

Game Manual / Product Requirements Document (PRD)

Game Title: Mermaid's Marina Delivery Dive

1. Overview

Game Concept

Mermaid's Marina Delivery Dive is a node-based route optimization puzzle game that merges fun underwater adventure with an intuitive way to teach the Traveling Salesperson Problem (TSP). Players control a mermaid who must collect and deliver treasures to her underwater kingdom, while planning the most energy-efficient path and avoiding sea hazards.

Genre: Puzzle / Educational

Target Audience: Casual gamers, students (8–18+), puzzle lovers

Platform: Web or mobile

Core Educational Goal: Teach route optimization (TSP) through engaging gameplay

2. Objectives

- Teach players to optimize routes using real-time feedback
 - Encourage strategic thinking with energy and hazard management
 - Provide a fun, magical underwater experience with progressive difficulty
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3. Game Mechanics

3.1 Map System (Node-Based Navigation)

- **Nodes** (Locations):
 - Surface Trading Post (Start location): Collect medicine and tools.
 - Sunken Ship: Collect jewels (high value, guarded by sharks).
 - Coral Reef: Gather rare plants (low risk, maze-like structure).





- Abandoned Cave: Retrieve ancient artifacts (dark, high energy).
- Home Cave: Final delivery point (route must end here).
- **Edges** (Paths with Attributes):
 - **Calm Currents:** Low energy cost, preferred routes.
 - **Strong Currents:** High energy cost, long detours.
 - **Predator Zones:** Triggers time penalties (shark animations).
 - **Kelp Forests:** Moderate energy usage, slows progress.

3.2 Player Interaction

- Drag-and-drop nodes to form a complete delivery route.
- Energy cost meter updates in real time.
- Animated hazards (e.g., dodging sharks) increase immersion.
- Undo/Reset route function available during planning.

3.3 Route Validation

System checks:

-  All required nodes are visited once
-  Route ends at Home Cave
-  Total energy and time calculated
-  Invalid route triggers animated feedback and message:
 - E.g., “The kingdom is still missing supplies!”

4. Game Flow

1. **Start Screen**
 - Title, play button, settings, tutorial option
2. **Tutorial (Optional)**

- Teaches TSP basics, drag mechanics, and hazards

3. Route Planning Phase

- Drag nodes in desired order
- View energy cost per path
- Hazards trigger animated previews (e.g., sharks slowing down)

4. Route Execution

- Mermaid follows the planned path
- Hazards and energy costs animate in real-time

5. End of Route

- System checks route validity
- Score calculated
- Feedback: animation, score, stars, unlockables

5. Scoring System

Criteria	Description
Energy Efficiency	Lower energy used = higher stars (1-3 stars)
Time Bonus	Fast completion = extra points
Completion Bonus	All nodes visited = base score reward

Unlockables

- New maps (e.g., Arctic Trench, Volcanic Vents)

- Mermaid customization items (tail colors, crowns, accessories)
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6. Visual & Audio Design

Graphics

- Cute, magical underwater aesthetic
- Color-coded paths for clarity:
 - Blue (Calm), Red (Shark zones), Green (Kelp Forest), Orange (Strong Currents)

Animations

- Mermaid swims path after confirmation
- Hazards trigger:
 - Shark dodge
 - Jellyfish zap
 - Crabs block path

Sound Effects

- Splashing, bubbling, ocean sounds
 - Unique SFX for treasures collected and hazards triggered
 - Rewarding chime on success
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7. User Experience (UX)

Player Needs

- Easy interaction (drag-and-drop)
- Clear visual feedback

- Replayable for better scores
- Guided tutorial for new players
- Ability to undo or reset path

Emotions to Target

- Excitement of discovery
- Satisfaction from solving puzzles
- Joy from customization and rewards

Frustration Points to Avoid

- Unclear scoring
 - Overwhelming complexity too early
 - No route guidance or error cues
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8. Development Notes

Core Features

- Node system with unique identifiers
- Energy cost calculation system
- Hazard triggers and animation system
- Route validation logic
- Scoring & reward mechanics
- Map progression & customization storage

Future Features

- Timed challenge mode
- Daily missions

- Leaderboards
- Cooperative mode (team route planning)

Sample Image generated from Chatgpt:

