1. General Shared Pages (Admin & Player)

Registration and Login Page

Registration Process:
1. Navigate to the **Register Page**.
2. Enter your details (e.g., email, name, etc.).
3. A verification code will be sent to your email.
4. Enter the verification code on the register page to complete the registration process.

Login Process:
1. Navigate to the **Login Page**.
2. Enter your credentials to log in.

Profile Page
- Upon logging in, both admins and players can:
  - View and modify their profile information (*except their role*).
  - View their scores earned from each tournament.

2. Player Specific Pages

Available Tournament Page
Players can:
- View all upcoming tournaments.
- Sign up for their desired tournament using the available information.

Sign-Up Process for Tournaments
1. Navigate to the **Available Tournaments** page.
2. Click on the tournament you want to join.
3. Sign up for the tournament.

On competition day:
- Admins will match players with opponents based on:
  - **Random Matching**, or
  - **Skill-Based Matching** (*using Trueskill*).

AI ChatBot
- Players can query the **AI chatbot** for questions contextually relevant to this web app, or any questions at all.

3. Admin Specific Pages

Tournament Page
Admins can perform the following actions:
- **Create tournaments.**

- **Edit tournament details.**
- **Delete tournaments** they have created.

Admins can select the matching algorithm for a tournament:
- **Skill-Based Matching:** Matches players based on their **Trueskill rating**.
- **Random Matching:** Pairs players randomly.

Generating Matches

On the competition day:
1. The admin clicks the **"Match Participants"** button to pair users.
2. If the **"isRandom"** checkbox is unchecked:
   - Players will be matched according to their **Trueskill rating**.
3. If the **"isRandom"** checkbox is checked:
   - Players will be randomly paired.

Scoreboard Update Page

During matches, the admin can:
- Update the scoreboard.
- Players' ratings are updated using the **Trueskill Rating system**.
- Move the winner to the next round of matches.
- Display the winner for the tournament at the end of the game.

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4. Trueskill Rating System

How Skill-Based Matchmaking is Done

- **TrueSkill Rating:**
  Our system uses Microsoft's **TrueSkill algorithm** to rank players. TrueSkill uses:
  - **Mu (μ):** Represents a player's **skill estimate**.
  - **Sigma (σ):** Represents **uncertainty** in that estimate.

When a player competes and wins:
- **μ increases** and **σ decreases**, reflecting a higher and more certain skill level.
- Ratings are updated after each duel.
- **High σ values** indicate more uncertainty.
- **Low σ values** indicate greater confidence in the skill estimate.

Key Concepts in TrueSkill

- **Mu (μ) - Skill Estimate:**
  Players start with a default **μ** value representing their initial skill. This value adjusts as players win or lose, reflecting changes in their skill.
- **Sigma (σ) - Uncertainty:**
  Players also start with a default **σ** value representing initial uncertainty.
  - **Winning against stronger opponents:** Decreases σ (*more confidence*).
  - **Losing against weaker opponents:** Increases σ (*greater uncertainty*).

TrueSkill Calculation

- **Match Updates:**
  During each match, ratings for both players are updated based on the outcome.
- **Outcome Effects:**
  - If Player A wins against Player B:
    - Player A's **μ increases** and Player B's **μ decreases**.
    - Player A's **σ decreases** (*higher confidence*), while Player B's **σ might increase**.
  - This dynamic process ensures that ratings reflect both recent performance and the confidence in a player's skill level.