Product Design Specification

Team Project Info:

Team Name: XMarksTheSpot

→ The team name was chosen because the phrase “X marks the spot” makes the user think of a map where ‘X’ marks a certain location. We thought this name was relevant to our project since it is geography based and maps relate to geography.

Team Members: Gargi Tawde, Areebah Iqbal, Fariha Ahmed

Technologies Being Used:

→ *Frontend*
- HTML
- CSS
- React
- Tailwind

→ *Backend:*
- Flask
- Python
- MySQL

Specific Tasks per Person:

→ ***Gargi:*** Fullstack, focus on User Authentication and User Dashboard

→ ***Areebah:*** Fullstack, focus on Game Logic and Databases

→ ***Fariha:*** Fullstack, focus on Game Logic and Databases

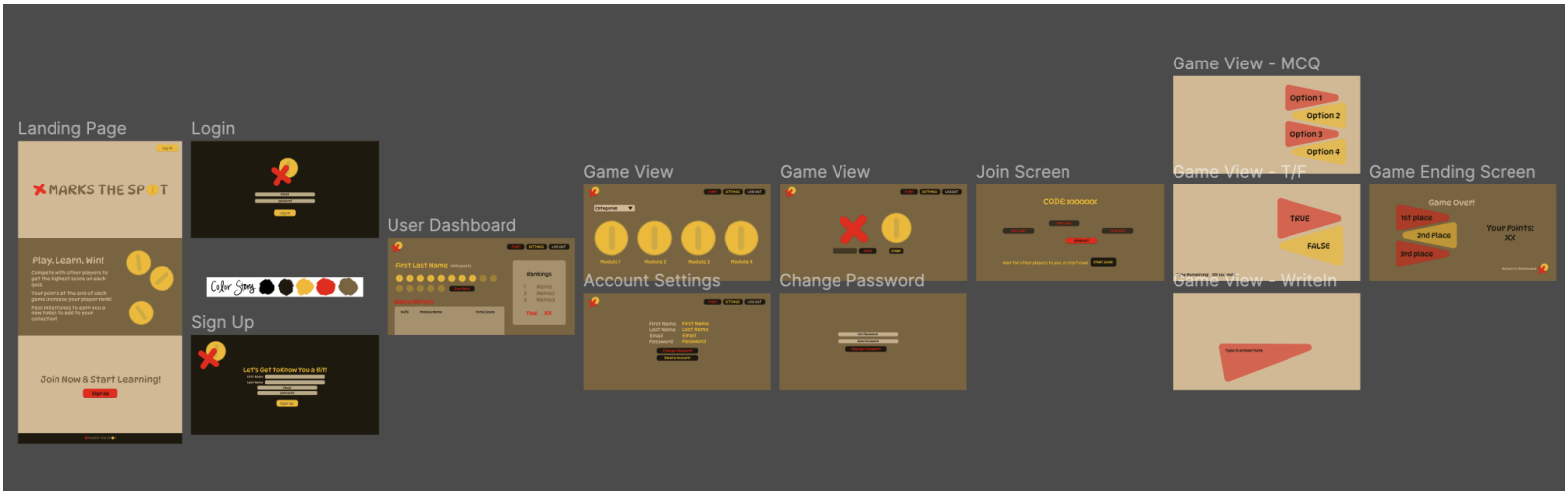
Project Description:

Description of End Product: X Marks The Spot is a geography learning game site, where users can participate in quiz game sessions by themselves or with others to learn new geography concepts. Users will earn points in the game session based on accuracy, speed, and question difficulty, and the points will go towards their account total. Users can earn certain tokens for every milestone they pass based on the total number of points they have accumulated, which they can view on their user dashboard.

