

WEBSTER

PROBLEM STATEMENT



DIFFICULTY: EASY



The Pyramid of Pandemonium

(Visualization of sorting algorithms as circus performers getting in order for the grand act.)



The grand finale's "Pyramid of Pandemonium" requires all acrobats to be in perfect height order, but each lead performer uses a different chaotic method to arrange them. As the Ringmaster's new "Formation Maestro," your job is to build a "Magical Rehearsal Mirror" to make sense of their techniques. Your tool must visualize each arrangement style step-by-step, using colorful costumes to highlight every comparison and swap. For the most complex methods, the Ringmaster wants to race them side-by-side, track their efficiency, and even pause the action to quiz you on the next move. The success of the final act depends on your creation!

BASIC FEATURES

1. Visualize simple algorithms: Bubble Sort, Insertion Sort, Selection Sort.
2. Provide an option to generate a random array or input a custom array.
3. Allow adjustable array size and sorting speed.
4. Implement step-by-step animation showing swaps and comparisons.
5. Use color-coded visualization (e.g., to indicate active comparison, sorted section).
6. Include a basic text-based explanation of what is happening at each step.

ADVANCED FEATURES

1. Add support for complex algorithms: Quick Sort, Merge Sort, Heap Sort, Radix Sort.
2. Implement a side-by-side algorithm comparison on the same dataset.
3. Display performance metrics: number of comparisons, swaps, and execution time.
4. Create an Interactive Quiz Mode: the visualization pauses and asks the user to predict the next step, providing AI-driven feedback on their answer.

DIFFICULTY: MEDIUM



Alchemist's Grimoire

**Medicine schedules and
wellness tracking for performers.**

As the circus's "Alchemist of the Arena," you brew the vital potions and elixirs that keep your performers safe and strong. The problem is they often forget their complex dosage schedules, risking their health and the entire show. Your task is to build the "Alchemist's Grand Grimoire" to ensure they never miss a dose. This magical tool will log each elixir's schedule (name, dosage, frequency), dispatch a "Circus Crier" with reminders, and display a "Wellness Rate" dashboard with charts. For an advanced touch, a Mystic Fortune Teller will predict when a performer might forget, send proactive nudges, and answer your natural language questions. The Mystic can even sync the Grimoire to the "Great Sky Calendar" for all to see.

BASIC FEATURES

1. Web app to set medicine schedules (pill name, dosage, time, frequency).
2. Reminder notifications via browser alerts or email.
3. Simple log of taken vs. missed doses.
4. User-friendly dashboard to view upcoming and past reminders.
5. Basic edit/delete functionality for medication schedules.
6. Data visualization dashboard: graphs showing adherence rates, missed doses, and trends over time.

ADVANCED FEATURES

1. AI-Powered Adherence Prediction:

- AI detects patterns (e.g., “User often misses night doses”) and sends extra reminders before high-risk times.
- Proactive nudges like: “You usually forget your pill after dinner — should I remind you again in 15 minutes?”

2. AI Chatbot Health Assistant:

- Users can ask natural language questions like: “What pills do I need to take today?” or “Did I miss any dose yesterday?”

3. Google Calendar Integration (Showstopper Feature):

- Medication schedules sync directly with Google Calendar.
- AI Assistant can auto-update calendar events if a dose is missed or rescheduled.

DIFFICULTY: MEDIUM



Gallery of Wonders

**Preserving and showcasing creative
works & performances.**

Under flickering torchlight, the Circus of Fleeting Wonders comes alive with acts that last for a single, brilliant moment before vanishing forever. In this whirlwind of spectacle, the greatest performances are lost to memory. Your mission, as the circus's Grand Archivist, is to build the "Grand Gallery of Wonders"—a timeless stage where every performer's legendary act can be captured and celebrated, ensuring their magic never disappears.

