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Project Proposal

Chopsticks Game Site

Our proposal is to create a competitive online 1v1 chopsticks game, allowing players to compete against other users and track their skill at the game.

Context

Chopsticks is a two-player hand game in which players extend fingers from both hands and transfer their scores to their opponents by taking turns tapping each other's hands. Each player starts with one finger extended on both hands. They attack the hands of their opponent by tapping them, adding to the number of fingers the opponent has extended. For example, if a player with two fingers on a hand attacks an opponent with one finger on the hand, the opponent now has three fingers on their hand. If a hand has exactly five fingers, that hand is out of the game. The first player to knock out the hands of their opponent wins. If an attack results in a sum greater than five, then five is subtracted from the sum. For example, if a player with four fingers attacks an opponent with three, the sum is seven, so five is subtracted for a total of two. The opponent will extend two fingers. In addition to attacking, once per round a player can transfer fingers between hands. A player cannot make a transfer resulting in zero or five fingers, and cannot transfer to a dead hand.

Our project will feature chopsticks as its primary component.

Users will be able to play a game of chopsticks 1v1 against a:

- Random user on the server
- Friends available on a friend list
- Computer (tentative)

Which player goes first will be decided by a coin flip.

Users will have two moves available during their turn:

- Attack: Has two inputs which is choosing target (opponents left or right hand) and choosing attacking hand (users left or right hand)
- Transfer: "Move" fingers between hands (option can be done by selecting the fingers on one of the users hands)

Note: "Dead" hands cannot be used to attack or transferred to.

The chopsticks game is the central part of this project and will likely take the most effort to ensure that games can be played properly. Proper synchronization of turns is important to ensure that users are not taking multiple turns at once and that player orders are properly handled. Of course, we must ensure that the game properly recognizes the moves that players make and reacts accordingly. The UI must update to reflect changed fingers and the score must change.

Each user has a user profile:

- Username, profile picture (customizable)

- Player statistics: wins, losses, winrate %
- Achievements: Fastest win/loss, winning certain number of games, other tasks or objectives

Cosmetics such as the hand skins can be purchasable in the shop using tokens obtained from objectives/achievements. The user profile is also an essential part of this project. The stat tracker and achievement tracker will need to be linked to the game to ensure proper tracking. A risk with the implementation is that if the profile system is poorly implemented, other users might be able to see information they shouldn't or even change settings like a user's password. We will need to properly separate what the user themselves can see and what other users can see.

A friend system will be implemented, allowing users to add other users to their friend lists. A user will be able to see a list of friends and send them messages or challenge them to games. A user can add a player as a friend by going to their profile through a user search option and choosing the option to add them. The friend system is linked with both the user profile and the chopstick game, but it is a separate system entirely.

The game will also have an elo rating system, a crucial aspect to the leaderboard feature. Each player will start at a certain elo number (such as 1,000) and each win or loss will increase or decrease this number, respectively. The higher the elo rating of the player, the higher their rank on the leaderboard. The amount a player gains will also be dependent on the elo of the opponent (i.e.: winning against higher elo player gives more elo).

