Fat Helicopter Tech Spec

Fat Helicopter Game Design

Overview

Fat Helicopter is a side-scrolling, infinite-level arcade game where players control a heavy, unwieldy helicopter. The game focuses on balancing fuel, health, and ammunition while navigating obstacles and fighting enemies to progress through an endless series of levels with increasing difficulty.

1. Project Choice

- **Option**: Web Game Design
- **Game Title**: “Fat Helicopter”

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2. Purpose of the Game

- **Goal**: Provide an engaging, skill-based arcade experience with a unique physics-based flight system. Players aim to survive as many levels as possible while competing on a global leaderboard.
- **Target Audience**:
  - **Age Group**: Ages 13 and up.
  - **Interests**: Casual gamers, fans of arcade and physics-based games.

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3. Design

▼ A. Functionality

Core Features

1. **Flight System**:
    - Pressing “W” applies an upward force on the helicopter, depleting fuel.
    - Players adjust the angle of ascent using “A” and “D” keys, altering the direction within a 0-180 degree range.
    - A 2D physics engine simulates realistic gravitational pull, velocity, and acceleration for an immersive flight experience.
2. **Health System**:
    - The helicopter’s health decreases if it collides with the ground at high speed or takes damage from enemy fire.
    - Health pickups appear throughout levels to replenish health.
3. **Fuel System**:
    - The helicopter consumes fuel when “W” is pressed.
    - Players can collect fuel pickups to keep the helicopter airborne.
4. **Weapons Mechanics**:
    - Aiming is controlled by the mouse, which directs the helicopter’s turret.
    - Firing depletes the ammunition gauge, which can be replenished through pickups.
5. **Failure Mechanics**:
    - The game ends if the health or fuel gauge is depleted.
    - A failure screen appears, giving players the option to view their score and return to the main menu.
6. **Leaderboard**:
    - After each game, players can submit their score to a global leaderboard stored in a Firestore database.
    - The leaderboard displays the highest scores and ranks players globally.
7. **Level Progression**:
    - Players progress by moving the helicopter from the left to the right of each level.

- Levels become progressively more challenging, adding complex obstacles and more aggressive enemies.

8. **Enemies**:
    - Anti-aircraft guns spawn in later levels, firing physics-based projectiles at the helicopter.
    - Players can defeat enemies by aiming and firing the turret to deplete enemy health.
9. **Loot System**:
    - Levels contain pickups for health, fuel, and ammunition.
    - Each pickup type replenishes the respective gauge, allowing players to continue their progress.

User Flow

1. **Start Screen**:
    - Options: Start Game, Leaderboard, Instructions, Settings.
    - **Instructions**: Brief tutorial covering flight controls, fuel management, health, and enemy combat.
2. **Gameplay**:
    - Players use keyboard and mouse controls to maneuver the helicopter, manage resources, and engage in combat.
    - Levels progress as the player reaches the right end of the screen; difficulty increases as new levels generate.
3. **Game Over Screen**:
    - Displays the final score and provides options to submit the score to the leaderboard or return to the start screen.

Mechanics

- **Flight Physics**: Pressing “W” applies force, counteracting gravity and altering flight trajectory based on angle.

- **Collision Detection**: The game monitors the helicopter's interactions with the ground, obstacles, and enemies.
- **Resource Management**: Players manage fuel, health, and ammunition, balancing usage to survive as long as possible.
- **Enemy Interaction**: Enemies attack with projectiles that can be evaded or destroyed, adding to the game's difficulty.

Interactive Elements

- **HUD (Heads-Up Display)**:
  - **Fuel Gauge**: Shows current fuel level.
  - **Health Bar**: Indicates remaining health.
  - **Ammunition Counter**: Displays remaining ammunition.
  - **Score Counter**: Updates in real-time based on level progression and enemy kills.
- **Buttons**: Accessible at the start and game over screens (Start, Submit Score, Settings).

▼ B. Aesthetics

Visual Style

- **Theme**: Retro-inspired arcade style with colorful, pixelated graphics for a nostalgic feel.
- **Imagery**:
  - **Helicopter**: A large, cartoonish helicopter with exaggerated proportions.
  - **Enemies**: Anti-aircraft guns with basic animations for shooting.
  - **Pickups**: Easily identifiable icons for health, fuel, and ammunition.

Color Scheme

- **Palette**: Bright, contrasting colors for pickups and UI elements.

