Design Document

Mobile Applications Development 2

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Table of Contents

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Introduction

I'll be describing how to make a thrilling 2D vertical scrolling space shooter in this design document. With each level, I want to create a more difficult version of the original arcade gameplay. As they pilot their sleek spacecraft through stunning stars and planets and engage in intense dogfights with enemy starships, players will be thrown into the vastness of space. My objective is to create a fast-paced and challenging gameplay experience that keeps players on the edge of their seats while offering a sense of progression and satisfaction. I used unity tools to the best of my ability to bring together sounds, spirits, fonts, scripts, and prefabs to create an exciting gameplay experience. Throughout this document, we will delve into the core components that make up my space shooter game.

Space Shooters history

Shoot'em ups were one of the most common genres of the years in the 80's. While they are mostly built on the simple premise of "shooting the enemies on the screen" this genre also has many sub-genres. As you all know the oldest ancestor of this genre is the 1978 arcade game Space Invaders. Along with Pac-Man these two are the biggest icons of arcade gaming. This is to say that these are games where you stay on a non-moving screen and shoot enemies while mostly moving along a single axis.

Space Invaders, arcade game created by Japanese engineer and game designer Nishikado Tomohiro in 1978 and produced by Japanese electronic game manufacturer Taito Corp. Space Invaders is a very simple game by modern standards, but it was a technological marvel in its time. Typical levels consist of a player piloting a laser cannon to battle columns of descending aliens while using shields to block alien fire. Space Invaders was a worldwide success and paved the way for a generation of shooting games.

Shoot 'em ups are a subgenre of action game. These games are usually viewed from a top-down or side-view perspective, and players must use ranged weapons to act at a distance. The player's avatar is typically a vehicle or spacecraft under constant attack. Thus, the player's goal is to shoot as quickly as possible at anything that moves. In some games, the player's character can withstand some damage, or a single hit will result in their destruction. The main skills required in shoot 'em ups are fast reactions and memorising enemy attack patterns. Some games feature overwhelming numbers of enemy projectiles, and the player must memorise their patterns to survive.

Game Formats

The Unity 2D Vertical Scrolling Space Shooter will follow a classic arcade-style format with an engaging and thrilling gaming experience. Players will control a spacecraft as they traverse vertically through a scrolling space environment and facing waves of enemies. Let's explore the key elements of the game format:

Key Elements

A sleek and individualized spacecraft will be under the player's control. Within the confines of the game, the spacecraft is capable of vertical and horizontal movement. Players will also have attributes, such as speed, health, and gun lasers. The game will feature three levels, each taking place in a vertically scrolling space environment. As the player advances, the enemies increase, adding to the challenge. The level design will include diverse and visually appealing backgrounds, giving players a sense of progression through different cosmic regions. Various enemy units, such as enemy spacecraft and drones will appear during the levels. Players will have to try to avoid the enemies' frenzied attacks as they fire bullets at them.

Throughout the game, players will encounter a power-up that grant temporary boosts to their spaceship speed. A health bar will be present on the player's spacecraft, and hitting an enemy or an enemy projectile will reduce the health. Players will have a limited number of lives. If their health reaches zero, the game over title will appear. The game's UI will display key details, such as the player's health, score, and number of lives. The main menu will offer options to start a new game, the end menu lets you quit the game and play button in the levels to allow you to play the level.

Start Menu

The start menu serves as the gateway to the thrilling cosmic adventure that awaits players in the Unity 2D Vertical Scrolling Space Shooter. Designed with user-friendliness and visual appeal in mind, the main menu allows players to navigate the game seamlessly.

Key Components

The title and logo of the game, which have been artistically created to reflect the space shooter theme, will be displayed prominently on the start menu. Players will get a sense of the game's style and mood from the logo. The central and most prominent option in the main menu will be the "Start" button. When clicked, this will initiate a new game, taking the player to the first level.
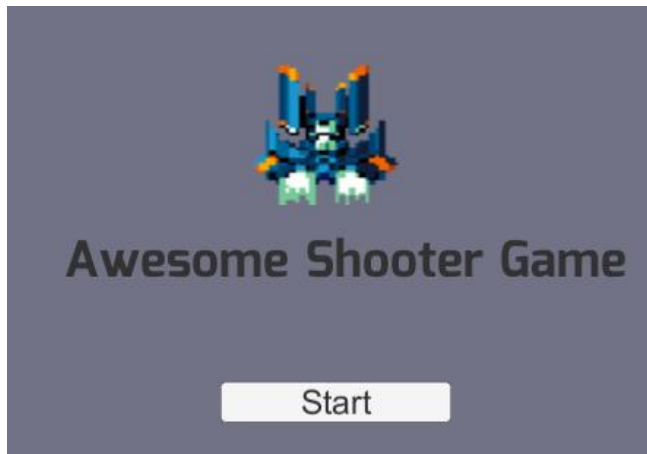
- Start menu.

