CS5700 Project 2: Functional Programming - FishMiner

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1. Business Requirements – Package Managing System

The Fish Miner game is a React-based browser game where players use a moving fish net to catch falling items and earn points. The goal is to reach 100 points before the 60-second timer runs out. The fish net automatically moves left and right at the bottom of the screen, and players must time their catches by pressing the "Catch!" button to extend the net upward. Different items fall from the top of the screen: fish give positive points, garbage deducts points, and mystery boxes give a random score. Players must carefully choose when to catch items to maximize their score while avoiding penalties. The game features smooth animations, a score tracker, and timed gameplay to create an engaging experience.

- N**ouns-verb**s: Noun Verbs
- Target Audience
    - Casual Gamers: People who enjoy simple, fun, and engaging games that are easy to learn.
    - Students and young players: Kids and students looking for a fun animations and interactive game to play in their free time.
    - People who enjoy classic arcade games: People who are fans of retro style games like Gold Miner.
    - Functional Programming Enthusiasts: Developers or students interested in functional programming and react.
- Rules
    - The game should end when the player reaches the target score or the timer runs out.
    - The fish net should move left and right automatically across the bottom of the tank.
    - The net reverses direction when it reaches the edges of the tank.
    - Items fall from the top of the tank at random intervals.
    - Players click the "Catch!" button to extend the net upward.
    - Catching a fish increases the score by 20 to 60 points.
    - Catching garbage decreases the score by 30 to 50 points.
    - Catching a mystery box results in a random score change between -50 and +50 points.
    - If an item is within the net's catch area, it is caught, and the player's score is updated.
    - Caught items are removed from the game.

- A popup notification displays what was caught and the points earned or lost.
- A "Play Again" button appears at the end of the game.

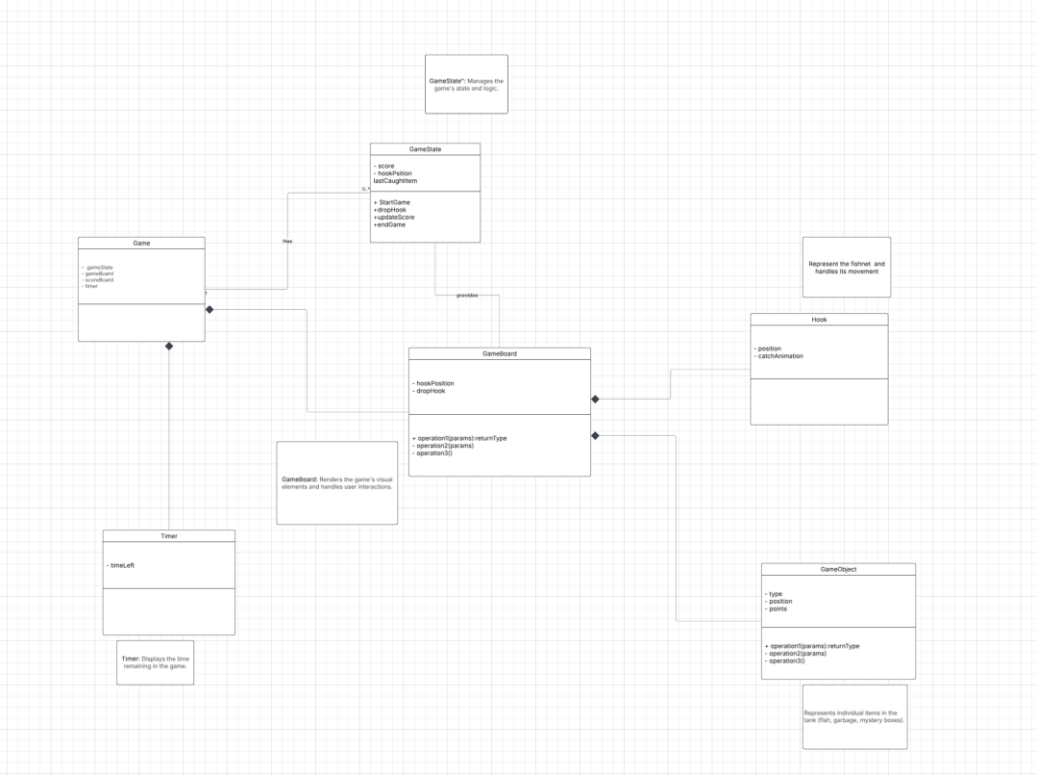
2. User Personas and User Stories for Fish Miner Game

