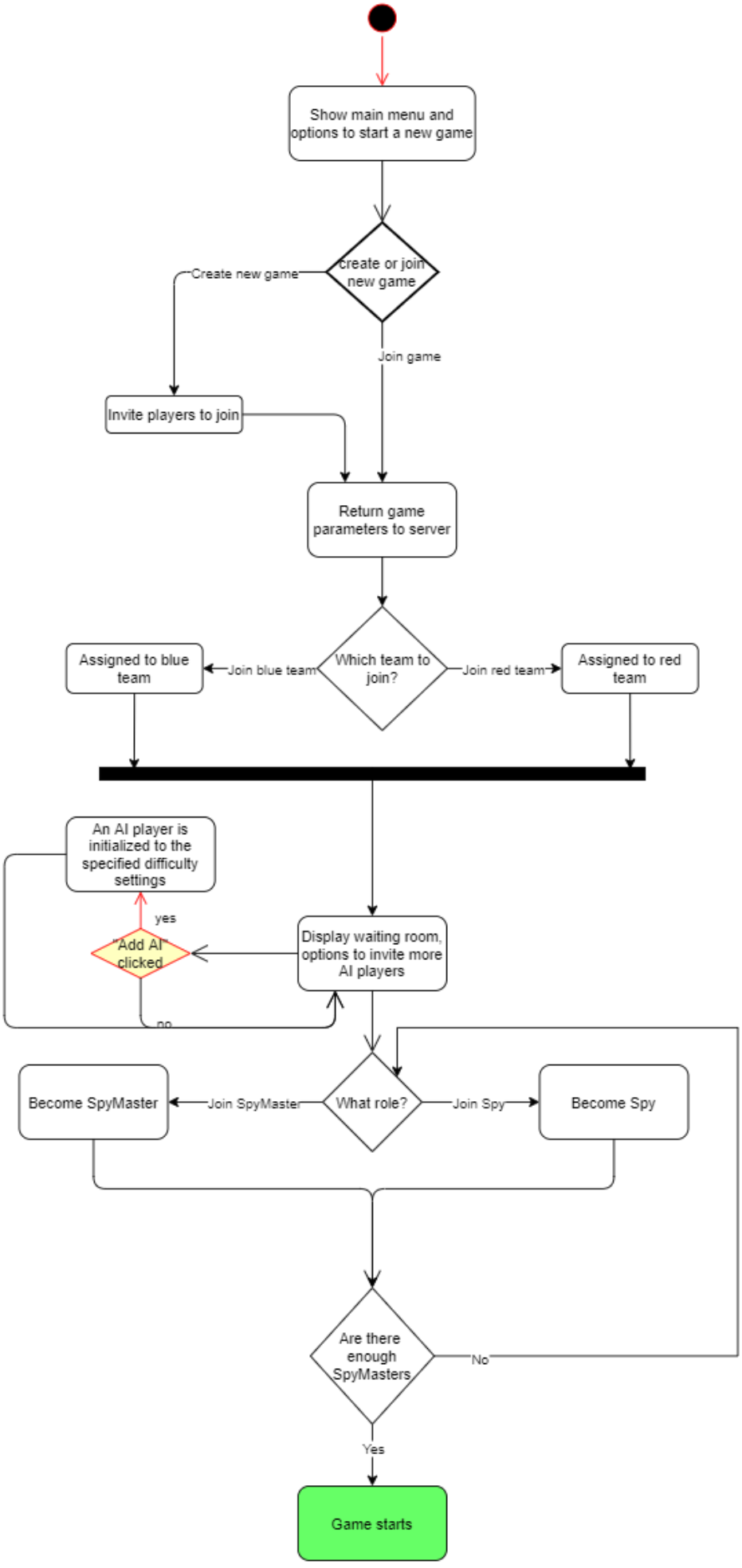
5. The game should be accessible to players with bad eyesight.
6. The interface should take advantage of being on a screen.

