ASU / NASA

Web-Based Game for Psyche

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Project Description: Developing an engaging, educational Unity-based web game to promote NASA Psyche mission's goals and STEM awareness.

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1. Project Description

Developing an engaging and educational Unity-based web game to promote NASA Psyche mission's goals and STEM awareness.

Purpose of Project (Motivation)

The project aims to inspire curiosity and interest in space exploration by educating users about NASA's Psyche mission. It integrates gameplay with educational content to make learning engaging and interactive, fostering STEM awareness among diverse audiences.

List of Deliverables

- **Playable Game Prototype:** A functional Unity-based web game featuring a top-down base world with integrated educational minigames.
- **Minigame Modules:** Individual games showcasing distinct aspects of the Psyche mission.
- **Documentation:** Comprehensive instructions, user guides, and educational content aligned with NASA's objectives.
- **Testing and Feedback Report:** User test results and feedback analysis to refine the game.
- **Final Polished Game:** An optimized version of the game ready for public release.

2. User Overview

The game is designed for a broad audience, including students, educators, and space enthusiasts of varying age groups and knowledge levels.

User Descriptions

1. **Students:**
    - Age: 10–18 years
    - Interests: Space exploration, gaming, and interactive learning
    - Motivation: Learn about the Psyche mission in a fun and engaging way.
2. **Educators:**
    - Age: 25+ years
    - Interests: Teaching tools, accessible educational content
    - Motivation: Use the game to complement classroom instruction and promote STEM.
3. **Space Enthusiasts:**
    - Age: 15+ years
    - Interests: Space science, technology, and exploration
    - Motivation: Gain insights into the Psyche mission while enjoying an interactive experience.

User Scenarios

- A middle school student plays the game to complete a science class assignment on space missions.
- A teacher uses the game in a classroom setting to explain asteroid exploration and planetary science.

- A space enthusiast explores the minigames to learn about the engineering challenges of the Psyche mission.

3. Requirements

Functional

1. Enable users to navigate a top-down base world and access minigames.
2. Provide engaging and educational gameplay experiences.
3. Include visually appealing and thematically accurate graphics.
4. Allow integration of sponsor-provided feedback and updates.

Performance

1. The game must load within 5 seconds on standard web browsers.
2. Achieve 60 FPS on mid-range devices.
3. Ensure error-free navigation and gameplay transitions.

Constraints

1. Limited development timeframe of two semesters.
2. Must adhere to the technical requirements and guidelines provided by NASA and ASU.
3. Accessible on standard web browsers without requiring high-end hardware.

4. Preliminary Results

Activities and Events

- **Game Development:** Completed multiple minigame prototypes with polished visuals and mechanics.
- **User Testing:** Conducted tests with students and educators to gather feedback on gameplay and educational value.
- **Sponsor Meetings:** Incorporated iterative feedback to align the game with the Psyche mission's goals.

Test Results and Deliverables

1. **Minigame Feedback:** Users found the asteroid navigation and satellite repair games educational and engaging.
2. **Performance Testing:** The game achieved 55–60 FPS across various devices during initial trials.
3. **Deliverables:** A functional prototype demonstrating seamless integration of minigames within the base world.

