

Griffin Bjerke

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Definitions:

- **Computer Game** - a form of interactive multimedia used for entertainment played on a PC.
- **Player** - a person who interacts with a game.
- **Common Core** - An educational initiative that details what K-12 students should know at the conclusion of each grade level.
- **Single-variable-equation (SVE)** - An algebraic expression in the form of $a=bx+c$ where $a, b,$ and c are known rational numbers, and x is the single unknown rational number.
- **GEMA** - An acronym that stands for Groupings, Exponents, Multiplication, and Addition which determines the conventional order to solve a mathematical expression.
- **Ratio Test:** A test to compare two numbers through division. For any real numbers a and b : if $a/b \leq 1$ then $a \leq b$.
- **Distance Test:** A test to compare two numbers through subtraction. For any real numbers a and b : if $a - b \leq 0$ then $a \leq b$.
- **NPC:** An acronym that stands for non-player character.

Requirements:

1. Game Content
 - 1.1. The game shall be suitable for 6th grade and up or for ages 10+ according to the ESRB.
 - 1.1.1. The game may contain cartoon, fantasy or mild violence, mild language and/or minimal suggestive themes.
 - 1.2. The game shall provide a tutorial level or section to introduce the basic gameplay mechanics.
 - 1.3. The game will have its players apply and extend previous knowledge of elementary school arithmetic to single-variable-equations.
 - 1.4. The game shall educate its players on the order of operations for SVEs. The convention of GEMA will be explained.
 - 1.5. The game shall educate its players on how to solve single-variable equations according to the guidelines of the Common Core for 6th graders.
 - 1.6. The game shall include progressive levels of difficulty to adapt to the player's increasing skill level and knowledge as they progress through the game.
 - 1.7. The game will take place in a prison.
2. Game Mechanics
 - 2.1. Players shall learn how to solve SVEs through a lock picking minigame.

- 2.1.1. Players will open a lock by solving a randomly generated SVE according to the rules of GEMA. Each stage of the lock will represent a part of an SVE, and must be solved in an order that satisfies GEMA.
- 2.2. The player may search for items around the prison that will assist them in solving the locks.
- 2.3. The game will have prison guards which are enemy NPCs that will roam the environment trying to hinder the player's progress. If the guard spots the player, it will reset the stage.
- 2.4. The game will have video surveillance cameras throughout the prison. If any camera spots the player, the game will have them restart the stage.
3. UI & Experience
 - 3.1. When the game starts, it will first display a warning if there are any epileptic triggers.
 - 3.2. The game menu will allow players to turn off any bright, flashing light effects.

Usecase Diagram:

