PocketSports

A Digital Coaching App

Design Plan Document
Version 1.0

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1.0 INTRODUCTION

1.1 Purpose

The purpose of this document is to extensively lay out the design of the software architecture, user interface, functionality, and data of the PocketSports digital sports team management application. This document will detail each aspect of the software and the plan of how it will be designed.

1.2 Scope

This document will cover the software system, architecture, data design, and user interface for the PocketSports app. For each section, the descriptions will go into detail about the plans for the design of each element. The PocketSports app is a digital team-management application made for coaches, players, owners, and parents. The goals of this app are to streamline the many different features of several different apps that often need to be used concurrently to achieve a team's goals. This app will serve as a more advanced and streamlined version of several different applications, combining all of the most advanced features into one simple user experience. Coaches, players, owners, and parents can all benefit from a more centralized experience to see player stats, league standings, game box scores, and more.

1.3 Overview

This document has several sections pertaining to the software system design of the PocketSports application. First, a system overview of the functionalities and features of the application itself. Next, an architectural overview of the system, including an ER diagram showing the entity relationships as well as design rationale. Next, the data design, detailing what data will be flowing in and out of the application (input vs. output), how that data will be stored, how CRUD operations will be performed, and more. Then the user interface, describing how users (players, coaches, owners, and parents) will interact with the app and some examples of what the UI itself will look like for this application.

1.4 Reference Material

The reference material used for the design of this system include several other digital sports coaching apps that are currently used by our client as well as other coaches of Florida Tech Sports teams. These apps all have key features that our client seeks to have in one single centralized user experience.

1.5 Definitions and Acronyms

CRUD (Create, Read, Update, Delete)

PocketSports: The name of the digital coaching app.

AI: Artificial Intelligence.

ML: Machine Learning.

UX/UI: User Experience/User Interface.

CSV: Comma-Separated Values.

JSON: JavaScript Object Notation.

MERN stack: MongoDB, Express, React, Node

Player: The individual students who make up the positions of the sports team

Coach: The individual(s) responsible for managing the team

Owner: The overall manager of the entire operation including the coaches and players

2.0 SYSTEM OVERVIEW

2.1 Functionality

The sports team management application is designed to facilitate seamless communication, organization, and performance tracking for coaches, players, and parents. Users can create accounts, log in securely, and manage their profiles, including team roles and settings. Owners can create and manage teams, invite players via email, and assign roles (owner, coach, player, parent) within the team. Coaches can create custom drills and practice plans, utilizing tools for animation and real-time adjustments. These can be saved in a drill bank for future use. Users can view practice schedules, game dates, and team events through an integrated calendar system. Additionally, the *PocketSports* application allows tracking of individual and team goals, providing visual progress reports and statistics to enhance training focus.

2.2 Context

The application is set against the backdrop of youth and amateur sports, where effective team management and communication are critical to fostering player development and engagement. Coaches often juggle numerous responsibilities, including practice planning, player development, and administrative tasks. This application aims to streamline these processes, making it easier for coaches to focus on training and skill development.

2.3 Design

The application will feature a user-friendly interface designed with a focus on usability and accessibility. The design will adapt to various devices, including desktops, tablets, and smartphones, ensuring that users can access the application anytime, anywhere. Clear menus and buttons will guide users through the application, allowing easy access to features like team management, drills, and performance analytics. Animated elements and visual cues will enhance user interaction, especially when creating drills and plans, providing a dynamic and engaging experience.

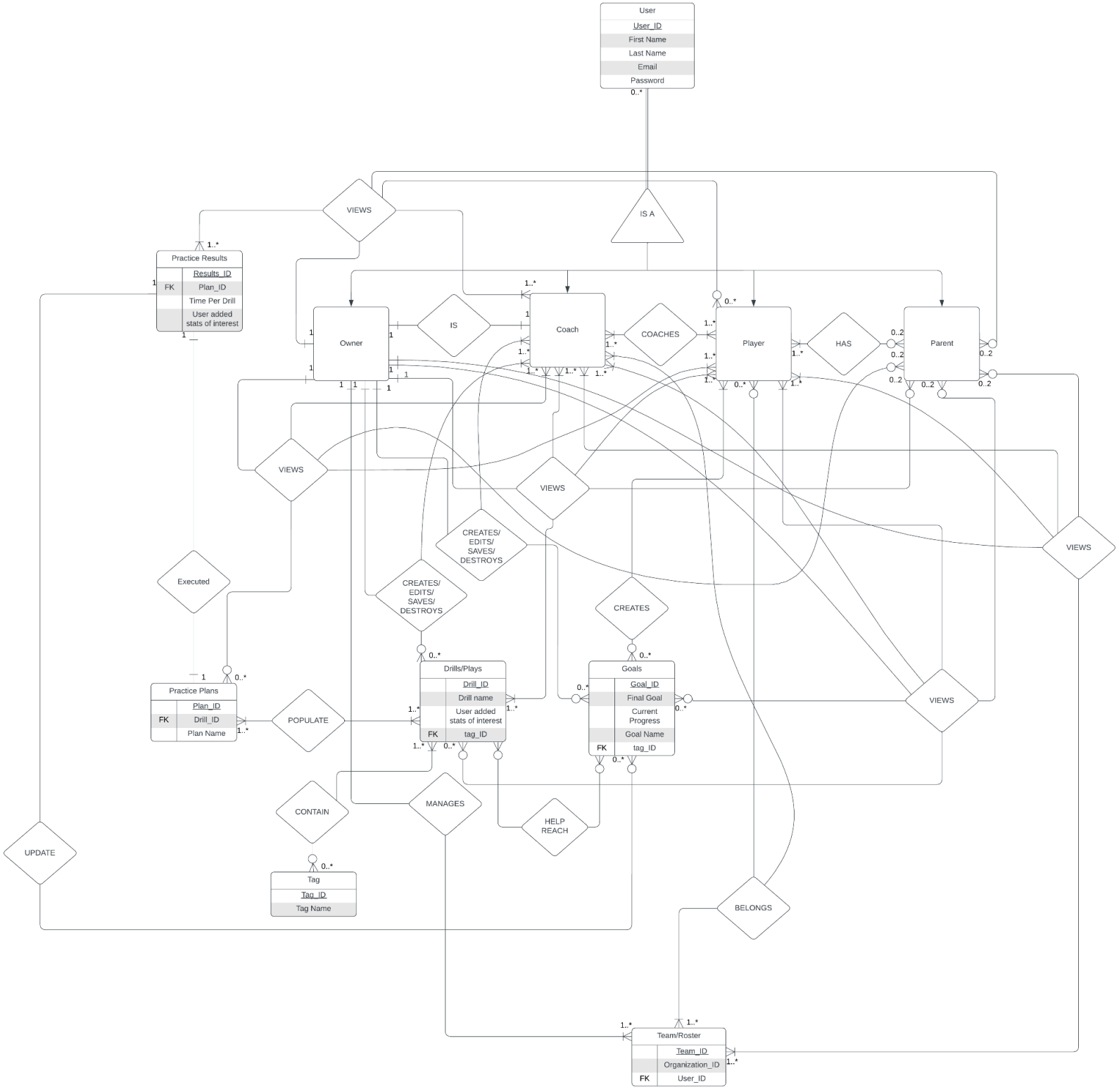
3.0 SYSTEM ARCHITECTURE

The system architecture will be composed primarily of JavaScript and will use the MERN stack. The MERN stack is a popular web development framework that combines four key technologies: MongoDB, Express.js, React, and Node.js. MongoDB is a NoSQL database that stores data in a flexible, JSON-like format. Express.js is a web application framework for Node.js that simplifies the process of building server-side applications and APIs. React is a JavaScript library for building user interfaces, particularly single-page applications, allowing for dynamic and responsive user experiences. Node.js is a runtime environment that enables JavaScript to be executed on the server side, facilitating full-stack JavaScript development. Together, these technologies allow *PocketSports* to be a robust, scalable web application with a seamless integration between the front-end and back-end.