- Two Key Dimensions:
  - Game Accessibility Dimension
    - Primary Focus: Ensuring the game is easy to understand and play for all users.
  - Player Engagement Dimension
    - Primary Focus: Keeping players motivated through challenges, scoring, and replayability.
- Persona 1: Alex (Casual Gamer)
  - Dimension: Game Accessibility
  - Age: 20
  - Background: A college student who enjoys playing simple, quick games during study breaks.
  - Scenario: Alex likes fun, engaging games but doesn't want anything too complex. He enjoys games that are easy to learn but still offer a bit of challenge.
  - Motivation: Wants a game that is simple to play, requires minimal effort to understand, and provides instant feedback on performance.
  - User Stories:
    - As a casual gamer, I want the fish net to move automatically so that I can focus on timing my catches instead of controlling movement. **(mockup 1)**
    - As a casual gamer, I want to see my score update immediately after catching an item so that I know my progress. **(mockup 2)**
    - As a casual gamer, I want visual feedback when I catch an item so that I can easily understand what I caught and how many points I gained or lost. **(mockup 3)**

- Persona 2: Sarah (Competitive Player)
  - Dimension: Player Engagement
  - Age: 17
  - Background: A high school student who enjoys arcade-style games and loves challenging herself to beat high scores.
  - Scenario: Sarah enjoys games that require skill and precision. She wants a game where she can improve her performance over time and compete with herself by achieving higher scores.

- Motivation: Wants a game that is fast-paced, challenging, and allows her to track her progress so she can keep improving her score.
- User Stories:
  - As a competitive player, I want the game to get harder over time so that I feel challenged and stay engaged.
  - As a competitive player, I want to restart the game quickly after losing so that I can try again without waiting.
  - As a competitive player, I want to track my highest score so that I can compete against myself and improve over time.

