

# Guess Country Game Design Document

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## Project Description

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Guess Country Game is an interactive educational web application where users learn world geography by identifying countries from their flags. The application combines an engaging quiz interface with an admin panel for content management.

### Core Features:

- **Flag Quiz Game:** Random flag representation, multiple-choice answers, immediate feedback, real-time scoring, results summary
- **Admin Panel:** CRUD operations for country data (name, capital, population, region, languages, country code), country list with flag thumbnails, automatic flag image integration via Flagpedia CDN
- **User Experience:** Responsive Bootstrap design, React Router navigation, real-time validation and error handling

### Technology Stack:

- **Frontend:** React (v19.1.1), React Router DOM (v7.9.6), Vite (v7.1.7), React Bootstrap (v2.10.10), Bootstrap (v5.3.8)
- **Backend:** Node.js (v22.x), Express.js (v4.16.1), ES6 modules, dotenv
- **Database:** MongoDB Atlas, MongoDB Node.js driver (v7.0.0), collections: adminCountries, mockCountries
- **External Services:** Flagpedia CDN (<https://flagcdn.com>) for flag images
- **Deployment:** Render for hosting, GitHub for version control

## User Personas & User Stories

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### Player

- As a player, I want to see a country flag and guess the country name so I can learn to recognize countries by their flags.
- As a player, I want immediate feedback after submitting my answer so I know if I am correct and can learn from mistakes.
- As a player, I want to see my current score throughout the game so I can track my performance in real-time.
- As a player, I want a summary of results after completing the quiz so I can understand my overall performance.
- As a player, I want countries presented in random order so each game session feels fresh.

### Administrator – Content Manager

- As an admin, I want to view all countries in an organized list with flags so I can quickly review the database.
- As an admin, I want to add new countries with complete information so the quiz has more diverse content.

- As an admin, I want to edit existing country information so I can keep data accurate and up-to-date.
- As an admin, I want to delete countries from the database so I can remove incorrect or duplicate entries
- As an admin, I want automatic flag image generation from country codes so I do not manually upload images.

### Developer – System Maintainer

- As a developer, I want to populate the database with 15-20 countries initially so the game has content to start with
- As a developer, I want proper error handling so users receive helpful feedback when issues occur.

### Design Considerations

- **Accessibility:** High contrast for flags, clear labels
- **Performance:** Lazy loading for images, CDN for static assets
- **Data Integrity:** Frontend/backend validation, duplicate prevention
- **Security:** Environment variables for sensitive data, input sanitization, and MongoDB Atlas security

**Future Enhancements** (Out of scope): Additional game modes (capitals, population, languages), difficulty levels, leaderboards, user accounts, timed challenges, hints system, analytics dashboard

### Design Mockups

