React and the Art of Gamification

Courtney Yatteau

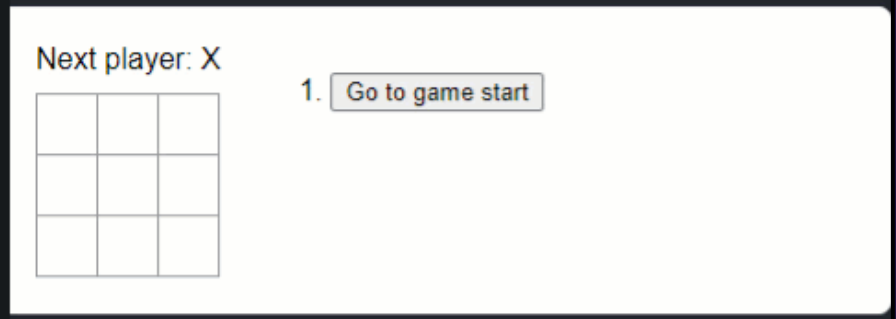
START

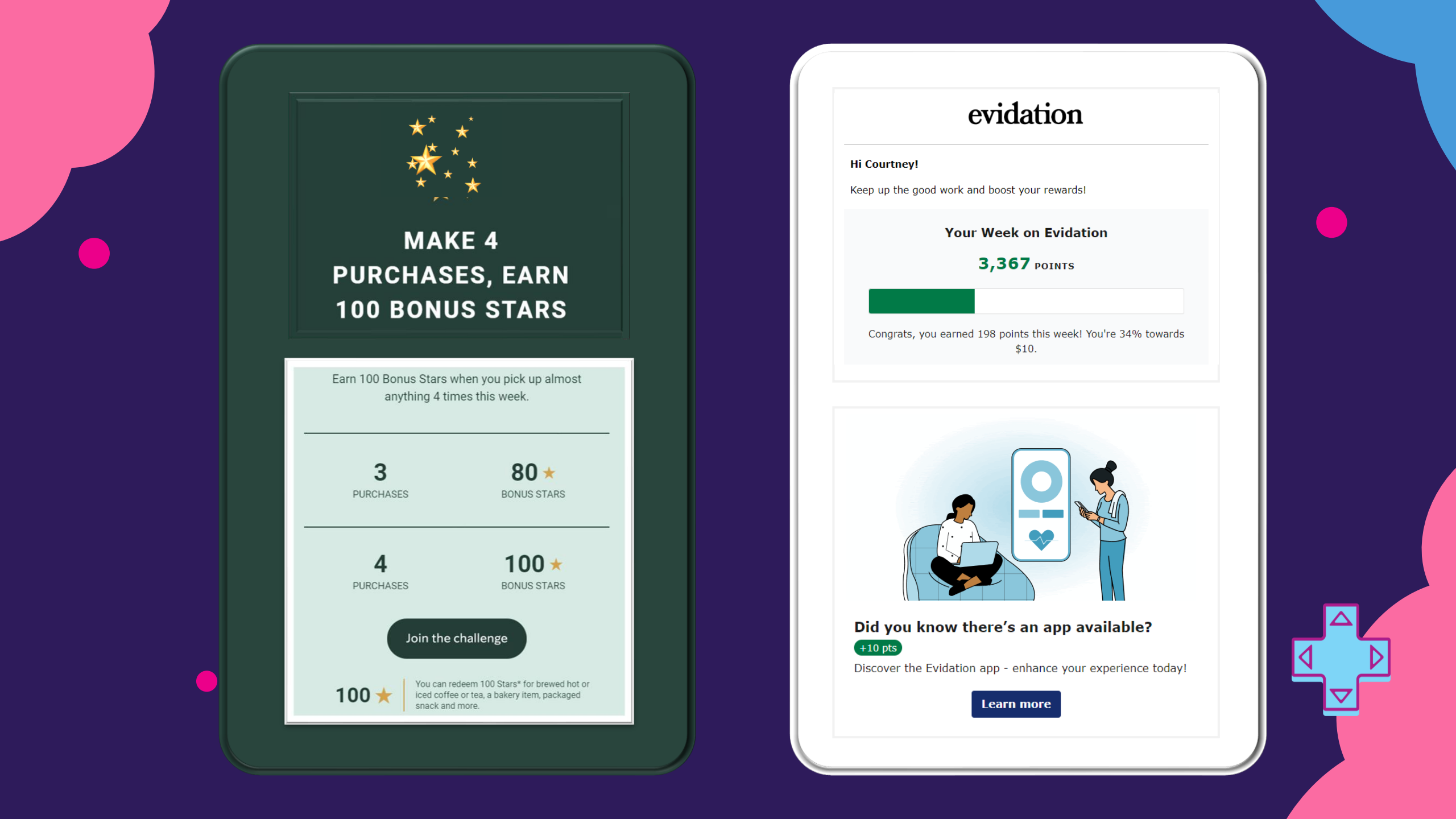
Gamifying React Education

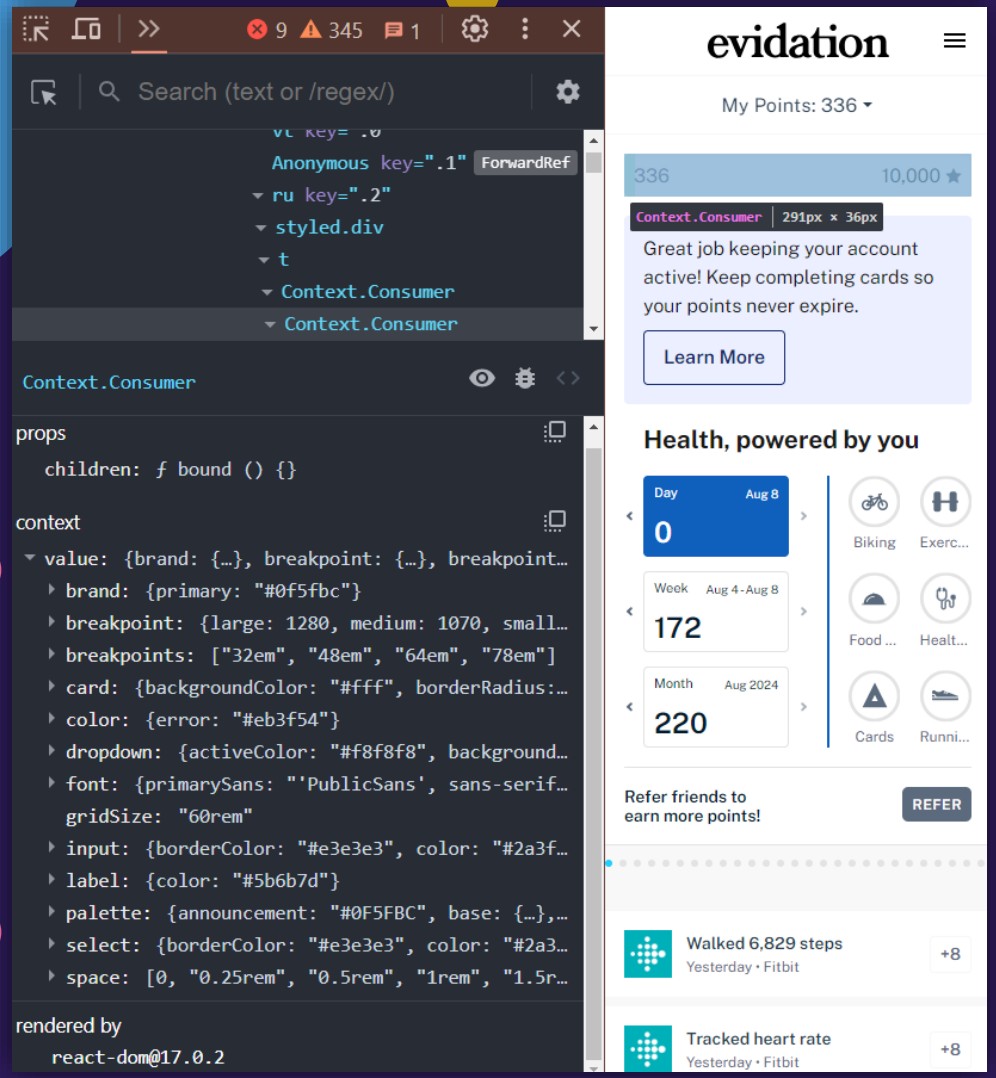
App.js

Download Reset F

```
1  import { useState } from 'react';
2
3  function Square({ value, onSquareClick }) {
4    return (
5      <button className="square" onClick={onSquareClick}>
6        {value}
7      </button>
8    );
9  }
10
11 function Board({ xIsNext, squares, onPlay }) {
12   function handleClick(i) {
13     if (calculateWinner(squares) || squares[i]) {
14       return;
15     }
16     const nextSquares = squares.slice();
17     if (xIsNext) {
18       nextSquares[i] = 'X';
```




