GROUP IRON MAN

HIDE & SEEK

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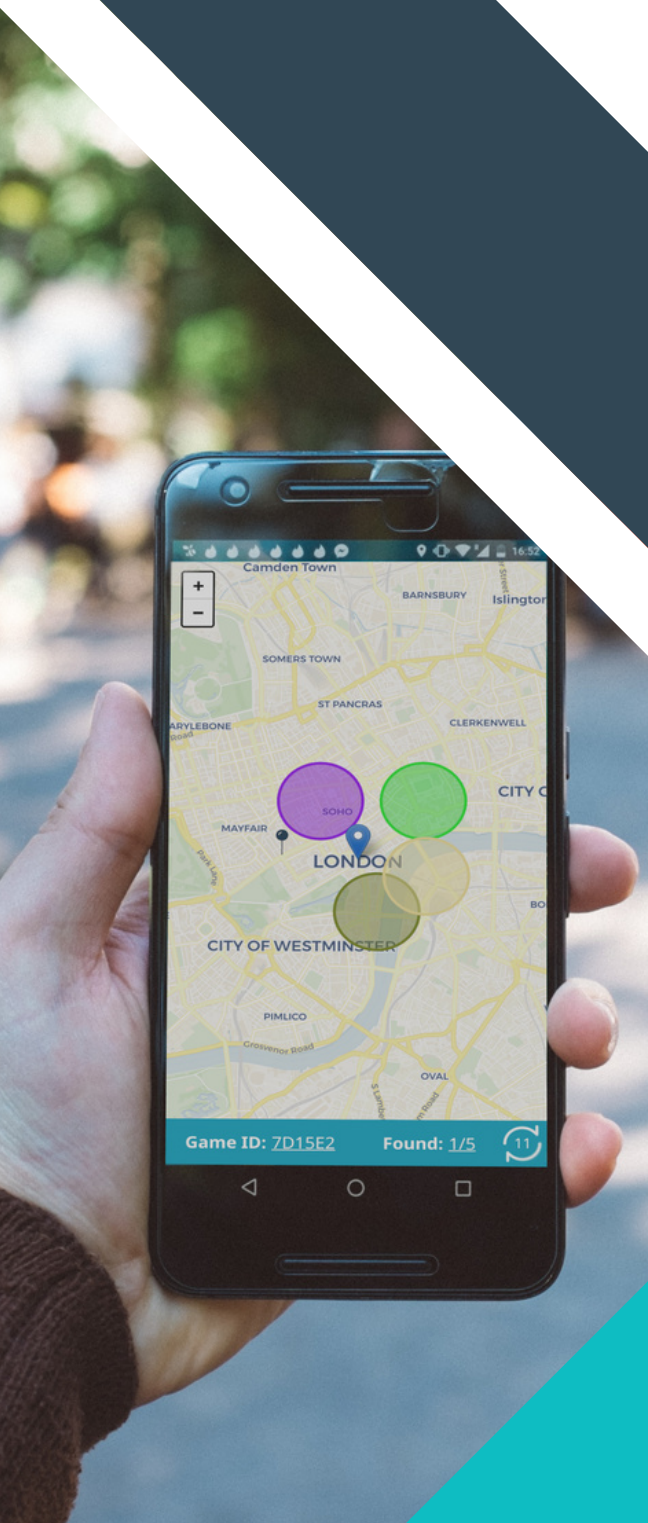

SOFTWARE PRODUCT MANAGEMENT 2022

UNIVERSITY OF TARTU
Institute of Computer Science

PLAY IT NOW!

hide-and-seek.vercel.app

1. INTRODUCTION

This report covers the design and implementation process of the minimum viable product version of the app called “Hide and Seek”, contains detailed user stories supported by acceptance criterias, describes the technical details of the app and its architecture, and gives an overview on the product roadmap for the next twelve months.

This app mimics the famous children’s game “Hide and Seek”, in which multiple people take part: some to hide themselves, and others to seek those who are hidden. The original game is played mostly physically, in a conceived and agreed environment, or area, and it is up to the players to establish the game interactions and rules, and agree on the outcomes. Our app shifts this concept to a virtual environment and takes all this responsibility from the hands of the players, by establishing the rules, coordinating the actions and outcomes, calculating the results of the users’ interactions and presenting it onto the users’ screens. The app also allows any game session to be played, anywhere in the world, giving the users the freedom to create and share their game sessions with anyone.

