

# Session 8 — Implementing Scoring & Victory

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## Application State Management 🏆

You're about to add the most satisfying part of any game — scoring and victory! This guide walks you through implementing a complete scoring system, managing complex application state, and creating your first independent React component. Ready to make your trivia game feel like a real achievement? Let's go!

## Table of Contents

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- [Understanding Application State](#)
- [Adding Score Tracking](#)
- [Implementing Score Updates](#)
- [Adding Cache Clearing](#)
- [Updating Reset Functionality](#)
- [Solo Mission: GameOver Component](#)
- [Essential Terms](#)
- [Ask the AI](#)

## ☁️ Accessing Your Codespace

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Visit [github.com/codespaces](https://github.com/codespaces) to relaunch your Codespace from Session 7.

## 🧠 Understanding Application State

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Before we dive into scoring, let's understand how **application state** differs from the component state you've used before.

**Application state** is the complete picture of your game's current condition — everything from the player's score to which zones are completed. Think of it as your game's "save file" that tracks all progress and achievements.

## State Categories in Your Game

Your `GameContext` manages five categories of state:

Category	Purpose	Examples
Game State	Core game progress	<code>score</code> , <code>screen</code> , <code>zoneProgress</code>
Quiz State	Current quiz session	<code>currentQuestions</code> , <code>currentQuestion</code> , <code>correctAnswers</code>
Audio	Sound controls	<code>music</code> settings
Actions	Game logic functions	<code>recordCorrectAnswer</code> , <code>resetGame</code>
Controls	UI state setters	<code>setScreen</code> , <code>setIsQuizVisible</code>

## Visualizing Game State

Think of your `GameContext` as the brain of your game — it keeps track of everything that's happening behind the scenes. The `useGame` hook provides access to this brain from any component that needs it. The mind map below breaks down how your game's state is organized, with a spotlight on **actions** — these are the functions that drive your game logic and help different parts of your app work together:

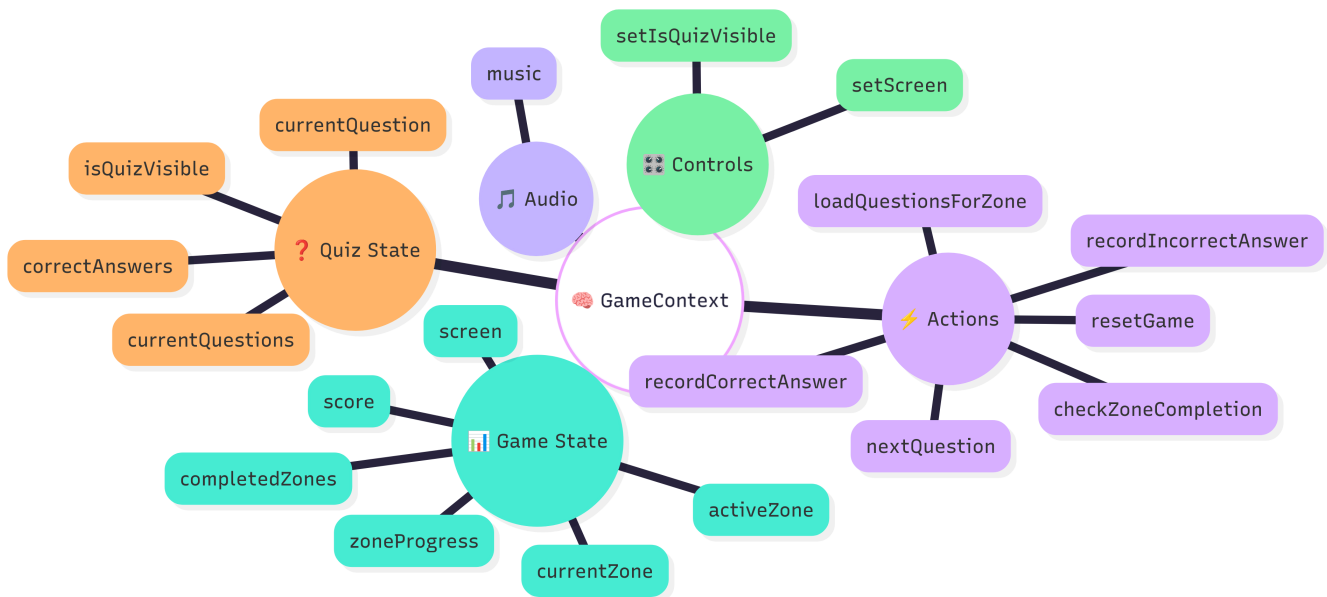


Figure: GameContext Mind Map

Application state management is what separates simple websites from complex, interactive applications. Your scoring system will coordinate multiple pieces of state to create a cohesive game experience where every action has consequences and every achievement is tracked.