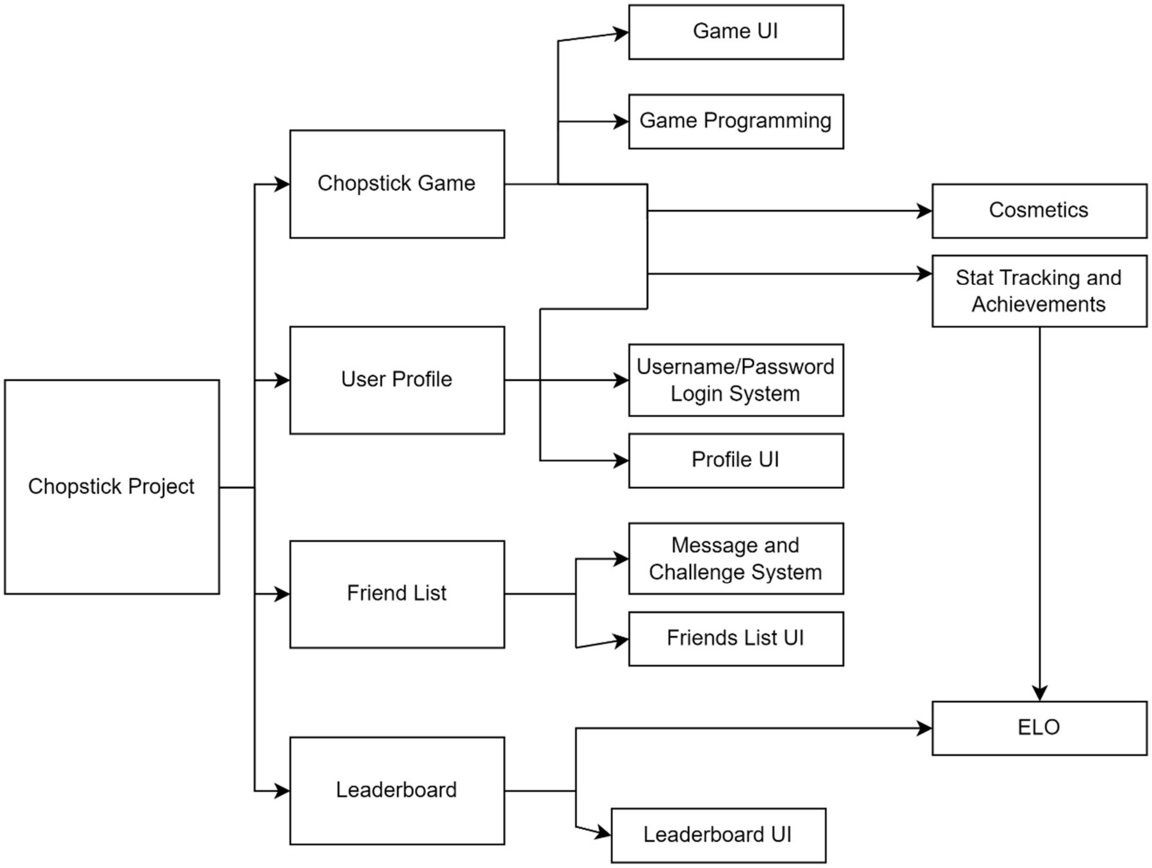
List of Deliverables:

- Chopsticks game UI (with cosmetics/skins)
- User Profile UI
- Friends list UI
- Leaderboard UI (with elo rating system)

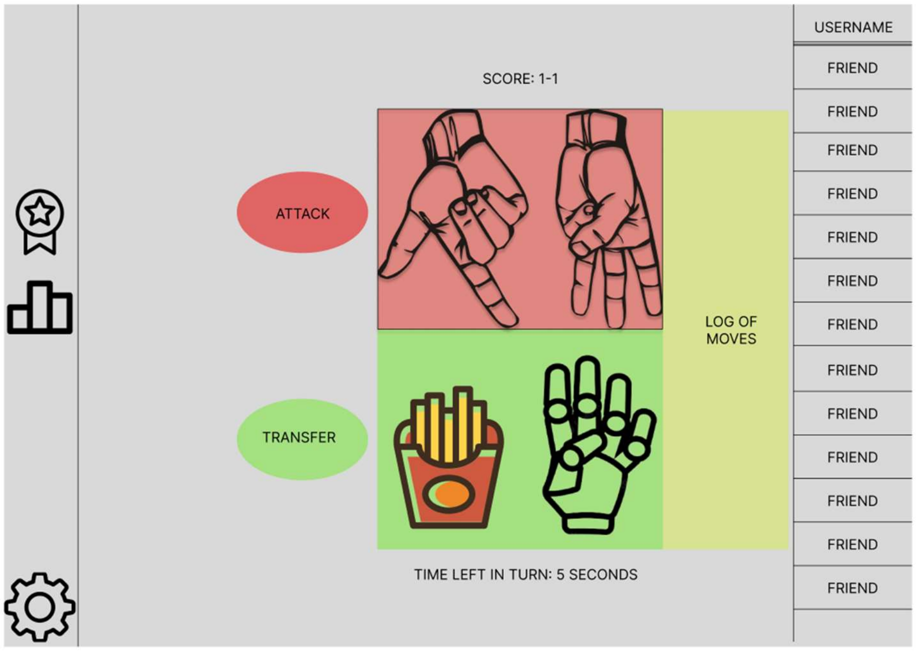
Client-Server Structure

The game is a web application based on React/Java/PostgreSQL stack. On the frontend side, a user can first interact with the server by creating a new account, logging in, and adding or removing friends. After logging in, leaderboards, player statistics, and creating a new game session would be available as well. The Java-based server would keep track of logged in accounts, and currently happening games through session management. The actual business logic of the game is also implemented in the server. RESTful APIs would connect all frontend interactions to the backend. Lastly, a PostgreSQL database would store all accounts and all pertinent information about each account, such as list of friends, chat logs, win/loss rates, ELO ratings, and more depending on future additions.

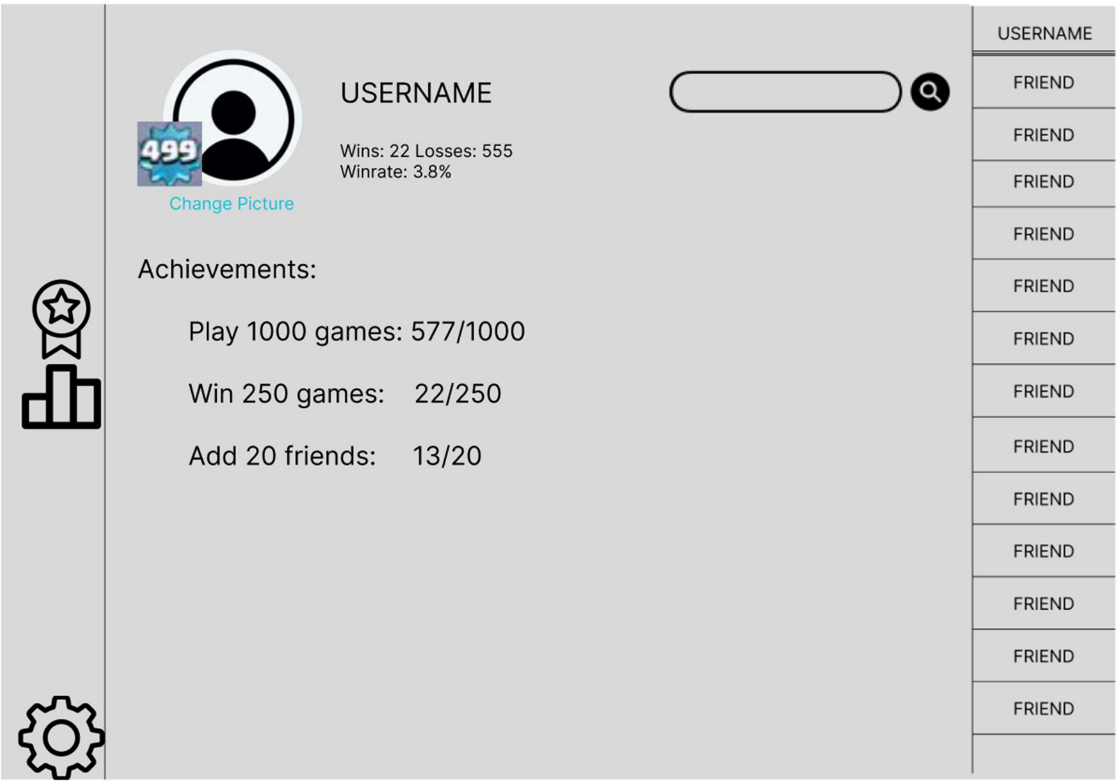
We will likely divide the work by having each member work on a subset of each larger component, like having one member work on the achievement tracker and stat tracker of the user profile while another works on implementing the password and username. This way every member is contributing to each major component and can get an idea of how each portion connects to each other. This may lead to some hiccups when we integrate each other's code into the whole component, but with proper formatting and documenting it should be achievable. Accountability will be achieved by clearly delineating the tasks as mentioned above. As each subset makes up the larger whole, group members will notice if part of the program needed for the entire component to function is missing or incomplete.