2. THE MVP

For planning this project we have adopted some of the approaches from the SAFe framework, where we divided the releases into four twelve-week iterations, each iteration having six two-weeks sprints for implementing the app. The first iteration was dedicated to the development of the MVP of the app. Our MVP version of the app contains just enough functionality, which allowed us to release the app rather quickly and gain early feedback from our users. Below is the list of features included in the MVP in a format of epics and user stories. Each user story reflects the business value (the user value), which intuitively covers the motivation behind their selection for the MVP. Before starting the implementation, our team has agreed on the Definition of Ready (DoR) and Definition of Done (DoD) which set a better communication within the team members. Following the DoR, we supported each user story with the acceptance criterias for the smooth functional testing.

During the ideation process, we used the User Story Mapping approach, borrowed from Jeff Patton’s book of the same name. This technique helps the team to understand user goals and cover all the steps within the user journey, and at the same time not to dive into the details too much in the early stages of the development.

2.1. MVP BACKLOG

Epic	User Story	Acceptance Criteria
GAME CREATION	As a Seeker I want to create a new private game, so that me and my friends could play it.	GIVEN I want to create a new private game WHEN I open the app THEN the I can see a “Seek” button GIVEN I have the “Seek” button WHEN I press it THEN I can see the map
SHARE GAME	As a player I want to share the game id, so that other players can join the game.	GIVEN I want to share the game id WHEN I start the new game THEN I can copy the game id
SHARE GAME	As a player I want to share the link via social media, so that more players can join the game.	GIVEN I want to share the game id WHEN I start the new game THEN I can see the social media buttons (Twitter, Facebook, Reddit, Telegram, WhatsApp) GIVEN I see the social media buttons (Twitter, Facebook, Discord, Telegram, WhatsApp) WHEN I press any of these buttons THEN the link to the game is shared
GAME AREA	As a player, I want to use my current location, so that I can play the game in my area.	GIVEN I started a new game WHEN I select an area THEN I can use my current location
GAME AREA	As a Seeker I want to see smaller areas of the Hiders, so that I can at least know where to seek them.	GIVEN I am a Seeker WHEN I open the map THEN I can see smaller areas of the Hiders
GAME AREA	As a Seeker I want to be able to scan the map where I am currently at, so that I know if I am near the Hiders.	GIVEN I am a Seeker WHEN I scan the map THEN I can see Hiders near me
JOIN GAME	As a Hider, I want to join a specific private game, so that I can play it.	GIVEN I am a Hider WHEN enter the game id THEN I joined the game
JOIN GAME	As a Hider, I want to join a specific private game via shared link, so that I can play it.	GIVEN I am a Hider WHEN followed the shared link to the game THEN I joined the game
PLAY GAME	As a Seeker, I want to be notified if the Hider is less than 50 metres away from me, so that I could know who is found.	GIVEN I am a Seeker WHEN I am less than 50 metres away from the Hider THEN I want to be notified: “<Player> is found”
PLAY GAME	As a Hider, I want to be notified if I am less than 50 metres away from the	GIVEN I am a Hider WHEN I am less than 50 metres away from the Seeker

	Seeker, so that I could know if I am found.	THEN I want to be notified: You are found

