

# **Overview of Grammar Grable**

**Software Engineering COMP 4110  
University of Massachusetts Lowell  
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## **Team members:**

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Software Developer: Darin Oti Abankwa, Nicholas Stearns

Software Architect: Andrew Clark

**Instructor: Dr. James Daly**

# Project Overview

- Grammar Grable is a puzzle based educational game designed to help improve your vocabulary.
  - Loosely similar to Escape Room type games. Players have to solve the problem using key items to escape the room and complete each level.
- Target audience: Grades 4-6 Students.
  - Interactive Lesson Modules: Players don't just read, they interact with the puzzle to learn grade 4-6 reading concepts.

# Motivation for project

Problem:

- “One-size-fits-all” teaching style leave some students behind

Vision Solution:

- Applying game design to create intrinsic motivation and mastery based learning

Goal:

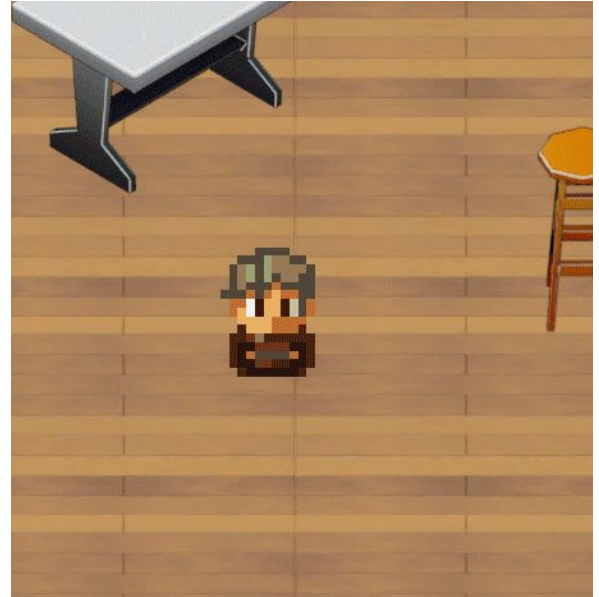
- To create an engaging, teacher supported tool that transform mandatory boring curriculum into a fun desirable learning level based adventure game

# Overview of Features

- Player movement and animation
- Randomized Grammar Questions to unlock door
  - Questions and answers based on selected difficulty
- Answers tied to key items
  - One wrong answer, one correct answer
- Enemy the player must avoid throughout the level
  - Detection Vision
  - Patrolling
- Level System

# Player Movement/Animation

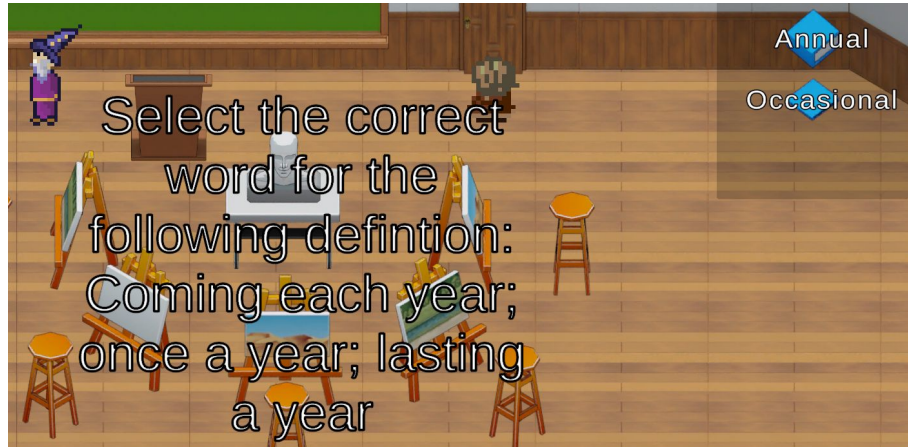
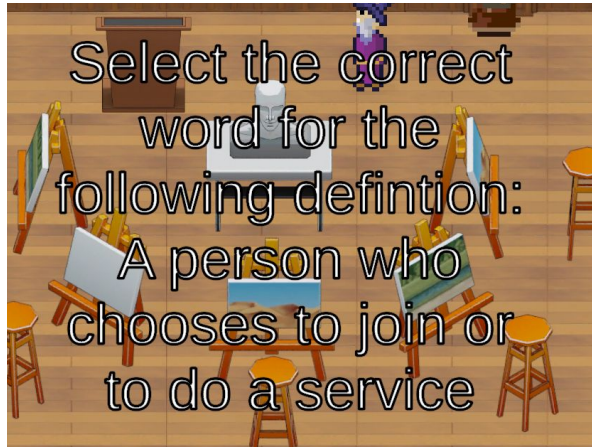
- Full Player Movement
- Full Animation for player
- Unity animation state machine



