

Sortonym Challenge Game – Documentation

1. Project Summary

Sortonym Challenge is a web-based vocabulary game designed to evaluate and enhance users' understanding of synonyms and antonyms through a fast-paced, interactive gameplay experience. The project focuses on usability, performance, and scalable architecture, aligning with real-world product development standards.

The application supports regular gameplay, difficulty-based challenges, and a Daily Challenge mode that enables competitive ranking among users.

2. Objectives

- Build an engaging educational game with real-time interaction
- Implement secure user authentication and session handling
- Design scalable backend APIs for game logic and leaderboards
- Capture user performance data for analytics and ranking
- Ensure responsiveness across desktop and mobile devices

3. System Architecture Overview

Frontend: React (Vite-based setup), React Router, Vanilla CSS, premium UI with animations and dark/light mode.

Backend: Django REST Framework handling authentication, game logic, scoring, and leaderboards.

Database: SQLite (development) storing vocabulary data, results, and user participation records.

4. Core Functional Modules

4.1 User Authentication

Email and phone-based registration/login, OTP verification (Email/WhatsApp), secure token-based session management, and an Admin Override Account for testing and QA validation.

4.2 Game Mechanics

Each game round is based on one Anchor Word. Users must classify given words into Synonyms and Antonyms. The following difficulty levels are supported:

Level	Time Limit	Word Pairs	Multiplier
Easy	90 sec	3 pairs	1.0x
Medium	60 sec	4 pairs	1.2x
Hard	45 sec	5 pairs	1.5x

4.3 Daily Challenge Mode

One fixed challenge per day for all users. Each user can attempt only once per 24 hours. Results and leaderboard unlock after 24 hours. Designed to encourage daily engagement and fair competition.

5. Scoring Logic

Base Score: 1 point per correctly categorized word.

Time Bonus: Remaining Time \times 0.1 \times Accuracy Ratio.

Difficulty Multiplier: Applied based on selected difficulty level.

This approach rewards accuracy, speed, and difficulty selection.

6. Leaderboards & Results

Global Leaderboard: All-time top performers

Daily Leaderboard: Rankings based on Daily Challenge results

Users can view final score, accuracy percentage, time taken, rank position, and score breakdown.

7. Backend APIs (High Level)

POST /api/game/start/ – Initialize a new game

POST /api/game/submit/ – Validate answers and store score

GET /api/leaderboard/ – Fetch leaderboard rankings

8. Development & Testing

Admin override login enables unlimited play, immediate result visibility, and full-page access for QA. Edge cases tested include replay prevention, timer expiration, incorrect word placement, and daily challenge lock conditions.

9. Key Outcomes

Successfully implemented a real-time interactive game, demonstrated full-stack development, applied professional software practices, and built a scalable base for future features.

10. Future Enhancements

Social media sharing, multiplayer real-time battles, advanced analytics dashboard, and cloud deployment.

Conclusion

The Sortonym Challenge project demonstrates the team's ability to deliver a production-ready educational game with strong technical foundations, clean UI/UX, and extensible architecture.