3.1 Architectural Design

The architectural design of the *PocketSports* application is a database. The application features various user roles, each with distinct attributes and functionalities. The USER profile serves as the base for anyone using the application, comprising key attributes such as User_ID (Primary Key), First Name, Last Name, Email Address, and Password. The OWNER, typically the head coach, possesses additional permissions to manage coaches, players, and parents, along with the ability to conceal specific items from them. The COACH is responsible for executing functions specific to their role within the team. PLAYERS can access information as permitted by their coach, while PARENTS can

view content allowed by the coach regarding their child. Coaches can create DRILLS/PLAYS in a sandbox mode, with each drill identified by a unique ID (Primary Key) and name, along with relevant statistics and a tag_ID as a foreign key. TAGS can be assigned to drills or plays, categorizing them (e.g., passing, running, shooting), with each tag containing an ID (Primary Key) and tag name. PRACTICE PLANS are organized sequences of drills or plays, each defined by a plan ID (Primary Key) and a unique name, which includes drill IDs as foreign keys. The outcomes of executing these plans are recorded in PRACTICE RESULTS, detailing the time spent on each drill and other statistics added by the coach, identified by a results_ID (Primary Key) and linked to a plan ID (Foreign Key). The TEAM/ROSTER outlines the players on the team, featuring a TEAM_ID as a primary key and an ORGANIZATION_ID, with each player associated via their user_ID (Foreign Key). Finally, the GOALS section encompasses individual and team goals, with each goal assigned a unique ID, name, and current progress, as well as tag_IDs as foreign keys to connect results to the goal tracking system. An image of the database is shown below, and its relations will be described in section 3.2.


User
User_ID
First Name
Last Name
Email
Password
VIEWS
IS A
Practice Results
Results_ID
FK
Plan_ID
Time Per Drill
User added stats of interest
Owner
IS
Coach
COACHES
Player
HAS
Parent
VIEWS
VIEWS
VIEWS
CREATES/ EDITS/ SAVES/ DESTROYS
CREATES/ EDITS/ SAVES/ DESTROYS
CREATES
Executed
Practice Plans
Plan_ID
FK
Drill_ID
Plan Name
POPULATE
Drills/Plays
Drill_ID
Drill name
User added stats of interest
FK
tag_ID
Goals
Goal_ID
Final Goal
Current Progress
Goal Name
FK
tag_ID
VIEWS
CONTAIN
MANAGES
HELP REACH
UPDATE
Tag
Tag_ID
Tag Name
BELONGS
Team/Roster
Team_ID
Organization_ID
FK
User_ID

3.2 Decomposition Description

In the application, a USER can take on multiple roles, such as a COACH, OWNER, PLAYER, or PARENT. Specifically, a user invited as a coach will manage players, while an owner can create a team and assume the role of head coach, possessing the capabilities of both owner and coach. Players can be invited to join teams, and they have parents who are also part of the team structure. The owner can create, edit, save, and delete drills or plays, while coaches have the same capabilities for managing drills and plays. Both owners and coaches can create, edit, save, and delete goals, with players also able to establish their individual goals. Each goal is linked to tags from drills, which help in reaching those goals. The execution of drills with the correct tags can update goals based on practice results. Drills and plays will contain specific tags and can be organized into practice plans, which are executed to track real-time results. After practice, both owners and coaches can view the post-practice analysis, along with players and parents who can also access this information. Owners manage the team roster by adding or removing coaches, players, and parents, while players and coaches belong to specific teams. Additionally, all users can view the daily practice plan, team goals, individual goals, and the roster. Players, coaches, owners, and parents can also access the bank of drills and plays, ensuring transparency and collaboration across the application.

3.3 Design Rationale

The architecture of the PocketSports application was carefully chosen based on several critical factors, including scalability, performance, ease of development, and user experience. The MERN stack was selected for its robustness and the seamless integration it offers between the front-end and back-end components of the application.

Scalability was a major consideration, as the application is designed to accommodate a growing number of users, including coaches, players, and parents. MongoDB's NoSQL structure allows for flexible data modeling and efficient handling of large datasets, which is essential for tracking numerous drills, practice plans, and user interactions over time. This flexibility enables the application to evolve easily, allowing for the addition of new features or user roles without extensive reworking of the existing database schema.

Performance was another critical issue. The combination of Node.js and Express.js facilitates high-performance server-side processing and real-time capabilities, essential for functions like live tracking of practice results and goal progress. React's

component-based architecture ensures that user interfaces are responsive, providing a smooth experience across various devices, which is crucial for users who may access the application during practices or games.

Ease of Development was also an important consideration. The MERN stack employs JavaScript throughout the entire application, allowing developers to maintain consistency and leverage their skills across both client and server sides. This coherence simplifies the development process and reduces the learning curve for new team members, ultimately leading to quicker iterations and enhancements.

However, several trade-offs were considered. While NoSQL databases like MongoDB offer flexibility, they may not provide the same level of complex querying capabilities as traditional SQL databases. This led to careful planning of the data structure to ensure that necessary queries for performance tracking and analysis could still be efficiently executed.

We also evaluated other architectural options, such as using a traditional LAMP stack (Linux, Apache, MySQL, PHP). While LAMP is well-established and could provide stable performance, it would involve a steeper learning curve for integrating front-end technologies like React. Additionally, the dynamic capabilities and responsive design potential offered by the MERN stack align more closely with the needs of our application, particularly the requirement for real-time updates and interactive features.

4.0 DATA DESIGN

4.1 Data Description

In the PocketSports Digital Coaching App, the system's information domain is transformed into data structures that represent various entities such as Users, Teams, Players, Drills, Practice Plans, Stats, and Goals. These entities are stored and organized in a MongoDB database. Each entity is stored as a collection of documents, where the information will be transferred and allocated. The typical data flow of the system is input, processing, and output. Input includes user created accounts, tracking stats, and setting goals. This input will then be processed by the system which will organize specific users into teams or tracking goal progress. Finally for the output, processed data will be shown to coaches and players through the view of stats, drills, and goals. Each major entity is represented by a schema that defines its attributes and relationships. For example, schemas for users would represent a coach, player, or parent. These data structures are processed through CRUD operations.

Listed databases:

- MongoDB: Primary Database
- AWS S3: Media storage for videos or images related to drills or practice plans

Listed data storage items:

- User Data
- Team Data
- Drills/Plays Data
- Practice Plan
- Practice Results
- Goals Data

4.2 Data Dictionary

1. Drill

   Description: Represents an individual drill created by a coach.