Table 1 - MVP Product Backlog

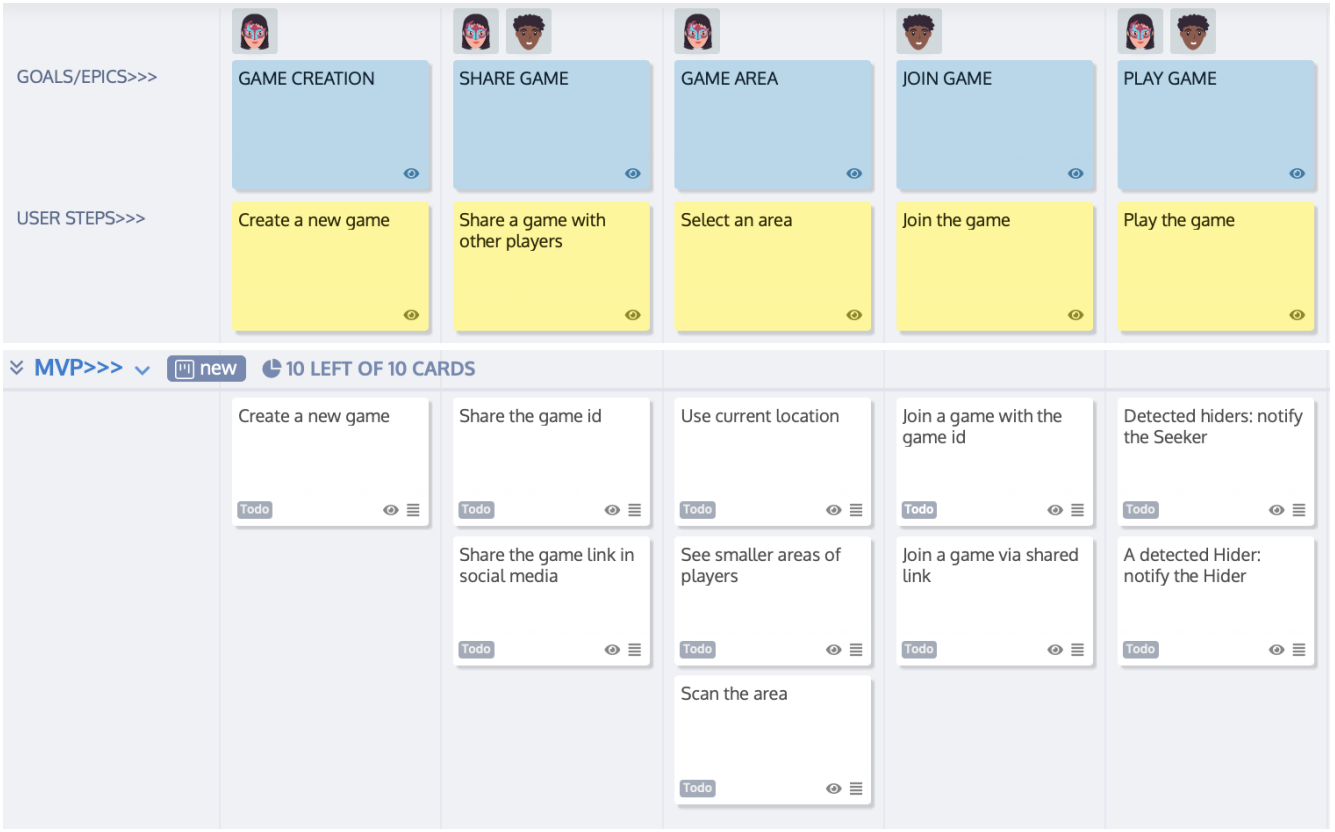

Figure 1 - User story map (MVP fragment)

2.2. USER FLOW

The MVP was designed with minimality in mind. This is reflected in the number of total pages or different screens, and, consequently, in the number of different action paths a user can take within the App, in order to fulfil one's specific goal, either as a Seeker, or as a Hider.

Entering the first page, identified by the URL path "/", two different decisions are promptly presented to the user. This allows to early distinguish the user role in the execution flow, within that interaction instance.

Choosing to hide, the user will be redirected to the URL path "/hide", where there is an input field to enter a game ID. Entering the correct game ID, the user is moved to the URL path "/hide/GAMEID". At this moment, the user formly becomes a Hider, identified by a random UUID and a random username, and the device starts

to broadcast the location and to receive updates from the server, changing the screen accordingly.

If the user chooses to seek, he/she immediately becomes a Seeker, by being redirected to the URL path "/seek/GAMEUUID", that identifies the new game session that was just created. The screen has two vertically scrollable panels. The first shows a map, with the players' approximate or true location, and some game information, namely, the game ID, the number of Hiders (found or missing), and the time left for the next information update. The second panel shows the Hiders' list and some buttons to share the game session, or the game ID, in various social media platforms. Every 30 seconds, the Seeker's device broadcasts its location and receives the Hiders' locations, updating the Seeker screen with the new information from the server.