Play Buttons

The "Play" button serves as the gateway to the thrilling gameplay experience. By clicking the "Play" button, players embark on a heroic quest, and begin the game levels
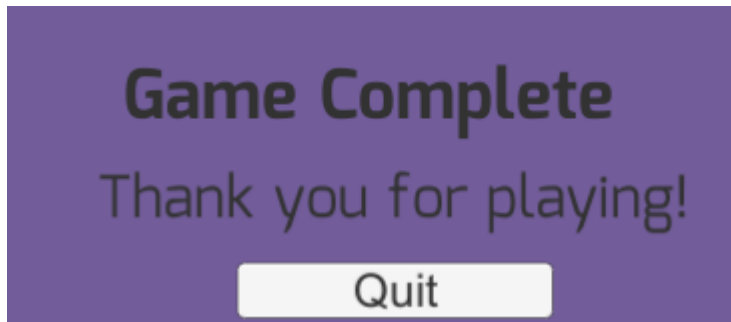

- Play Button

Exit Menu

The Unity 2D Vertical Scrolling Space Shooter's exit menu serves as the last interface before the game gracefully comes to an end for a player. Simple and effective design principles were used.

The most noticeable and prominent option in the exit menu is the "Quit" button. When selected, this option will exit the game entirely.


-    Exit Menu

Control Mechanism

The player will control their movement using the WASD keys or the arrow keys on the keyboard. I found this is the movement common keyset as it's the most functional hand placements. I decided that the fire action will be mapped to the space bar.

Controls for Player

• W or Up Arrow- Move UP

• A or Left Arrow- Move LEFT

 • S or Down Arrow - Move DOWN

• D or Right Arrow - Move RIGHT

 • SPACEBAR- Shoot
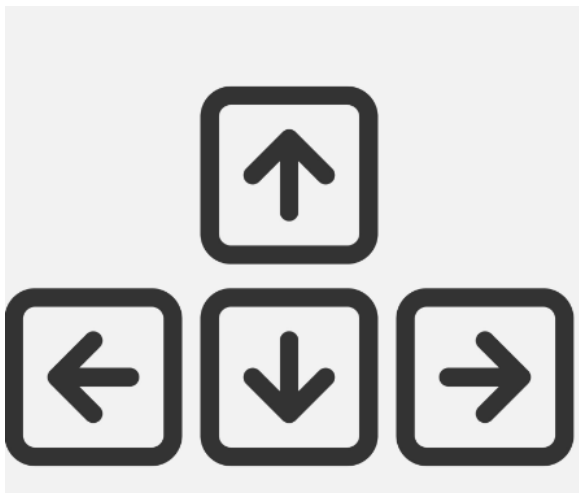
As the game starts, the player's spaceship will be positioned at the bottom of the screen, and the game world will scroll, revealing enemies as the player progresses through the levels.

The player's spaceship will be at the middle of the screen because the game has a vertical scrolling layout, and the game world will scroll upward as the player advances through the level, revealing new difficulties, enemies, and obstacles.
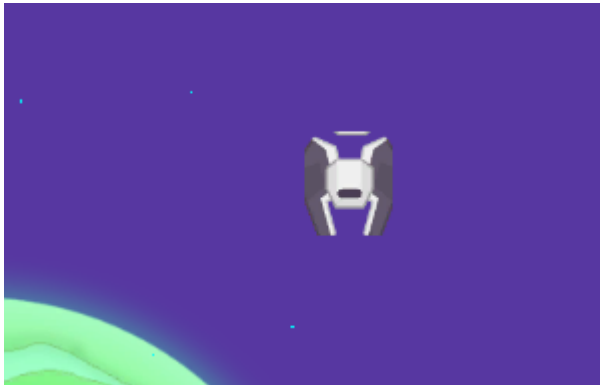

- Player Ship

Enemies

The enemies play a pivotal role in providing challenges and excitement throughout the game. There are two adversaries that will vary in appearance, behaviours, and attack patterns, presenting players with a diverse array of threats as they journey through the cosmos.