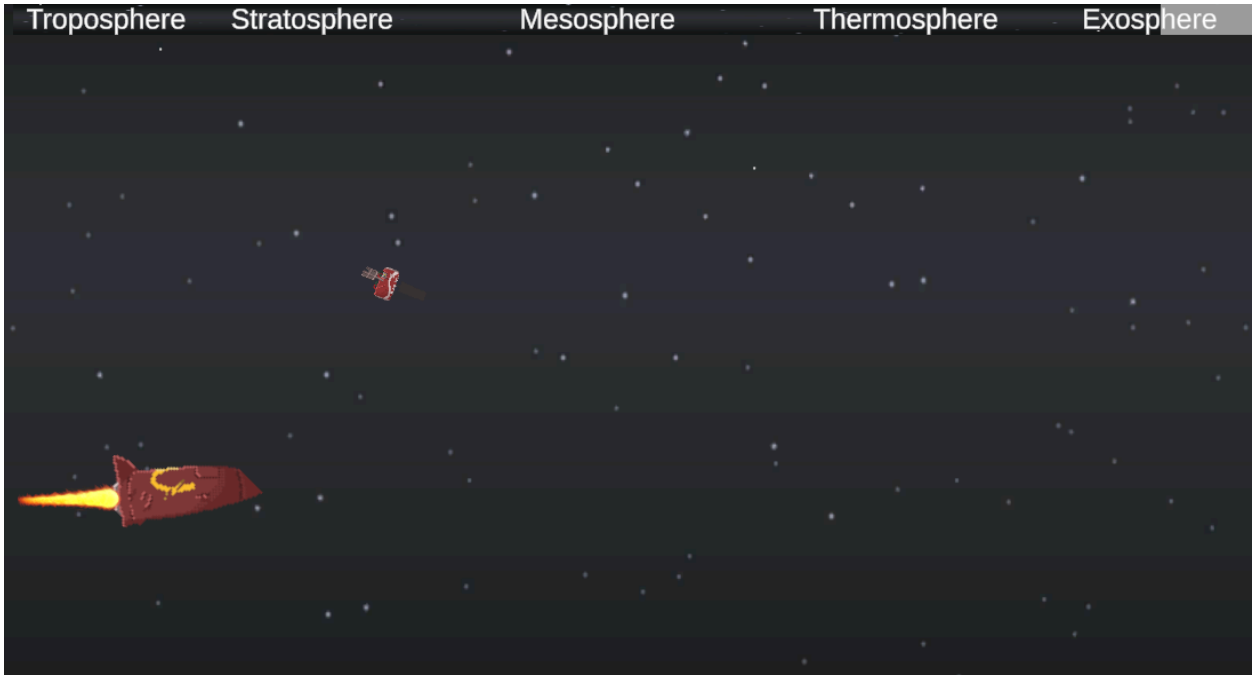
Include pictures and graphs showcasing gameplay, testing sessions, and feedback analysis.

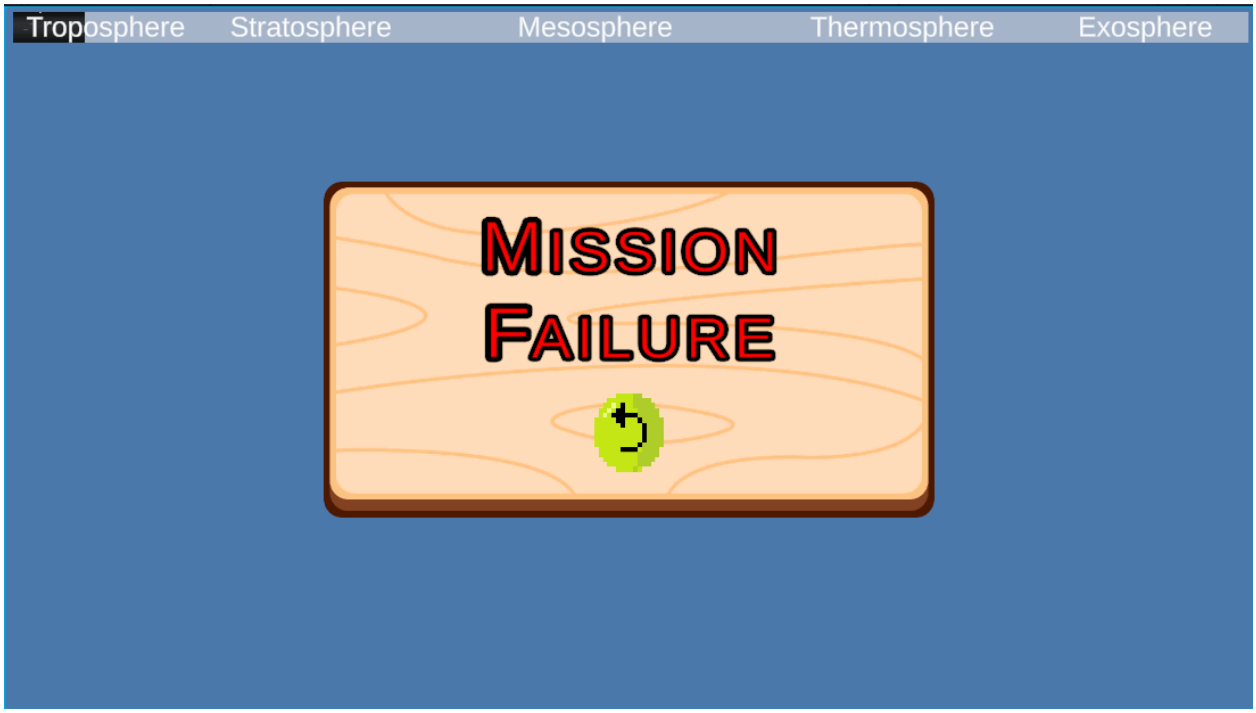
Individual Minigame Overviews:

Developer: Somesh Harshavardhan Gopi Krishna
Title: Escaping Earth: Psyche Mission Prep
Brief Description:
In Escaping Earth: Psyche Mission Prep, players control a rocket navigating Earth's atmosphere, avoiding satellites and debris as they work toward a safe escape from low-Earth orbit (LEO). The game introduces players to space navigation challenges similar to those faced by NASA's Psyche mission,

emphasizing the complexities of reaching interplanetary space while avoiding hazards in LEO.

Screenshots:





Feedback:

- Live altitude tracker as a score for real time feedback and gamification of the system.
- Variation with debris to match variances in the different layers of the atmosphere for increased accuracy in simulation of rocket launch.
- Sound effects to aid in completing the gameplay experience.

Developer: Ilia

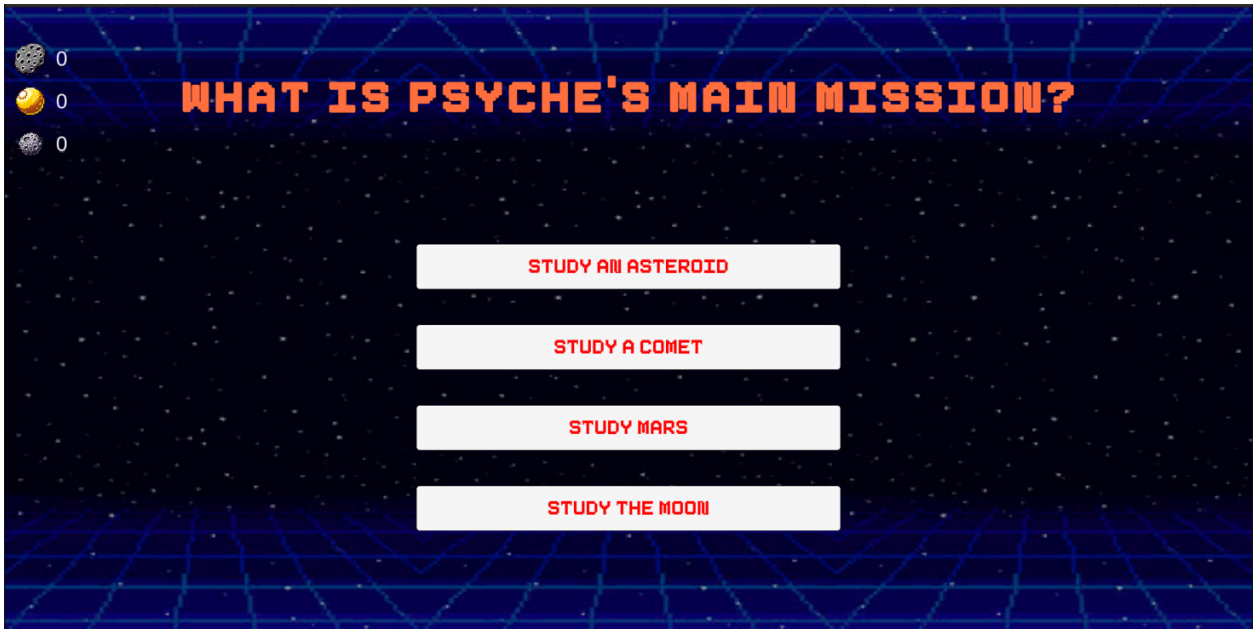
Title: Psyche instrument explorer

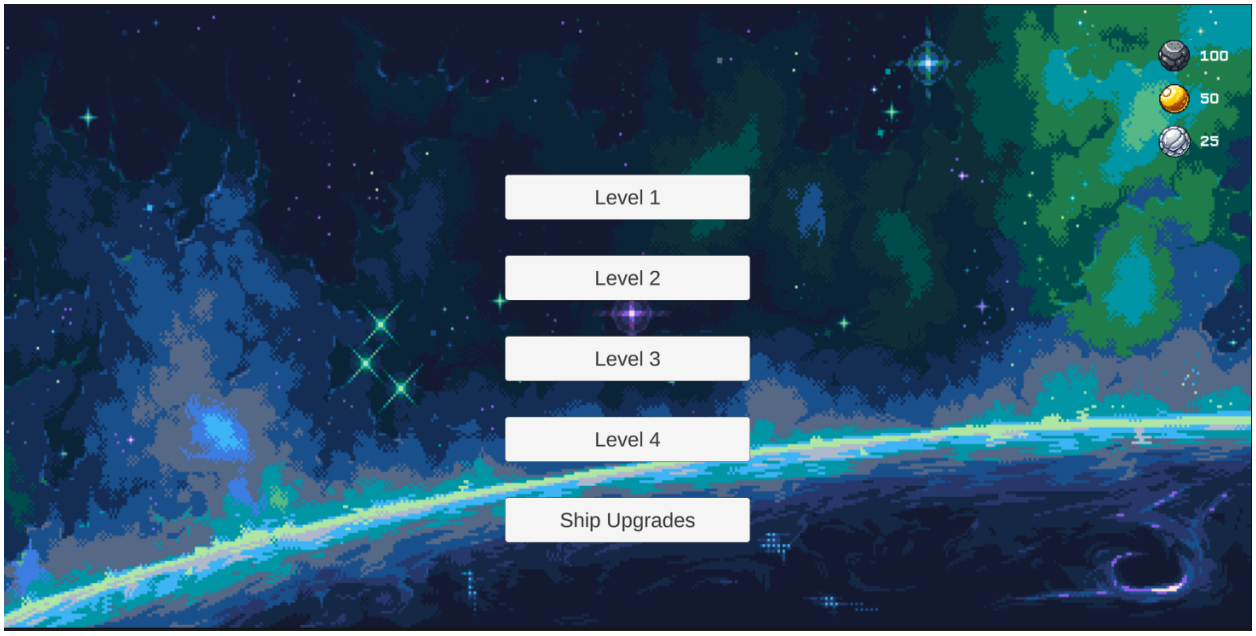
Brief Description:

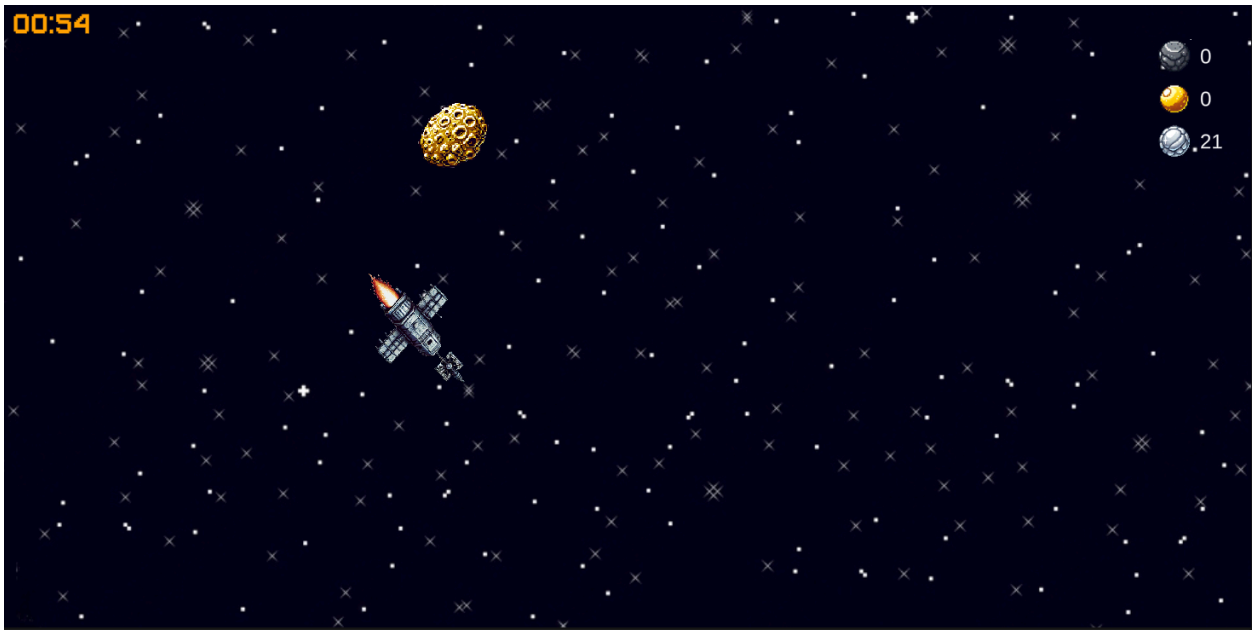
A user controls a Psyche probe flying through space. To educate them on the psyche mission and which tools it uses. They start with a barebone satellite and

