

“The Arithmetician” Game Design Document

Document v.3.0

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Version 3.0

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Revision History

Version 1.0: this is the initial outline of the Game Design Document

Version 2.0: edited the Game Design Document to reflect the more streamlined version of the game

Game goals

- The game is an educational game, which is meant to make learning entertaining. The player is challenged by letter grades, passing their quizzes until they eventually achieve an A. In this prototype of the game, however, the player will only get to meet the first couple of letter grades. Art style is basic with the exception of the main protagonist, the rest of the game taking place in a sort of pencil-drawn dreamscape.
- Targeted audience is everyone 10 and up, the equations themselves are aimed at a general audience of third graders. It will be rated E for everyone.
- The game, as mentioned, is designed to both teach and to entertain in a seamless way, between the quizzes and the personality-filled dialogue from the letter grades.
- The targeted platform is for the personal computer, though it is entirely possible for it to be ported to other platforms.

Story overview

- The game takes place in the dreams of “The Child”(of which is left ambiguous), whom fears they might fail their math course. In this dream they take on the persona of a wizardly-looking anthropomorphic fox creature known as “The Arithmetician”. The arithmetician must use their wits and battle their way through each letter grade, all while being hounded by the personification of said letter grades throughout. At first, the letter grade is of a hostile and bullying figure, but as it transforms the letter grade eventually turns into a far more candid figure. After achieving grade A, the player wins the game.
- The letter grade will be visible throughout, taunting(or encouraging as is the case in later levels) the player character throughout. The dreamscape that

is of The Child's imagination is that of a classroom background, with pencil scribbles and the like being the foreground.

Licensor Points and Concerns

The purpose of The Arithmetician is to provide an interesting and fun game for a 3rd grade student to play that will tutor them in grade level math skills and enable them to demonstrate an understanding of the published US Federal Common Core Math skills for 3rd grade mathematics. The Arithmetician has two categories of "licensor". There will be a "purchaser" licensor that will acquire the tool and a "user" licensor that will be the actual game user. It is unlikely that the purchaser licensor will be the actual game user. The purchaser licensor will be the student's parent (or legal guardian) or teacher. The user licensor will be the student the game was purchased for. The goal of the purchaser licensor is simple; to inculcate the student with the appropriate federally mandated math skills for 3rd grade. The goal of the user licensor is also simple: to have fun playing a game, Learning the math skills is of secondary or tertiary interest to the user licensor.

Game controls

- The game controls are primarily using the mouse to click on buttons. The quizzes in the game are multiple choice, and the player will click on buttons to choose the correct answer.

Technological Requirements

- The majority of this game is to be created using the 2d game development program known as *Stencyl*. The artwork will be created using *Photoshop* and *Illustrator*.
- Camera is that of a sideways view of the character, giving the player the whole view of whatever "scene" they may be in. Bosses will work as would be expected of platformer bosses, requiring movement and navigation.

They will also, of course, require the use of mathematical problem solving. These will likely be done through events that ascribe what happens when player does a certain action.

- Requirements will be minimal as is the nature of the game itself. To be on the safe side, a dual-core 1GHz or better processor is of necessity with 4 gigabytes of dedicated RAM and at least integrated graphics processing(GPU integrated into the CPU) for the graphics processor.

Front end of the game and Title/Start Screen



This is a simple game. The player simply vanquishes Letter grades starting with an “F” by answering math equations. As each letter grade is conquered the next higher grade takes its place. The game begins upon pressing the “Start” button.

Game flowchart

The game starts off in a dream where the scenery is entirely that of pencil scribbles and line paper. Throughout the game it remains that way, but each letter grade the player goes up has a different NPC that reacts to what the player does whether they are correct or incorrect.

Game Camera

- This game will have a Side View camera angle throughout all of the gameplay.

HUD system

- The HUD system will include a live counter to show the player's score as they answer questions.

