

# Educational Video Game

## "AstroQuiz"

### *Requirement Specification Document*

Final Version

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# **1. Introduction to AstroQuiz**

## **1.1. Purpose:**

The purpose of this document is to describe the requirements for an engaging and educational video game titled "AstroQuiz". This game aims to combine the excitement of classic arcade gameplay with educational content on ethics in computer science, fostering learning through interactive experiences. In "AstroQuiz", players will navigate a spaceship through asteroid fields, shooting asteroids and answering educational questions to achieve the highest score possible.

## **1.2. Overview:**

This document is structured into six sections for a better understanding of "AstroQuiz". Section 2 describes the project's scopes and objectives, detailing its purpose and monetization strategy. Section 3 highlights the features, highlighting educational content, and intricate reward and challenge systems. Section 4 identifies the target users, ranging from students to educators. In Section 5, the user interface is discussed, covering the main menu and in-game elements. Section 6 outlines the development strategy, emphasizing compatibility, iterative development, and user feedback. Lastly the document concludes with a references section, acknowledging all the sources contributing to "AstroQuiz's" development.

# **2. Scopes & objectives**

## **2.1. Scope**

"AstroQuiz" is designed as a single-player arcade-style game, inspired by the mechanics of classic games like Asteroids. Players control a spaceship and maneuver through space, shooting asteroids to earn

points. However, "AstroQuiz" introduces an innovative twist by integrating educational content on ethics in computer science. Special asteroids scattered throughout the game will trigger questions upon destruction. Correctly answering these questions will reward the player, while incorrect answers will pose challenges.

## 2.2. Objectives

The "AstroQuiz" project is essential as it addresses a crucial need for innovative and engaging educational tools in today's digital landscape. With traditional educational methods often failing to fully captivate students' attention, there's a growing demand for interactive learning experiences that merge entertainment with education. By combining classic arcade gameplay with educational content, "AstroQuiz" offers a unique solution that not only enriches players' knowledge across computer science ethics but also fosters critical thinking skills and problem-solving abilities in a fun and accessible manner.

## 2.3. Monetization

"AstroQuiz" can be offered as a free-to-play game with optional in-app purchases for additional features, such as unlocking new spaceship skins or accessing premium question packs. Integration of non-intrusive advertisements can provide an additional revenue stream. Collaborations with educational institutions or organizations can lead to sponsored content or special events within the game.

# 3. Features of AstroQuiz

## 3.1. Classic Arcade Gameplay:

Players control a spaceship, navigating through asteroid fields and shooting asteroids to earn points. Gameplay is similar to arcade games

from the 1980's with the added twist of questions in a quiz like format being presented to players during gameplay.

### 3.2. Educational Content:

Special asteroids reveal questions related to ethics in computer science in order to further the education and knowledge of the players. The questions can be changed from the main menu from the default computer science questions to questions related to various subjects such as math, science, history, and many other topics which can be entered by the user.

### 3.3. Reward System:

During gameplay players with destroy asteroids to gain points and will be rewarded extra points for correctly answering questions that pop up. The rewards for answering questions could be a bonus to the players score, power-ups that improve the players power or a shield that preserves the players health.

### 3.4. Challenge System:

To make the game more challenging, incorrect answers impose penalties such as decreased score, slower movement speed, or an increase in the speed of asteroids. The player will also lose health if they take damage from hitting an asteroid. As the game progresses, the difficulty of questions and the amount of asteroids present on the screen will increase.

### 3.5. Scoring System:

The player's goal in AstroQuiz is to get the highest score possible by answering questions, destroying asteroids and progressing in the game. Players can check their scores against themselves or other players on the leaderboards in order to improve their scores.

### 3.6. Multiple Difficulty Levels:

The difficulty of the game can be adjusted by the player in order to make a more challenging playthrough. Adjusting the difficulty could result in starting with more asteroids on the screen as well as more difficult questions being answered. Adjustable difficulty settings cater to players of different skill levels, ensuring both enjoyment and challenge.

## 4. Target Users

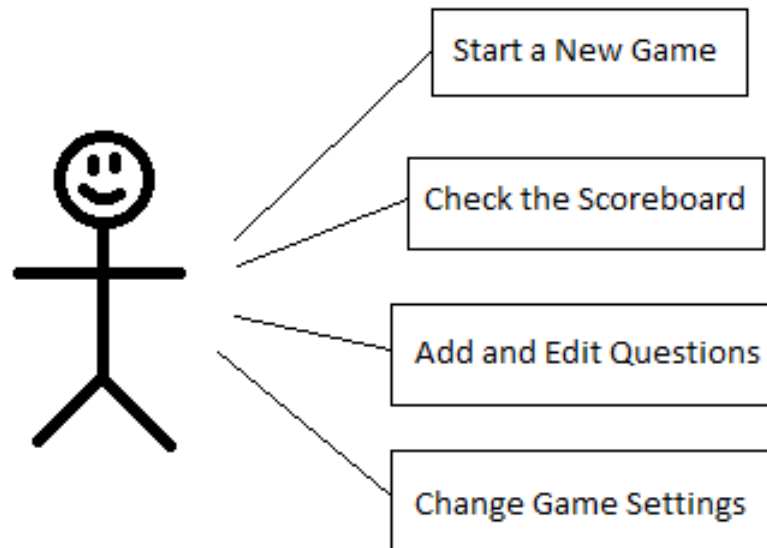
"AstroQuiz" customer is Dr. Stringfellow, instructor for CMPS 4991 (Senior Seminar):

### 4.1. User scenarios:

- Educator:
  - As an educator seeking to enhance classroom instruction with engaging educational tools, the concept of programming a game with ethical considerations will complement traditional instruction methods. The "AstroQuiz" will capture students' interest and teach them about ethical dilemmas. By capturing students' interest in gaming to instill ethical awareness, educators can cultivate a generation of ethically strong individuals readied to navigate the issues of an increasingly connected world.
- Students:
  - By integrating ethical questions into the gameplay, students will gain supplementary learning experiences in a fun and interactive format. As players navigate through the asteroid field, they will be questioned about ethical principles such as privacy, security, and fairness. Students will gain a deeper understanding of the ethical implications of the decisions they will face in the Computer Science field. This gaming

experience will instill ethical awareness and values that are integral to the evolving landscape of technology and society.

#### 4.2. Use Case Diagram and Use Cases



### 5. User interface: Visuals of the Game

#### 5.1. Main Menu:

The user interface (UI) for this game will be designed to provide a seamless and intuitive experience for players. It will feature a main menu that serves as the central hub for accessing various functionalities. From the main menu, users will have options to initiate gameplay, modify questions, adjust settings according to their preferences, and view the high scores achieved by other players.

#### 5.2. Game UI:

Overall, the UI aims to provide a user-friendly and engaging interface that facilitates seamless navigation, clear feedback, and interactive elements to enhance the gaming experience. By incorporating intuitive design principles and visually appealing elements, the UI contributes to the

overall enjoyment and immersion of the game for players. During gameplay, the UI will dynamically adapt to provide relevant information and feedback to the player. Key components of the in-game UI include:

5.2.1. Health Count:

This component will display the player's current health status, indicating how much damage they can sustain before losing the game. It provides vital feedback on the player's progress and performance, encouraging strategic decision-making to preserve health throughout the game.

5.2.2. Score Count:

The score count section will showcase the player's current score, reflecting their performance and achievements in the game. It serves as a motivational tool, incentivizing players to strive for higher scores and compete with others for the top spot on the leaderboard.

5.2.3. Upgrade Section:

As players progress through the game and successfully answer questions, they will earn upgrades or power-ups that enhance their gameplay experience. The upgrade section of the UI will display these earned upgrades, allowing players to track their enhancements and strategize their usage during gameplay.

## **6. Development & Target Environment**

"AstroQuiz" presents a unique opportunity to merge entertainment with education, offering players an engaging experience while reinforcing learning objectives. With its innovative gameplay mechanics and captivating educational content, "AstroQuiz" aims to become a leading choice for students, educators, and gamers alike.



Thank you for considering our proposal. We look forward to the opportunity to develop and launch "AstroQuiz" to inspire learning and enjoyment among players worldwide.

## 7. References

[1] ACM, "ACM Code of Ethics and Professional Conduct," *Association for Computing Machinery*, Jun. 22, 2018. <https://www.acm.org/code-of-ethics>

[2] IEEE, "IEEE Code of Ethics," *ieee.org*, Jun. 2020. <https://www.ieee.org/about/corporate/governance/p7-8.html>