Bird Adventure - Mini-Game Documentation

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1. Which mini-game did you choose and why?

I chose the **Flappy Bird prototype** because it offers a solid foundation for physics-based gameplay. It allowed me to focus on refining the player experience through precise movement and a custom UI that adapts to different screen sizes.

2. What new creative feature did you add to the game?

The main creative addition is the **"Shrink Mechanic"**. Unlike the original game, the player can reduce the bird's size while flapping (Space bar). This adds a layer of strategy, as the player must time the size reduction to navigate through tighter gaps between obstacles.

3. Technical approach and architecture decisions

- **Physics-Based Movement:** Used Unity's Rigidbody2D for the bird's flap and gravity mechanics.
- **Responsive UI:** Implemented a flexible Canvas system using **Rect Transform Anchors** (Min 0,0 / Max 1,1) for the Game Over panel, ensuring it stretches to cover any resolution in WebGL.
- **Object Pooling (Implicit):** Obstacles are spawned and managed to maintain performance on web platforms.

4. Explanation of bonus feature implementation

- **Custom Cursor:** A custom hand-sprite was implemented as the default cursor. I adjusted the **Texture Type to Cursor** and downscaled it to 32px for better clarity and thematic consistency.
- **Score Integration:** A dynamic score system using **TextMeshPro** updates every time a pair of pipes is cleared.

5. Generative AI Tool Usage

I used **Generative AI (Gemini)** as a technical collaborator to:

- Debug UI alignment issues related to **Pivots and Anchors**.
- Optimize the Texture Import settings for the custom cursor.
- Help structure the documentation and refine the WebGL build workflow.

6. Challenges faced and solutions implemented

- **Challenge:** The Game Over panel was appearing outside the screen bounds or not stretching correctly.
- **Solution:** Corrected the **Pivots to (0.5, 0.5)** and reset **Pos X/Y** to zero after setting the Anchors to full stretch.

- **Challenge:** The custom cursor appeared too large in the browser.
- **Solution:** Modified the **Max Size** in the texture import settings to 32px.

7. What would you improve with more time

- Implement a **Global High Score** system using local storage.
- Add **Sound Effects (SFX)** for the flapping, shrinking, and game-over states.
- Create multiple **difficulty levels** where the pipe gaps are tinier.
- Responsiveness in fullscreen.