Figure 2 - User flow

3. TECHNICAL DESCRIPTION

3.1. ARCHITECTURE

Our Hide & Seek app was built following a generalised architectural pattern, with the system being divided into two big components, the backend and the frontend.

The backend service is composed of a REST API written in Python, served by the micro web framework Flask. This REST API is able to persist the data through a NoSQL MongoDB database. The backend communicates with the frontend by the HTTP web protocol, using the REST architectural pattern.

The frontend itself is represented by a Progressive Web App, written using the modern web tools, meaning, Javascript, HTML and CSS, with the help of the web framework Svelte and Svelte Kit, and the CSS toolkit Tailwind.CSS. Being a PWA allows the Application to be delivered through the web, accessed through the devices' web browsers and run on any platform or operating system, with no major compatibility effort. It also allows it to be installed and to behave similarly to a native phone App. On the frontend, the OpenStreetMaps community earth maps are used to display the user's current location, which is fetched using the device's Geolocation API.

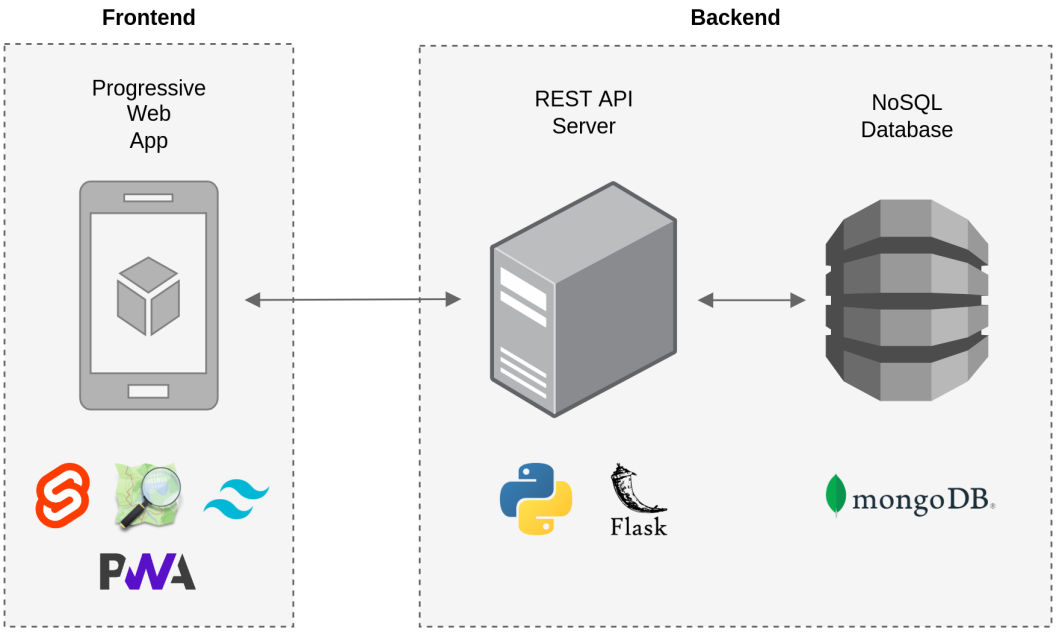

Figure 3 - Application architecture

3.2. IMPLEMENTATION DETAILS

The inner workings and the user flow of the app were inspired by other online multiplayer games, like “Kahoot!”. In our case, for the sake of minimising the viability of the product, we chose not to create a login mechanism, but rather rely on the mathematics of probability to authenticate, authorise and verify the integrity of the users. Put in simple terms, each game session is identified by a randomly large token and it is the responsibility of the game creator to only allow trusted people to participate in his/her game, by sharing the game code, or the game link, only with trusted people. The same mechanism was used with the users themselves, as each one is identified by a random authentication token, which testifies their identity within the game. So, the app is cryptographically secure by the probabilities around the randomness of those tokens. After that, it is all about joining a game with a valid code (that was previously created, i.e., it exists in the database), and playing as a valid user.

The obvious cost of this flexibility is that anyone in the world can create a game and anyone in the world may join a game session, if he/she possesses the code. For the sake of this MVP, there were no considerations made in this regard, however, it is pointed in the roadmap the need for creating mechanisms to prevent abusive use of the app.

