

Final Game Design Document

Rayan Afsar, Maddox Pealock, Oliver Kuehl

Schepens 1st Game Dev

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Game Summary

The Mission to the Moon game is based off the classic arcade game Lunar Lander, in which the player tries to land a lander/ship onto the moon on specific spots successfully as well as destroy as many asteroids as possible in the bonus level. The player must be careful to not land the lander too fast or risk a collision that will destroy it.



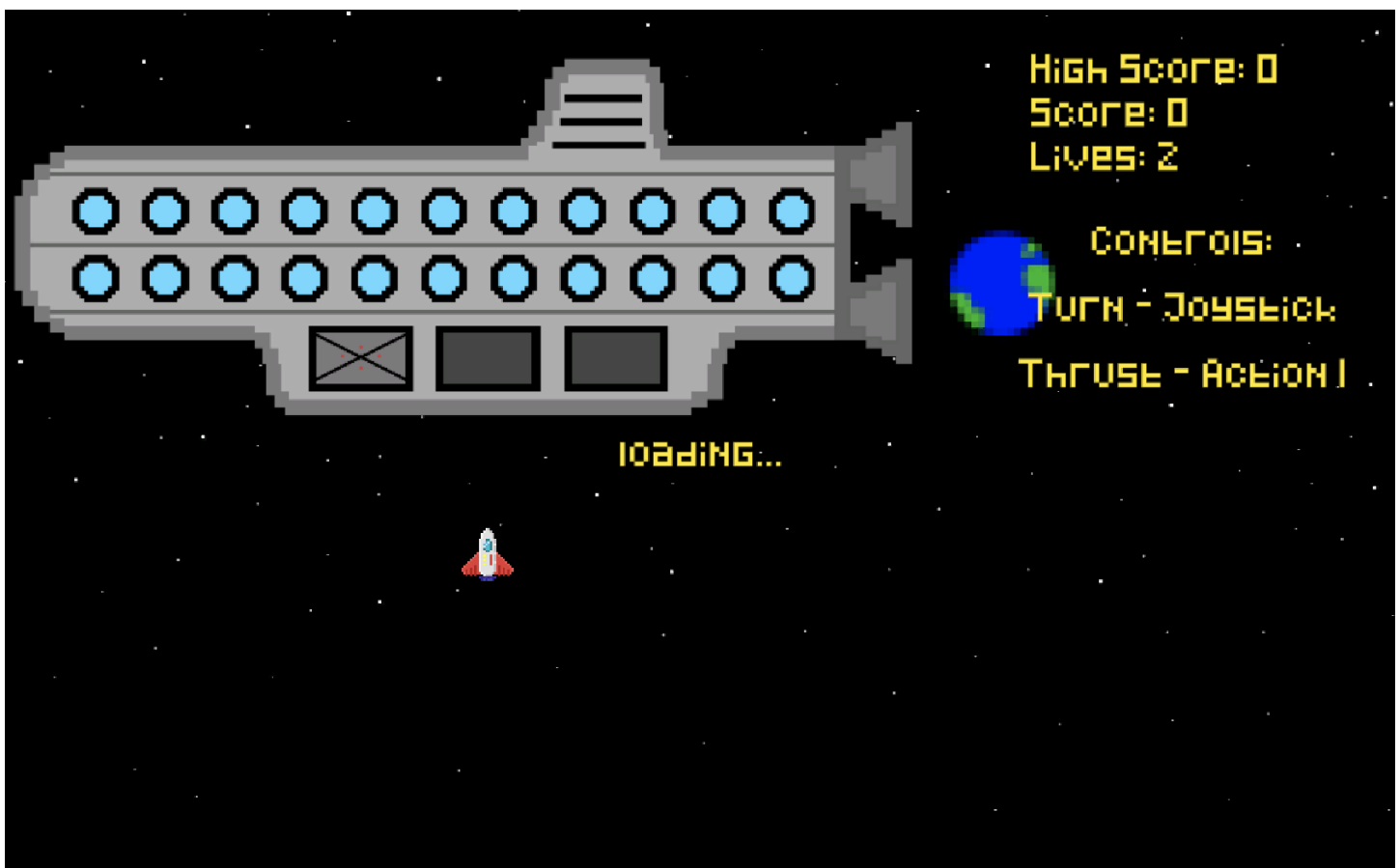
Aesthetics

Genre

The game is a 2D single player strategy arcade game where the player's goal is to score the highest possible by landing as many landers as they can, as well as destroying the most asteroids in the bonus level.


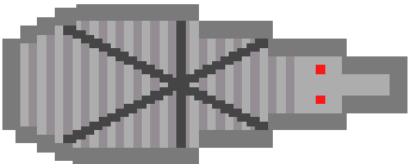
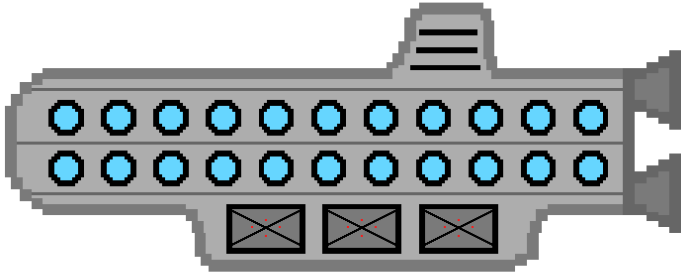
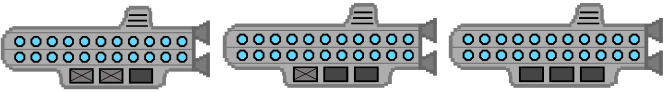
Theme

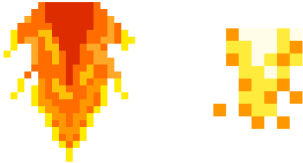
