

8-Puzzle Game (Image Upload & Solvers)

A simple, responsive 8-puzzle (sliding puzzle) built with vanilla HTML, CSS, and JavaScript. Play manually or visualize solutions using classic search algorithms. You can also upload an image to turn it into a 3×3 sliding puzzle.

Features

- Upload an image or switch to numbered tiles
- Shuffle to a guaranteed-solvable configuration
- Manual play with move counter and status updates
- Solution viewer with Previous/Next step controls
- Algorithm stats: path length, nodes explored, time, efficiency
- Algorithms: A* (Manhattan), A* (Misplaced Tiles), BFS, DFS

Run Locally

- Open `index.html` in any modern browser. No build or server needed.

Controls

- Upload Image: choose a picture for tiles
- Use Numbers Instead: switch back to numbers
- Shuffle Puzzle: random solvable state
- Show Solution: run selected algorithm and view steps
- Reset: return to solved state
- Previous / Next: navigate solution steps

How It Works (Brief)

- State is a 1D array for the 3×3 grid with 0 as the empty tile.
- Solvability checked via inversion count (for 3×3 boards).
- Search:
 - A*: $f = g + h$ using Manhattan or Misplaced Tiles
 - BFS: shortest path in moves
 - DFS: depth-limited (default max depth 20)

Tech

- `index.html, styles.css, script.js`

Notes

- Uploaded images are scaled to 300×300 for tiling.
- Efficiency shown is path length / nodes explored.