159261 Assignment 2

Fynn Rollinson, Any Kwok, Greshka Lao, Nathan Ploos Van Amstel

OVERALL CONCEPT

While attempting to travel through the whole Solar System, an astronaut has crashed into a planet and is forced to stopover there, as she cannot refuel to fly. The aim of this game is to gather enough resources (fuel bottles) by successfully completing mini-games and avoiding obstacles. If the player does not complete all the mini-games - and, consequently, does not gather enough fuel - the player must replay the level in order to progress through the game. Unfortunately, the astronaut crashes at every planet, so each level represents a different planet in the Solar System and gets increasingly harder to pass.

DESIGN DECISIONS

In the early stages of planning, we were going to create short levels as our demo that will showcase different aspects of a platform game - for example, one level is purely puzzle-based while another is purely combat-based - but, because of the lack of time, we had decided to create one long and complex level as our demo which will showcase both of these aspects. However, we couldn't fit time to implement an animate opponent (eg. aliens), so we had replaced that concept with obstacles to dodge - flying lava balls. If we were to create multiple levels for our demo, we were planning on changing the gravity constant according to the current level/planet.

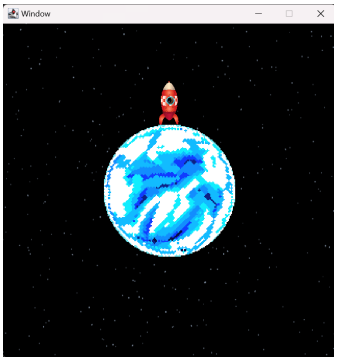
Visually-wise, we have decided to use a panning layout - when the astronaut moves to the edge of the screen, the "camera" follows the astronaut and so the layout pans. Everything in the main game is drawn with a camera offset which updated by the horizontal position(x) of Astronaut. It ensures that the camera follows the astronaut within the defined boundaries and provides a smooth transition when the astronaut moves beyond the window width.

To provide more flexibility, the game level is drawn based on the level map (level.png). Objects such as level elements, mini-game objects, and endgame objects are drawn based on the red RGB value of the corresponding positions in the level map. Additionally, "hitbox" Rectangle objects are drawn to facilitate collision detection.

For collision detection, initially, we drew a hitbox around the astronaut's body. However, since it didn't work as expected, we made the decision to draw mini-hitboxes on all sides to improve collision detection. In doing this, we achieved to make the reaction of the astronaut's collision depend on what side of the collision occurs. Collision from the top (the astronaut's head) causes the astronaut to bounce back to towards the ground with the same vertical speed - inversed velocity. Collision from the sides - left and right - causes the astronaut to stop moving. Collisions from the bottom causes the astronaut to land.

Initially, we had intended to gather all our sprites from one source, due to time, we have obtained our sprites from different sources. The astronaut sprites were created by Greshka's brother while the platform and fuel

sprites were obtained from the internet. There was a series of sprites for the astronaut's jumping animation. However, due to lack of time, not all of those sprites were used, resulting in a single sprite for when the astronaut jumps.



Initially, we had intended to create an animated "level completed" screen of the spaceship flying off the planet. However, due to the lack of time, we were unable to successfully animate it and implement it to the main program.
*(**Right:** A concept of the Level Completed screen.)*

The first mini game was made to be an aim based game where you have to click the green circles in time before they turn red. A set back that came to our attention was that each mini game utilizes a different game loop and are separate objects from the main game. Therefore notifying the main game when these mini games were complete was an issue. The solution to this problem was creating a mini-game listener interface that essentially acted as the "middle man" between the mini games and the main game, allowing them to communicate.

The second minigame was made to be a simple game to test the reaction time of the user where the user has to spot the needle in the correct spot while it spins around the circle, each one gets faster. All the art for the second minigame was created using Fynn's pixel art. A setback that required extra time was getting the needle to spin correctly inside the circle, however eventually was able to get it to correctly spin in the symmetrical way.

FEATURES OF THE GAME

Main Platform Game:

Controls: Left and right key to move the astronaut side to side. Down key to increase vertical velocity for landing. Spacebar to jump. Escape key for the pause menu.

Rules:

- From the ground, the player is only restricted to two jumps. This resets when the astronaut lands back on the surface.
- Player must obtain all fuel tanks (which can be obtained by completing each mini-game) to complete the game.
- Player starts with five lives and will lose a life per collision of the moving lava.
- Game will end if player falls into the undergroundlava or player's life count falls to zero.

Mini Game 1 - Reaction Game:

Controls: Use the mouse pointer to click expanding circles.

Objective: Click 15 circles before one turns red (which happens when the player takes too long) to complete the mini-game.

Mini Game 2 - Time-based Game:

Controls: Use the spacebar to align the rotating bar in the circles (with varying speeds) to the red wires. These circles must be aligned in number order (from 1 to 3).

Objective: Align all three to complete the mini-game.