MAKE 4 PURCHASES, EARN 100 BONUS STARS
Earn 100 Bonus Stars when you pick up almost anything 4 times this week.
3
PURCHASES
80 ★
BONUS STARS
4
PURCHASES
100 ★
BONUS STARS
Join the challenge
100 ★
You can redeem 100 Stars* for brewed hot or iced coffee or tea, a bakery item, packaged snack and more.
evidation
Hi Courtney!
Keep up the good work and boost your rewards!
Your Week on Evidation
3,367 POINTS
Congrats, you earned 198 points this week! You're 34% towards $10.
Did you know there's an app available?
+10 pts
Discover the Evidation app - enhance your experience today!
Learn more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brand: {primary: "#0f5fbc"}
breakpoint: {large: 1280, medium: 1070, small…
breakpoints: ["32em", "48em", "64em", "78em"]
card: {backgroundColor: "#fff", borderRadius:…
color: {error: "#eb3f54"}
dropdown: {activeColor: "#f8f8f8", background…
font: {primarySans: "'PublicSans', sans-serif…
gridSize: "60rem"
input: {borderColor: "#e3e3e3", color: "#2a3f…
label: {color: "#5b6b7d"}
palette: {announcement: "#0F5FBC", base: {…},…
select: {borderColor: "#e3e3e3", color: "#2a3…
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rendered by
react-dom@17.0.2
evidation
My Points: 336
336
10,000
Context.Consumer 291px × 36px
Great job keeping your account active! Keep completing cards so your points never expire.
Learn More
Health, powered by you
Day Aug 8
0
Week Aug 4 - Aug 8
172
Month Aug 2024
220
Biking
Exerc...
Food ...
Healt...
Cards
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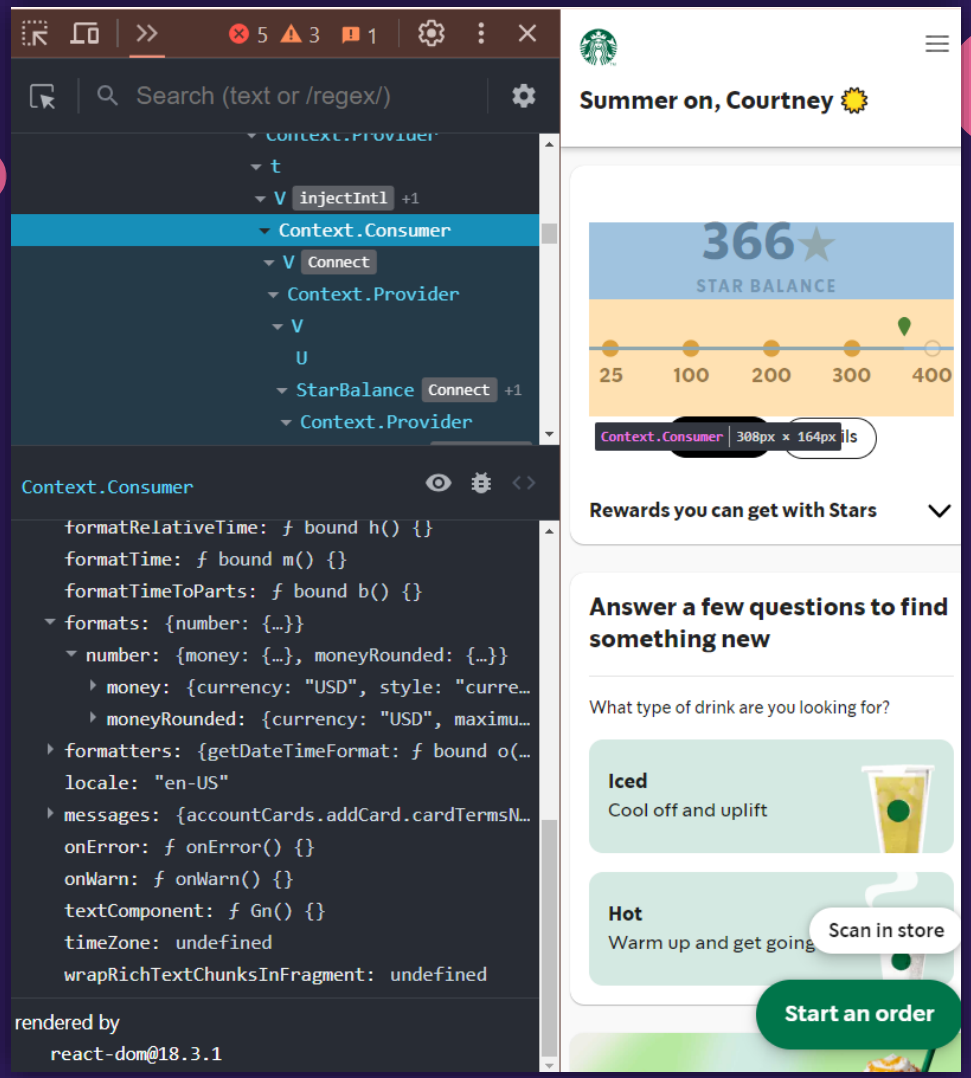
Refer friends to earn more points!
REFER
Walked 6,829 steps
Yesterday • Fitbit
+8
Tracked heart rate
Yesterday • Fitbit
+8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Context.Consumer
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onError: ƒ onError() {}
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timeZone: undefined
wrapRichTextChunksInFragment: undefined
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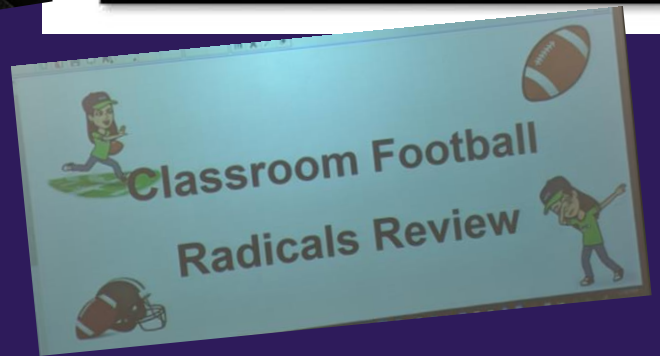
react-dom@18.3.1
Summer on, Courtney
366★
STAR BALANCE
25
100
200
300
400
Context.Consumer 308px × 164px
Rewards you can get with Stars
Answer a few questions to find something new
What type of drink are you looking for?
Iced
Cool off and uplift
Hot
Warm up and get going
Scan in store
Start an order

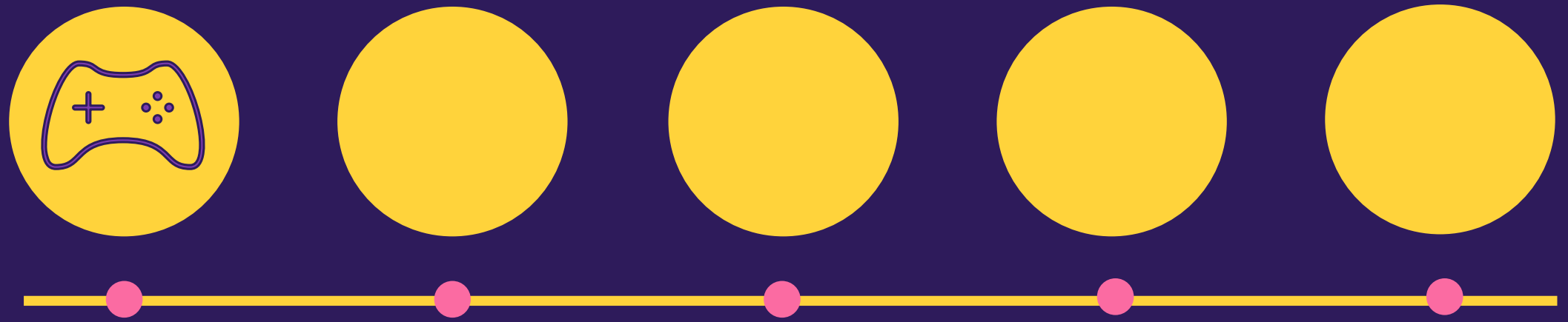

Effective gamification creates an ecosystem where users are constantly motivated to engage, improve, and achieve. It's about harnessing the power of game mechanics to drive real-world results.
- Sebastian Deterding

Courtney Yatteau

Developer Advocate, Esri



G.A.M.E.S.