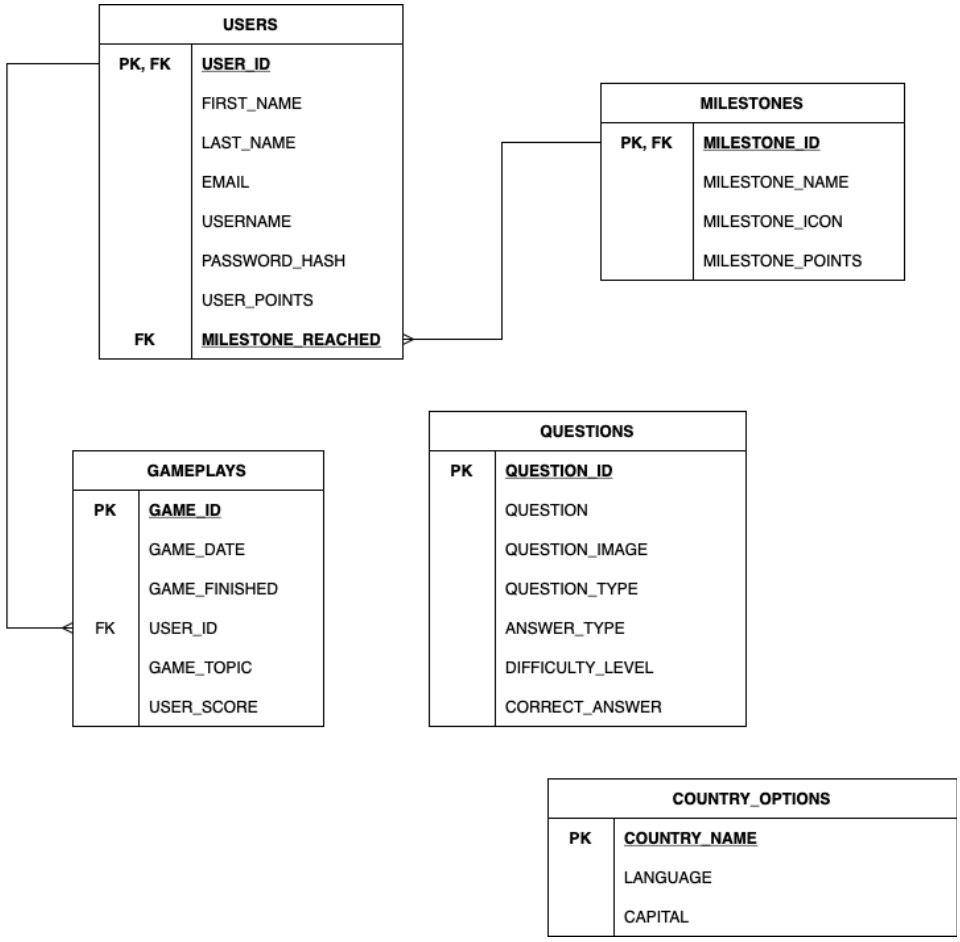
→ *Site Logistics*

- Game Logistics
  - Number of users allowed in a game session: 1 - 4
  - Number of questions in a game session: maximum of 15
  - Base points users can earn per question: 100 points
  - Maximum amount of time users get to answer a question: 30s
  - Maximum number of points users can earn in 1 game session: 4,500 points (based on algorithm [see below])
- Milestone logistics
  - Player will reach the first milestone after gaining a total of 15,000 points
  - Subsequent milestones will be incremented by 10,000 points (i.e., Milestone 2 is reached after 25,000 total points, Milestone 3 is reached after 35,000 total points, etc)

→ *Wireframes (better view)*



→ *ERD for Databases*



Algorithms/ML/AI schemes Used in the Core Engine:

→ *Algorithm Description:*

- Points are earned per question based on:
  - Correctness of the answer
  - Base number of points the player gets per question
  - Speed at which question is answered
  - Difficulty of question

→ *Algorithm:* c * ((b/t) * d)

- c: correctness
  - Can be 0 (answer was incorrect) / 1 (answer was correct)
- b: base points
  - The number of points each question is worth is 100.
- t: time it takes to answer
  - Max. time a user gets to answer a question = 30s

- d: difficulty of the question
  - Difficulty = range of 1 - 3 (for difficulty levels 1 - 3 respectively)

→ *Time Complexity:* O(1)
- Only simple arithmetic equations are used in the algorithm, so the time complexity will be constant

The Market Space the Application is Related to + Selling Points:

→ "According to the Nation's Report Card, the largest continuing and nationally representative assessment of academic performance in the U.S., only 25 percent of American students in the eighth grade scored "at or above NAEP (National Assessment of Educational Progress) proficient" in geography." SOURCE

→ This tool can be used to help students refine material they're learning in school, and ensure they are performing at the appropriate level.