## 🏆 Adding Score Tracking

Let's add a scoring system that tracks player performance and displays it prominently in your game's HUD.

1. Open `src/context/GameContext.jsx` and add score state inside the `GameProvider` function

```
const [score, setScore] = useState(0);
```

2. Make score available by adding it to the Context value

```
<GameContext value={{
  // GAME STATE
  screen,
  score,
  zoneProgress,
  // ... rest of existing properties
```

3. Open `src/components/HUD.jsx` and add a Scoreboard component at the top of the file

```
function Scoreboard() {  
  const { score } = useGame();  
  return <div className="score-display">Score: {score}</div>;  
}
```

4. Update HUD component to render both components using a React Fragment (`<>...</>`)

```
// Replace this single line:  
return <CurrentZone />;  
  
// With this Fragment structure:  
return (  
  /* Fragment groups components without extra DOM wrapper */  
  <>  
    <Scoreboard />  
    <CurrentZone />  
  </>  
);
```

5. Test by navigating to the game screen and verifying Score: 0 appears in HUD

The **Scoreboard component** demonstrates the single responsibility principle — it has one job: display the current score. This modular approach makes your code easier to maintain and test.



## Implementing Score Updates

Now let's make the score actually change based on player performance with point rewards and penalties.

1. Open `src/context/GameContext.jsx` and find the `recordCorrectAnswer` function, then add points for correct answers

```
const recordCorrectAnswer = () => {  
  setCorrectAnswers((prev) => prev + 1);  
  setScore((prev) => prev + POINTS_PER_CORRECT);  
};
```

2. Find the `recordIncorrectAnswer` function and add point deduction

```
const recordIncorrectAnswer = () => {  
  // Prevent score from going negative  
  setScore((prev) => Math.max(0, prev - POINTS_PER_CORRECT));  
};
```

3. Test by clicking zone, answering questions, and observing score changes

- Correct answer → +100 points
- Incorrect answer → -100 points (but never below 0)

**Updater functions** like `setScore((prev) => prev + 100)` are crucial when updating state based on the previous value. React batches state updates, so using the previous value ensures accurate calculations even when multiple updates happen quickly.

## Adding Cache Clearing

Let's add cache clearing functions to remove stored questions when zones are completed or the game resets.

1. Open `src/services/trivia.js` and add cache clearing functions at the end of the file

```
export function clearQuestionCache(zoneId) {  
  const cacheKey = getCacheKey(zoneId);  
  localStorage.removeItem(cacheKey);  
}  
  
export function clearAllQuestionCache() {  
  Object.keys(localStorage)  
    .filter((key) => key.startsWith("trivia_questions_zone_"))  
    .forEach((key) => localStorage.removeItem(key));  
}
```

2. Import the cache functions into `GameContext.jsx`

```
import {
  fetchQuestions,
  clearQuestionCache,
  clearAllQuestionCache
} from "../services/trivia";
```

3. **Update** the `checkZoneCompletion` function to clear the current zone's cached questions when completed

```
const checkZoneCompletion = () => {
  if (activeZone === null || currentQuestions.length === 0) return;

  const questionsNeeded = Math.ceil(
    currentQuestions.length * PASS_PERCENTAGE
  );
  const passed = correctAnswers >= questionsNeeded;

  if (passed) {
    setZoneProgress((prev) => ({
      ...prev,
      [activeZone]: { completed: true },
    }));

    clearQuestionCache(activeZone);

    if (activeZone === ZONES.length - 1) {
      setScreen(SCREENS.GAME_OVER);
    }
  }
};
```

**Cache management** prevents stale data from affecting gameplay. When players complete a zone, clearing its cache ensures they get fresh questions if they replay. The `Object.keys()` and `filter()` pattern is an effective way to find and remove related `localStorage` entries.