Enemy Spaceship

- Enemy ship 1

- Enemy ship 2

These enemy spaceships, which are the most prevalent type of foe, will come in a variety of sizes and shapes and have unique attack patterns. The enemy 1 fires a single bullet, and enemy 2 will fire two. I wrote a C# script that will deplete the player lives when the colliding with the enemy and its bullets.

Temporary Power-Up: Speed Boost

The Speed Boost power-up is a thrilling addition to the game. The Speed Boost is designed to provide players with a burst of speed and agility, enhancing their spaceship's mobility for a limited time. When players pick up this power-up during gameplay, they will experience an exhilarating surge in speed and manoeuvrability, allowing them to outmanoeuvre enemies and seize tactical advantages.
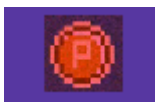
- Power UP

Score and Health

A player's performance and achievements during the game are evaluated by their score. The score is a crucial aspect of game play that encourages players to engage and vanquish enemies. Player advances to the following level until they finish the game once they reach 5500 points.

The player's spaceship will have a health bar displayed on the screen, indicating its current health status. Players will have three lives. When the spaceship collides with enemies and enemy projectiles, its health is reduced.

-   Score and Lives

Levels

Three levels must be completed to complete the game.

Level 1

Level one is an introductory level to the game. This is to give the player a taste of how the gameplay and mechanic's work. I want this level not to be that challenging so the player can get familiar with the controls and discover how to shoot and kill enemies. It will only be one enemy attacking the player. The player must kill enemies to earn 5500 points to advance to level 2. The player can use a power up to accelerate. The background is dark blue for the first level.

Level 2

In level 2 I'll be upping the difficulty by having two enemy spaceships attacking the player ship. The player will have to work harder to dodge the enemy projectiles. The pace of the game will feel much faster than level 1. This will create a different experience for the player. The player will feel the uniqueness of level 2. I plan to design the level in such a way that the player will have to use all the knowledge they gained in the level 1 for them to beat level 2. The background I chose is purple.

Level 3

This will be the hardest level. The enemies have an extra slot for spawning. I did another C# script for a third slot for the enemy spawning. This allowed me to create a greater challenge for the players. The players will feel the intensity of the level 3. The player will have to adapt to the hard intensity of level 3 to win the game.
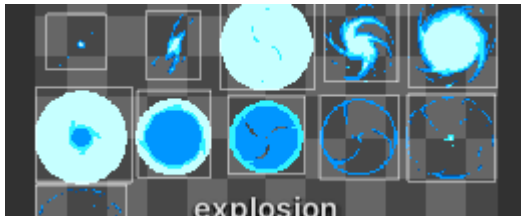
Soundtrack

The free audio for my game was found at https://www.youtube.com/watch?v=me4fLBN3_0U&t=199s and I planned to use this music for the background, player shooting and the explosion animation. I found a theme which is arcade sounding for my background music. The laser shooting sound was very fitting for the game. The explosion sound was great for the effects.

Animation

Animation offers life and dynamism to the game's characters and events. The enemy spaceship and units will be animated to convey movement and attacking behaviours. I also plan for the player's spaceship to be animated to show movement. The explosion animation might have particle effects, debris, or shockwaves, providing a satisfying visual and auditory spectacle upon impact. I will create C# script for the movement of stars and planets in background. These movements will create a scrolling effect for the game.

- Explosion animation

- Player animation

- Enemy animation

Tutorials

I followed a tutorial at
https://www.youtube.com/watch?v=Rxv5muAukhs&list=PLRN2Qvxmju0Mf1GB1hXsT-x1GQJQ0pwE0, to create an arcade style space shooter game. I was able create the player, enemy, and explosion animations. I set up the player and enemy movement, sounds, spaceship bullets. I also set up the score, health, levels and game scrolling thanks to this helpful tutorial.

References

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Tutorials

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https://www.youtube.com/watch?v=Rxv5muAukhs&list=PLRN2Qvxmju0Mf1GB1hXsT-x1GQJQ0pwE0, to create an arcade style space shooter game. I was able create the player, enemy, and explosion animations. I set up the player and enemy movement, sounds, spaceship bullets. I also set up the score, health, levels and game scrolling thanks to this helpful tutorial.