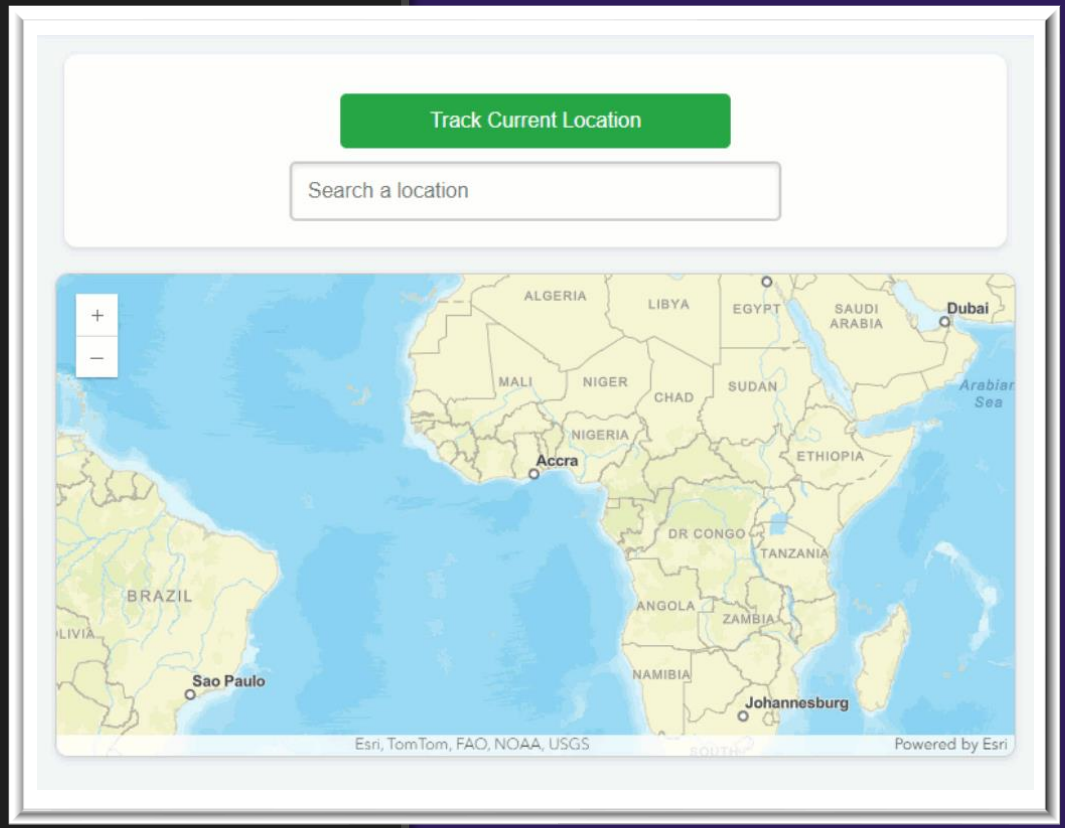


G A M E S

Gamified UI Components

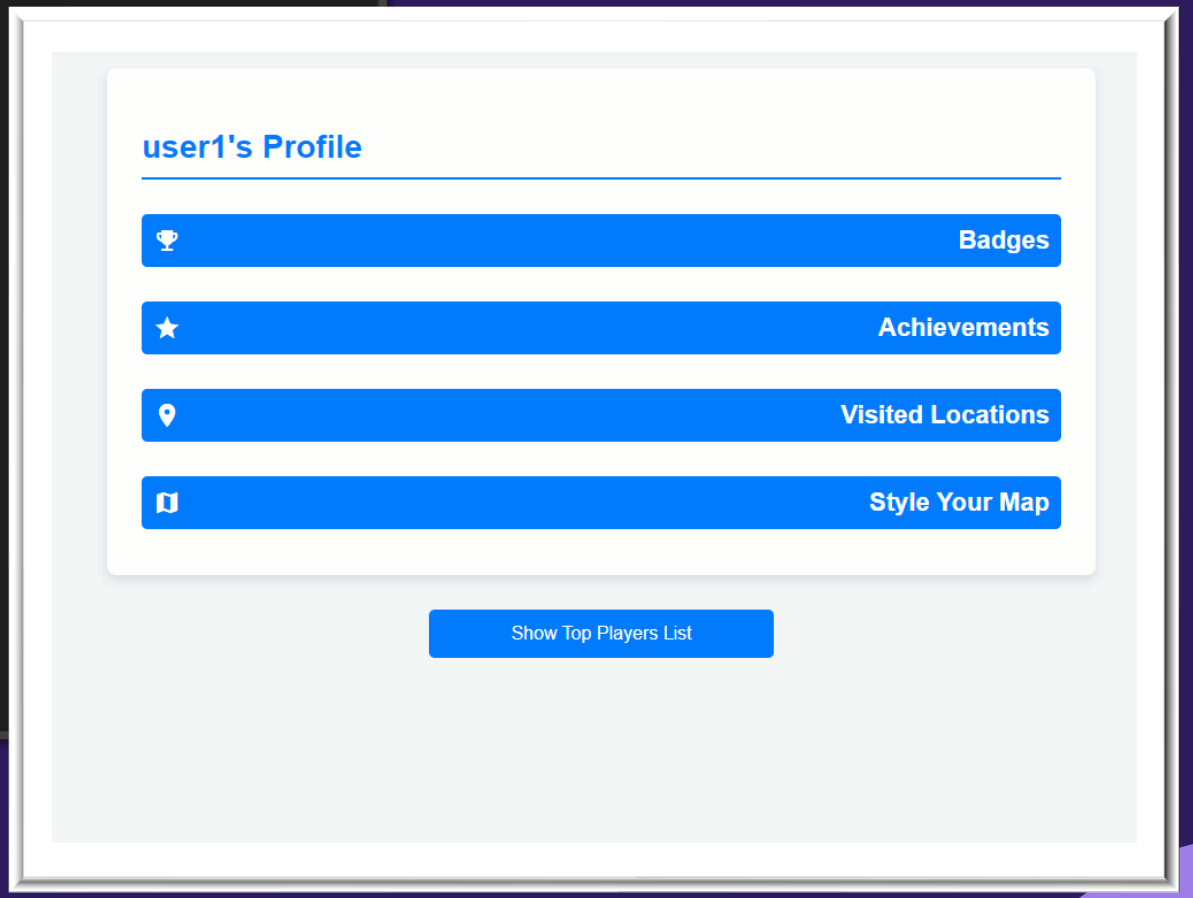
Gamified UI Components

```jsx
const Badge = ({ badges }) => {
  const [earnedBadges, setEarnedBadges] = useState([]);
  const [selectedBadge, setSelectedBadge] = useState(null);

  const handleBadgeClick = (badge) => {
    setSelectedBadge(badge);
    setEarnedBadges((prev) => [...prev, badge]);
  };

  return (
    <div className="badges-container">
      {badges.map((badge, index) => (
        <div
          key={index}
          className={`badge ${earnedBadges.includes(badge) ? "badge-earned" :
          style={{ backgroundColor: badge.color }}
          onClick={() => handleBadgeClick(badge)}
        >
          {badge.text}
        </div>
      ))}
      {selectedBadge && <BadgePopup badge={selectedBadge} onClose={() => setSelectedBadge(null)} />}
    </div>
  );
};
```