   Attributes:

   - name (String): The name of the drill.
   - tags (Array[String]): Tags categorizing the drill ("Shooting", "Passing").
   - description (String): A brief description of the drill.
   - fieldView (String): The type of field or court (Lacrosse, Basketball).
   - createdBy (ObjectId): Reference to the user who created the drill.

2. Goal

   Description: Represents a player's or team's performance goal.

   Attributes:

   - player (ObjectId): Reference to the player the goal is assigned to.
   - description (String): A description of the goal ("Increase shooting accuracy to 85%").
   - targetValue (Number): The target value for the goal.
   - currentValue (Number): The current progress toward the goal.
   - dueDate (Date): The deadline for the goal.
   - tag (ObjectId): Reference to a tag related to the goal (Passing).

3. Player

   Description: Represents an individual player on a team.

   Attributes:

   - firstName (String): Player's first name.
   - lastName (String): Player's last name.
   - email (String): Email address of the player.

- team (ObjectId): Reference to the team the player belongs to.

4. PracticePlan

   Description: A practice plan created by a coach, which includes multiple drills.

   Attributes:

   - name (String): Name of the practice plan.
   - drills (Array[ObjectId]): List of drills included in the plan.
   - duration (Number): Total time allocated for the practice.
   - media (Array[String]): Attached media or files (optional).
   - createdBy (ObjectId): Reference to the user who created the practice plan.

5. Stat

   Description: Represents a player's performance metrics during practice or games.

   Attributes:

   - player (ObjectId): Reference to the player whose stats are being recorded.
   - drill (ObjectId): Reference to the drill for which the stats were recorded.
   - timeSpent (Number): Time spent on the drill (in minutes).
   - stats (Object): Key-value pairs for different metrics (passing accuracy, speed).

6. Tag

   Description: Represents a category or label used for drills, goals, and stats.

   Attributes:

   - name (String): Name of the tag ("Shooting", "Footwork").
   - description (String): A description of what the tag represents.

7. Team

   Description: Represents a group of players and coaches.

   Attributes:

   - name (String): Name of the team.
   - sport (String): The type of sport (Lacrosse, Basketball).
   - owner (ObjectId): Reference to the owner of the team.
   - players (Array[ObjectId]): List of players on the team.

8. User

   Description: Represents a user in the system, which can be a coach, player, or parent.

   Attributes:

   - firstName (String): User's first name.

- lastName (String): User's last name.
- email (String): User's email address.
- role (String): The role of the user (Owner, Coach, Player, Parent).
- team (ObjectId): Reference to the team the user is associated with.

6.0 Human Interface Design

6.1 Overview of User Interface

The user will begin on the login page, where they can enter their email and password to access the system. If the user is new and hasn't registered, they can click the registration link, which will redirect them to a registration page. On this page, they will be asked to provide their full name, select whether they are registering as a coach or a player, and then enter their email and password to complete the process. Once registered, the user will be taken to the appropriate interface depending on whether they signed up as a player or a coach.

6.1.1 Player User Interface

If the user registers as a player, they will be directed to the player's home page. This page offers a personalized view of the player's progress and upcoming events. At the top, the player will see a display of their three goals that are closest to completion, giving them insight into what they should prioritize. Below that, there is a section that highlights upcoming events, such as practices, games, or other team activities, ensuring that the player stays informed about important dates.

On the Roster page, the player can see the entire team's roster. This page lists all team members, and the player can click on any name to view more detailed information about that teammate, such as their position, contact information, or stats. The player also has access to their own detailed profile, which includes their own stats, performance data, and personal details. This makes it easy for players to understand how they compare to their teammates and track personal progress throughout the season.

The Calendar page presents a full calendar view, making it easy for players to stay on top of scheduled events. By clicking on any specific date, the player can see

detailed information about what is happening on that day, such as scheduled games, practices, or team meetings. In addition, if the coach has uploaded any practice plans or event details for that day, the player will be able to view and review them, giving them the ability to prepare in advance for upcoming events or training sessions.

On the Goals page, the player has the ability to create and track both personal and team-related goals. When creating a goal, the player can fill out relevant information such as the goal name, specific metrics to measure progress, and a category, such as sport-related or workout goals. The page also displays a list of existing goals, where players can track both personal and team goals and see which ones are closest to completion. For completed goals, achievements or badges may be displayed to recognize the accomplishment. Additionally, players can track the status of each goal—whether they are on track, off track, or ahead—based on progress made towards completing the goals before the end of the season. The player also has access to performance feedback and stats through various parts of the interface. For example, by selecting a date on the calendar, the player can view any feedback or performance notes the coach has uploaded from previous practices or games. This allows players to reflect on their progress and identify areas for improvement. Stats from these sessions will be available, giving players valuable data on how they are performing and where they stand in relation to team goals.This system provides players with an integrated view of their personal progress, team dynamics, and coach feedback, helping them stay organized and focused on their development throughout the season.

6.1.2 Coach User Interface

When the user logs in as a coach, they will be directed to the coach's home page. The home page provides an overview of upcoming events, the most recent practice plans, and top performers in key stats. Each of these sections is interactive, allowing the coach to click on an event, practice plan, or player’s stats to view more detailed information or make updates.

If the coach navigates to the Roster page, they will see a list of all the players on the team. The coach can click on any player’s name to access detailed information about that player, including their stats, performance history, and personal details. Additionally, the coach has full control over the roster, with options to create new player profiles, edit existing ones, or delete players from the roster as necessary. This gives the coach flexibility in managing the team and updating information as the season progresses.

By clicking on the Calendar tab, the coach will be presented with a full calendar view. From here, they can select any specific date to view details about that day, including games, practices, and meetings. The coach has the ability to add or edit event details directly on the calendar. Also, they can provide feedback on specific days and send personalized feedback to individual players or group messages to the entire team. This allows the coach to communicate practice feedback or game day instructions efficiently, ensuring that players are always informed.