# Randomized Question tied to items and door

- The user can use collected items from inventory to unlock the door
- Must answer the grammar question shown to progress to next level
- Reinforces grammar concepts in a fun repetitive game flow
- Selected Difficulty affects the question pool selected from

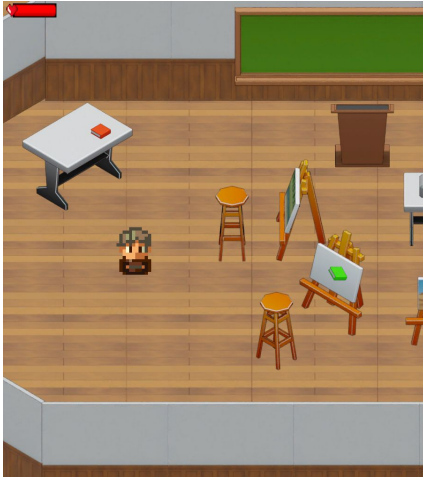
Player Interacted with door to show the question      Randomized questions, items, and item icons on each run



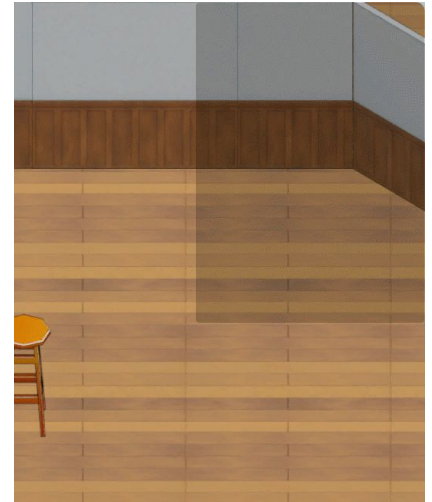
# Items

- Key items are placed throughout the level the player must find and pick up to escape the room
- Randomized icons
- Randomized Answers

Items placed in level with their randomized icon



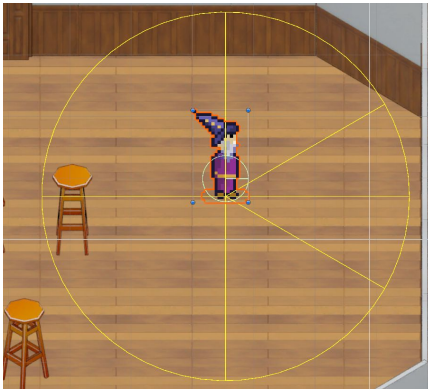
Items show a popup on pickup and place in inventory with proper icon and word



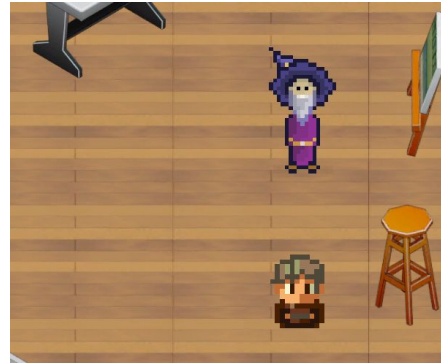
# Enemy

- Enemy Patrols through the level on preset path
- Rotates vision based on direction it is looking
- Follows and damage player