3. Modules Diagram



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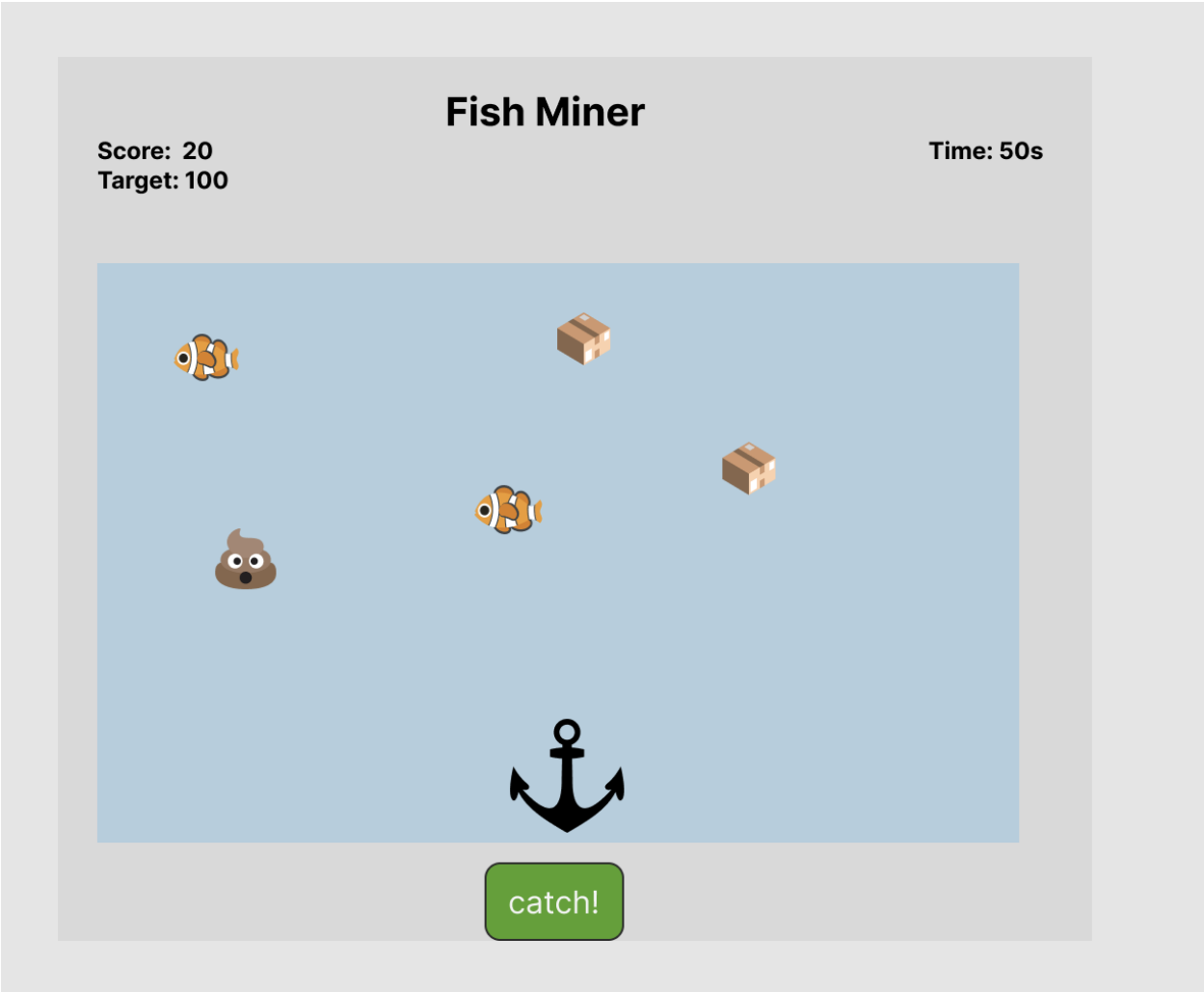
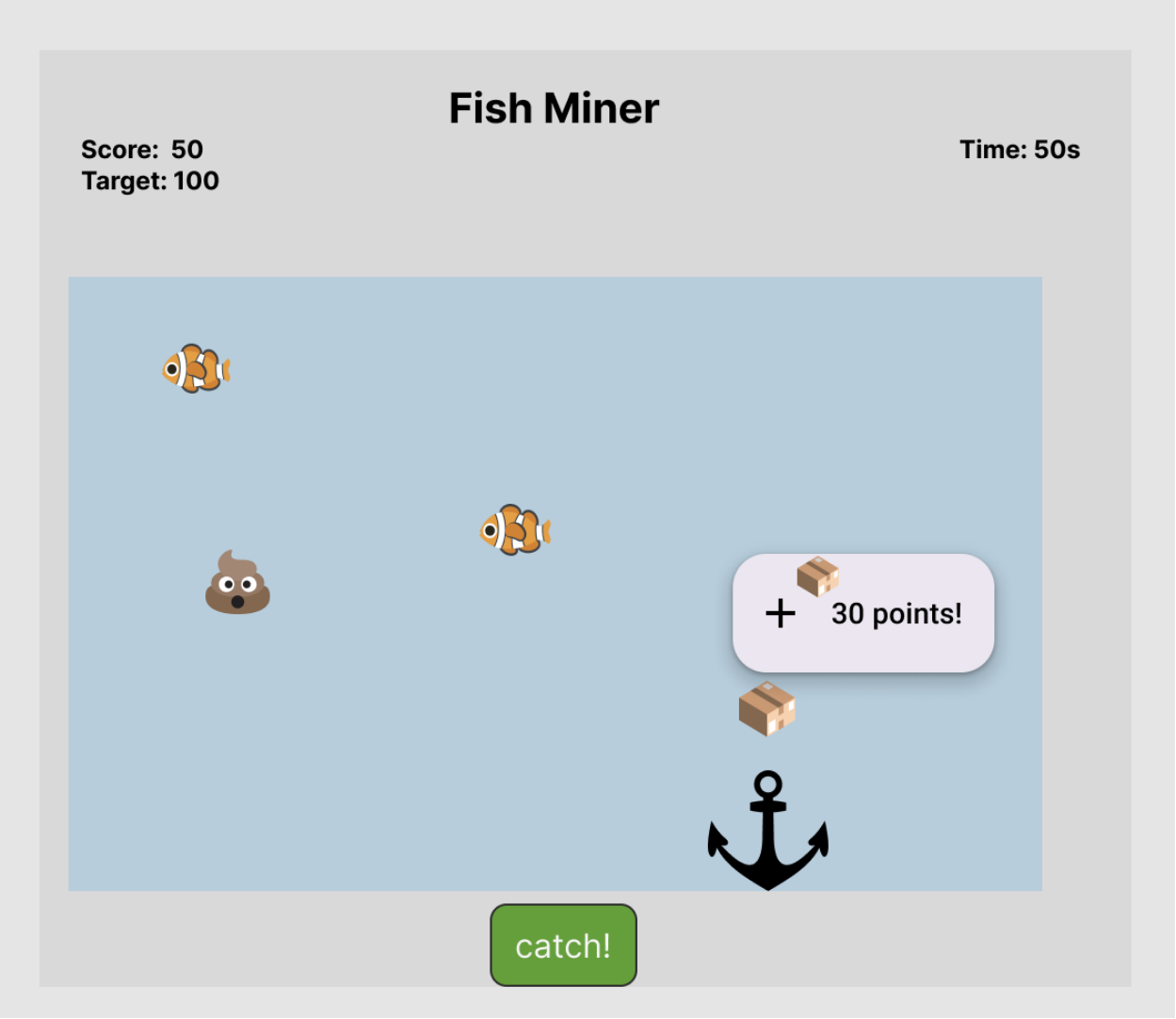
4. Interface low level mockups