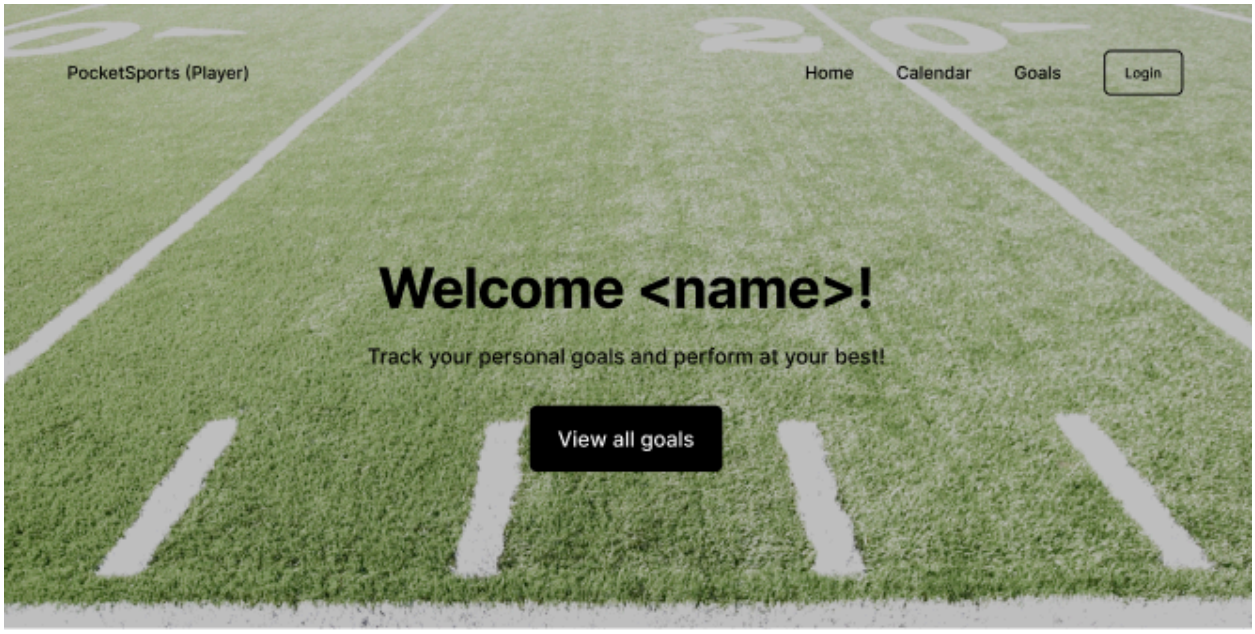
The Goals page allows the coach to manage and monitor team goals. The coach can see a list of all the goals they've created for the team, including progress indicators for each goal—whether they are on track, off track, or ahead. By clicking on a specific goal, the coach can edit details, update stats, or contribute data to help move the team closer to achieving that goal. The coach also has the option to create new goals for the entire team or assign goals to specific players based on individual performance. Once a goal is accomplished, an achievement will be displayed at the top of the screen for players and coaches to celebrate the milestone.

When the coach clicks on the Practice Plans tab, they will be able to create and manage detailed practice plans. The coach can input all necessary information, such as the name of the practice session, objectives, and the drills that will be included. The coach also has access to a drawing tool where they can visually draw drills, making it easier for players to understand the exercises. Practice plans can be saved, and the coach can return at any time to edit or update any part of a plan, ensuring that practice sessions are made based on the team's needs.This system provides coaches with a platform to manage their team, organize practice sessions, track player progress, and set goals, as well as make personal practice plans.

6.2 Screen Images

The following screen images are the proposed basic design for the PocketSports Digital Coaching App. Format may differ in future with more time.

The first screenshots is the Homepage of the Player user interface. It shows the three closest goals to being achieved and the upcoming practices and games for the player. When the user clicks on a goal or an upcoming event, more information will be shown.

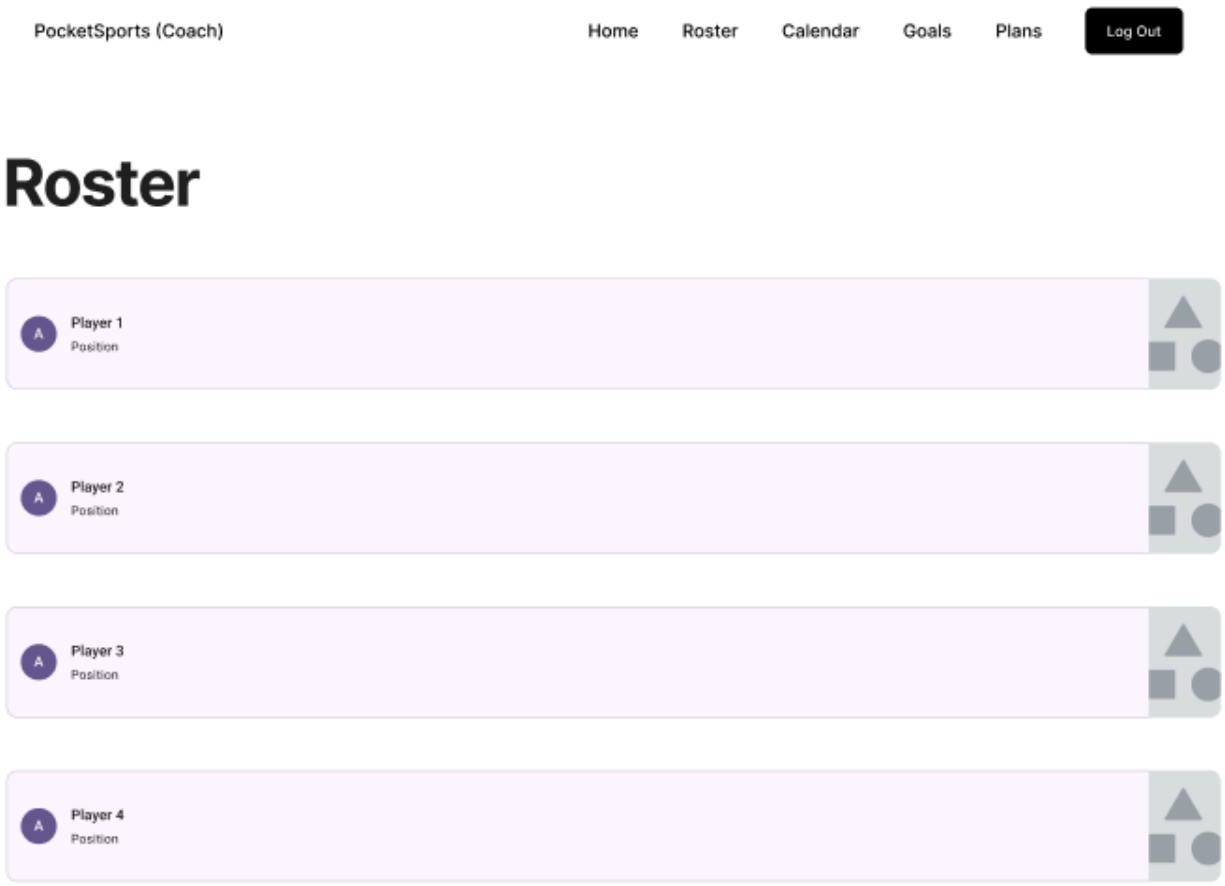


Keep Going!!