BASIC FEATURES

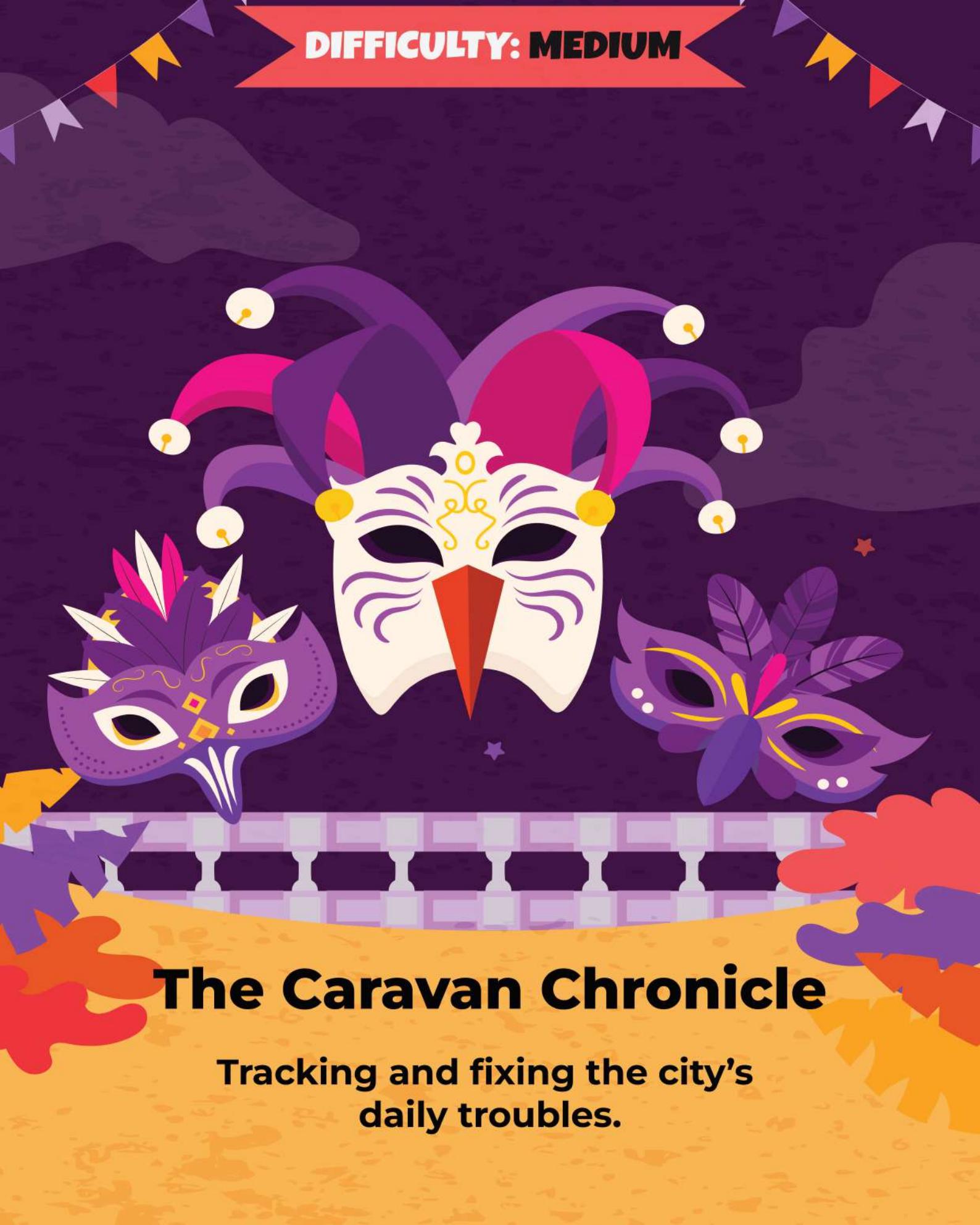
1. Web app where users can sign up and create a profile.
2. Ability to upload and showcase creative works (art, photography, writing, etc.).
3. Organize content into boards/collections.
4. Basic like/save functionality to bookmark others' works.
5. Simple search and filter by category (e.g., art, photography, writing).
6. User dashboard to manage uploaded content.

ADVANCED FEATURES

1. AI-Powered Recommendations: personalized content feed suggesting works based on user preferences and activity.
2. AI Tagging & Categorization: auto-tag uploaded content (e.g., "landscape," "portrait," "abstract").
3. Community Interaction Tools: comments, collaborative boards, and group collections.

4. Content Insights Dashboard: graphs showing views, saves, and engagement trends.
5. AI Similarity Search: find visually or thematically similar works using AI-based image/text similarity.

DIFFICULTY: MEDIUM



The Caravan Chronicle

**Tracking and fixing the city's
daily troubles.**

The Circus of Wonders isn't just a show; it's a mobile city with its own citizens—the performers, vendors, and roadies. But as this city springs up overnight, its infrastructure often breaks down: main pathways become damaged, water lines to the caravans leak, and garbage piles up. The citizens' complaints are lost in the day-to-day chaos, hurting morale. The Ringmaster, acting as the city's Mayor, has appointed you the new Grounds Manager. Your mission is to build a formal grievance tracker where any circus citizen can report these municipal issues and watch them get resolved, ensuring their traveling city runs as smoothly as the show itself.

