**Requirements Document: NASA Psyche Mission Web-Based Game**

**Project Overview**

**The NASA Psyche Mission Game is a web-based game designed to engage the public with the Psyche mission, which aims to study the metal-rich asteroid Psyche in the asteroid belt between Mars and Jupiter. The goal of this project is to develop an entertaining and educational game that appeals to all age groups, especially younger children. By combining interactive trivia with a fun mini-game where users land a spacecraft on different celestial bodies, the game will spark interest in space exploration while teaching users about the Psyche mission and other aspects of space science.**

**The game will feature:**

* **Trivia-based gameplay: Users will answer questions about planets, asteroids, and moons, with a focus on the Psyche mission.**
* **Interactive mini-game: After answering a trivia question, players will control a spacecraft and attempt to land it on the correct celestial body.**
* **Engaging and colorful visuals: The art style will be playful and cartoony to keep younger children engaged.**
* **Accessible design: The game will be simple enough for children to play but fun for all age groups.**

**The project is being developed by a team of students over a two-month period, from mid-October to early December. The final game will be submitted by December 7, 2024, as part of a class assignment. The game will be developed using either Unity or Godot game engines, leveraging the team’s existing programming skills to overcome the learning curve of these tools.**

**Requirements**

**1. Core Objectives:**

* **Education**: The game will focus on educating users about NASA, the Psyche mission, and celestial bodies, with an emphasis on Psyche. The educational content will be delivered in an engaging, enjoyable way, making learning an effortless and fun part of the game.
* **Entertainment**: The game will keep users engaged with entertaining, colorful, and cartoony graphics, especially tailored for younger children, but enjoyable for all age groups.
* **Engagement**: The balance between education and entertainment is crucial, ensuring that players remain interested and entertained while also learning new facts.
* **Accessibility**: The game will be web-based, accessible through desktop browsers, and designed for intuitive play so that users of all ages, especially children, can easily pick up the game.

**2. Target Audience:**

* The game will primarily target younger children but will be designed to be fun and playable by all age groups.

**3. Key Features:**

* **Three-Part Gameplay**:
  1. **Trivia Section**: The game will feature trivia questions randomly drawn from a question bank. The focus will be on space-related topics, particularly NASA's Psyche mission, using information from the [Psyche FAQ](https://psyche.asu.edu/mission/faq/). Players will select the correct planet, moon, or asteroid based on the trivia question.
  2. **Planet/Asteroid Selection**: Players will click on a celestial body they believe matches the trivia question. Correct answers will be rewarded with points, and incorrect answers will be followed by the correct answer.
  3. **Landing Mini-Game**: The landing mini-game will be arcade-style, where players control the shuttle using arrow keys to land on a platform. The physics will be simple and fun, without realistic calculations for each planet.
* **Points System**: Points will be awarded for:
  1. Correctly answering trivia questions.
  2. Successfully landing the space shuttle in the mini-game.

**4. Platforms:**

* The game will be available through **desktop browsers**.

**5. Constraints:**

* **Timeline**: The project must be completed by early December.
* **Budget**: There is no budget, as this is for a class assignment.
* **Technical Constraints**: The team has no prior experience with game engines but will be using **Godot**. The team has programming experience in other areas and plans to quickly overcome this limitation.

**6. Functional Requirements:**

* **Start Screen**:
  + Three options: "Play" and "Tutorial." And “Credits”.
* **Tutorial Mode**:
  + The tutorial will be basic, teaching players how to control the shuttle and answer trivia questions, ensuring that players can pick up the game quickly.
* **Play Mode**:
  + **Trivia Section**: Displays planets, moons, and asteroids in order from the Sun. A random trivia question will prompt users to click on the correct celestial body.
    - Players are shown if their answer is correct or incorrect.
    - Points are awarded based on the correctness of the answer.
  + **Landing Game**: After selecting the correct planet/asteroid, players enter the space shuttle landing mini-game.
    - Players direct the shuttle to a landing platform on the surface of the chosen celestial body using simple arrow key controls.
    - Points are awarded based on landing accuracy.
* **Points Display**: Points are shown in the top right corner of the screen during gameplay.
* **Latency**: After answering a trivia question, there will be a 2-3 second delay before transitioning to the shuttle lander mini-game. All other transitions will be as fast as possible, dependent on internet connection speed.
* **Settings Button**: Clicking the settings button will pause the game and allow users to adjust sound settings.

**7. Non-Functional Requirements:**

* **Portability**: The game will be accessible through desktop web browsers.
* **Security**: Security measures will be managed by NASA’s hosting.
* **Maintainability**: Code will be well-documented for easy understanding and troubleshooting.
* **Reliability**: If a critical failure occurs, the game will restart from the beginning to minimize downtime.
* **Scalability**: The game’s workload should not change significantly with increased traffic. Hosting will be managed by NASA, which can handle scalability.
* **Performance**: Performance depends on the user’s internet connection speed.
* **Usability**: The tutorial will explain the steps of the game, making it user-friendly and easy to follow.

**Acceptance Criteria for Project Completion**

The project will be considered complete if the following criteria are met:

1. **Core Game Mechanics**:
   * The game must include a trivia section where users answer questions about celestial bodies (planets, asteroids, moons) with a focus on Psyche.
   * After answering trivia, players must progress to a mini-game where they control a space shuttle lander and attempt to land on the correct celestial body.
   * Players must earn points for correct answers and for successful landings.
2. **User Experience**:
   * The game must have a working tutorial that guides players through the game mechanics and controls.
   * The game should be easy to navigate, with clear instructions and simple controls (e.g., using arrow keys for the lander).
   * The game must be engaging for younger children but accessible to all age groups.
3. **Visual and Audio Design**:
   * The game must have a cartoony, colorful art style that appeals to children.
   * Sound effects should be present and aligned with the space theme, with an option to turn them off via a settings menu.
4. **Performance and Technical Functionality**:
   * The game must be playable on web browsers and run smoothly with minimal latency (except for planned 2-3 second delays between screens).
   * The game must handle user input without crashes or bugs that interrupt gameplay.
   * The game must restart from the beginning in the event of a critical failure or error.
5. **Non-Functional Requirements**:
   * The game must be accessible via web browsers.
   * Settings must allow players to turn off sound effects at any point during gameplay.
   * The game should include basic maintainability features, such as clear code comments for ease of debugging and future fixes.
6. **Completion Deadline**:
   * The game must be delivered by December 7, 2024, as per the project’s timeline.
7. **Feedback and Review**:
   * The game must be reviewed and tested by the team to ensure it aligns with the educational and entertainment goals of the project.
   * The game must function correctly in all its core sections (trivia, landing mini-game, tutorial, settings).

**Citations**

OpenAI. (2024). *ChatGPT conversation on NASA Psyche Mission Game*. Retrieved October 11, 2024, from <https://www.openai.com/chatgpt>