→ The site is geared towards users who are interested in learning geography.

→ The game will help users remember geography facts in a fun and interactive manner.

→ Game and site is focused towards the type of content being learned.

→ Multiplayer allows users to learn with others.

→ Users can earn tokens as performance overall improves, which provides incentive to learning.

Functional Specifications:

List of of Product Features:

→ *Home Screen:* Landing page for when the user first accesses the site. From here, they can elect to log-in to an existing account, or sign-up for a new one.

→ *User Authentication:*
- *Account Creation*: User enters information like first and last name, email address, and a password for the account.
- *Login:* User logs into a pre-existing account after providing the correct email address and password associated with said account.
- *Password Hash/Encryption:* User data from account creation will be safely stored after encryption for security purposes.

    - ***Forgot Password:*** If a user cannot remember their password, they should be able to reset it by providing the email address associated with the desired account; an email will then be sent to the user instructing them on how to reset their password and pick a new one.
    - ***Logout:*** User can log out of a pre-existing account. Any progress made during that session will be stored underneath their account.
- → ***Account Settings:*** On the settings page, users can view the account first name, last email, email, and password. On top of that, the user will have the ability to change the account password or delete the account.
- → ***Delete Account:*** Users can delete the account by going to the settings page. The user's account will be deleted from the databases as well.
- → ***Join Game:*** Users can join a game with other users by providing a pin number into the prompt.
- → ***Start Game:*** Users can start a game where they will be provided a generated unique pin number, which they can provide to other players they want to join, or they can play the game by themselves.
- → ***Game:*** Users will be able to play a geography quiz session by themselves or with other players, where they will be tested on their knowledge of different geography topics.
- → ***Multiplayer Game Mode:*** Multiple users can access a game session by inputting the unique game identifier code that is generated upon starting a game.
- → ***Game End Screen:*** At the end of the game, users will see the order players placed in as well as the points the user has earned through the game.
- → ***User Dashboard:*** On the user dashboard, users will see:
    - ***User Total Points Display:*** Users can view the total points earned from all the games they have played.
    - ***User Milestone Display:*** Users can view all the milestones earned based on the total number of points they have accumulated. Users will also be able to view the milestones that are still locked, which will incentivize them to continue completing the quizzes.
    - ***User Game History:*** Users will have the ability to view their game history, which is a list of previous games they have played. Each entry will include the date of the game, the module name, and the total points earned in the game.
    - ***Overall User Leaderboard:*** Users can view the current rankings of all the users on the site and see who is collecting the most points.

Description of Features that Allow Multiplayer:

→ *Join Game with Unique Pin Number:* A unique pin number is generated upon the start of a new game. Users can share the pin with others and other users can join the game by entering the pin. It allows multiple users to complete the quiz at the same time, incentivizing learning with a healthy competition.

Deployment:

How the Flask Project will be Deployed:

We will deploy the Flask project with Heroku. After creating a Heroku account and installing the Heroku CLI, we will first create a file named Procfile in the project's root directory and update the requirements.txt file and commit the files to Git. Afterwards, we'll use the Heroku CLI to create a Heroku app and then push the Git repository to the remote created with the Heroku create command. Afterwards, the building and deployment process will occur; the app will now be online and can be opened on the web browser.

List of Features that will be Accomplished in Milestones M1 - M5:

→ *M1 (2-5 - 2/13): Finalize Design + Features*
- Backlog
- Database ERD
- Wireframes

→ *M2 (2/14 - 2/29): Database Setup + User Authentication*
- Initial Database Setup
- Home Screen
- Account Creation Page
- Login Page
- Password Hash/Encryption
- Forget Password Functionality
- Logout Functionality
- User Dashboard (basic UI)
- Account Settings
- Delete Account Functionality

→ *M3 (3/1 - 4/5): Game Implementation*
- Join Game Functionality

- Start Game Functionality
- Game Implementation
- Multiplayer Functionality
- Game End Screen

→ ***M4 (4/6 - 4/20): User Engagement***

- User Dashboard
- User Total Points Display
- User Milestone Display
- User Game History
- Overall User Leaderboard

→ ***M5 (4/20 - 4/25): Internal Testing***