BASIC FEATURES

1. User Registration & Login: Secure accounts for citizens to submit and track complaints.
2. Complaint Submission: Citizens can report issues (road damage, water leakage, garbage not collected) with text, location, and photo upload.
3. Ticket Lifecycle: Complaints go through status stages → OPEN → IN PROGRESS → RESOLVED.
4. Municipal Dashboard: Staff can view, assign, and update complaints.
5. Search & Filtering: Filter complaints by type, area, urgency, or date.
6. Citizen Portal: Citizens can track their submitted complaints and receive status updates.
7. Role-Based Access: Different dashboards for citizens, staff, and admin.
8. Export & Reports: Generate CSV/PDF reports for monthly analysis.

ADVANCED FEATURES

1. Heatmap Visualization: Interactive map showing density of complaints by locality.
2. SLA Tracking: Monitor how long issues remain unresolved, highlight overdue ones.
3. Escalation System: Auto-escalate if SLA deadline is breached.
4. Public Transparency Portal: Show live stats (resolved vs pending complaints, average resolution time).
5. Notifications: SMS/email/push notifications for status changes and overdue reminders.

DIFFICULTY: MEDIUM



The Legacy Trunk

**Preserving family stories
across generations.**

For the Great Zanetti family, the circus is a hundred-year-old bond forged in sawdust and starlight. Their heritage is a tapestry of legendary acts and whispered family stories passed from grandparent to grandchild. But as the elder Zanettis take their final bow, this precious heritage is fading. Your mission, as the family's Chronicler, is to protect their shared soul. You will build the "Family Trunk," a private digital hearth where every member can safeguard their stories and heirlooms, ensuring the Zanetti kinship and their magic live on.

BASIC FEATURES

1. Family Story Recording: Upload and store stories in audio, video, photo or text form.
2. Timeline Creation: Build personal or family timelines to map important life events.
3. Photo Uploads with Tagging: Add descriptions, dates, and simple tags for easy organization.
4. Private Family Circles: Share stories securely with selected family members.
5. Search Functionality: Find stories, media, and events quickly.
6. User Authentication & Family Member Management: Roles for contributors (e.g., parents, grandparents, kids).
7. Story Export: Convert collections into a printable PDF or book format.

ADVANCED FEATURES

1. Memory Prompts: Predefined question templates (e.g., "What was your happiest childhood moment?") to encourage storytelling.
2. AI Text Analysis: Categorize and auto-tag stories using text analysis APIs.
3. Cross-Generational Matching: Match family members with similar interests/experiences across generations.
4. Collaborative Story Editing: Multiple contributors can co-create and refine family stories together.

DIFFICULTY: HARD



The Odyssey Atlas

Guiding the circus into
every new city.

A traveling circus thrives on the soul of the cities it visits, but each new destination is an unknown territory. Arriving unprepared means the magic is lost, the connection to the audience never forms. Your mission, as the circus's Pathfinder, is to scout the road ahead. You will build the "Odyssey Atlas," an interactive portal for your troupe to explore the next city on the tour—to learn its history, walk its streets, and hear its sounds—ensuring that when the big top rises, it feels like it belongs.

BASIC

1. **The Scout's Portal:** A portal where performers can explore curated facts and stories about the next tour city (local landmarks, culture, major events).
2. **Tour Maps & Histories:** Interactive maps and timelines to present the next city's layout and history.
3. **Ringmaster's Drills:** Quiz modules on city facts and history, with instant feedback to prepare performers.
4. **Top Scout Board:** A simple leaderboard to track performance on the Ringmaster's Drills.
5. **Performer's Logbook:** A personal dashboard to track completed drills and explored cities.

ADVANCED

1. **Pathfinder's Accolades:** Achievements, badges (e.g., "Paris Pioneer"; "Tokyo Trouper"), and progress levels to encourage exploration.
2. **Veteran's Wisdom:** Performers can contribute their own stories or tips about cities they've visited before, subject to the Ringmaster's approval.
3. **The Global Tour Map:** A data dashboard showing insights like "Most anticipated tour stops" or "Toughest Ringmaster's Drills."
4. **Sounds of the City:** Immersive audio stories using AI-generated voices with emotion and background ambience (e.g., market sounds, traffic, local music) to give performers a feel for the next stop.
5. **The Ghost Walk:** Integration with a Maps API so performers can "walk" virtually through a city's streets and listen to stories linked to specific locations.

DIFFICULTY: HARD



The Tricksmith's Ledger - Capture the Spark

Backstage at the circus, genius strikes like lightning—an acrobat imagines a new leap, a clown conceives a perfect gag. But in the chaos, these brilliant sparks are as fleeting as applause, and countless legendary acts are forgotten before they're ever performed. Your mission, as the circus's Inventor-in-Residence, is to build the "Tricksmith's Ledger." You will create a magical notebook where performers can instantly capture their raw ideas, and later refine them into the next show-stopping spectacle.