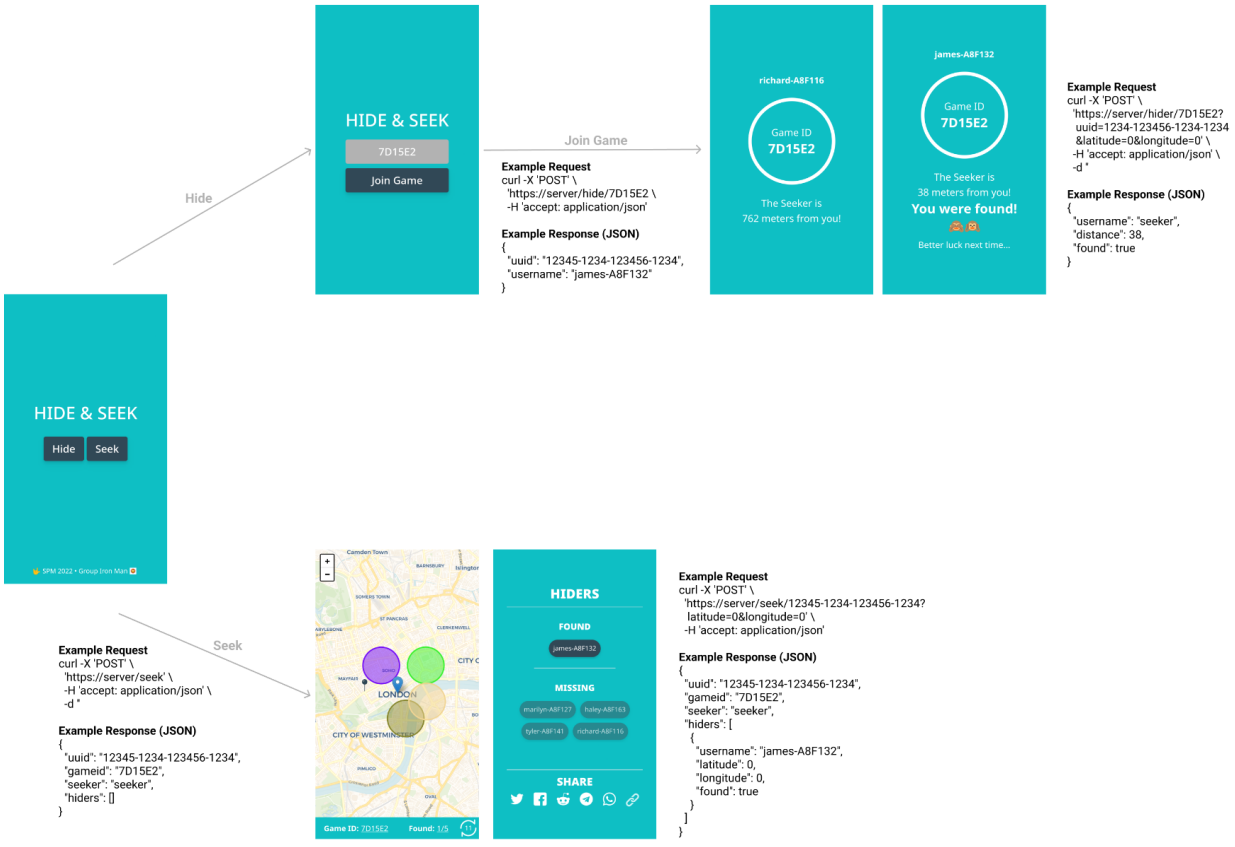

Figure 4 - Application Request/Response Wireflow

4. ROADMAP - NEXT 12 MONTHS

We started building the product roadmap from framing the vision behind our product, to create a mobile phone game which you can play outside.