## Updating Reset Functionality

Let's update the reset function to properly clear all game state and cached data for a fresh start.

1. Find the `resetGame` function in `GameContext.jsx` and update it

```
const resetGame = () => {
  setScore(0);
  setZoneProgress({
    0: { completed: false },
    1: { completed: false },
    2: { completed: false },
  });
  setIsQuizVisible(false);
  setCurrentQuestions([]);
  setCurrentQuestion(0);
  setCorrectAnswers(0);
  clearAllQuestionCache();
};
```

2. Test the reset functionality by completing a zone and then using React DevTools to trigger `resetGame()`

**Complete state reset** ensures players can start fresh without any lingering data from previous games. This includes both React state and `localStorage` cache, providing a clean slate for new gameplay sessions.

## Solo Mission: GameOver Component

Now for the exciting part — you'll create a `GameOver` component that celebrates player achievements and allows them to play again! You've got all the tools — now it's time to build your own victory screen using everything you've learned.

### 1. Create the Component Foundation

- Create `src/components/GameOver.jsx` with function component and default export
- Return JSX with `div className="game-over"` containing `h1` congratulations message
- Import `GameOver` into `App.jsx` and add conditional rendering for `SCREENS.GAME_OVER`
- Test by using React DevTools → setting `screen` to "gameover" → Component appears

### 2. Add Score Display

- Import `useGame` hook and destructure `score`
- Add `div` with `className="final-score"` displaying `Final Score: {score}`

- Test by checking score display → Shows current game score

### 3. Add Play Again Functionality

- Create click handler calling `resetGame` and `setScreen(SCREENS.SPLASH)`
- Import and render `GameButton` with “Play Again” text and `"primary"` variant
- Test by clicking Play Again → Game resets → Returns to splash screen

### Testing Tips

- **Quick testing** by using React DevTools to change `screen` state to “gameover” (find `GameProvider` → hooks → screen)
- **Full testing** by completing all three zones to naturally trigger GameOver screen
- **Verify** final score displays correctly and Play Again button resets everything

### Requirements Checklist

Your completed GameOver component must:

- Export function component as default
- Wrap content in div with `className="game-over"`
- Display congratulations using h1 element
- Import `GameButton`, `useGame`, `SCREENS`
- Show final score in div with `className="final-score"`
- Include Play Again button using `GameButton` with `"primary"` variant
- Reset game and navigate to splash screen when Play Again is clicked
- Display when screen state equals `SCREENS.GAME_OVER` in `App.jsx`



### Reference Files




- `SplashScreen.jsx`: Component structure, `GameButton` usage, `useGame` hook, screen navigation, click handler patterns
- `HUD.jsx`: Accessing `score` from `useGame` hook
- **Session 2 guide**: `GameButton` props and component export patterns
- **Session 3 guide**: `SCREENS` constants and navigation patterns



This challenge combines everything you’ve learned: component creation, props, shared state, event handling, and conditional rendering. Following guided steps without code examples builds confidence in applying React patterns — you’re connecting concepts rather than copying code.

## Essential Terms

*Quick reference for the key concepts you just learned:*

Term	Definition	Why it matters
 application state	The complete condition of an application at a specific moment in time, encompassing all the information it needs to function correctly.	Your GameContext manages all application state — screen, score, zone progress — making it accessible to any component through useGame.
 updater function	A function passed to setState that receives the previous state value and returns the new state.	Essential for score calculations — ensures accurate updates even when React batches multiple state changes.
 single responsibility principle	Design pattern where each component or function has one clear, focused purpose.	Your Scoreboard component only displays score — this separation makes code easier to test and maintain.

## Ask the AI — Implementing Scoring & Victory

You just implemented a complete scoring system, managed complex application state, and built your first independent React component — excellent work!

Now let’s deepen your understanding of state management patterns, component architecture, and development practices. Here are the most impactful questions to ask your AI assistant about today’s session:

- How does application state differ from component state, and when should I use each?
- Why are updater functions important for state that depends on previous values?
- What are some common patterns for resetting application state in React apps?
- What makes a component follow the single responsibility principle?
- How do you decide what props a new component needs when building it from scratch?