BASIC FEATURES

1. **Quick Idea Capture:** A minimalist interface to instantly jot down sparks of inspiration for new acts or gags.
2. **Categorization:** Tag or sort ideas a different show categories (Comedy, Acrobatics, Magic, Grand Finale).
3. **Search & Filter:** Find a specific spark using keyword search and filtering by act type or date.
4. **Autosave:** Ideas are magically auto-saved so no spark is ever lost.

ADVANCED FEATURES

1. **Mind Map View:** Visualize how different sparks and tricks connect to form a complete, grand performance.
2. **AI Summarizer & Expander:** Use an AI Muse to:
 - o Summarize a jumble of notes into a structured routine.
 - o Expand a simple idea (e.g., "clown with a ladder") into a detailed scene description.
3. **Voice-to-Text Input:** Quickly capture ideas by speaking them aloud, perfect for when hands are busy juggling or rigging.
4. **Collaboration Mode:** Share a ledger with other performers to co-create and perfect an act in real-time.

DIFFICULTY: HARD



The Ringmaster's Roundtable

Uniting scouts, gazers, and planners for the tour.

Planning the grand tour for the Circus of Wonders relies on a council of experts: the Sky Gazer for weather, the Trailblazer for routes, and the Quarter-master for costs. But their advice is scattered, leading to caravans stuck in mud and shows opening to empty streets. Your mission, as the circus's Grand Orchestrator, is to unite them. You will build the "Ringmaster's Round Table," a digital platform where these expert agents can finally collaborate, combining their wisdom to forge the perfect tour plan.

BASIC FEATURES

1. Web-based Dashboard:
 - o A simple interface where users can input their destination and travel dates.
2. Single Agent Functionality:
 - o Weather Agent: Fetches weather forecast for the travel dates.
 - o Maps Agent: Shows travel routes (distance/time).
3. Trip Summary Card:
 - o Displays weather + route details in a neat card format.
4. Budget Estimator (Basic):
 - o Rough cost breakdown of travel (fuel, public transport, or flights).
5. Step-by-Step Guidance:
 - o Simple itinerary generation (e.g., Day 1: Travel, Day 2: Sightseeing).
 - o Explanations shown in easy language.

INTERMEDIATE FEATURES

1. Multi-Agent Orchestration:
 - o Weather Agent + Maps Agent + Events Agent work together.
 - o Example: “Plan my trip to Goa” → Suggests travel route, weather forecast, and local events.
2. Event Recommendations:
 - o Suggests concerts, festivals, or sports matches happening during the trip.
3. Smart Calendar Integration:
 - o Users can sync planned itinerary with Google Calendar.
 - o Automatic reminders for travel.
4. Comparison Mode:
 - o Compare multiple destinations (e.g., Goa vs. Pondicherry) based on weather, travel cost, and events.

ADVANCED FEATURES

1. Full Multi-Agent MCP Platform:

- o Orchestrator coordinates Weather, Maps, Events, Budget, and Itinerary Agents seamlessly.
- o Agents communicate in standard MCP format for smooth integration.

2. Budget Optimizer:

- o AI suggests cheaper travel options (e.g., train vs. flight, hotel deals).

DIFFICULTY: HARD



Circus Dash: Street Rush

The bustling streets of the traveling circus are alive with chaos — unicycles wobbling, jugglers tossing fire, and stilt-walkers blocking alleys. Performers must race through this carnival mayhem, leaping across tightropes and darting past clown carts to prove who's the fastest under the neon lights. Your mission is to build the timing and ranking system that captures every dash, from solo showdowns to electrifying multiplayer street races. The winners' names will glow forever on the circus skyline.

BASIC (SOLO MODE) FEATURES

1. **The Dash Streets:** Game environment with circus-styled levels (tightrope walkways, clown alleys, juggling tunnels).
2. **Festival Map:** Menu designed as a circus fairground map, with each tent as a playable arena.
3. **Performer's Stopwatch:** Timer records how long each run takes.
4. **Big Top Billboard:** Displays the fastest completion times for every arena.
5. **Spotlight Moment:** When a challenger beats the old record, the new time replaces it with fireworks and confetti.

ADVANCED (MULTIPLAYER MODE) FEATURES

1. **Multiplayer Tent:** Menu option to enter a shared circus cityscape with live challengers.
2. **Graffiti Stage Tags:** Each performer's name floats above their avatar like circus graffiti.
3. **Live Parade Tracking:** Real-time display of completion times as challengers race through the streets.
4. **The Grand Billboard:** Post-race screen ranking all performers and declaring the champion.
5. **Victory Wall:** Persistent record of each performer's wins, acting as a bragging stage in the circus square.