Gamified UI Components

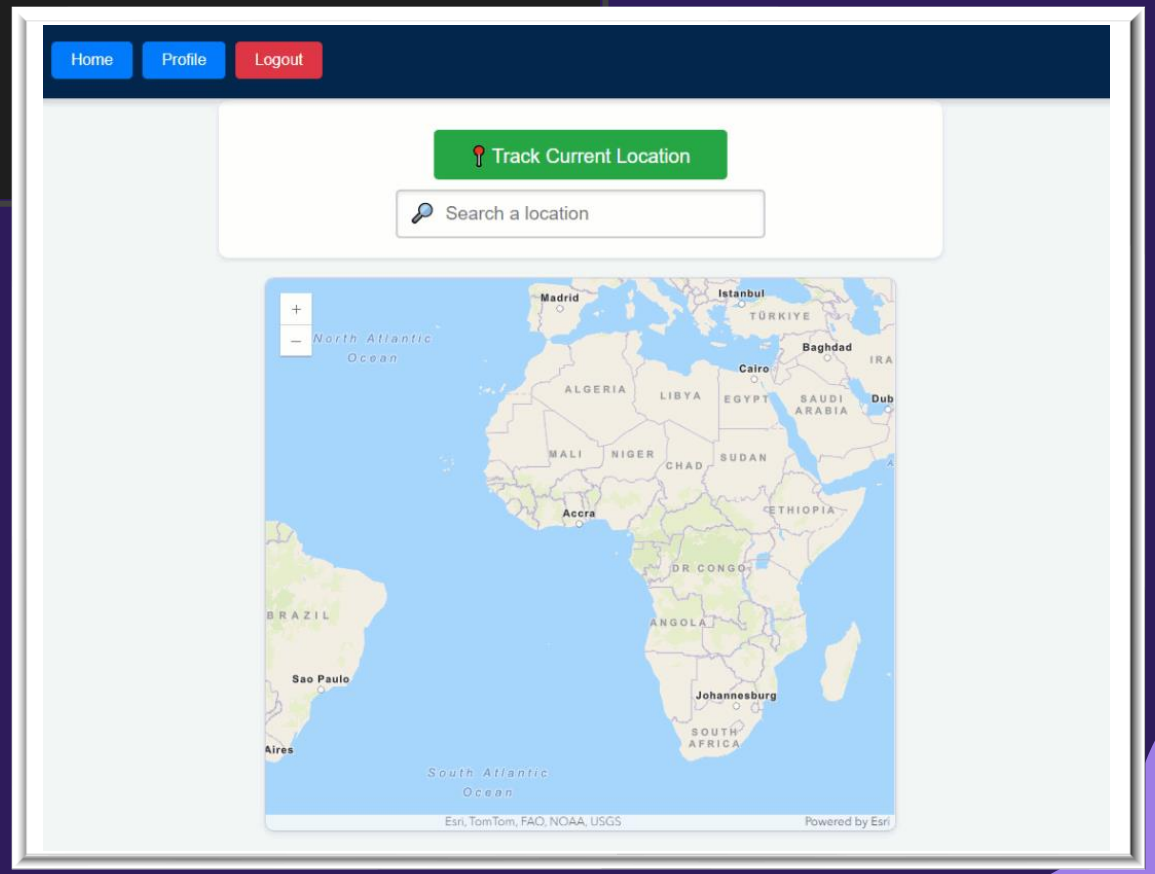
```jsx
const ProgressBar = ({ points, maxPoints }) => {
  const progress = Math.min((points / maxPoints) * 100, 100);

  return (
    <div className="progress-bar">
      <div
        className="progress-bar-fill"
        style={{ width: `${progress}%` }}
      ></div>
      <span className="progress-bar-text">
        {points} / {maxPoints} Points
      </span>
    </div>
  );
};
```



Gamified UI Components

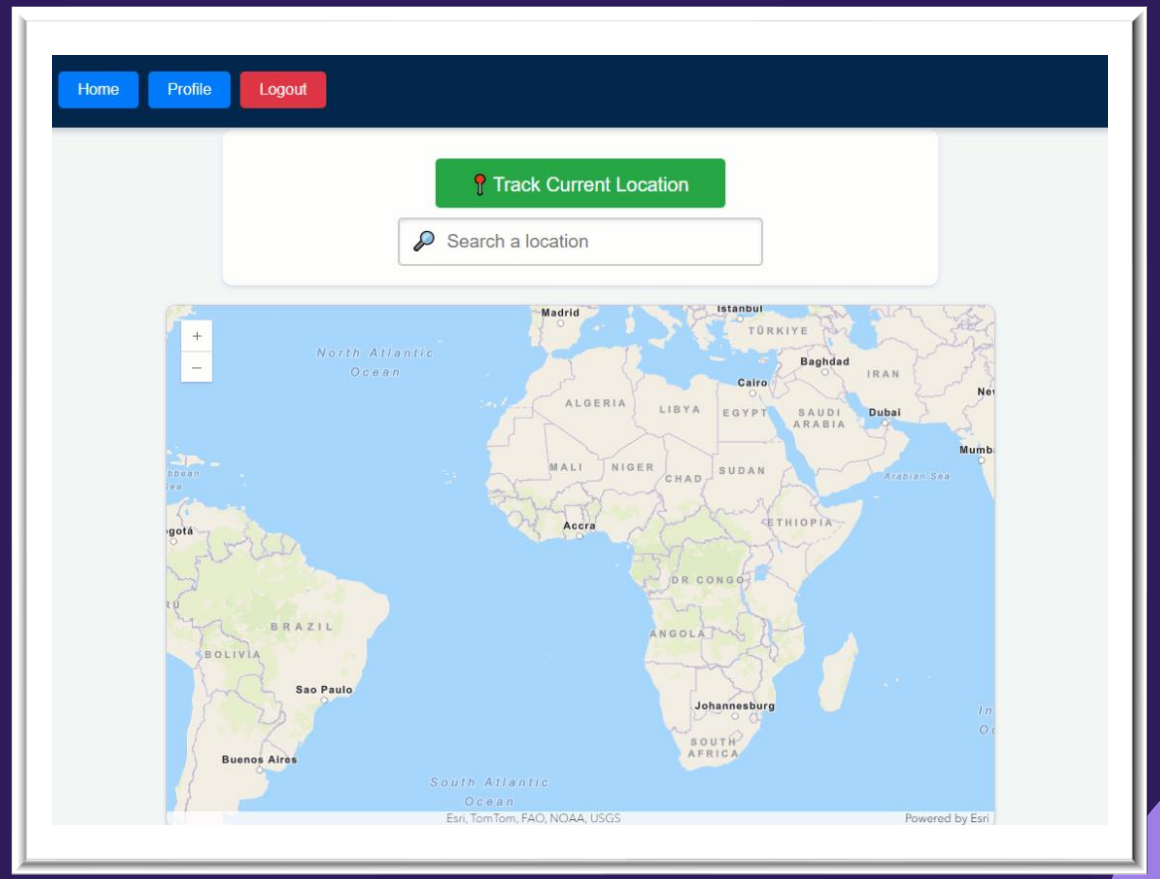
```
const showAchievementPopupMessage = (points, text) => {
  setAchievementMessage(`Congrats! You've earned ${points} points for ${text}`);
  setShowAchievementPopup(true);
  setTimeout(() => {
    setShowAchievementPopup(false);
  }, 3000);
};
```

```
{earnedAchievements.map((achievement, index) => (
  <div key={index} className="achievement-card">
    <h4>{achievement.text}</h4>
    <p>{achievement.description}</p>
    <p>Points: {achievement.points}</p>
  </div>
))}
```



Gamified UI Components

```
const basemapOptions = [
  {
    id: "11b7300674584eb793129a808290d235",
    name: "Default Basemap",
    unlocked: true,
  },
  {
    id: "456d1df3810e482b8abcb2aa0440d6ac",
    name: "Valentine's Basemap",
    unlocked: user.visitedLocations.length >= 1,
  },
  {
    id: "f5023edabfee4dd68f2e3f87e2a6c14d",
    name: "Popcorn Basemap",
    unlocked: user.achievements.length >= 2,
  },
];
```