Diagrams

Activity Diagram

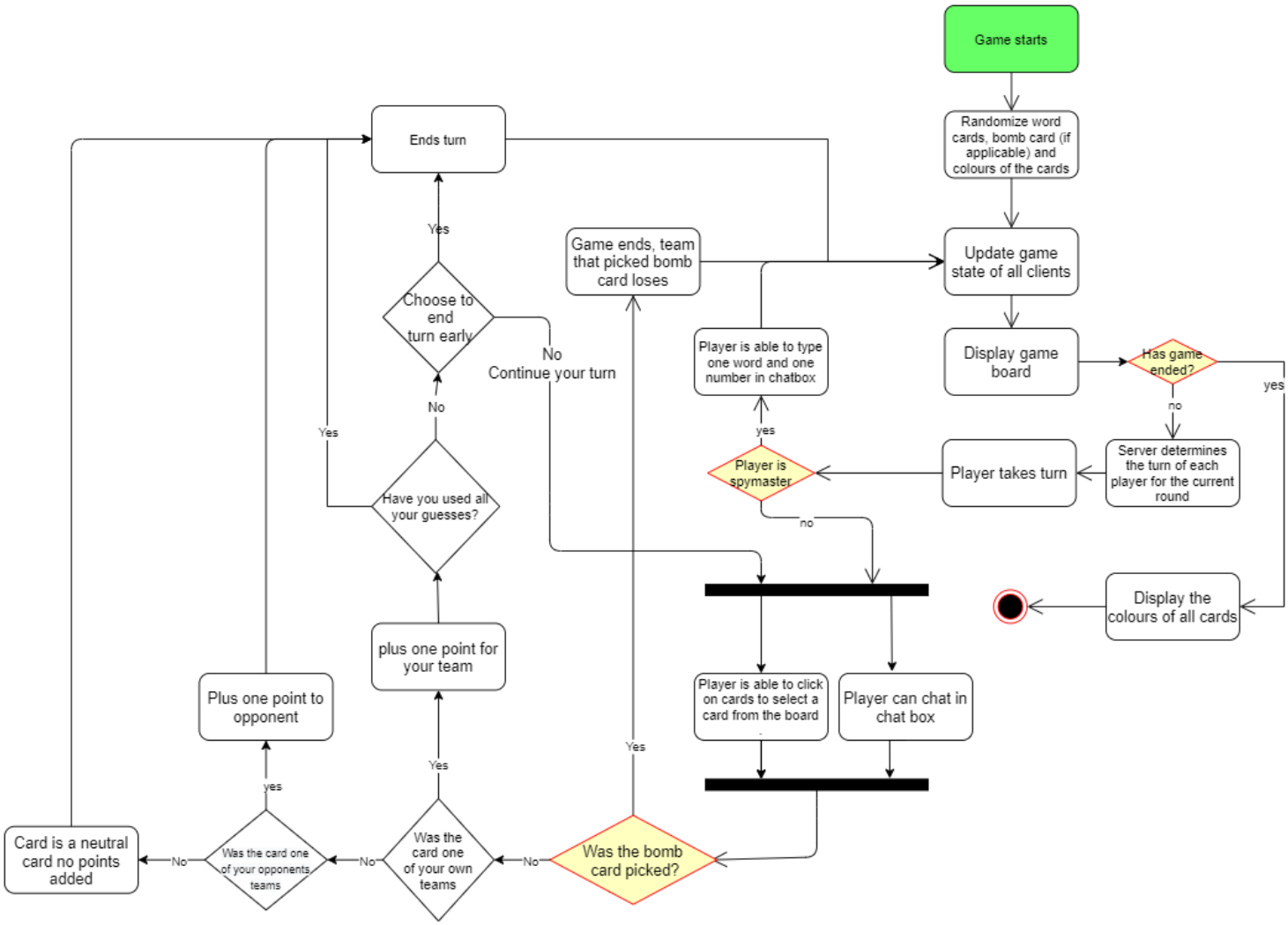
Below is the activity diagram representing the progression and actions a user would take when using the web app to join/create and play a game. It has been split into 2 parts so it can be read on the document.