- **Mockup 1**

- Mockup 2



- Mockup 3



5. Use of Generative AI in Development

- Purpose
    - Generative AI (ChatGPT 4.0) was consulted to enhance my understanding of functional programming and React in my Fish Miner Game
- Prompts and Responses
    - User Question: What are the dimensions I can use for this project?
    - AI Response: I suggested using two key dimensions:
      Game Accessibility Dimension – Ensuring the game is simple and easy to play.
      Player Engagement Dimension – Keeping players motivated through interactive elements like scoring, animations, and increasing difficulty.

    - User Question: How do I implement this game using React with Hooks?
    - AI Response: I provided a breakdown of how to structure the game using React functional components and hooks, including:
      Using useState for managing game state variables like score, time, and net position.
      Using useEffect to handle falling items, net movement, and timer countdown.
      Ensuring modularization, keeping each component focused on a single task, and avoiding unnecessary re-renders.

    - User Question: Instead of using a moving fishhook with a fishing line dropping from the top, how can I make this game easier?
    - AI Response: I suggested replacing the hook and line with a fish net emoji (🥏) at the bottom of the screen that moves automatically left and right.
      This simplifies: Game mechanics – Players only need to time their catches with a "Catch!" Button. Animations – Instead of handling complex physics for a swinging hook, the net extends straight up. User experience – The game remains fun and engaging while being easier to implement in React.