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Gamified UI Components

Advanced State Control

Advanced State Control

```jsx
import { createContext, useReducer, useContext } from "react";

const AppContext = createContext();

const initialState = {···
};

const reducer = (state, action) => {
  switch (action.type) {···
  }
};

export const AppProvider = ({ children }) => {
  const [state, dispatch] = useReducer(reducer, initialState);

  return (
    <AppContext.Provider value={{ state, dispatch }}>
      {children}
    </AppContext.Provider>
  );
};

export const useAppContext = () => useContext(AppContext);
```

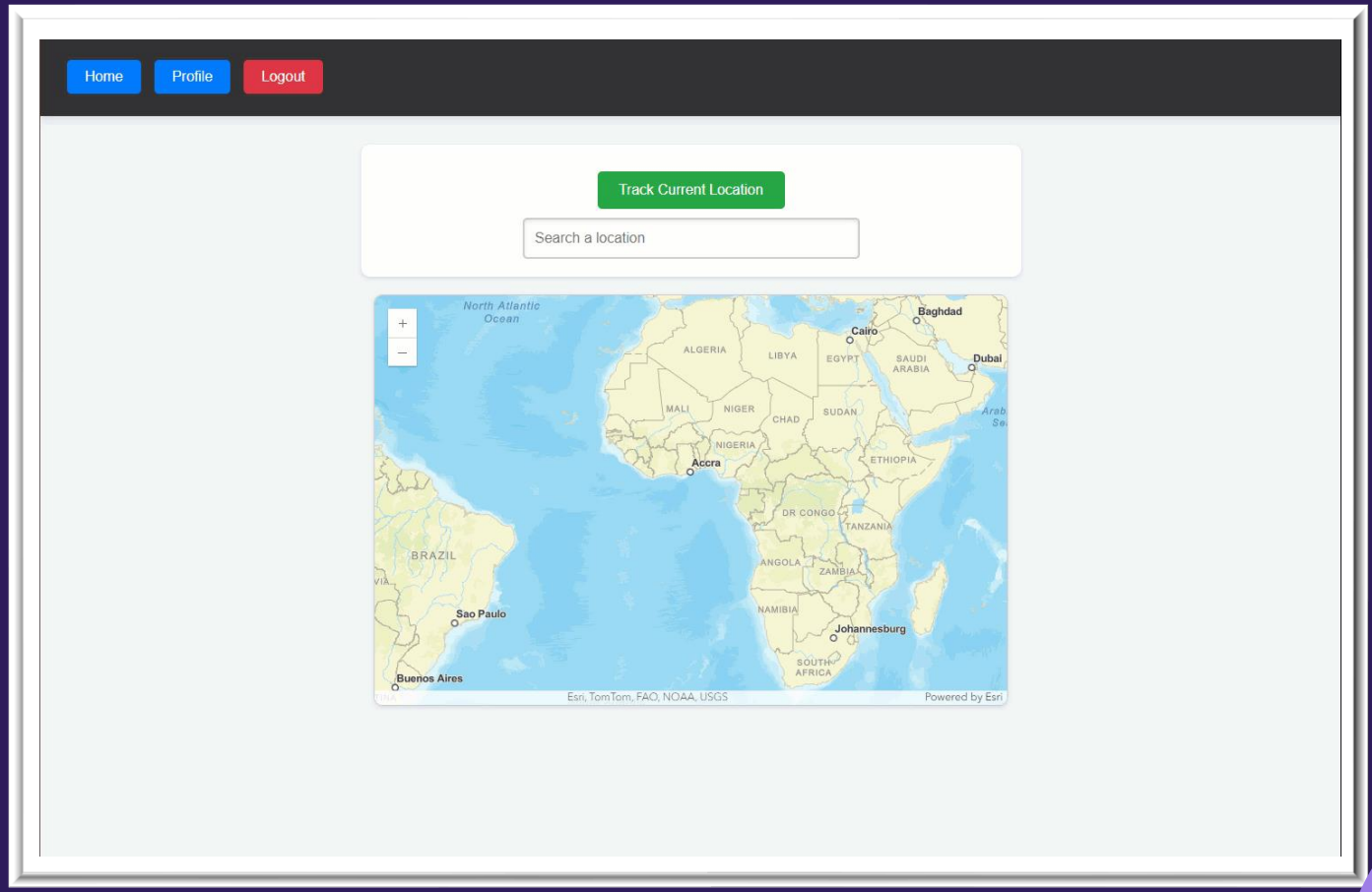
```jsx
switch (action.type) {
  case "SET_LOCATION":
    return { ...state, location: action.payload };
  case "SET_LOCATION_INPUT":
    return { ...state, locationInput: action.payload };
  case "SET_SUBMITTED":
    return { ...state, submitted: action.payload };
  case "RESET":
    return initialState;
  case "SET_SELECTED_BADGE":
    return { ...state, selectedBadge: action.payload };
  default:
    throw new Error(`Unhandled action type: ${action.type}`);
}
```

Advanced State Control

```
const handleStartQuest = () => {
  if (questEnabled) {
    setQuestStarted(true);
  }
};

const handleEndQuest = () => {
  setQuestStarted(false);
  // Reset other quest-related states
};

// UI elements controlled by questStarted
{questStarted && (
  <button onClick={handleEndQuest}>
    End Quest
  </button>
)}
```



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Gamified UI Components

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Advanced State Control

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Memoization Techniques ... to evolve into **M**odern Optimization

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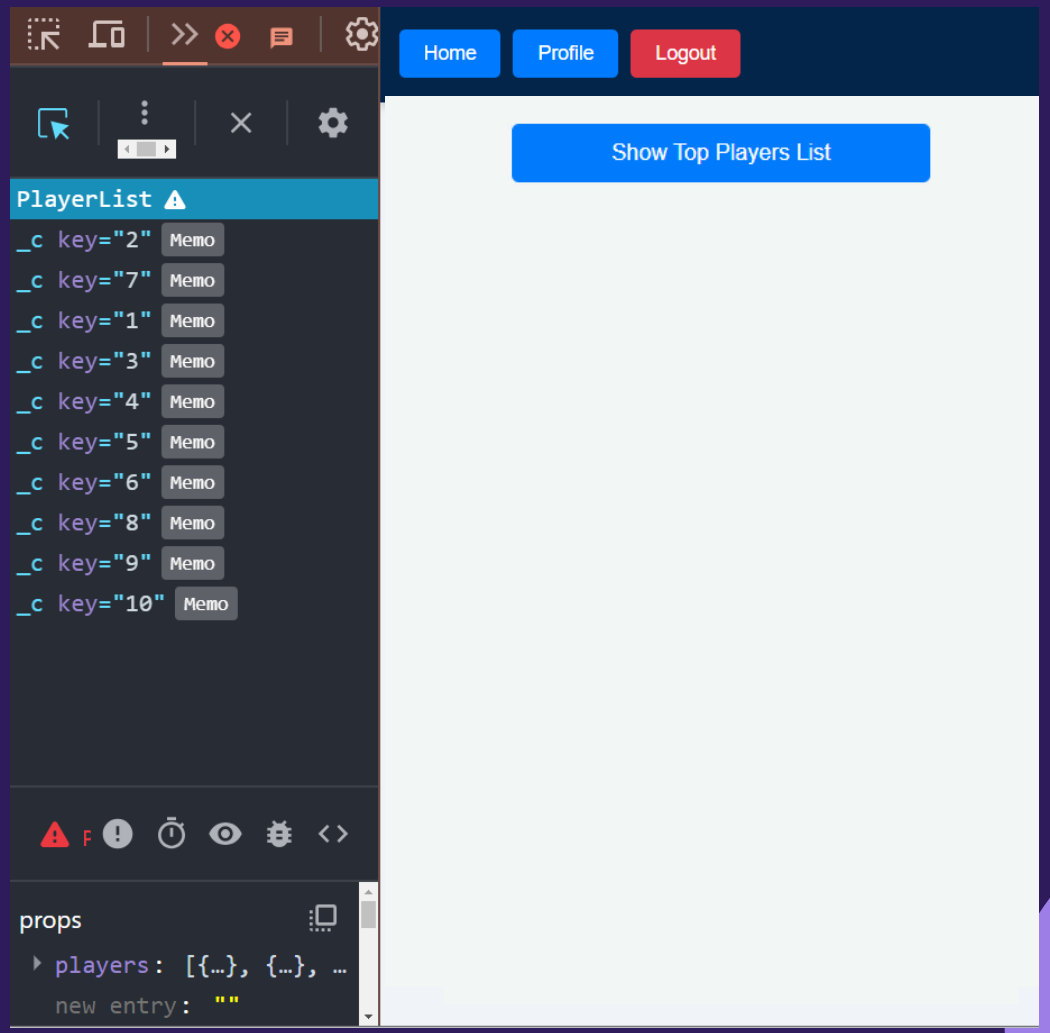
Memoization Techniques/Modern Optimization

```jsx
const Player = React.memo(({ player }) => {
  console.log(`Rendering ${player.name}`);
  return (
    <li>
      {player.name}: {player.score}
    </li>
  );
});

export default Player;
```

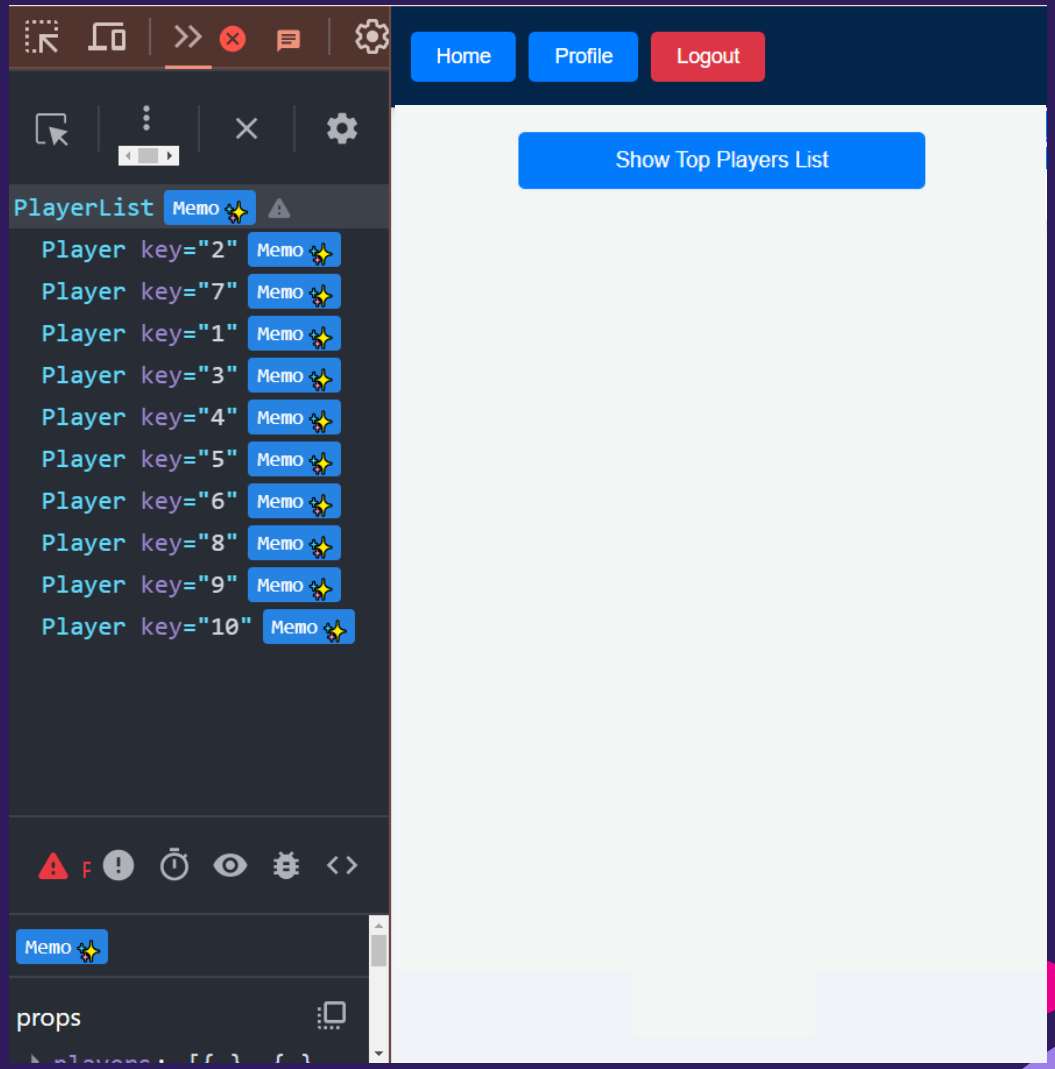
```jsx
import { useMemo } from 'react';
import Player from './Player';

const PlayerList = ({ players }) => {
  const sortedPlayers = useMemo(() => {
    return players.sort((a, b) => b.score - a.score);
  }, [players]);

  return (
    <div className="player-list">
      <h3>Top Players</h3>
      <ul>
        {sortedPlayers.map(player => (
          <Player key={player.id} player={player} />
        ))}
      </ul>
    </div>
  );
};

export default PlayerList;
```



Memoization Techniques/Modern Optimization

```
import { [illegible] } from 'react';
import Player from './Player';

const PlayerList = ({ players }) => {
  const sortedPlayers = [illegible](() => {
    return players.sort((a, b) => b.score - a.score);
  }, [illegible]);
```

```
const Player = [illegible]((({ player }) => {
  console.log(`Rendering ${player.name}`);
  return (
    <li>
      {player.name}: {player.score}
    </li>
```



