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| Game Design Document: Flappy Bird 2.0 |

# 1. Game Overview

* Title: Flappy Bird 2.0
* Genre: Hyper Casual
* Platform: PC
* Target Audience: casual players, ages 10+

# 2. Game Description

Flappy Bird 2.0 is a side-scrolling arcade game where the player taps to make a bird flap upward, avoiding pipes and collecting power-ups. Unlike the original, this version introduces character abilities, collectible items (like shields and stars), and dynamically changing pipe patterns to add challenge and variety.

The objective is to survive as long as possible and achieve the highest score.

# 3. Core Gameplay Mechanics

* Control:
  + Left click to make the bird flap upward
  + Gravity pulls the bird down automatically
* Goal:
  + Pass through as many pipes as possible
  + Collect stars to boost your score
  + Avoid hitting pipes or falling
* Scoring:
  + +1 for each pipe passed
  + +3 for each collected star
* Game Over Conditions:
  + Collided with a pipe
  + Ground collision

# 4. Power-ups and Abilities

* Power-ups Spawn Rate:
  + For each pipe that spawns, 20% to spawn a collectible with it
  + In that 20%:
    - Star: 70%
    - Shield: 30%
* Shield: Grants invincibility for up to 8 seconds or until the player collides with a pipe. Upon collision, the shield remains active for an additional 1 second before expiring, whichever condition occurs first.
* Star: give +3 bonus points when collected
* Abilities: Each bird possesses a unique ability with a 5-second cooldown that begins after the ability ends.
  + Red Bird: Slows down time for 8 seconds.
  + Blue Bird: Shrinks for 8 seconds.
  + Yellow Bird: Become intangible for 5 seconds (won’t be able to pick up power-ups).

# 5. Difficulty & Progression

* Difficulty Threshold: reach max difficulty after 2 minutes
* Pipe - 4 types:
  + Special – 1: Has 2 gaps instead of 1, 20% chance to spawn
  + Common – 3: The difference between them is how large the gaps are, with an 80% chance to spawn
* Pipe Spawn Y-Offset: Each pipe will have a different offset in the y-axis when spawned in

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|  | Start of the game | 2 minutes and onward |
| Pipe Spawn | Easy: 65%  Mid: 25%  Hard: 10% | Easy: 0%  Mid: 50%  Hard: 50% |
| Gravity | 80% | 120% |
| Fly Height | 1.2-unit height | 1.5-unit height |

# 6. User Interface (UI)

* Main Menu:
  + Start Game
    - Character selection
  + Exit Button
* In-Game UI:
  + Score Counter
    - Current Score: Top left
    - High Score: Top right
  + Pause Scene
* Game Over Scene:
  + Final Score: Top left
  + High Score: Top right
  + Retry
  + Back to Menu

# 7. Technical Details

* Engine: Unity
* Language: C#
* Physics: Unity Rigidbody2D, gravity, collider-based pipe detection
* Power-Up and Pipe Spawn Logic:
  + Object pooling for pipes and collectibles
  + Fixed timer for pipe spawning (1.75s)
* Platform Integration:
  + Keyboard/mouse for PC
  + Score saving (PlayerPrefs)