- **Helicopter**: Bright colors with a metallic feel.
- **Enemies**: Darker, aggressive tones.
- **Pickups**: Vivid red (health), blue (fuel), and green (ammunition).

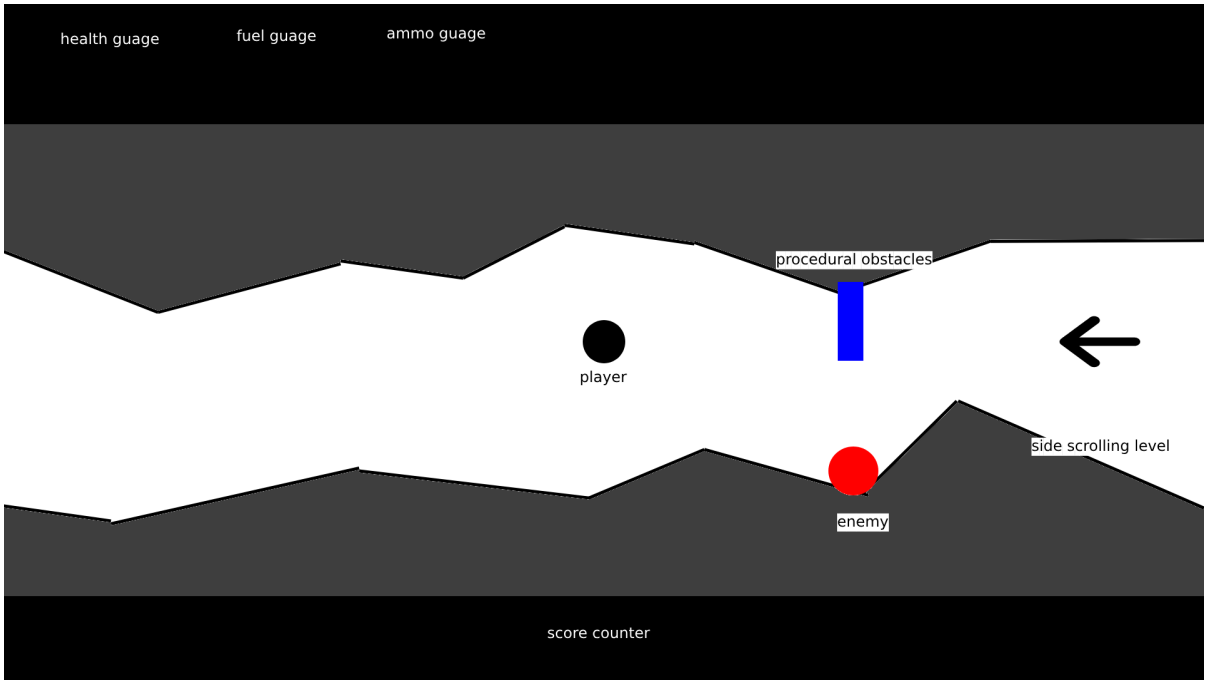
Typography

- **Font Style**: Arcade-inspired, bold font for UI text.
- **Readability**: High contrast for clarity against dynamic backgrounds.

Layout

- **Screen Arrangement**:
  - **Game Area**: Centralized for easy viewing.
  - **HUD**: Top corners for fuel, health, and ammunition; center-bottom for score.

Wireframe



Mockup

Technical Specifications

1. Technology Stack

- **Programming Language**: JavaScript
- **Frontend:** HTML5 and CSS3
- **Backend**: Firebase (for persistent leaderboard)

3. Data Model

- **Levels**: Procedurally generated with varying obstacle patterns.
- **Leaderboard**: Stores player names and scores in Firestore, sorted by score.

5. Specific Functionalities

a. Flight System and Physics

- **Specification**: Use Matter.js to implement realistic helicopter movement, gravity, and adjustable flight angles.

b. Resource Management

- **Specification**: Update HUD dynamically to reflect fuel, health, and ammunition levels; set limits for each gauge.

c. Enemy Behavior and Combat

- **Specification**: Enemies aim based on player's position, with projectiles following a physics-based trajectory.

d. Scoring and Leaderboard

- **Specification**: Track score in real-time; upon game end, send score to Firebase and update leaderboard.

e. User Interface

- **Specification**: HTML5/CSS3 for UI design; responsive layout for different screen sizes and device orientations.

f. Procedural Level Generation

- **Specification**: Randomize obstacles, enemies, and pickups to increase difficulty with progression.