Below we can see the flow and actions the player is able to make before the game. The player is met with a main menu as indicated at FR.19 in requirements. As the players can pick between playing as a spy or spymaster this fulfils requirement FR.1. Also, the player can play locally or online while also inviting friends or adding AI which fulfils requirements FR.13, FR.14, FR.15, FR.16.


Show main menu and options to start a new game
create or join new game
Create new game
Join game
Invite players to join
Return game parameters to server
Which team to join?
Join blue team
Join red team
Assigned to blue team
Assigned to red team
An AI player is initialized to the specified difficulty settings
yes
"Add AI" clicked
no
Display waiting room, options to invite more AI players
What role?
Join SpyMaster
Join Spy
Become SpyMaster
Become Spy
Are there enough SpyMasters
No
Yes
Game starts

Continuing to the second half of the activity diagram, this is where the game will start and the actions and turns the player is able to make during the game at different times. Spymaster can give a word and the number it relates to (FR.2), The spies can guess the words (FR.5) and the scoring system indicated by the decision diamonds to see which team scores fulfilling FR.6, FR.7, FR.8, FR.10. Also, we can see the path for when the game ends satisfying requirements FR.11 and FR.12. The players will be able to talk to each other in parallel with being able to choose a card on the board fulfilling FR.17. The Spy Master is only able to type one word and one number as a clue fulfilling NFR.3

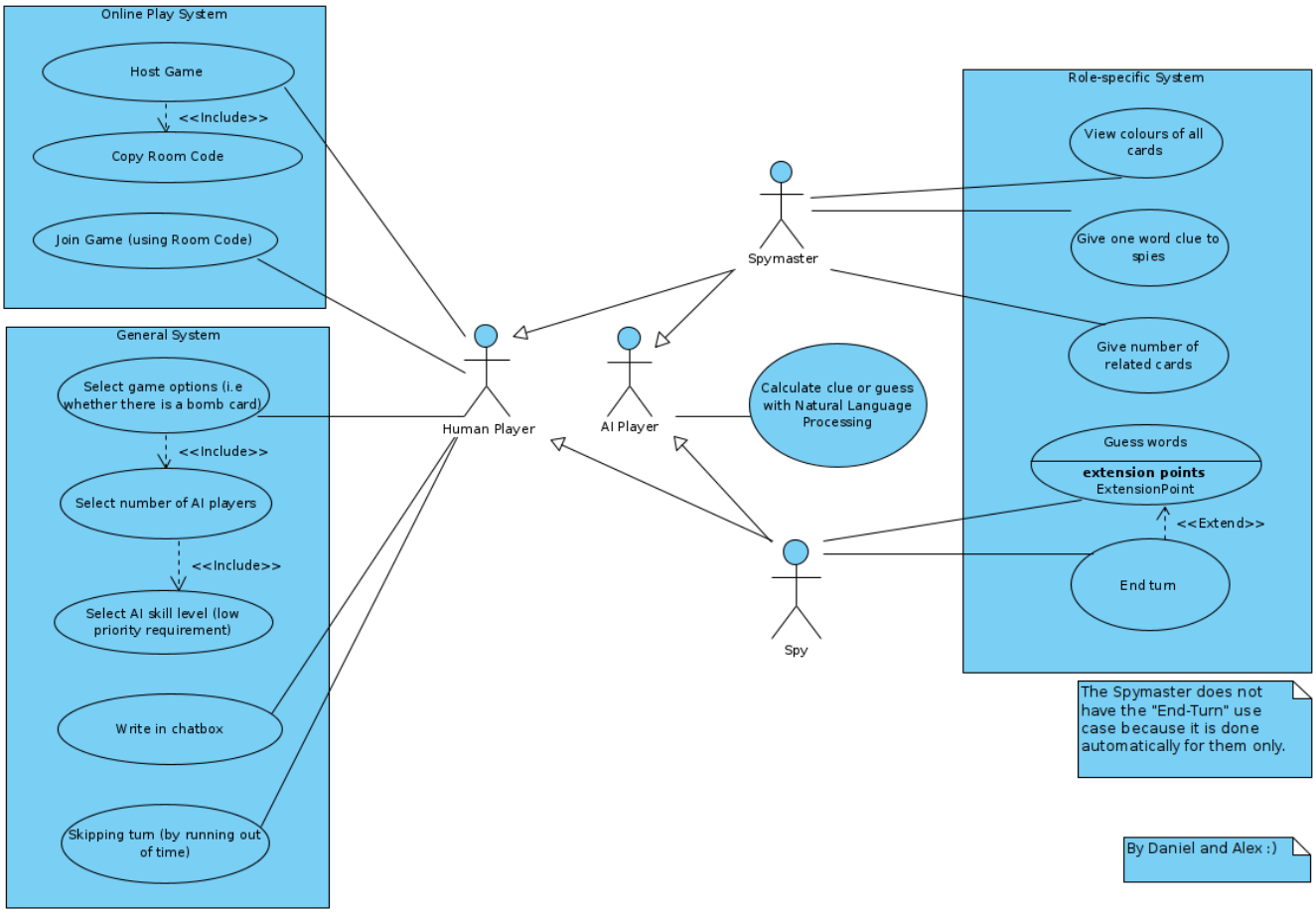
As of a timer and meeting FR.9 we decided that there would be a timer which will start after before the spymaster gives their word and will skip their turn if they take too long. Same with the Spies a timer will start as soon as the spy master gives a hint, if the spies take too long to guess the words their turn will end.