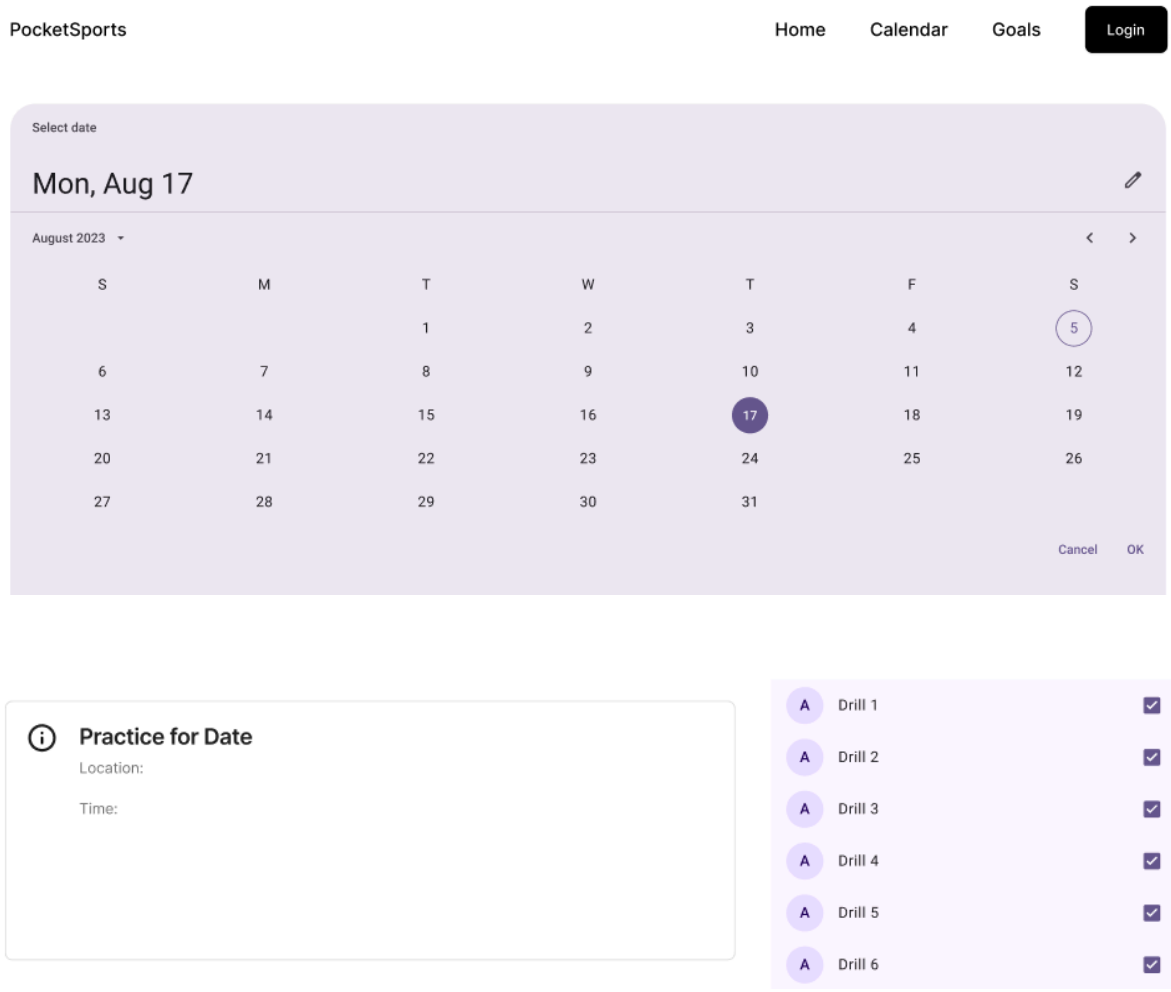
View all goals



The next screenshots is the Roster page for the player user interface. The page shows the list of players within the team and information. The user can click on a player and see any information about them. If the user clicks on themselves, then the user will see their stats and performance reviews.



The next screenshots is the Calendar tab for the player user interface. The page shows a calendar where the user can click on a date and the information about any practices or games that day will appear below the calendar. The practice plan the coach has uploaded for the day will also display next to the practice's information.



The final screenshots for the player user interface are from the Goals tab. The page tells the user all of the user's personal and team goals, as well as any achievements. The user can create new goals and track the progress. The player can also view practice and game results with any coach feedback that the coach uploaded.