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Gamified UI Components

Advanced State Control

Memoization Techniques ... to evolve into **M**odern Optimization

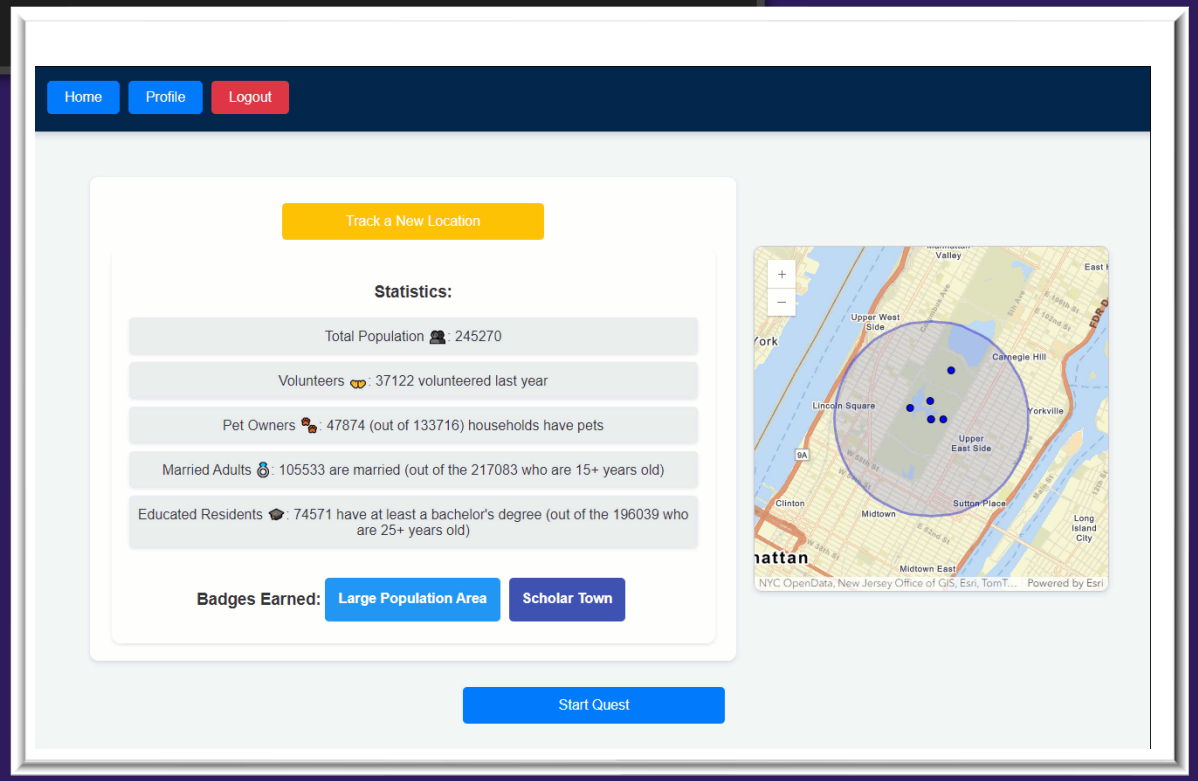
Efficient Rendering

Efficient Rendering

```
const MapViewComponent = lazy(() => import("./components/MapViewComponent"));
const SimpleMapComponent = lazy(() => import("./components/SimpleMapComponent"));
const DemographicData = lazy(() => import("./components/DemographicData"));
<Suspense fallback={<div>Loading...</div>}>
  {state.location ? (
    <MapViewComponent location={state.location} landmarks={landmarks} />
  ) : (
    <SimpleMapComponent />
  )}
</Suspense>
```

Efficient Rendering

```jsx
{showLeaderboard && <Leaderboard />}
{selectedBadge && (
  <BadgeModal
    badge={selectedBadge}
    onClose={() => dispatch({ type: 'SET_SELECTED_BADGE', payload: null })}
  />
)}
```

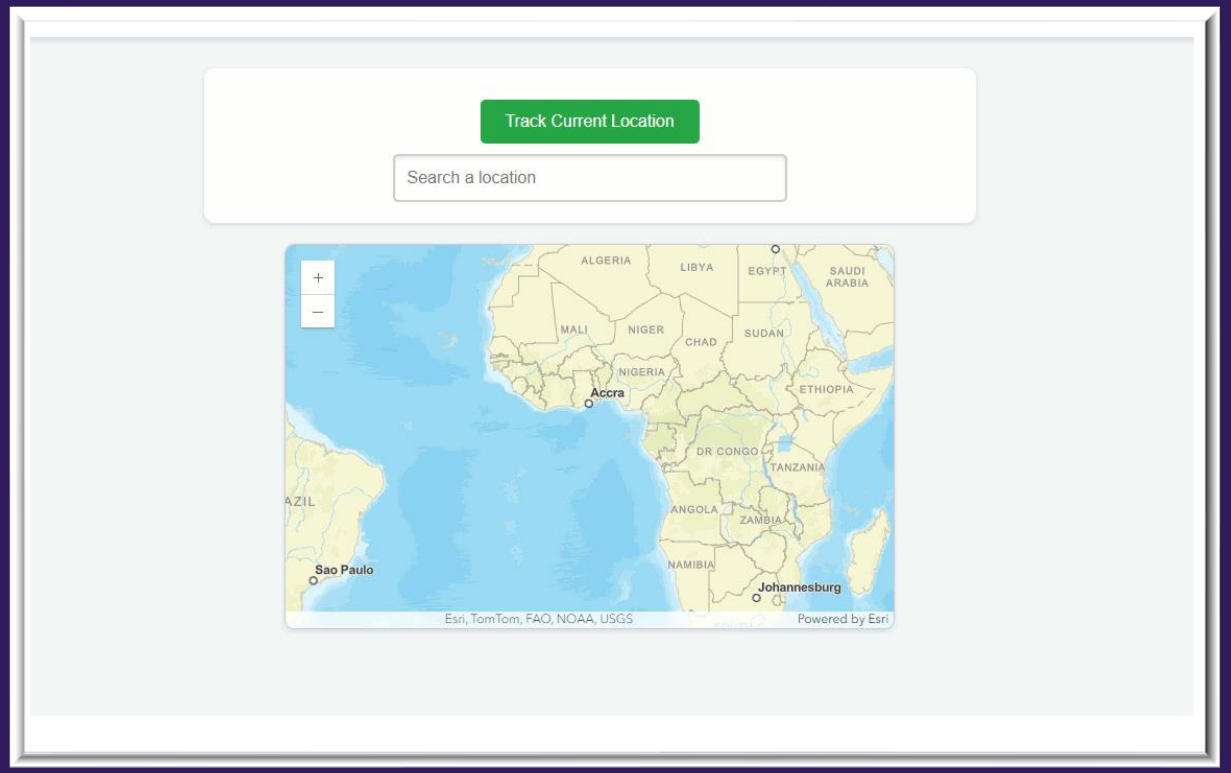


Efficient Rendering

```
useEffect(() => {
  if (!location || !mapDiv.current) return;

  const map = new Map({ basemap: 'streets' });
  const view = new MapView({
    container: mapDiv.current,
    map: map,
    center: [location.longitude, location.latitude],
    zoom: 12,
  });

  return () => view.destroy();
}, [location, landmarks]);
```



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Gamified UI Components

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Advanced State Control

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Memoization Techniques ... to evolve into **M**odern Optimization