The Diagrams allows us to easily identify the flow of the software and game making it easily to identify the functionality of the system in detail. Also simplifies our use cases and shows the logic of our algorithm which in return makes it easier for us to identify different functions and starting points for this project.

Use Case Diagram

Below is the use-case diagram for the different types of players that will play our game.



The Actors used are *Human Player, AI Player, Spymaster* and *Spy*. The team decided to remove the *Team* actor because there were no use cases unique to it. The Spy and Spymaster have access to all the use cases of either the AI player or the Human player depending on which type of player they are.

There are three main systems, the *Role-specific system*, the *Online play system,* and the *General system.* The role-specific system includes the specific use cases of the spy and spymaster only, fulfilling requirements FR.2, FR.3, FR.5, FR.7 and FR.8 (FR.4 is also implied because the Spy cannot view colours of all cards). The online player system includes the online-multiplayer functionality, such as creating and joining a game, demonstrating requirements FR.14 and FR.15. This system will also run on a web-browser (NFR.1). Finally, the general system includes functions available to the human player (and therefore both the human spy and human spymaster), such as writing in the chat box. This last system is useful to requirements FR.16, FR.17, FR.18 and FR.19.

This diagram demonstrates how the different types of actors will interact with our game functionally and how many use-case related requirements are needed by actors.

Personas

Persona	The CS student (Novice player)	The bartender (Outgoing player)	The teacher (Experienced player)