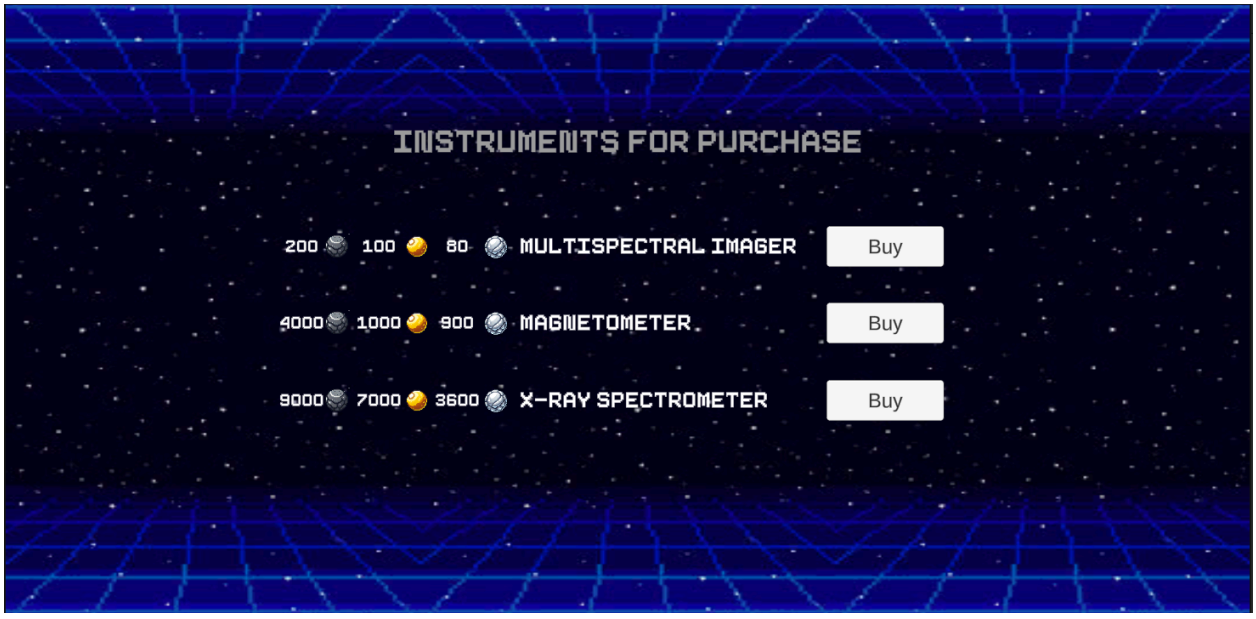
play a minigame where they have to maneuver a spacecraft to collect resources needed to build tools for the mission. There's several levels that get unlocked after each instrument is built. After each game players are presented with a mini quiz about a psyche mission that lets them multiply their resources if they answer it correctly.

Screenshots:









Feedback: Will need to make a list of all questions in my game that are used to quiz players and have them reviewed and approved.

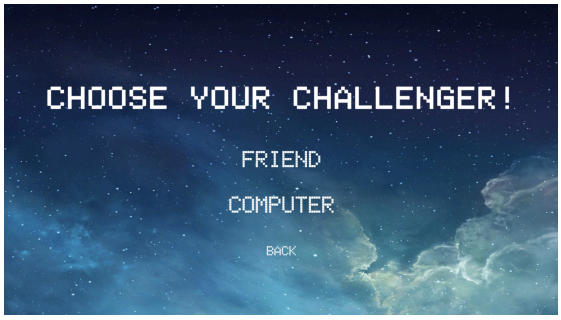
Developer: Tanishq Manikya

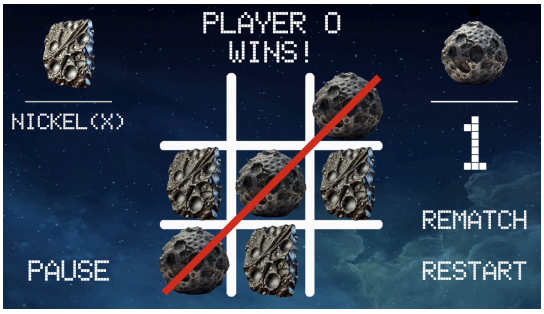
Title: Psyche Asteroid Align

Brief Description:

The players use Nickel (X) and Iron (O) to play the game like tic tac toe. Using Nickel and Iron as symbols introduces kids to the asteroid's composition, tying the gameplay to real world science. Players can enjoy classic 3x3 gameplay in single or multiplayer modes, with adjustable AI difficulty and live score tracking. There is also score tracking where there is a live counter in multiplayer mode.