Next, we defined three major strategic goals for our product for the next year:

- Technical improvement
- Customer delight
- Up-sell in-game features

We then organized the following initiatives into themes, grouped by shared strategic goal and customer value:

- Game time limit
- Game players limit
- Limitation based on location
- Back-end verification
- Create an account
- Log in to the app
- Scalability
- Add badges
- Add leaderboard
- Add tournaments
- Collect easter eggs
- Show business owners on the map
- Add an in-game chat
- Add an in-game store
- Add map themes

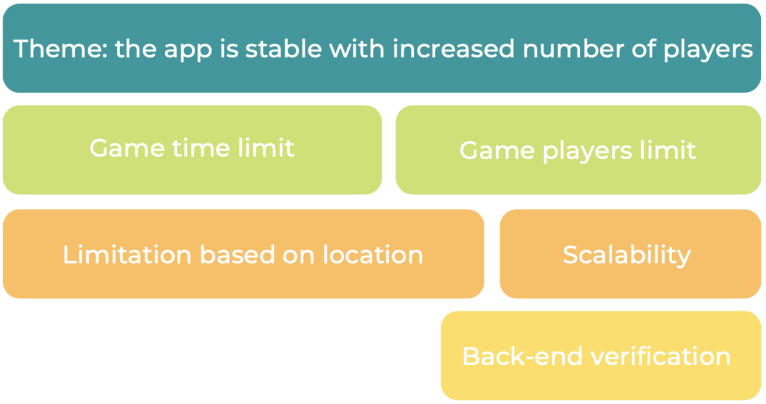

Figure 5.1 - Product Roadmap Theme

Figure 5.2 - Product Roadmap Theme

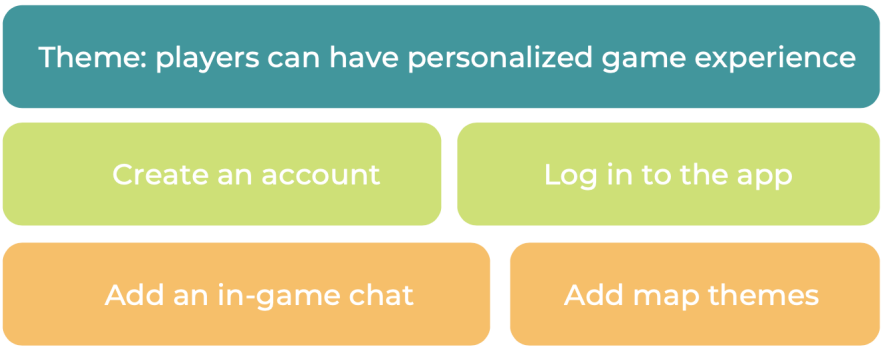

Figure 5.3 - Product Roadmap Theme

Figure 5.4 - Product Roadmap Theme

To prioritize features for the product roadmap we have chosen the story mapping technique, where we created high level user stories under epics and put them for the next four three-month releases. Prior to the beginning of each sprint, we will refine, split and estimate our user stories. It is important to note that the order and volume of the features may change after receiving the feedback from the users of our application.