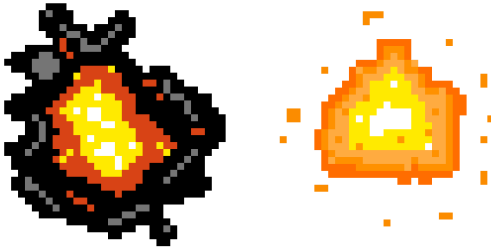
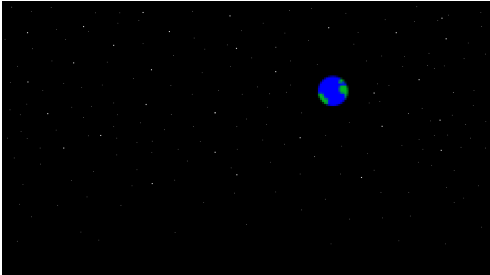

The theme of this game is styled after old arcade games and the original Lunar Lander game it was based off of, with lots of fun new art and sound effects! This gives the game overall a lighter and more fun tone.



Visual Design

The visual aesthetics of the game are colorful and pixelated. Much of the scene is dark, due to being in space, but the bits that move and do are packed with well designed and colorful sprites. Visuals were also added in order to give the player as much feedback as possible, such as the rocket showing a thruster sprite when force is being applied, or laser sprites being used to show the player that they are actively firing. This in addition to audio feedback gives the player a good sense of what they are doing. Classic 8 bit fonts were also used in all of the UI in order to complement the art style of the rest of the game.

