

Group Project Proposal - Fifteen Puzzle

Group Members:

- Vignesh A M Raja
- Devon Ivory

Project Summary:

“Fifteen Puzzle” is a puzzle game that Noyes Chapman invented. This puzzle consists of 15 numbered pieces arranged in a 4 x 4 grid. The goal is to arrange the tiles into numerical order by sliding a square that neighbors the missing square into its space. The tiles will contain a background image, and you can choose the background for the tiles.

Key Features:

- Sliding Multiple Tile pieces
- MYSQL DB storage
- Login/Registration
- Personalized Leaderboard
- View Player Progress
- Admin Role and Content Management System(CMS)
- User-Generated Content
- Game Time with Music
- Multiple backgrounds

Proposed Wireframe:

1. LoginPage

- **Title:** “Fifteen Puzzle Login”
- **Tagline:** “Are you a returning player or a new Player”
- **Buttons:** Login | Register
- **Input:** Player Name and Password

2. Homepag(Intro)

- **Title:** “Fifteen Puzzle”
- **Tagline:** “Do you have what it takes to solve this puzzle?”
- **Buttons:** Add Image | Start Game | How to Play | Select Image
- **Input:** Image URL

3. Layouts (Unique Screens):

- Login/Register
- Home

- Game Board
- Leaderboard
- Game Over

4. Each Page Details:

- **Login/Register:**
 - The user can Login or Register to play game.
 - Validation will be used in order to check if player is registered and will not be allowed to proceed unless registered.
- **Home/Lobby:**
 - The user can upload an image or choose from preloaded image backgrounds or chose images that are already loaded
 - **Game Board:**
 - 4 columns \times 4 rows (Numbered Tile) grid
 - Header bar: player names, timer
 - Disabled styling for already-picked cells
- **Leaderboard (in-game sidebar or modal):**
 - Real-time ranking of players with Time changes
 - Auto-updates via WebSockets
- **Game Over:**
 - Final ranking, champion highlight
 - Buttons: Play Again

Functionality:

- **Register Game:** Form validation that will check MYSQL DB to see if user is registered or not.
- **Start:** Generates 4 \times 4 board, with background images. Music playing while game is in session
- **Slidding Tiles:** Js will be utilize to slide tiles across grid
- **Game Over:** When the puzzle is complete server computes final leaderboard, broadcasts “gameOver”.

Transition Implementation Details:

- React Router handles navigation between Register/Login, Board, Leaderboard, and Game Over screens.

Transformations Implementation Details:

- **JavaScript:** Tiles will be given a sliding effect
- **CSS transform:** scale and fill tile background

Animations Implementation Details:

- **Timer bar:** Width transition from 100%→0% over puzzle board.
- **Score pop-in:** Brief bounce effect on leader standing changes.

User Experience:

- Mobile-first responsive grid (horizontal scroll on narrow viewports).
- High-contrast theme option, accessible ARIA labels.
- Individual tiles that contains numbers and part of an image.

Test Cases:

1. **Usability:** New user being registered
2. **Functionality:** viewing leader board, Admin having a designated view that can see more configurations than regular users..
3. **Edge Cases:** Game will not start if user is not registered
4. Leaderboard persistence across page reloads.

Approach to Refine Improvements:

- Multiple rounds of different users registered
- Collect quantitative metrics (response latency) and qualitative feedback (surveys).
- Prioritize critical UX fixes and bug resolutions between sprints.

Statement:

We, the undersigned members of the group, acknowledge that we understand the conditions outlined in this proposal. We are committed to actively participating in the implementation of the group project from start to finish. We understand that individual grades may vary based on our contributions and performance, and we agree to present an important phase of the work collectively.

Signed Proposal:

Name: Vignesh Azhagiyanambi Madaswamy Raja _____

Name: Devon Ivory _____

Date: 07/02/2025

Wireframes:

I. Login/RegisterScreen.

Fifteen Puzzle

Already Registered? Login

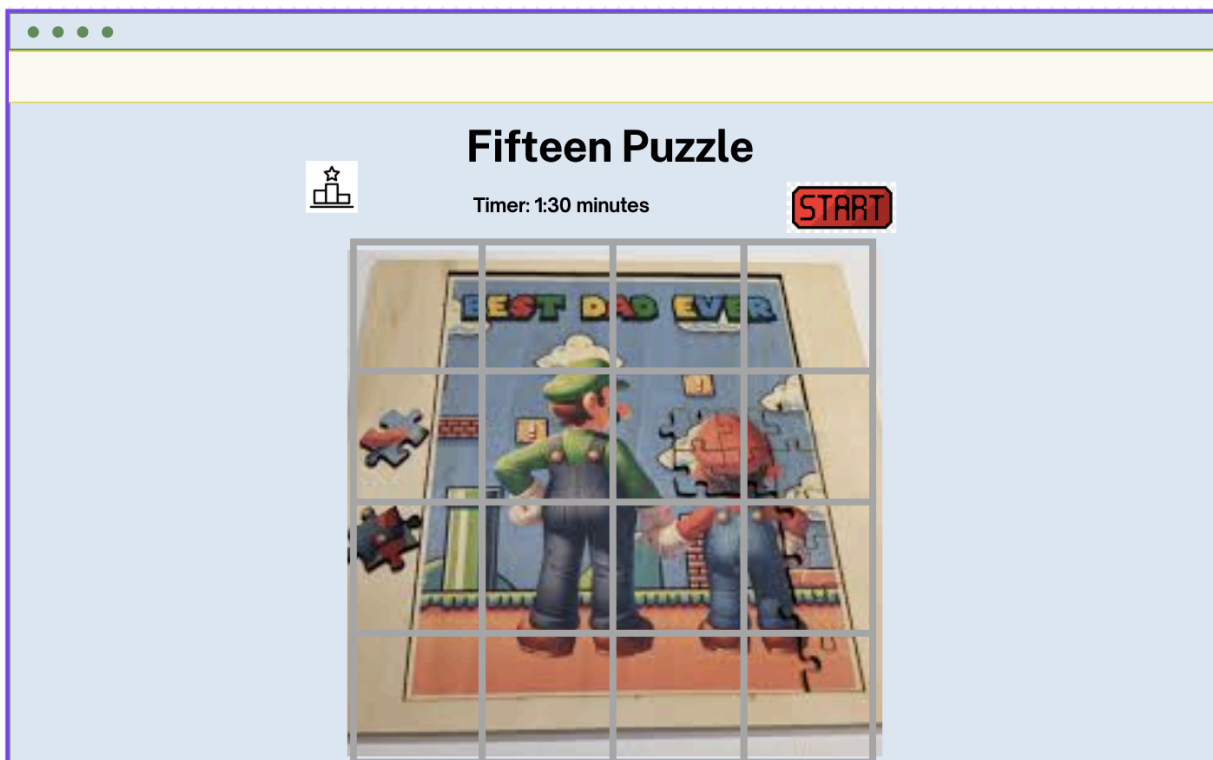
NAME

Jara Martins

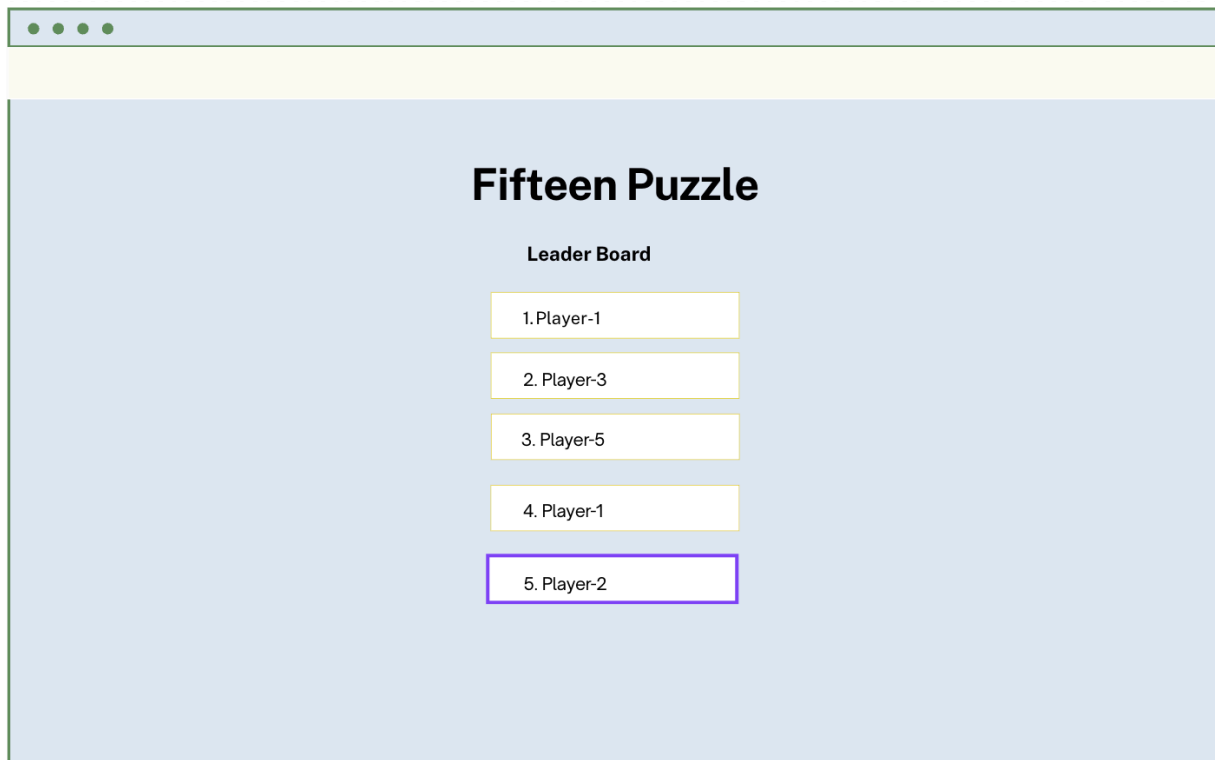
PASSWORD

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II. Game Board



III. Leader Board



IV. Winner Screen