PocketSports

Home Calendar Goals Login

Achievements

All Mine Team

New Goal +

Crushing

A Goal 1
% Complete

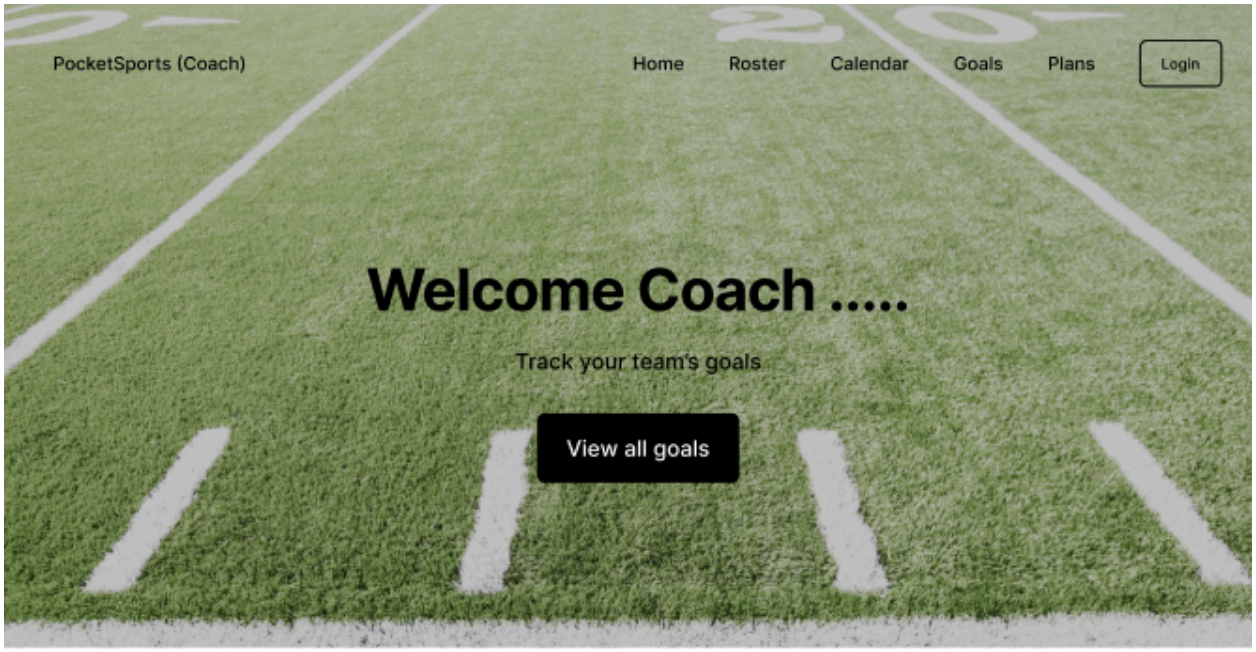
On Track

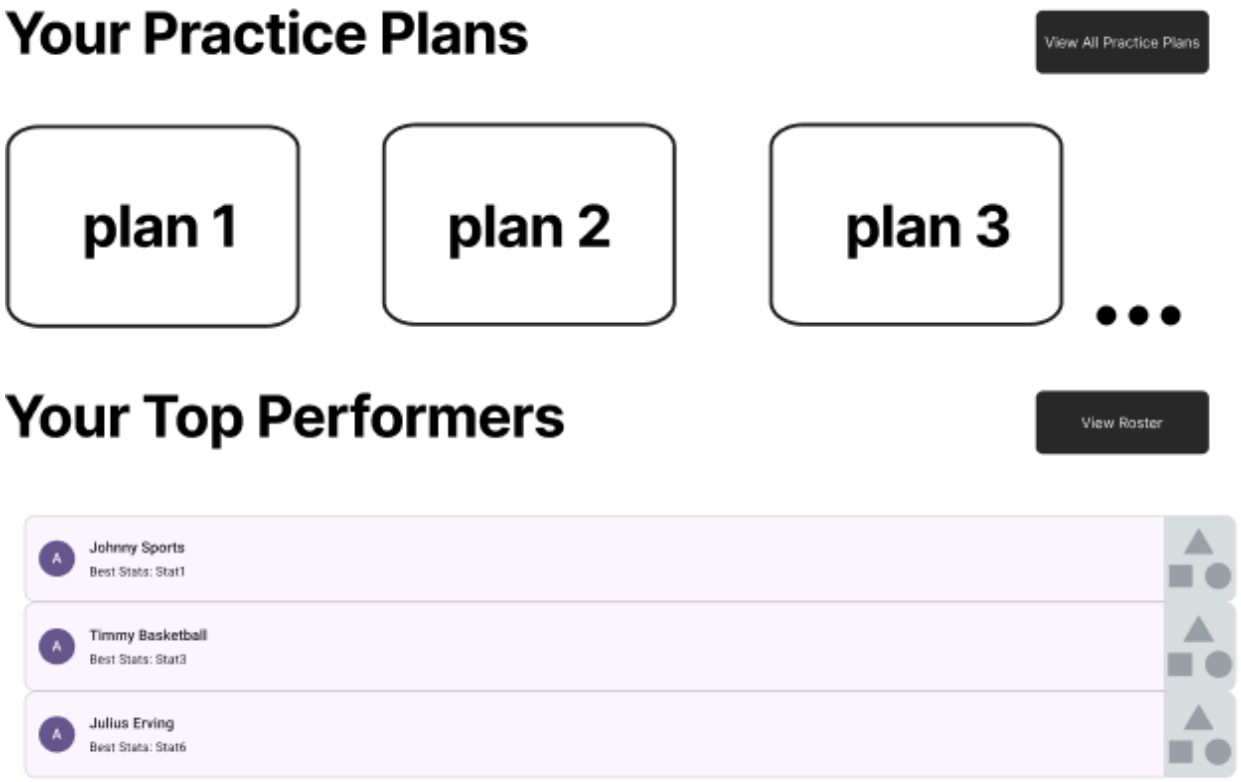
A Goal 2
% Complete

Off Track

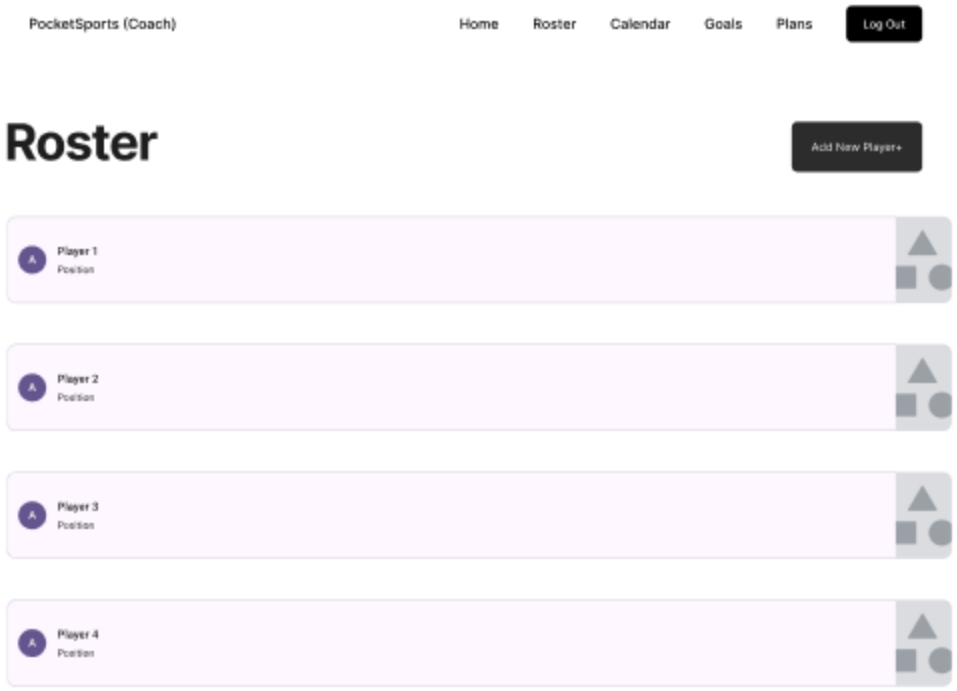
A Goal 3
% Complete

The first screenshots of the Coach user interface is the Homepage of the PocketSports Digital Coaching App. It reminds the coach of any upcoming practices and games of the team, as well as quick views for any practice plans the coach has created and uses often. Another feature on the Homepage is showing the top performers for different stats, such as who is excelling.

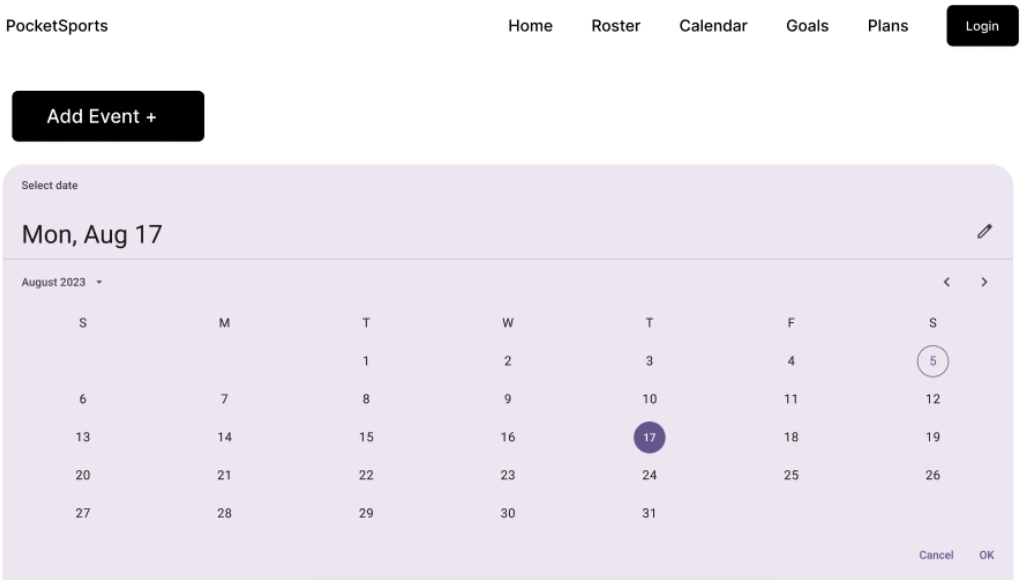


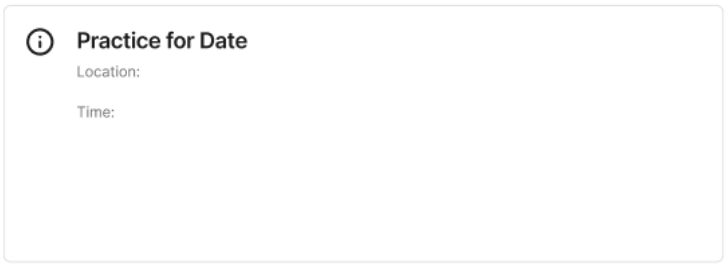


The next screenshots is the Roster page for the coach user interface. The page shows the list of players on the team and allows the user to add, edit, and delete a player and the information. The coach can also select a player and see their stats and information.