Enemy vision visualized in Editor



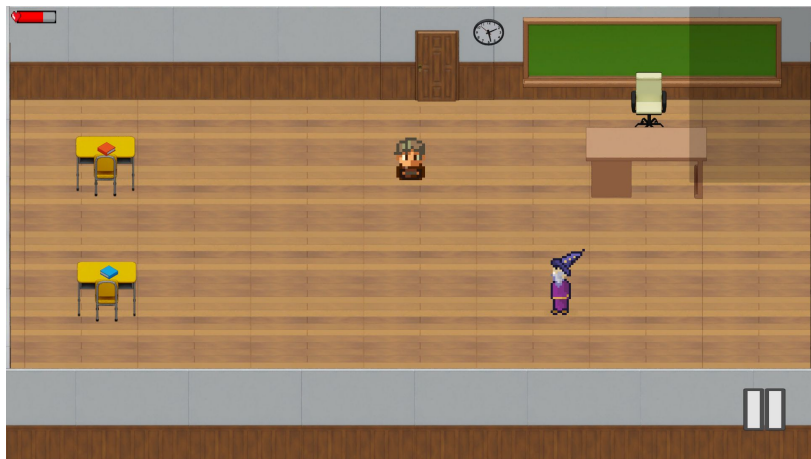
Following the Player in the level





# Levels

- Set of levels the player must progress and escape through
- Each level has its own item locations and enemy placement and patrol
- 4 custom made Levels



# **PART I: Domain Research and Constraints**

# Domain Research

- Investigated Massachusetts Common Core State Standards and English Language Arts Standards to define what is considered educational and useful to 4th-6th students
- Researched puzzle games to understand the balance of educational, mental stimulation, engagement, and fun
- Took inspiration from Sokoban and Pokémon for UI and gameplay

# Project Constraints

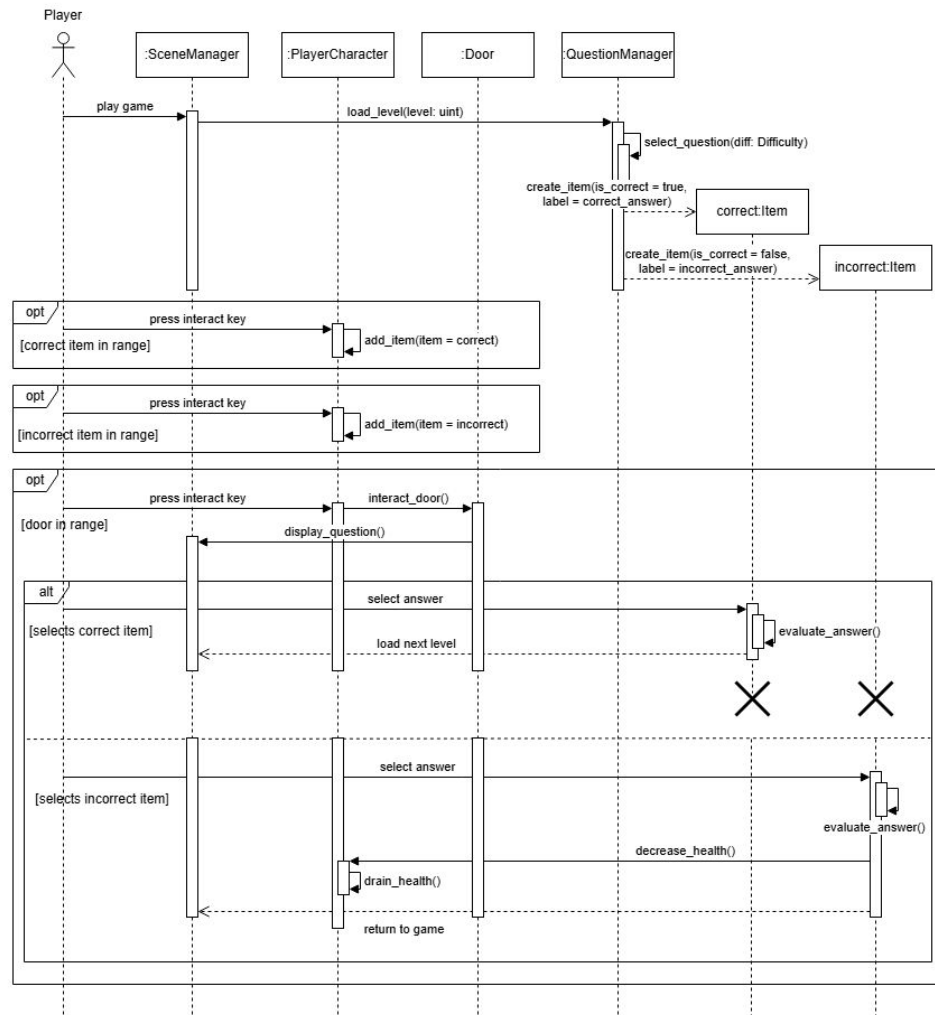
- Creating a game that is engaging and fun for children, whilst fitting the category of educational
- Developing a complete and functional prototype within given timeline while balancing personal responsibilities
- Using the Unity Engine

# **Part II: Model-based View of System**

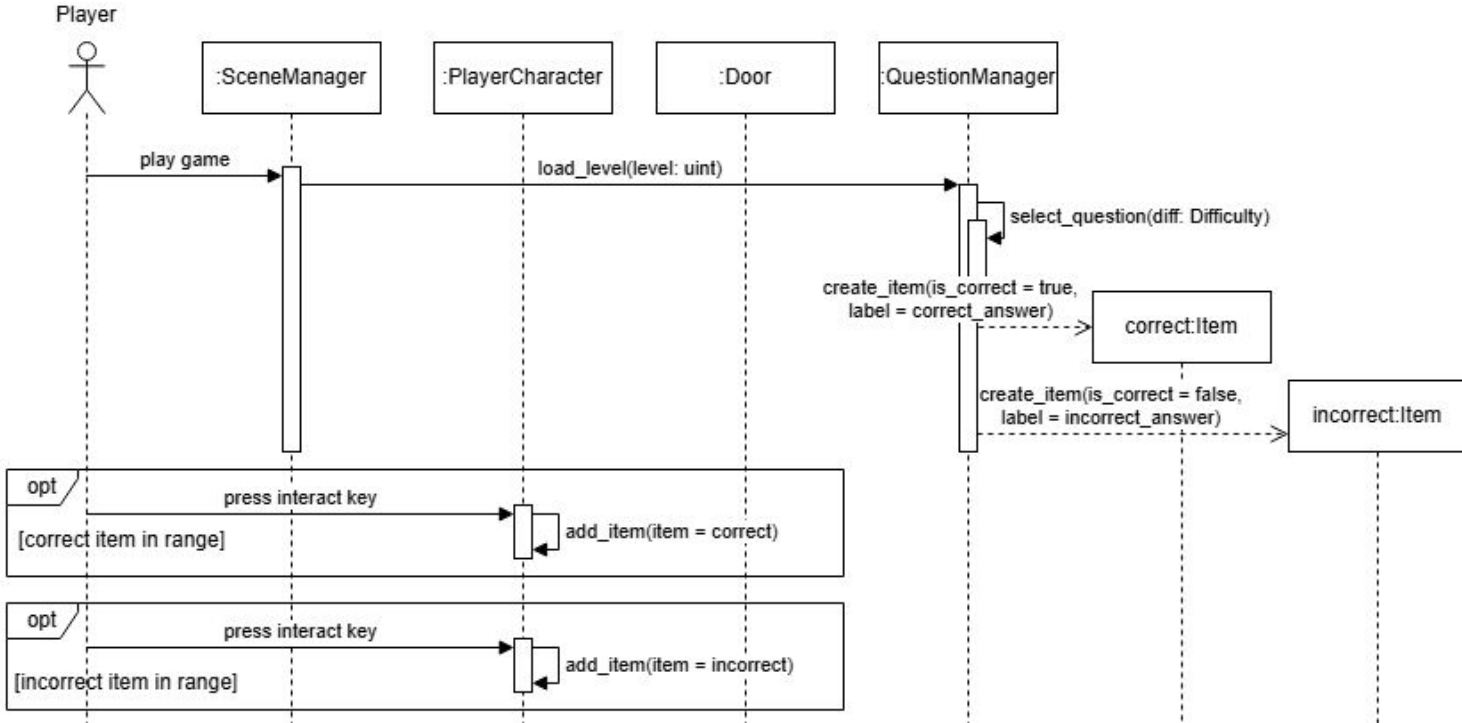
# Sequence Diagram

Describes:

- Selecting a level's question
- Creating items
- Adding items
- Correct and incorrect answer outcomes