Picture			
Name	**Zhiyu Dong**	**Ashen Chen**	**Jennifer Zhang**
Age	**20**	**31**	**42**
Location	**Ningbo, China Mainland**	**Birmingham UK**	**Hong Kong, China**
Work life	**He is now a junior student studying in the Department of Computer science at The University of Nottingham Ningbo.**	**Work as a bartender in a bar in Birmingham.**	**She is an English teacher in a high school in Hong Kong**
Social life	**Zhiyu lived in the accommodation in university and has many friends who play board games, so he desired to play with them, but he is unfamiliar with codenames.**	**Chen is a social butterfly who lived in a big apartment with his roommates and has lots of friends thus he has the demand for social contact and games that can play with many people together**	**Zhang lives in a very small and crowded apartment alone and her workload is heavy, thus she doesn't have much social needs**
Computer experience	**Proficient in the application of multiple computer languages.**	**Unfamiliar with PCs.**	**Proficient in making slides and charts**
Frequency of playing board games	**Once or twice a week**	**A board game lover that plays lots of board games every week**	**Plays board game online when she is free, around once a day**
Exposure to computer games	**Rich experience in computer games, used to play Rainbow Six, League of Legends.**	**Not very familiar with them.**	**Experienced in playing puzzle games**
Knowledge of Codenames	**He doesn't know the rules of Codenames, but he has some knowledge of other board games, such as UNO and Werewolf Kill, so he is interested in Codenames.**	**Knows how to play the game skilfully but is only likely to play with his friends and enjoys multi-player.**	**Plays Codenames very well, none of her friends play better than her.**
Requirements to Codenames	**He wanted to get some guidance on the rules of the game when he first started playing it, sort of like a tutorial. Then in the following**	**He wants this game to offer him a platform which allows many of his friends to play codenames together online or on the local**	**She wants this game to provide her a more challenging AI player to play against, also multiple difficulty levels so that her**

	game, He can familiarize himself with the game process and gets some sense of achievement by fighting against AI players.	**web, so the game needs to be multi-players and require both online and LAN play.**	**students could play this game for studying English.**
Expected number of human players	**1 at present but require more players in the future.**	**4**	**1-4**

The Persona Board illustrates three general user types, with major difference in the knowledge of the game. The first persona fulfils requirements FR1, FR4, FR7, the second persona fulfils requirements FR.2 FR.3, and the third persona fulfils requirements FR.1, FR.13, FR.16, FR.20, FR.21 and NFR.2

Requirements Validation

Internal Review

The team held a meeting to discuss this document and make sure that it covers all the proper requirements properly and concisely.

During the meeting we made the following updates:

- Updated the Activity Diagram to have better coverage and flow.
- Added FR.24, *"The player should be able to observe an AI-only match."*
- Added FR.25, *"The player should be able to get hints or advice."*
- Clarification on the chat box: It can **only** be used by spies; spymasters have no access to it and instead provide their clue in a dedicated window.
- Where they were missed, made sure that all high-priority requirements are explicitly linked to diagrams. (I.e FR.9, *"The players can be timed,"* is now mentioned in the description of the activity diagram.
- Added a summary below the Personas table as it was missing.
- Grammar adjustments.

Focus Group

The main purpose of the focus group was to make sure that our implementation of the game was correct, and we haven't missed any steps or rules of the game. Thankfully, there were no mistakes that we could have found. Additionally, after the game, we asked a few questions to see what the people think of the game and maybe find a way to improve it.

Q1. What was your favourite part of the game?

- A1.1 How competitive it gets when you are nearing the end of the game.
- A1.2 The fact that you can technically come back even from a huge point difference.
- A1.3 Trying to think of connections between multiple words.

Q2. What would you add to the game, considering our implementation will be on a website?

- A2.1 Probably a tutorial since the game was a little difficult to understand at the beginning.
- A2.2 Making the cards red or blue so that you don't have to keep glancing at the cheat sheet.
- A2.3 Maybe being able to have more than 2 teams play at the same time.

Q3. Which game mechanics do you think should be optional?

- A3.1 Probably the bomb card as it wasn't fun for the game to be finished out of nowhere.
- A3.2 Maybe the timer if you want to try and think of some difficult connections between 4 or even 5 words.
- A3.3 The number of red and blue cards as you sometimes want a shorter game.

External Review

This document was reviewed with our supervisor and sponsor Colin Johnson. We recorded some of his remarks:

- The activity diagrams are well suited to be converted into code.
- The use-case diagrams had well written generalised systems for every actor.
- Our explicit requirements will be useful in checking whether we are on track.
- We missed the addition of the Timer at the time of showing him an earlier version of this document, which we have since added as FR.9.

Colin appeared to be happy with the direction of the project, hence we will continue by writing a Specifications Document.