Player character

- The player character is a figure known as "The Arithmetician", who has the appearance of an anthropomorphic fox. Their gender remains ambiguous and are ultimately a creation of the imagination of "The Child". They wear wizard clothing and carry a large yellow pencil. They are ultimately the center of the dream, and the game is entirely focused around them and passing the quizzes.

Scoring

- Points can be earned throughout the game by answering questions correctly. However, points can also be taken away by answering incorrectly.

Game progression outline

This is an outline of the full list of levels if we were to complete a full version of the game. The prototype will include the first couple of levels.

Level 1: F

This is the introductory level, where the player meets the first enemy, F, and the game goals and mechanics are introduced. F acts almost like a bullying, teasing type of character, who taunts the player-character into completing the quizzes. This section will focus on addition and subtraction.

Level 2: D

This level is hosted by the letter D, who you meet after outsmarting F in level one. Letter D has a similar personality to F, but is a little less mean. This section will focus on multiplication and division.

Level 3: C

This level is hosted by the letter C, and will focus on measurement lengths. C is a lot more neutral towards the character; it is neither taunting nor encouraging.

Level 4: B

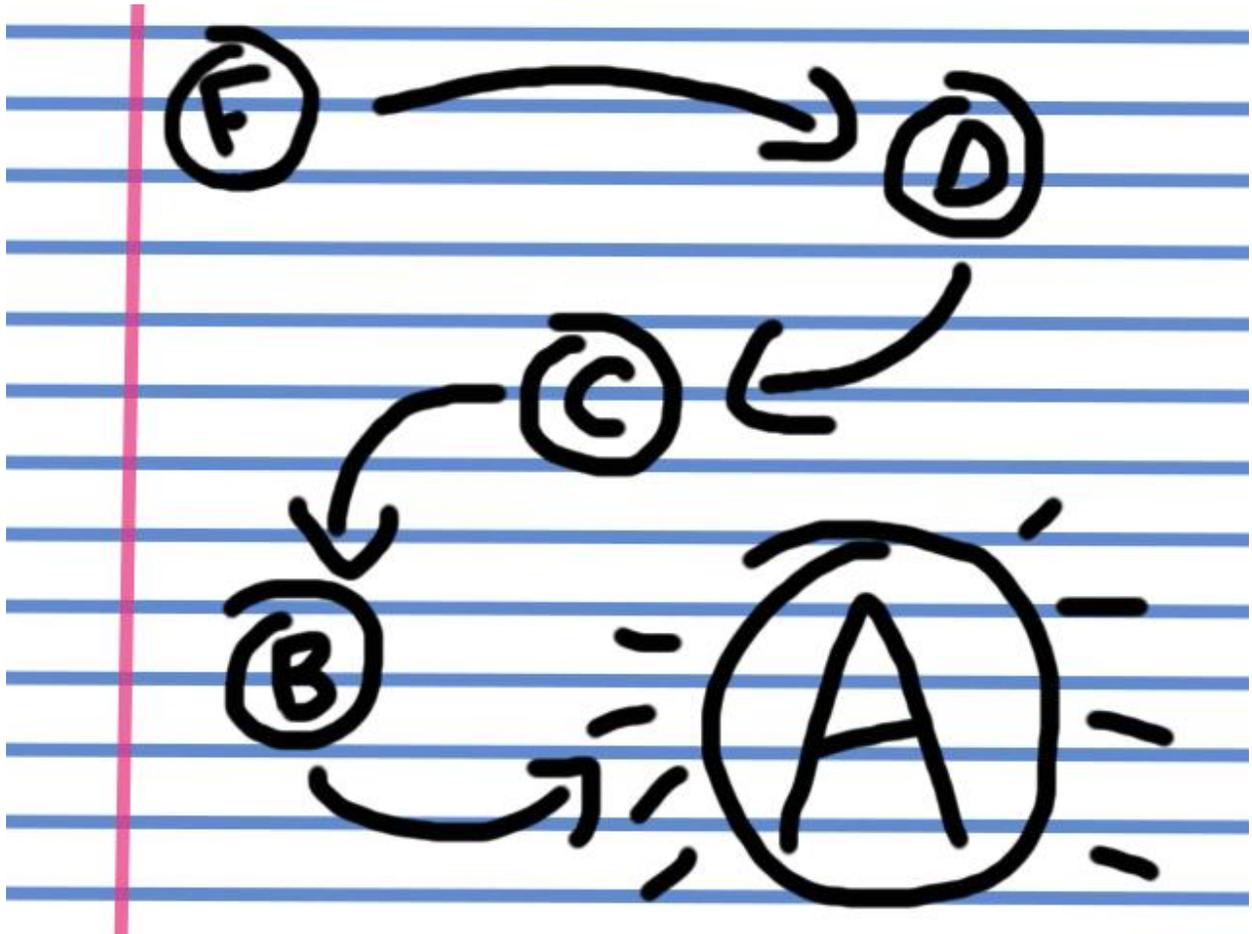
This level is hosted by the letter B, and will focus on geometry. Letter B is friendlier towards the player-character, and encourages them to do well.