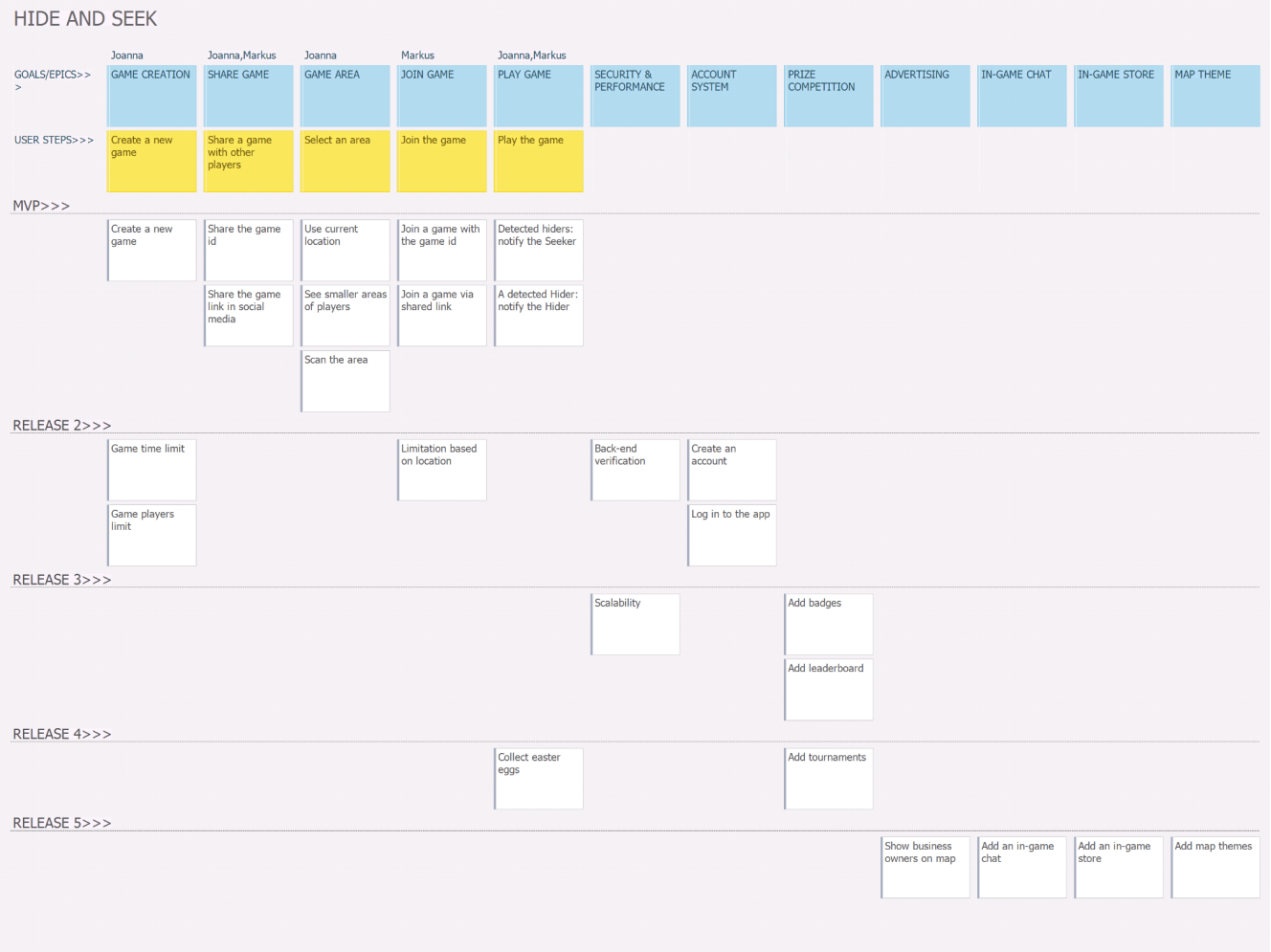

Figure 6 - User Story Map

And finally, we built the product roadmap for the next twelve months.

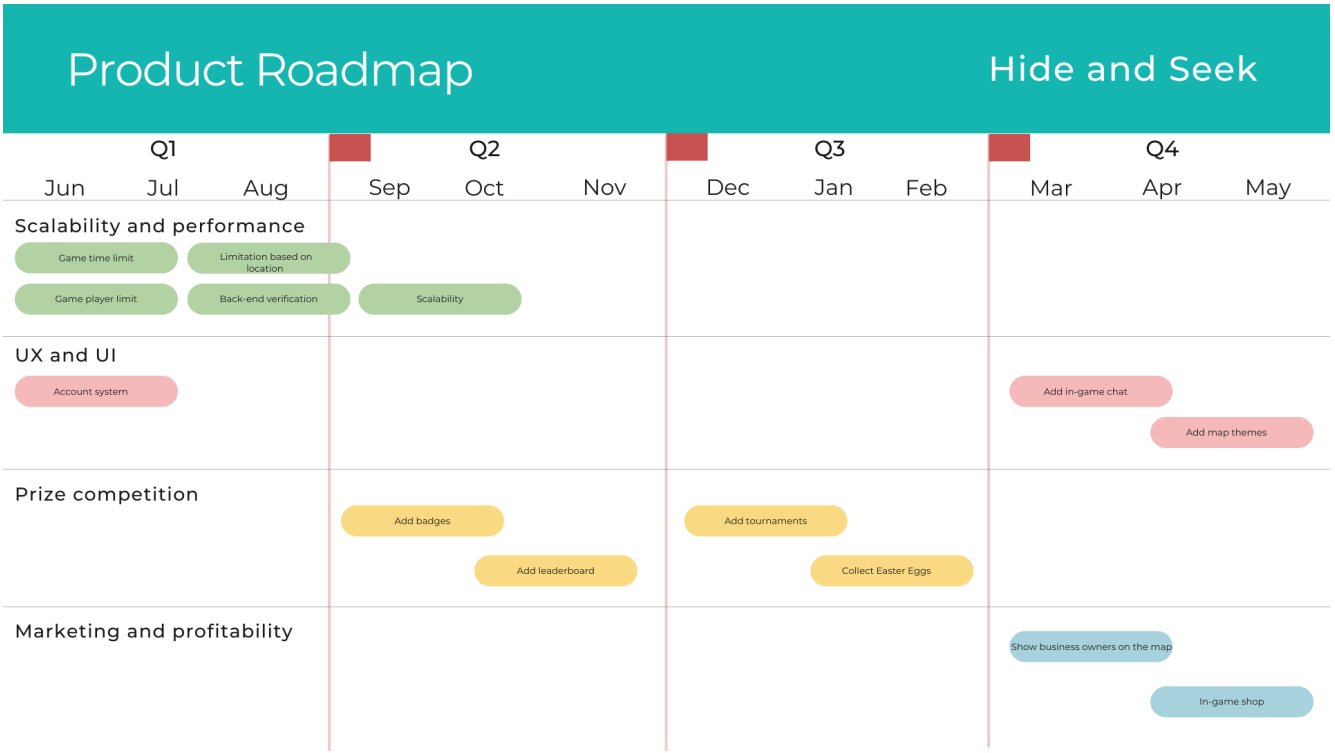

Figure 7 - Product Roadmap

The release plan and backlog is also written in a format of the table below.

Epic	Theme	User Story	Release
GAME CREATION	Game time limit	As a Seeker I want to set a time limit for the game, so that the game becomes more challenging.	Release 2
GAME CREATION	Game players limit	As a Seeker I want to limit the number of players, so that the game is bound to a realistic number of Hiders.	Release 2
JOIN GAME	Limitation based on location	As an app, I want to check if a new player is not far than 5 km from the Seeker, so that the game is limited to users within the same area.	Release 2
SECURITY & PERFORMANCE	Back-end verification	As an app, I want to perform additional verification, so that the front-end is more secure	Release 2
ACCOUNT SYSTEM	Create an account	As a new user, I want to create an account, so that I could save personal configurations for next games.	Release 2
ACCOUNT SYSTEM	Log in to the app	As an existing user, I want to log in to the app, so that I can access my account.	Release 2

SECURITY & PERFORMANCE	Scalability	As an app, I want to expand the capabilities of the backend, so that I could support real-time data for a larger number of users.	Release 3
PRIZE COMPETITION	Add badges	As a winner, I want to receive a special badge, so that my rating in the app is improved	Release 3
PRIZE COMPETITION	Add leaderboard	As a player, I want to see my winnings rating in the leaderboard, so that I could compete with other players.	Release 3
PRIZE COMPETITION	Add tournaments	As a player, I want to participate in the tournaments, so that I could win prizes and badges.	Release 4
PLAY GAME	Collect easter eggs	As a player, I want the game to have "Easter eggs" (boosters), so that I could find them and use them to win a game.	Release 4
ADVERTISING	Show business owners on map	As an app, I want to show some business owners, like cafes, shops, so that I could make a profit on advertising.	Release 5
IN-GAME CHAT	Add an in-game chat	As a player, I want to have an in-game chat, so that I could communicate with other players.	Release 5
IN-GAME STORE	Add an in-game store	As a player, I want to have an in-game store, so that I could purchase some boosters or "abilities' for the game.	Release 5
MAP THEME	Add map themes	As a Seeker, I want to be able to select a map theme, so that a game is more fun.	Release 5

Table 2 - Product Backlog

5. REFERENCES

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- Cascading Style Sheets (CSS) https://en.wikipedia.org/wiki/CSS
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- SvelteKit - Frontend framework https://kit.svelte.dev
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- Link to the User Story Map https://spmproject.storiesonboard.com/m/hide-and-seek
- “Hide & Seek” Github Repository https://github.com/edurbrito/hide-and-seek