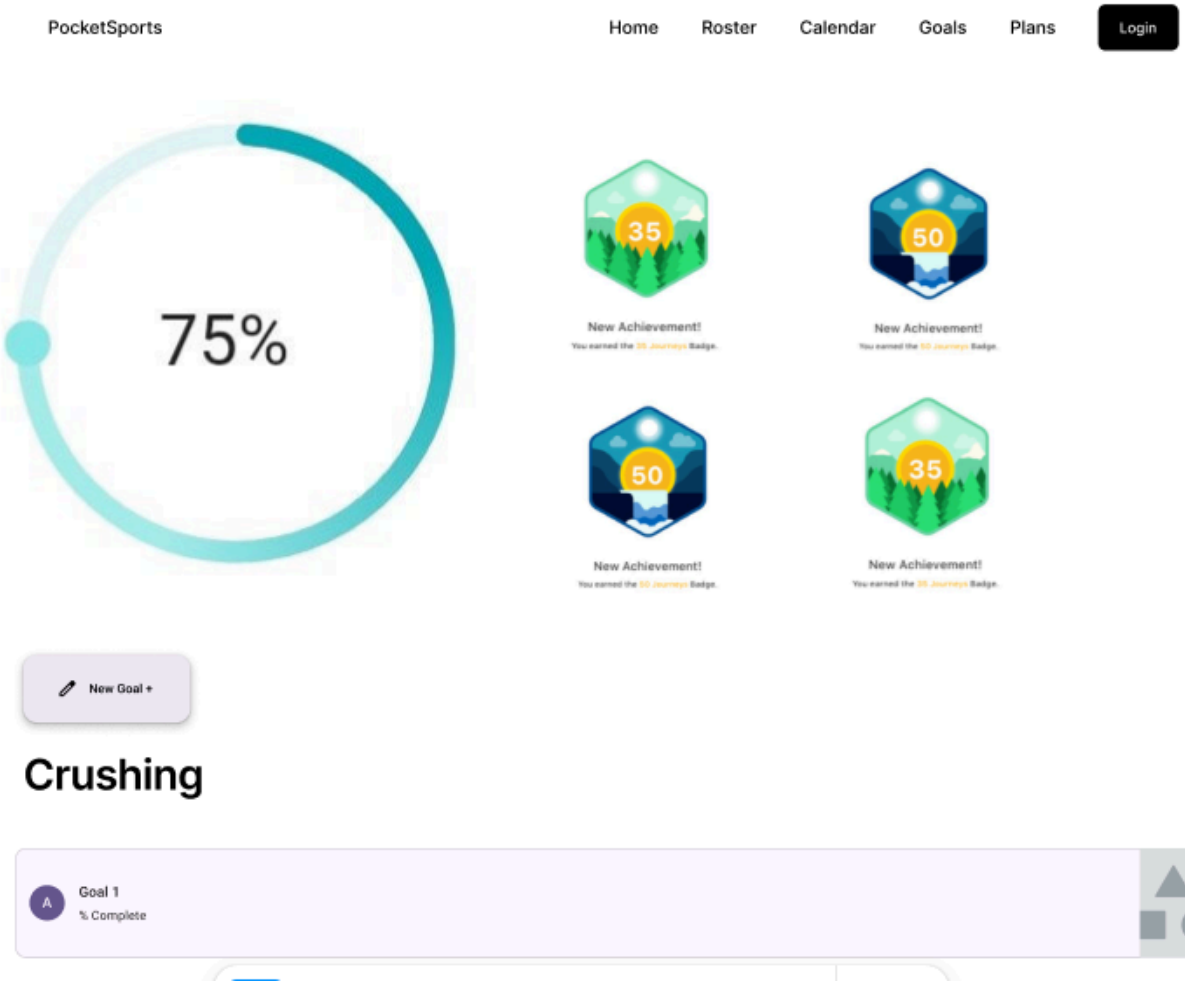


The next screenshots is the Calendar tab for the coach user interface. The page shows a calendar where the user can click on a date and the information about any practices or games that day will appear below the calendar. The practice plan the coach has uploaded for the day will also display next to the practice's information. The coach will also be able to add and delete events on the page.