Screenshots:





Feedback:

- Have to input the facts I am going to be using in the comprehensive document and get them approved
- Sound or background music

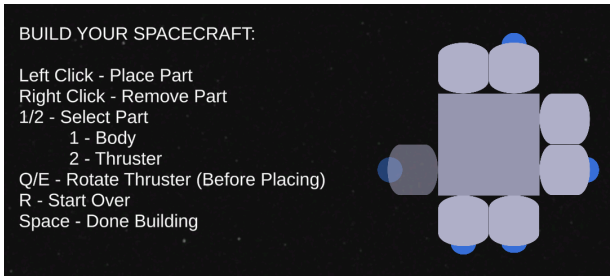
Developer: Jake

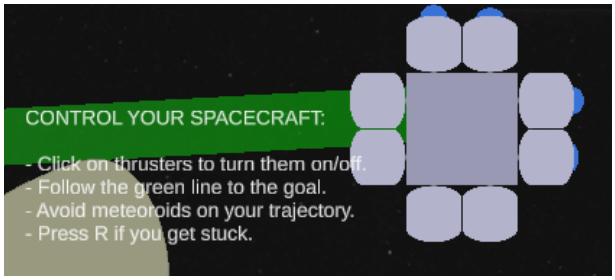
Title: Super Psyche Maker

Brief Description:

The user builds a sci-fi spacecraft out of repurposed parts from the Psyche mission, and then pilots it. Users learn about the physics of spaceflight by controlling their spacecraft's flight, as well as what it takes to design a complex mission by tweaking their spacecraft's design until it succeeds.

Screenshots:





Feedback:

- Look at similar games like Spaceflight Simulator for inspiration.
- Make the game easier by zooming out the camera to allow for more time to react to obstacles.

Developer: Donovan

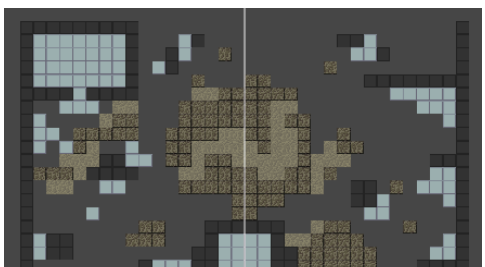
Title: Repair Psyche

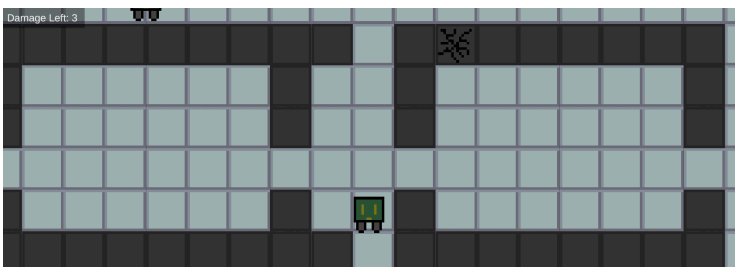
Brief Description:

Repair Psyche is a top-down exploration game which reimagines the interior of the Psyche satellite as its own world, complete with inhabitants based on the various components of the satellite. The player takes control of a small repair robot, who is tasked with repairing damage the satellite sustained from a debris strike during its orbit around mars. The player must find and restore four primary components of the satellite, each represented by a large mechanical creature. The player can also repair smaller damage scattered about, and speak with NPCs to learn more about the game's fictional world and about the real-life Psyche mission.

This game acts as a connecting hub between the other four games, with each mechanical component creature requiring the player to beat one of the four other games in order for them to be repaired. The game takes inspiration from Deltarune in how it personifies different aspects of the Psyche satellite.

Screenshots:





Feedback:

The game looks good so far. Artwork of the component creatures could even be posted to the Psyche art gallery.

5. Conclusion

This project successfully demonstrates the potential to combine gaming and education to promote NASA's Psyche mission. Through iterative design and testing, the game has evolved into a functional prototype that engages users while delivering valuable educational content. Future work will focus on refining the game based on feedback and preparing it for public release.