| | |
|---|--|
|  | <p>The asteroid sprite that was used inside of the bonus scene.</p> |
|  | <p>The cannon sprite that was used inside of the bonus scene.</p> |
|  | <p>The mothership shown in the intermediate scene. A door opens and lets a lander out depending on the amount of lives left.</p> |
|  | <p>These are alternate forms of the mothership with different doors open and closed to represent how many lives the player has left.</p> |

| | |
|---|--|
|  | <p>The lander that the player has to control and successfully get to land in the main level. This asset is also used in the intermediate level.</p> |
|  | <p>The flame sprites are shown when the player tries to use the thruster. The two sprites alternate to give an animated look.</p> |
|  | <p>The explosion sprites are shown when the lander or an asteroid are destroyed. The two sprites alternate to give an animated look.</p> |
|  | <p>The background is present throughout the game. It is meant to resemble the famous Apollo 8 photograph <i>Earthrise</i>. The white pixels are stars which add to the spacey look, and the bright blue and green of the Earth provide stark contrast with the rest of the game.</p> |
|  | <p>The level sprite is used as terrain, with many ridges and valleys. There are four different flat areas which are potential landing sites (the game will choose the actual landing site for each attempt). Muted gray just like the actual moon.</p> |

Sound Design

Sounds were taken based off of old 8-bit arcade games in order to give the game an authentic feel. For example, the explosion sound is not that of what would be a typical explosion, but it resembles . Sounds were added in as many places in order to give the player as much feedback as possible. For example, sounds are played when the player makes a menu selection choice, when the player uses

the thruster on the rocket, and when lasers are fired in order to give the player audio confirmation that they have taken an action. This in combination with visual feedback added gives the player a good feel of what they are doing.

| | |
|--------------------------|--|
| Select Sound | The select sound is played whenever a user makes a selection on the main menu in order to give them audio feedback that their selection was successful. |
| Explosion Sound | The explosion sound is played whenever the lander crashes during an unsuccessful rocket landing, showing that the player has failed. |
| Thruster Sound | The thruster sound is played whenever the player presses the space button in order to get the rocket moving in any direction. |
| Laser Sound | The laser sound is played whenever the space button is pressed in the bonus scene, showing that the laser was fired from the cannon. |
| Success Sound | The success sound is played whenever the player lands successfully. |
| Fail Sound | The failure sound is played whenever the player crashes their lander rather than landing successfully. |
| Asteroid Explosion Sound | The asteroid explosion sound is played whenever a laser comes into contact with an asteroid. |
| Asteroid Flying Sound | The asteroid flying sound is played whenever an asteroid spawns and flies across the screen. This is to alert the player that they should be looking to aim their cannon in the bonus scene. |

Gameplay

Goal

The goal of the game is for the player to get the highest score possible. They can do this in two different ways:

- Landing during the multiple landing sequences
- Destroying asteroids

Each of the three landing sequences grants 1000 points if done successfully, and each asteroid destroyed grants 100 points. The player can hit each of the landings successfully, allowing them to earn a total above 3000 points. If their score is high enough, they can set a high score as well.

Mechanics

There are various mechanics within each of the levels within the game:

- Main Level
 - The gravity of space pulls the lander down
 - Essentially just uses a Rigidbody2D with a really scaled down gravity
 - The lander can move against gravity with its thruster
 - Adds force in the direction it is facing
 - The lander can turn to steer, allowing it to move around the scene
 - Adds Torque Force either left or right
 - The camera zooms in on the lander depending on its height
 - This is done by lerping at various speeds and zooms
 - It knows when to lerp since it is triggered by the height (y)
 - The landing zone in the level is randomly determined
 - A random value is generated, and depending on what it is, a corresponding landing zone is chosen
 - The lander can land successfully if on a marked landing pad and below safety speed
 - When the lander comes into contact with something, it checks that it is right side up, that the item it collided with is a landing zone, and that it was at a "safe" speed that would not destroy it
 - If these specifications are not met, the lander will crash

- The lander can crash if not on a marked landing pad and if it is above the safe landing speed
 - If all of the above conditions are not met, the lander will trigger a crash function that ends the level and takes away a life
- Points will be added depending on whether the player lands successfully
 - If the landing function is called, points are added to the PlayerPrefs
 - If the crash function is called, points are not added to the PlayerPrefs