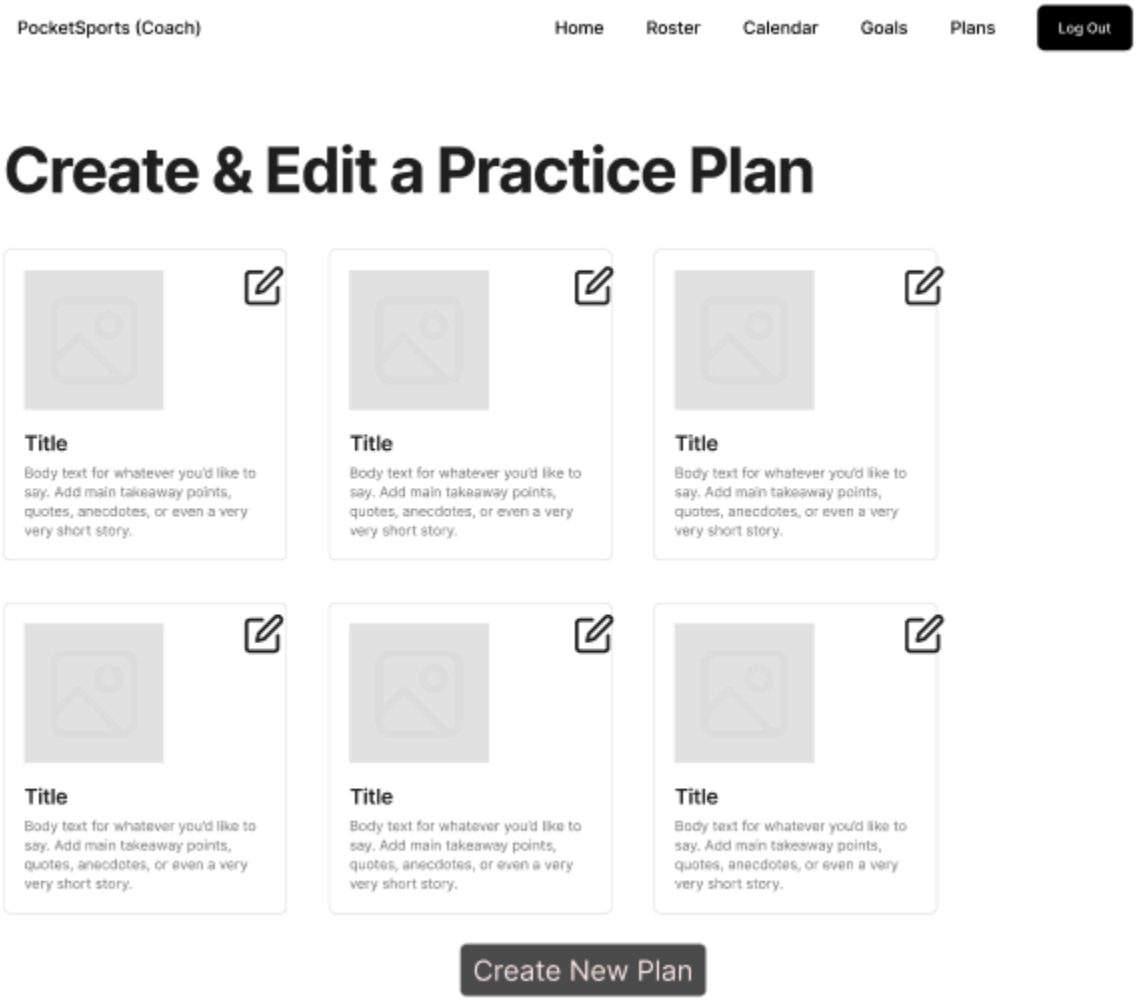


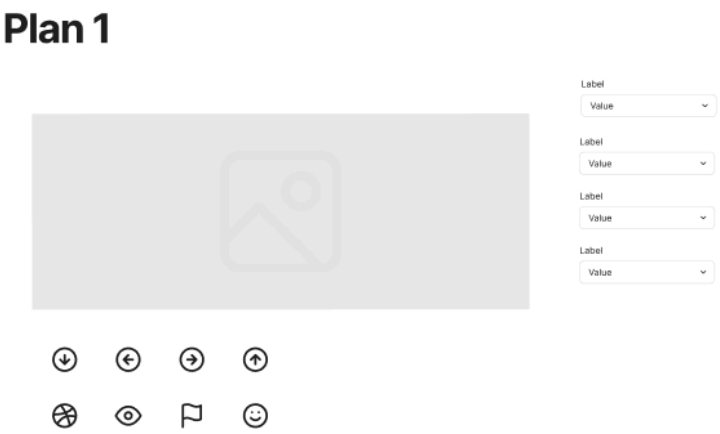


The next screenshots for the coach user interface are from the Goals tab. The page tells the user all of the user's team goals, as well as any team achievements. The user can create new goals and track the progress.

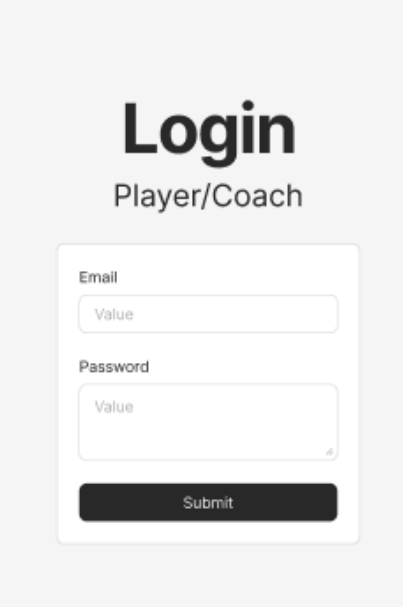


The final screenshots of the Coach user interface includes the Plans page where the coach can create and edit practice plans for the team. The coach will be able to customize each practice plan for their team and specific sport.





The login and registration pages are for the users who have an account or want to create an account with PocketSports.



6.3 Screen Objects and Actions

The header on every page of the user interface includes navigation tabs for the Home, Calendar, Goals, Roster, and Login pages. Clicking any of these tabs takes the user to the corresponding page.

If the user clicks the Login tab, they will be directed to the Login page, where they can enter their credentials. The “Submit” button on the login page sends the entered information for validation to grant access to the system. Additionally, the login page

includes a "Forgot Password" option, which opens a form allowing users to reset their password.

There is also a "Register" button on the login page for new users, which directs them to the registration form. On the Registration page, users can fill in their details, and by clicking the “Submit” button, they can complete their registration and enter the system.

6.3.1 Player User Interface

On the player's Home page, there are two key buttons: “View All Goals” and “View All Events.” Clicking "View All Goals" takes the user to the Goals page, where they can see a detailed list of goals. Clicking "View All Events" directs the user to the Calendar page, where they can search for events by specific dates. The list of upcoming events displayed on the Home page is interactive, allowing the user to click on an event and view detailed information retrieved from the database and displayed on-screen through the system's design.

On the Goals page, the user can manage their goals. Clicking the “New Goal” button opens a form where the user can input information such as the goal's name, metrics, and description. Once the form is filled out, clicking the “Save” button stores the goal information in the database. After being successfully saved, the new goal will appear on the page, formatted and styled according to the design of the software.

The Goals page also features three filter buttons: "All," "Mine," and "Team."

- **All**: Displays both personal and team goals.
- **Mine**: Shows only personal goals specific to the player.
- **Team**: Displays only team-wide goals.

When the user clicks on any goal from the list, detailed information about the goal will appear, along with an option to add a new stat to help progress toward achieving that goal. Any updates or changes made to the goal are saved back to the database, and the system will automatically update the percentage of goal completion based on the newly added stats. Additionally, the user can select a specific date using a date selector. The system will then retrieve any feedback the coach provided for that date from the database and display it on the screen, along with relevant stats from that day.

On the Calendar page of the player user interface, the user can select a specific date using the date selector. Once a date is chosen, the system retrieves any information the coach has uploaded for that day from the database. This may

include details such as event details, practice schedules, or notes. The retrieved information, along with the practice plan for that day, is then displayed on the screen, allowing the player to review important details and prepare accordingly. The seamless integration of the date selector with the database ensures that players have quick access to relevant updates for any given day.

6.3.2 Coach User Interface

The header on all of the pages for the coach user interface includes the Home Page, Roster Page, Calendar Page, Goals Page, Plans Page, and Login. When the user clicks on each of the tabs, the user will be directed to the wanted page. If the login is pressed, the Login screen will appear for the user.

The Home Page features several buttons:

- **View All Goals**: Redirects to the Goals page, displaying a list of goals.
- **View All Events**: Redirects to the Calendar page, allowing the user to browse events by date.
- **View All Practice Plans**: Opens the Plans page, where recent practice plans are accessible.
- **View Roster**: Leads to the Roster page, where clicking on a player displays their stats.

Additionally, recent events and practice plans listed on the Home page can be clicked to retrieve detailed information from the database.

On the Roster page, users can click on any player to view detailed information, including the player's name, position, height, hometown, age, stats, and performance reviews. Coaches can use the "Add New Player" button to create a new player profile. They also have the ability to edit or delete player information as needed.

On the Goals page, the "New Goal" button opens a form where users can input details such as the goal name, metrics, and specific player assignments if desired. Clicking "Save" stores the goal in the database, and it will appear on the page with the appropriate formatting.When a goal is selected, its details are displayed along with an option to add stats that contribute to achieving the goal. Any updates are saved automatically, and the completion percentage for the goal is adjusted accordingly.

On the Calendar page, coaches can select a date using the date selector. The system then retrieves and displays any information the coach previously uploaded

for that day, including the practice plan. The “Add Event” button opens a form where the coach can input event details such as the event name, time, location, and associated practice plan. Clicking “Save” stores the event in the database, making it accessible when that date is selected by any user. Coaches can also edit events and add player-specific feedback, which will be visible on the player’s interface.

The “Create New Plan” button on the Plans page opens a field view, allowing coaches to design custom drills for practice and create accompanying sketches. Coaches can select and edit drills from a list, adding new details or modifying existing ones. Clicking “Save” stores the drill in the database for future use or updates.

7.0 Requirements Matrix

Design Plan	Requirements Document
1.0 Introduction	1.0 Introduction
2.0 System Overview	2.0 Overall Description
3.0 System Architecture	2.1 Product Perspective
4.0 Data Design	3.2 Functional Requirements
5.0 Component Design	3.2 Functional Requirements
6.0 Human Interface Design	3.0 External Interfaces