High Level Diagram: Features to Deliver



Game UI Concept



Wins: 22 Losses: 555
Winrate: 3.8%

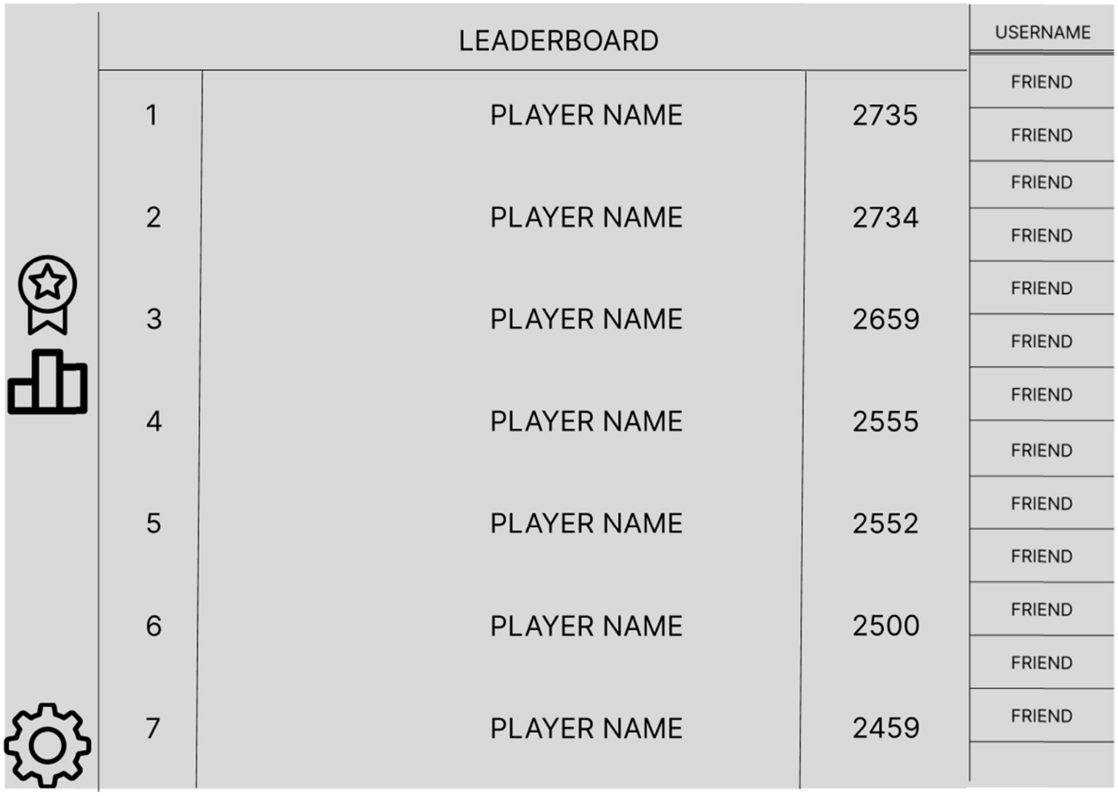
Achievements:

Play 1000 games: 577/1000

Win 250 games: 22/250

Add 20 friends: 13/20

User Profile Concept



LEADERBOARD

1	PLAYER NAME	2735
2	PLAYER NAME	2734
3	PLAYER NAME	2659
4	PLAYER NAME	2555
5	PLAYER NAME	2552
6	PLAYER NAME	2500
7	PLAYER NAME	2459

Leaderboard Concept