- Bonus

- The asteroids in the scene are randomly spawned and move to a random position
 - Random values are assigned to determine if the asteroid spawns on the left or right side, as well as the starting height
 - The asteroid's end position is automatically on the opposite side it started on, and random values are assigned to determine the asteroids finishing height
 - The asteroid changes its position at a random speed
- The player can steer a cannon
 - The cannon is rotated based on the key pressed at a set speed
- The player can fire a laser from the canon
 - If the fire button is pressed, a laser is instantiated
 - The laser automatically moves in the direction it is facing at a set speed
- The laser firing has a cooldown of one second to prevent spam
 - A coroutine is called that lasts a second, and simply turns off and on the cannon's ability to fire before and after that second passes
- The asteroids explode and give the player bonus points if the laser hits it
 - When the laser's collider is triggered, it calls a function on the asteroid and destroys itself (the laser)
 - The asteroid spawns an explosion, plays a sound, adds points, and destroys itself

- Scoring

- Score is saved using PlayerPrefs during each landing
 - Whenever the player completes a landing during the main level, their current score is changed.
- Score is saved using PlayerPrefs during the bonus level
 - Whenever the player destroys an asteroid on the bonus level, their current score is updated.

- High score is updated depending on if the current score is higher than the previous high score
 - Whenever the current score is updated, it is compared with the high score to see if it is bigger
 - If it is bigger, then the high score gets updated in PlayerPrefs and the player display
- High score and current score is kept track of using PlayerPrefs and displayed to the player
 - At the beginning of each level, PlayerPrefs uses GetInt to grab the scores and display them as text on the HUD.

Players

This game is single player, but gives the players an opportunity to set a high score. This encourages different people to play, trying to beat each other's previous scores.

Hazards

The primary level has two main hazards:

- The lander can hit the ground too hard (velocity is too high)
- The lander can hit a non-landing zone spot (hits the terrain collider which is tagged "Ground")

The bonus level has no hazards, as it is meant simply as a chance to give the player some extra points.

References

Technical References

2D Movement in Unity (Tutorial) - <https://www.youtube.com/watch?v=dwcT-Dch0bA>

Arcade Game: Lunar Lander (1979 Atari) - <https://www.youtube.com/watch?v=McAhSoAEbhM>

Unity Documentation - <https://docs.unity3d.com/Manual/index.html>

Unity Lerp - <https://www.youtube.com/watch?v=DI9iQ8UBi-g>

External Assets

All sprites used in the game, with the exception of the ones mentioned below, were made by us using Adobe Photoshop or Pixilart.com. The laser sprite is from a default sprite in Unity.

Font used in-game: Pixelated by OmegaPC777 - <https://www.dafont.com/pixeled.font>

All sounds taken from Zapsplat.com, license is free with attribution.

| Sound usage | URL Source |
|-----------------|---|
| Select sound | https://www.zapsplat.com/music/game-tone-sci-fi-button-select-or-menu-sound-1/ |
| Explosion | https://www.zapsplat.com/music/8bit-medium-explosion-bomb-boom-or-blast-cannon-retro-old-school-classic-cartoon/ |
| Thrust | https://www.zapsplat.com/music/loop-rockets-of-a-space-shuttle-on-full-power/ |
| Laser | https://www.zapsplat.com/music/game-laser-weapon-shoot-3/ |
| Landing success | https://www.zapsplat.com/music/game-sound-retro-synth-fat-warm-success-positive-tone-1/ |
| Landing fail | https://www.zapsplat.com/music/retro-game-tone-digital-synth-fifths-negative-fail-lose-2/ |
| Asteroid boom | https://www.zapsplat.com/music/8bit-explosion-bomb-boom-or-blast-cannon-retro-old-school-classic-cartoon/ |
| Asteroid fly | https://www.zapsplat.com/music/comet-asteroid-space-rock-or-small-planet-pass-by/ |