Mermaid’s Marina Delivery Dive

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Overview:
TSP Underwater Adventure Dive into an oceanic world where a mermaid must collect treasures and deliver them to her underwater kingdom, optimizing her route to **save energy and avoid dangers**.

1. Node based

   Locations (Nodes):

   a. **Surface Trading Post:** Starting point. Collect goods (medicine, tools) to deliver underwater.
   b. **Sunken Ship:** Gather jewels (high value but guarded by sharks).
   c. **Coral Reef:** Collect rare plants (low risk, but maze-like paths).
   d. **Abandoned Cave:** Retrieve ancient artifacts (dark, high energy cost).
   e. **Home Cave:** Must return here to complete the mission.

   Paths (Edges with Costs):

   f. **Calm Currents:** Low energy cost (safe, direct routes).
   g. **Strong Currents:** High energy cost (requires detours).
   h. **Predator Zones:** Adds time cost (e.g., sharks force slower movement).
   i. **Kelp Forests:** Moderate energy cost (slows progress).

2. Route Planning

   Objective: Plan a loop starting and ending at the **Home Cave**, visiting all nodes once.

   Mechanics:

   a. Drag and drop nodes to plot the mermaid’s path on an interactive map.
   b. Each path shows the cost (energy bubbles consumed).
   c. **Hazards:** Selecting a shark-infested path triggers an animation (mermaid dodges, adding time).

3. Route Validation

Checks (the game itself will check):

a. All nodes visited? ✅
b. Ends at Home Cave? ✅
c. Total energy cost calculated.

Feedback:

d. Invalid route: Highlight missed nodes or incorrect endpoint with a warning (e.g., “The kingdom is still missing supplies!”).
e. Valid route: Play a celebration animation (mermaid rejoices, treasures sparkle).

4. Scoring System

Scoring:

a. **Energy Efficiency:** **Lower energy = higher score (3-star system)**.
b. **Time Bonus:** **Faster routes earn extra points**.

Unlockables:

c. New maps (e.g., Arctic Trench, Volcanic Vents).
d. Mermaid customization (scales, accessories) for beating optimal routes.

5. Core Feature

🗺️ **Node-based map**	Coral checkpoints (nodes) placed across the ocean
🧜‍♀️ **Player movement**	Mermaid moves from one node to another through coral bridges
💠 **Treasure delivery**	Some paths disappear after one use (forces smarter planning)

💦 **Energy meter**	Every move uses energy — optimized routes save it
🐙 **Obstacles**	Sea creatures like jellyfish or crabs block paths or create detours
🎨 **Customization**	Change mermaid's accessories (tail color, crown, etc.)
🔊 **Sound & FX**	Sea creatures like jellyfish or crabs block paths or create detours

Step 1: Empathize

Who is experiencing the problem?
Players who struggle to understand route optimisation concepts like TSP.

What are their needs and goals?
They want to enjoy a fun game while learning how to plan smart routes.

What challenges or frustrations do they face?
They get confused with too many paths while levels are going up, don't understand energy trade-offs, or choose inefficient routes.

What emotions are involved?
Excitement from gameplay, but frustration from repeated failure or unclear feedback.

What would success look like from their perspective?
Finishing the route with 3 stars, learning through play, and unlocking new customisations.

User Needs, Feelings, Frustrations, Observations:

- Need clear visual feedback and path guidance
- Want cute, magical graphics
- Frustrated if scoring feels unfair
- Observe that trial-and-error helps them learn

Step 2: Define

Problem Statement:
Players need an engaging and intuitive way to learn route optimisation because traditional methods are abstract and hard to grasp.

Step 3: Ideate

Ideas:

- Drag-and-drop node map for easy interaction
- Animated feedback for valid/invalid routes
- Unlockable accessories as rewards
- Colour-coded paths for energy cost
- Short tutorial mode to teach TSP basics
- Timed challenges for extra points

Step 4: Prototype

Chosen Idea: Node-based drag-and-drop route planning game with animated energy costs and scoring

Description:
Players start at the Home Cave, drag nodes to form a complete route (visiting each location), then return to the Home Cave. As they plan, energy bubbles update live. Shark paths trigger slowdown animations. At the end, they get feedback based on energy use and time taken.

Sample Image generated from Chatgpt:

Step 5: Test

Feedback from another group:

- Loved the sea-themed graphics and interactive map
- Suggested more hints for first-time players
- Asked for an undo button during planning

Responses:

- Will add beginner hints or a guided tutorial
- The undo feature is a great idea for usability
- More sound effects during route validation will improve feedback