ReasonED Product Specification Sections 1-2

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CS 411W

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1 Introduction

1.1 Purpose

The purpose of this Software Requirements Specification (SRS) document is to provide a comprehensive outline of the requirements and specifications for the development of ReasonED, a software solution aimed at enhancing internet literacy by addressing the issue of logical fallacies in online content. The document serves as a guiding framework for the development team, stakeholders, and users involved in the creation and implementation of ReasonED. It specifies the functional and non-functional requirements, outlines the scope of the project, and defines the goals and objectives to be achieved. It facilitates effective communication among all parties involved, ensuring a shared understanding of the project's objectives, features, and constraints. Additionally, it serves as a reference point throughout the development lifecycle, guiding the design, implementation, testing, and validation processes.

1.2 Scope

In this digital era of the information age, the need for strong critical thinking skills is at an all-time high. With the growth of opinion content across the web has come a growth in the use of flawed *reasoning,* or *logical fallacies*. Since logical fallacies are manipulative yet go unchecked on a very opinionated internet, it is almost solely up to *users* to recognize faulty logic in the posts they may encounter. Although American K-12 schools are increasingly advocating for internet literacy, the majority of educators cannot teach the level of critical reasoning necessary for identifying logical fallacies on the internet. Existing curriculums do not include adequate resources or requirements for teaching logical fallacies. As a result, high school graduates are not prepared with the skills necessary to identify logical fallacies in an increasingly online world. The ReasonED game-based learning website aims to equip educators and students with the tools and knowledge necessary to identify the various types of logical fallacies commonly found in online and in-person discourse. Specifically, ReasonED will:

- Foster Critical Thinking: empower students to discern between valid and flawed arguments, cultivating critical reasoning skills essential for navigating an information-centered world.

- Facilitate Logical Fallacy Curriculum Integration: simplify the process of incorporating lessons on logical fallacies into existing curricula, by providing educators with readily available resources to enhance their teaching.

- Promote Scalable Learning: With tailored materials spanning elementary to high school levels, ReasonED will ensure a progressive understanding of logical fallacies, enabling continuous skill development across grade levels.

- Ensure User-Friendly Experience: prioritize user-friendliness, offering simplified interfaces for educators to guide students of all ages through. Likewise, offer fun, easy-to-learn games that will engage and motivate students.

By addressing these goals, ReasonED can help promote more genuine, productive discourse within society, especially that which takes place within the digital landscape.

1.3 Definitions, Acronyms, Abbreviations

1.3.1 **Confirmation Bias** - A cognitive bias that involves seeking, interpreting, and remembering information that confirms one's preconceptions (American Psychological Association n.d.).

1.3.2 **Critical Thinking** - The ability to think clearly and rationally, understanding the logical connection between ideas and the ability to make reasoned judgements (American Psychological Association n.d.).

1.3.3 **Fact-Checking** - The process of verifying the accuracy of claims made in public discourse and journalism (Cambridge English Dictionary n.d.).

1.3.4 **False Dilemma** - A fallacy that presents a limited set of options as the only possible choices when there may be other alternatives (Excelsior OWL n.d.).

1.3.5 **Logical Fallacy** - An error in reasoning or a flawed argument that can make an argument appear valid when it is not (Nikolopoulou, 2023).

1.3.6 **Misinformation** - False or inaccurate information shared, often unintentionally, without the intent to deceive (Dictionary.com n.d.).

1.3.7 **Disinformation** - False information deliberately spread to deceive or mislead others (Dictionary.com n.d.).

1.3.8 **Slippery Slope** - A fallacy that suggests one small step will inevitably lead to a chain of related events, often with exaggerated consequences (Excelsior OWL n.d.).

1.3.9 **Straw Man Argument** - A fallacy that involves misrepresenting an opponent's argument to make it easier to attack and refute (Excelsior OWL n.d.).

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1.5 Overview

This document is structured to provide a comprehensive understanding of the project's scope, objectives, and requirements. The structure of the remaining sections is as follows:

Product Perspective: Describes the context of ReasonED within the broader scope of educational technology, outlining its purpose, functionality, and relevance to users.

Product Functions: Summarizes the main features and capabilities of ReasonED.

User Characteristics: Discusses the various user roles and their interactions with ReasonED, providing insights into the intended audience and user experience.

Constraints: outlines constraints that may limit the development of ReasonED.

Assumptions and Dependencies: Identifies any changes to constraints that may affect the requirements stated in the SRS.

System Features: Specifies the functional requirements of ReasonED, detailing the specific features and functionalities that the software must possess.

Performance Requirements: Outlines the performance criteria that ReasonED must meet to ensure optimal functionality and user experience.

Design Constraints: This section highlights any design constraints that must be considered during the development of ReasonED.

Software System Attributes: Defines the quality attributes and characteristics expected of ReasonED, such as reliability, usability, and security.

Other Requirements: Covers any additional requirements that are not addressed in the preceding sections but are essential for the successful implementation of ReasonED.

2 Overall Description

2.1 Product Perspective

ReasonED will be a game-based learning website that improves the ability of users to identify logical fallacies through fun, age-appropriate games. ReasonED games will be curated for elementary, middle, and high school respectively to support year-long learning and continuous learning over all grade levels. The games will all share the same goal of introducing and improving logical fallacy identification skills, but the difficulties and approaches will vary depending on the age group. While the concepts and scenarios will be simplified for younger ages, these games aim to plant the seeds of critical thinking and encourage kids to recognize flawed reasoning. The prototype games will involve logical fallacies personified as fun characters and concepts. The fallacy characters will serve as memorable guides in students' fallacy education journeys.

2.2 Product Functions

The ReasonED prototype will consist of the following features:

2.2.1 **Website Interface:** The website will contain pages dedicated to game collections, student readings, and educator resources respectively.

2.2.2 **Straw Manny:** A 2-dimensional, top-view game curated for high schoolers. Players need to help Manny build his combat skills by attacking real opponents rather than fake ones, teaching the concept of the "straw man" fallacy.

2.2.3 **Hasty Harry:** A 2-dimensional, top-view game curated for middle schoolers. Harry is an astronaut who makes flawed generalizations about the new creatures and plants he discovers on planets he visits. Players will collect enough information about each planet and help Harry avoid making generalizations in his planet report, teaching the "hasty generalization" fallacy. This will be a top-view game.

2.2.4 **Slope Sadie:** A 2-dimensional platformer game curated for elementary schoolers. Sadie is a snowboarder who tends to jump to extreme conclusions. In this game, players need to guide Sadie safely down a snowy path without letting her slip into a pitfall, introducing the "slippery slope" fallacy. This will be a platformer game.

2.2.5 **User Sign-Up and Log-In:** Users will be able to create a ReasonED account using their email address. Users will be able to pick an appropriate username to be displayed on leaderboards which they may place on.

2.2.6 In-game tutorials: Each game will have a tutorial level to introduce players to the gameplay mechanics.

2.2.7 Leaderboards: Each game will have a connected leaderboard displaying the usernames of account-holding users with the highest scores for the respective game.

2.2.8 User Progress Tracking: Account holders' high scores and level progress data will be stored in the database to enable the addition of achievements and badges in the future.

2.2.9 Adaptive Learning: The games must build logical fallacy identification skills as users play. The challenges that occur in the games must increase in difficulty if players select the correct answers or decrease in difficulty if players answer incorrectly. Each challenge will have a difficulty score that algorithms will use to determine the next challenge that a player will encounter.

2.2.10 PC & Tablet Compatibility: The ReasonED website and all its games will be compatible with personal computers, tablets, and various browsers. The Next.js and Tailwind CSS framework offers automatic sizing of the webpage elements to fit common screen sizes.

2.2.11 Text-to-Speech: Each game will have text-to-speech functionality provided by Godot.

2.2.12 Printable Graphics: Downloadable/printable images of each game's characters will be available in the teacher resources section of the website.

2.3 User Characteristics

There are a variety of user roles within ReasonED:

2.3.1 **Educators:** Teachers and professors at all levels leverage ReasonED to facilitate logical fallacy education in classrooms. With formal training in teaching methodologies and varying levels of technical expertise, educators effectively integrate ReasonED into their teaching practices to enhance student learning. Educators can integrate ReasonED into their curriculum, either introducing logical fallacy concepts using ReasonED materials or using them to supplement and deepen students' understanding.

2.3.2 **Students:** Students from kindergarten through college, homeschoolers included, will engage with ReasonED to develop critical reasoning skills. With varying educational experiences, students benefit from its age-specific learning experiences.

2.3.3 **General Public:** Individuals from diverse backgrounds access ReasonED to improve their understanding of logical fallacies. With varied educational levels and technical skills, the platform aims to provide a user-friendly interface accessible to all users.

2.3.4 **Players:** The primary users, players engage directly with ReasonED's games to learn and reinforce their understanding of logical fallacies, utilizing basic technical skills to navigate the platform.

2.4 Constraints

ReasonED's development is subject to various constraints that influence the project's scope and implementation. These constraints include:

2.4.1 Regulatory Policies: Compliance with relevant educational regulations and data protection laws, such as COPPA (Children's Online Privacy Protection Act) and FERPA (Family Educational Rights and Privacy Act), must be ensured to protect user privacy and adhere to legal requirements for educational platforms.

2.4.2 Hardware Limitations: The platform must accommodate diverse PC and tablet hardware configurations, ensuring compatibility with different devices, screen sizes, and browsers.

2.4.3 Reliability Requirements: The platform must be reliable and stable, minimizing downtime and ensuring consistent performance to support uninterrupted gameplay and educational activities.

2.4.4 Safety and Security Considerations: Implementing robust security measures, such as encryption protocols and user authentication mechanisms, is essential to safeguard user data and protect against potential cybersecurity threats.

2.4.5 Educational Value and Content Integrity: Ensuring the accuracy and educational value of the content, including game scenarios and educational materials, is crucial to uphold the platform's credibility and effectiveness in teaching logical fallacies.

2.4.6 Game Development Complexity: Creating engaging and educational games for different age groups entails addressing technical complexities and design challenges while ensuring the accessibility and playability of the games across diverse user demographics.

2.5 Assumptions and Dependencies

ReasonED's software requirements are influenced by several assumptions and dependencies that impact the development and functionality of the platform. These factors include:

2.5.1 Availability of Internet Connectivity: This SRS assumes that users will have reliable internet access to interact with ReasonED's web-based platform. Dependency on stable internet connectivity is crucial for seamless gameplay, access to educational resources, and all other communication between users and the platform's servers.

2.5.2 Browser Compatibility: This SRS assumes that ReasonED will be compatible with commonly used web browsers such as Google Chrome, Mozilla Firefox, Safari, and Microsoft Edge. Dependency on browser compatibility ensures that users can access the platform's features across different browsers without encountering compatibility issues.

2.5.3 Hardware Compatibility: This SRS assumes compatibility with various devices, including desktop computers, laptops, and tablets, to accommodate users with different hardware configurations. Dependency on hardware compatibility ensures that ReasonED can be accessed across a range of devices commonly used in educational settings.

2.5.4 Data Privacy and Security Compliance: This SRS assumes compliance with data privacy regulations, including COPPA and FERPA, to protect users' personal information and educational data. Dependency on robust security measures and data protection protocols is essential to safeguard user privacy and maintain regulatory compliance.

2.5.5 Availability of Development Resources: ReasonED's development relies on the availability of resources, including human resources, development tools, and infrastructure. This SRS assumes access to skilled developers, necessary software tools, and hosting infrastructure to support the platform's development and deployment.

2.5.6 Vercel Reliability: It is assumed that Vercel's infrastructure will provide sufficient uptime, scalability, and performance to support the expected traffic and usage of the website. Any changes or disruptions to Vercel's services may impact the deployment and availability of the website.