Tank Game Project - Week 1 Milestone

Introduction

The Tank Game is a multiplayer real-time combat game where players control tanks and engage in battles arena. Players can join or create games in a central lobby, chat with other players, and compete in various game modes, such as Free-for-All or Team Deathmatch. The objective is to destroy opponents' tanks using strategy, power-ups, and precise controls. Players can also manage their profiles, track their scores, and customize certain game settings.

Features

1. **User Authentication**:

   o Players can create accounts, log in, and log out.

   o Authentication is required to join games, create new matches, or chat with others.

   o Passwords will be hashed and stored securely in the database.

2. **Lobby System**:

   o The lobby displays a list of available games that players can join.

   o Each game in the lobby will show the game mode (Free-for-All or Team Deathmatch), the number of players, and a button to join.

   o Users can create a new game by specifying the game mode and the number of players.

   o Chat is available for users to communicate while in the lobby.

3. **Profile Management**:

   o Players can view and edit their profiles, including their avatar

   o Players can change their password and update their profile information as needed.

4. **Chat System**:

   o Players can send and receive messages in the lobby and during gameplay.

- Player avatars (from Gravatar) are displayed next to messages for easy identification.

Tank Game-Specific Features:

1. **Tank Movement and Controls**:

   - Players control their tanks using the keyboard (WASD or arrow keys for movement, and the spacebar for shooting).

   - Tank movement is smooth and responsive, allowing players to navigate the battlefield and avoid enemy fire.

2. **Shooting and Combat Mechanics**:

   - Tanks can fire projectiles to destroy opponents.

   - Each tank has a set amount of health, which decreases with every hit. Tanks are destroyed once their health reaches zero.

   - Players can respawn after destruction, depending on the game mode.

3. **Power-ups**:

   - Power-ups like speed boosts, health packs, and shield enhancements are available throughout the battlefield.

   - Players can collect these power-ups to gain advantages over opponents.

4. **Game Modes**:

   - **Free-for-All**: Every player competes against each other. The last tank standing or the player with the most kills wins.

   - **Team Deathmatch**: Players are divided into two teams. The team with the highest combined score at the end of the match wins.

5. **Score Tracking and Leaderboard**:

   - Players earn points by destroying enemy tanks and collecting power-ups.

   - A real-time leaderboard shows the current rankings of all players during the match.

   - At the end of each game, players can view their final scores and standings.

6. **End Game Screen**:

- o   After a match ends, players are shown their final scores and can choose to return to the lobby or start a new game.

Technologies

Required Technologies:

1. **Render**:

   - o   The web application will be deployed and hosted on Render, which provides a platform for running web services like the Tank Game.

2. **Node.js**:

   - o   Node.js will be used to handle the server-side logic of the game. This includes handling authentication, managing game sessions, and facilitating real-time communication.

3. **Express.js**:

   - o   Express.js will be used as the backend framework to build RESTful APIs, route requests, and serve the necessary pages and game data.

4. **PostgreSQL**:

   - o   PostgreSQL will serve as the database for storing user accounts, game statistics, and chat logs. Each player's profile, scores, and match history will be stored in a secure and scalable manner.

Additional Technologies (Optional)**:**

1. **Socket.IO**:

   - o   This library will be used to enable real-time, bidirectional communication between the server and the client. This is critical for real-time updates in the game (tank movements, firing, and chat system).

2. **Gravatar API**:

   - o   The Gravatar API will be used to display user avatars based on their email addresses. Players can customize their profile avatars via Gravatar, which will be shown in the lobby and game chat.

3. **Three.js or p5.js**:

o   A JavaScript rendering library like **Three.js** or **p5.js** can be used to create a simple 2D/3D rendering of the tank game. This will allow for more dynamic visuals and better performance.

4. **Bootstrap or Tailwind CSS**:

o   To ensure a responsive and user-friendly interface, Bootstrap or Tailwind CSS can be used to style the front-end components.

User Interaction

1. Login Screen:

- Users enter their username and password in the login form.

- After submitting, the system checks the credentials and either logs the user into the lobby or shows an error message for incorrect credentials.

- If the user doesn't have an account, they can click on a "Register" link to be taken to the registration form.

2. Lobby Screen:

- Upon successful login, the user is taken to the **Lobby** page.

- The lobby displays a list of available games, each showing:

    o   The game's name

    o   The number of players currently in the game

    o   The game mode (e.g., Free-for-All, Team Deathmatch)

    o   A **Join Game** button

- Users can either click **Join Game** to enter a match or **Create Game** to set up a new match with custom settings.

- On the right side of the screen is a **Chatbox**, where users can send real-time messages. User avatars are shown next to their messages.

- Users can also access their profile by clicking their avatar in the top-right corner and choosing **Edit Profile**.

3. Game Screen:

- Once in a game, players control their tanks using the keyboard.

  - **WASD** (or arrow keys) are used for movement.

  - The **spacebar** is used to fire projectiles.

- The game screen will show the **battlefield**, which includes walls, obstacles, and power-ups that players can collect.

- Each player's health bar and score will be displayed on the side of the screen.

- A **leaderboard** will track the players' scores, updating in real-time as tanks are destroyed and power-ups are collected.

- A **chatbox** will be available during the game for players to communicate.

4. Profile Screen:

- Players can view and edit their profile information.

- The **Profile** page allows users to change their email, update their avatar via Gravatar, and change their password.

- After making changes, players can click the **Save** button to update their information.