E

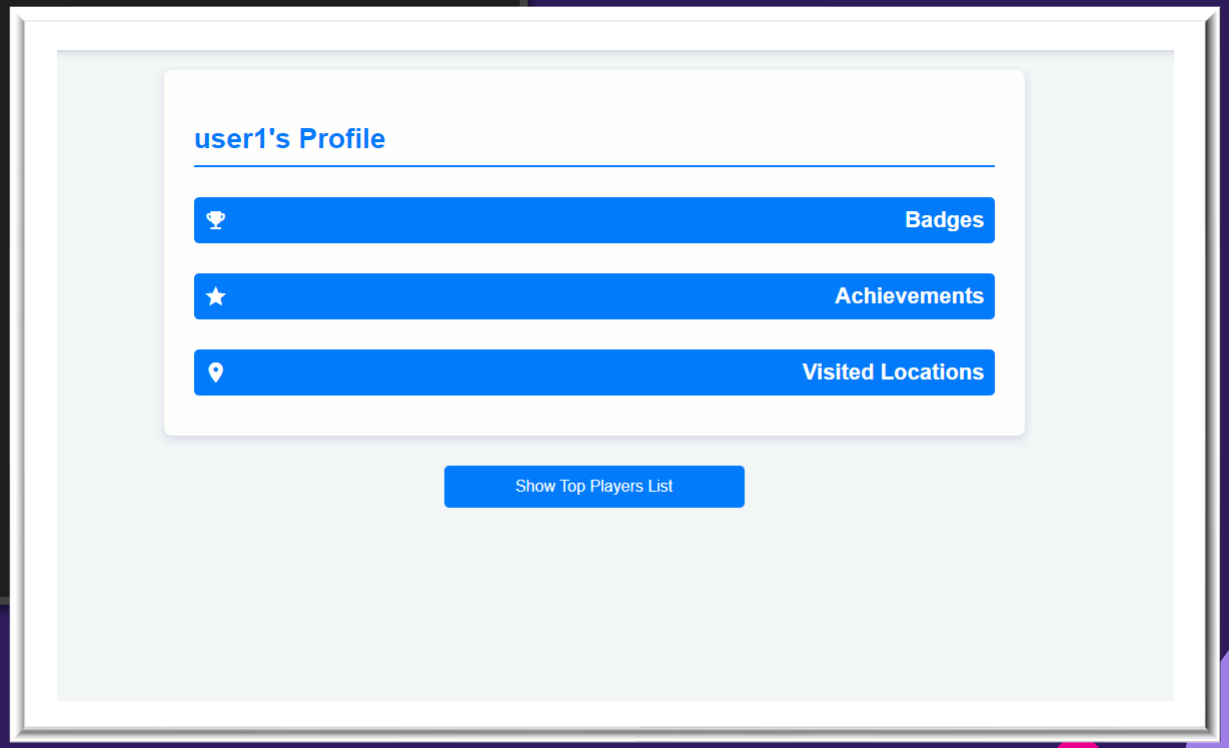
Efficient Rendering

S

Social Interaction

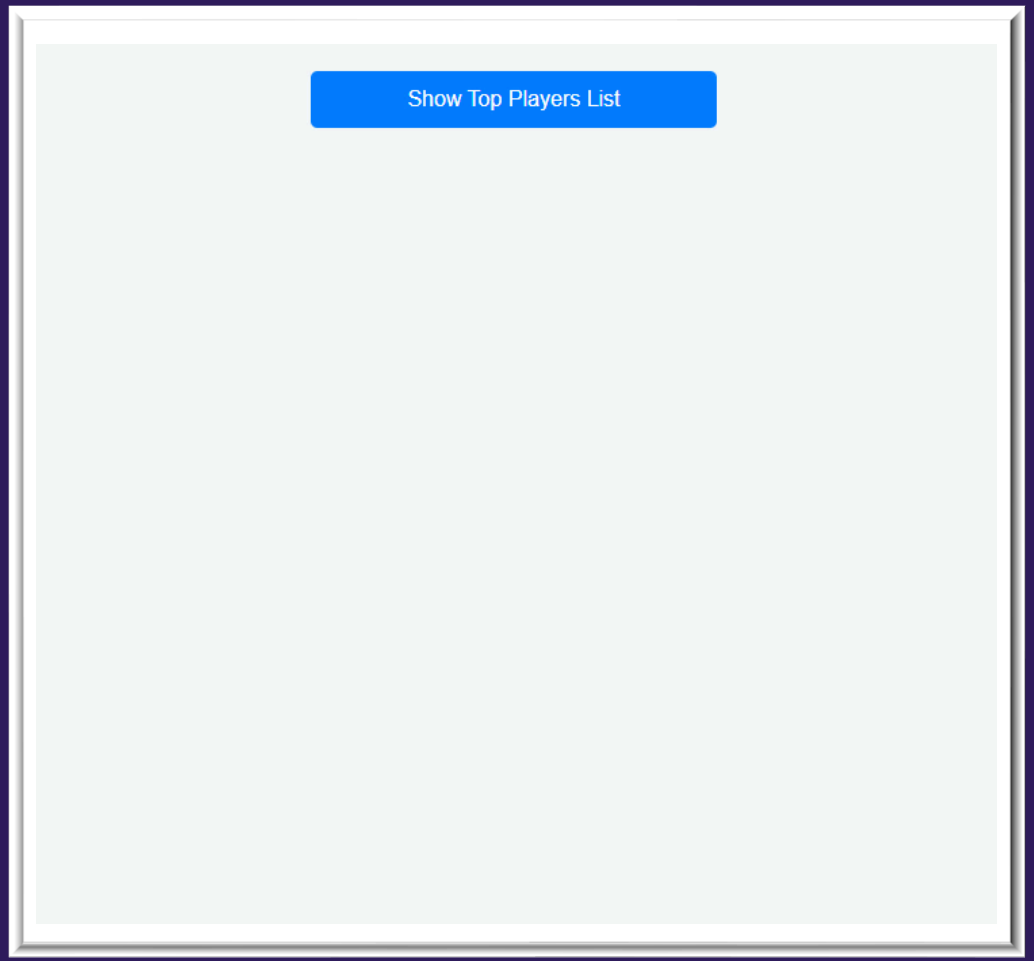
Social Interaction

```jsx
const ShareButtons = ({ url, message }) => {
  console.log("ShareButtons rendered with URL:", url, "and message:", message);
  return (
    <div className="share-buttons">
      <TwitterShareButton url={url} title={message}>
        <TwitterIcon size={32} round />
      </TwitterShareButton>
      <FacebookShareButton url={url} quote={message}>
        <FacebookIcon size={32} round />
      </FacebookShareButton>
      {/* other share buttons */}
    </div>
  );
};
```



Social Interaction

```jsx
const PlayerList = ({ players }) => (
  <div className="player-list">
    <h3>Top Players</h3>
    <ul>
      {players.map(player => (
        <li key={player.id}>
          {player.name} - {player.score}
        </li>
      ))}
    </ul>
  </div>
);
```



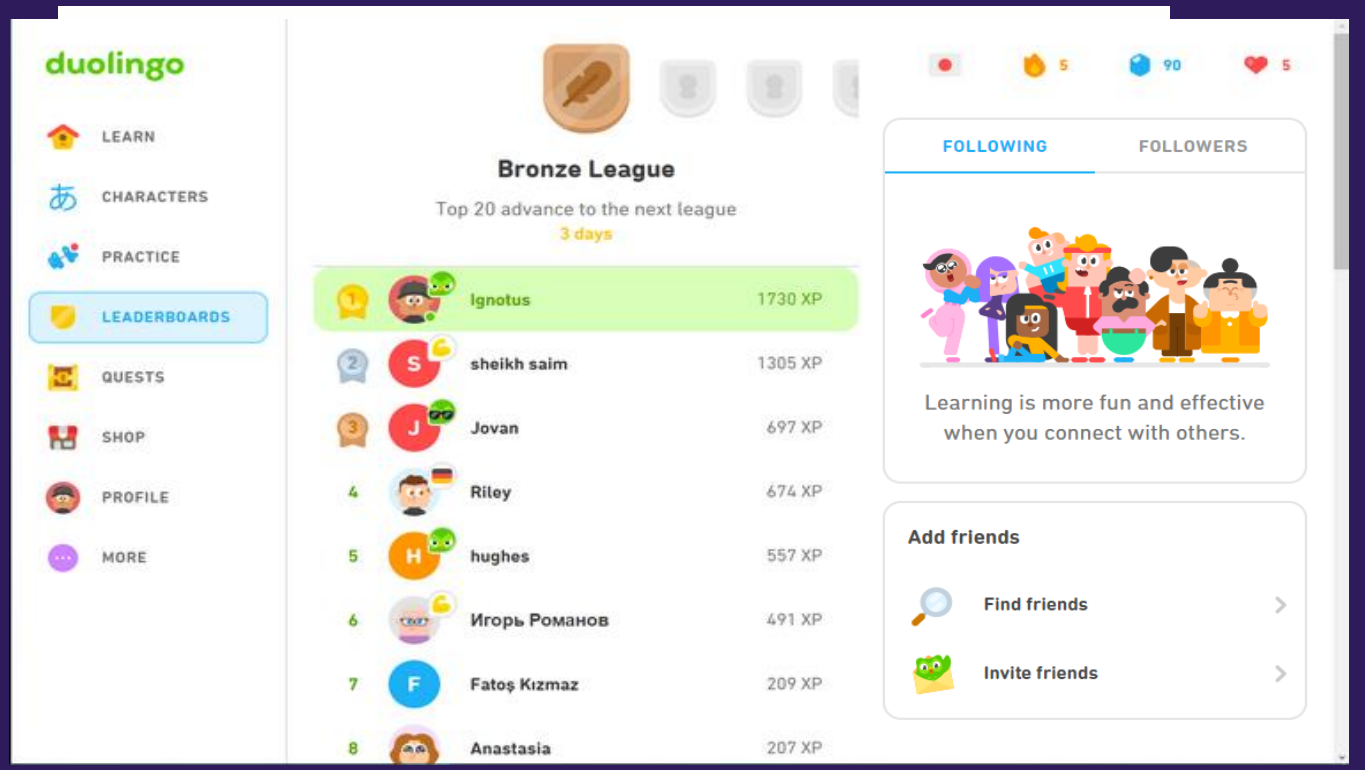
G Streak Counters & XP Bars

A Adaptive Learning System

M Optimized Lesson Rendering

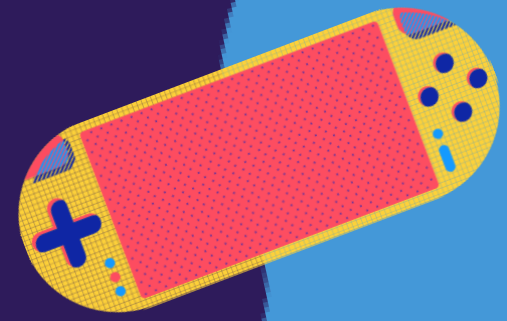
E Efficient Component Rendering

S Leaderboards & Challenges



duolingo

GAMES



Thank you, React Rally!

Courtney Yatteau

@c_yatteau

courtneyyatteau

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