Level 5: A

This level is hosted by the letter A, and will be a review of all of the math sections that the player has previously been quizzed on. Letter A is extremely friendly and encouraging towards the player-character, and enthusiastically gives praises.

World overview/level select/navigation screen

The prototype of the game will not feature a level select screen. However, this would be the rough concept if one were to be implemented in a full version.



Level select screen concept art

The level select screen will allow players to go back to each section and review each one as many times as they need. When the mouse is hovering over a letter, a brief description of that level will appear, so the player will know which section of math they will be reviewing.

Sound requirements:

- Correct and Incorrect sounds that play based on input.

Music requirements:

- A 20-second loop of music playing in the background. No longer because the player shouldn't be spending too long on this screen. The style of the music will be fun, but not too busy, since there is minimal movement on the screen.

Universal game mechanics

- The game mechanics are simple: point and click to the answers for the math equations presented.

Game levels

This is an outline of the full list of levels if we were to complete a full version of the game. The prototype will include the first couple of levels.

Level 1: F

- This is the introductory level, where the player meets the first enemy, F
- The game goals and mechanics are introduced
- Letter F teases and taunts the player-character
- This section will focus on addition and subtraction
- The music will be playful and mischievous, to match the personality of F

Level 2: D

- This level is hosted by the letter D
- Letter D still teases the player-character, but is less harsh than letter F
- This section will focus on multiplication and division
- The music will be playful and mischievous, but lighter than F's music, to match the personality of D

Level 3: C

- This level is hosted by the letter C
- Letter C is neutral personality-wise
- This section will focus on measurement lengths
- The music will feel more calm and neutral, to match the personality of C

Level 4: B

- This level is hosted by the letter B
- Letter B is kind towards the player-character
- This section will focus on geometry
- The music will be playful and happy, to match the personality of B

Level 5: A

- This level is hosted by the letter A
- Letter A is very enthusiastic and encouraging
- This section will be a review of all of the math sections that the player has previously been quizzed on
- The music will be even more playful and joyful, to match the personality of A

General enemy rules

The enemies are the letter grades. Their attack mode is ask progressively harder questions.

Level-specific enemies

Each level is a letter grade, from “F” to “A”.

NPCs

- The letter grades will act as the main NPCs the player character interacts with. They constantly chime in and, depending on the letter grade, they could either chide the player or cheer them on as they inch ever closer to their goal.

Music and SFX

For the prototype, the game will use license-free music, and Addie Anderson will create basic SFX. The overall feel of the music will be

childlike and fun, to match the “drawn” look of the dream and to appeal to children. The music will crossfade as each new level begins.

Music needs:

- 20-second loop for the title screen
- 30-60 second loops for each level of the game

SFX needs:

- Letter grade vocalizations, positive and negative reactions to based on the player’s answers
- Button click sounds