ROLES FROM EACH MEMBER

Any:

- Layout, Damage objects and End game objects implementation
- Camera implementation
- Game Complete screen, Instruction and Fuels count dialogue implement
- Programmed collision system for astronaut and other objects with Greshka (Hitboxes implementation)
- Overall merging, testing and debugging code of the main game
- Coordinate with team members to ensure that each member's tasks are in progress and can be completed on schedule. Offer assistance and support to team members if needed.
- Presentation preparation, video recording

Fynn:

- Second mini game
- Added the timer
- Added the Hearts, including losing hearts and game over once all hearts where gone.
- Merging code to the main game
- Recordings

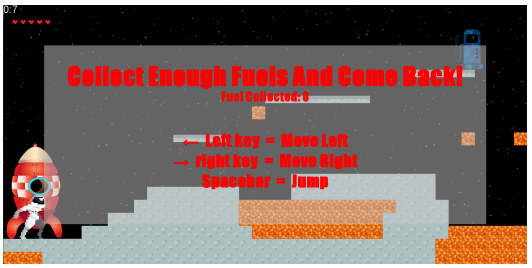
Greshka:

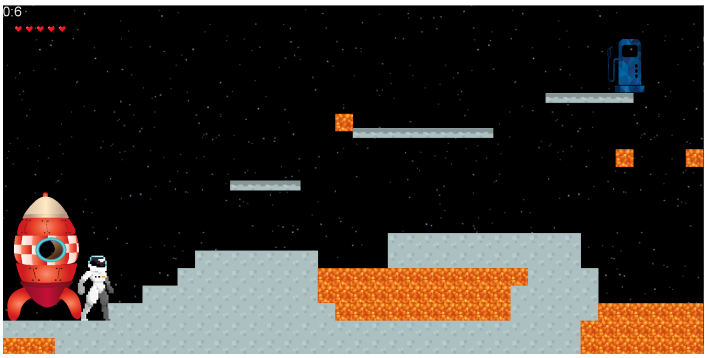
- Organised and animated the astronaut sprites according to the astronaut's actions - idle, walking, jumping, falling.
- Programmed the astronaut's motion using physics (with Any) and KeyListeners - ie. moving side to side, jumping against gravity, double-jumping (only restricted up to two jumps from the ground), stopping at a wall.
- Organised the report, ensuring all members described their setbacks/achievements in relation to their role, in great detail.
- Overall testing and debugging code of the main game
- Coordinate with team members, offer assistance and support to team members if needed.
- Presentation preparation
- Edited the video.

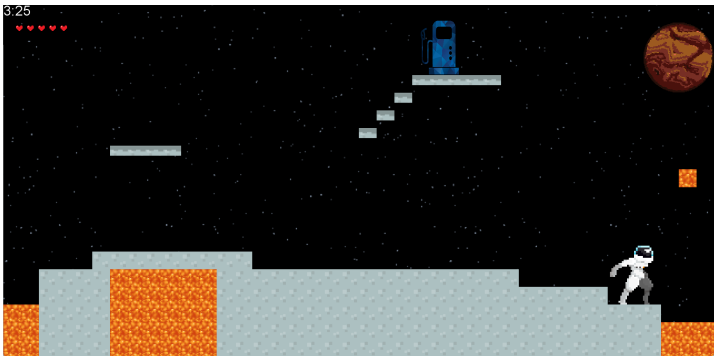
Nathan:

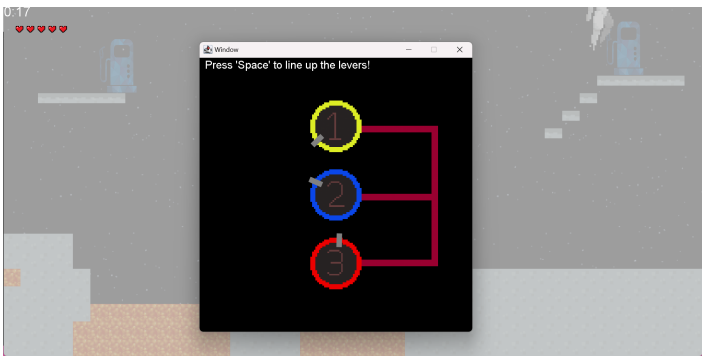
- Main menu, pause menu
- First mini game (Reaction mini game)
- Game over screen
- Audio implementation
- Implemented MiniGameListener Interface
- Overall merging, testing and debugging code of the main game
- Coordinate with team members, offer assistance and support to team members if needed
- Clean-up on the program ready for submission
- Presentation preparation

SCREENSHOTS









REFERENCES

Sprites:

- Red Rocket Ship Vector Hd Images (redRocketShip.png)
  https://pngtree.com/freepng/red-rocket-ship_4729614.html
- Pixel art Planet Pixelation, planet, game, solar System, pixelation png (Pngwing.com.png)
  https://www.pngwing.com/en/free-png-iymqr/download
- Platformer Pack Redux (Spritesheet_ground.png)
  https://www.kenney.nl/assets/platformer-pack-redux
- Space-Based Shoot-'Em-Up Sprites (Starfield.png)
  https://gamedevelopment.tutsplus.com/enjoy-these-totally-free-space-based-shoot-em-up-sprites--gamedev-2368a
- Textures Sprite Shet (Textures.png)
  https://piiixl.itch.io/textures
- Vector Fuel Station Icon (Fuel_station.png)
  https://pngtree.com/freepng/vector-fuel-station-icon_4237302.html

Music and Sound:

- https://pixabay.com/sound-effects/
- https://www.zapsplat.com