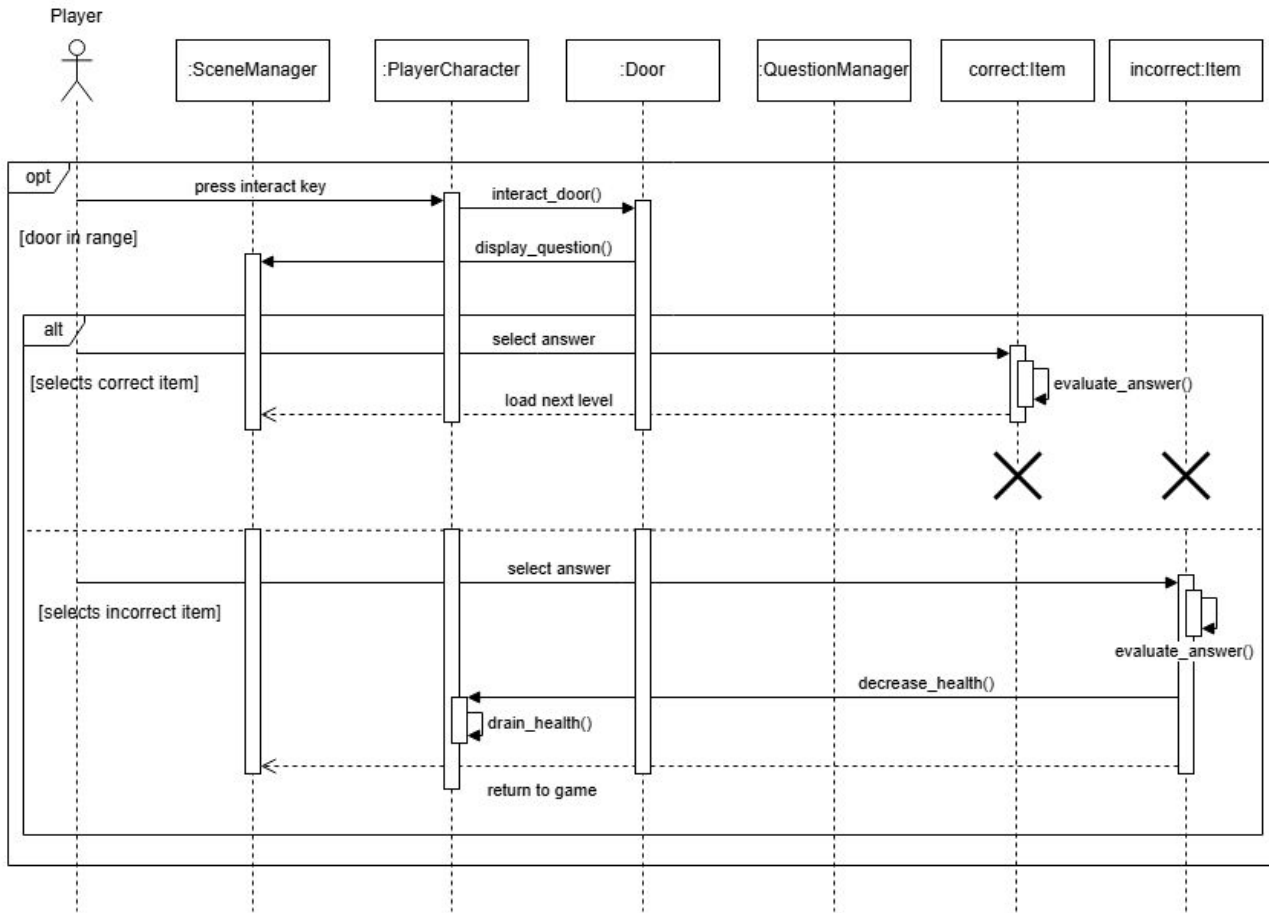
# Sequence Diagram: Part 1



Question  
selection

Item  
creation

Items  
added



# Sequence Diagram: Part 2

Answer by  
selecting items in  
inventory

Correct answer  
loads next level

Incorrect answer  
causes lost health



# Part III: Demonstration

- Navigation through menus
- Difficulty selection
- Unlocking the doors with Question
- Enemy following and attacking the player and patrolling

# Main Menu

The background of the main menu is a colorful cartoon illustration of a classroom. It features a large window with a view of green hills and a blue sky with clouds. A banner with the text 'Grammer Grable' is hanging across the window. In the foreground, there is a blackboard on a stand, and two sets of wooden lockers on either side. The floor is made of wooden planks. The overall style is bright and cheerful.

**Grammer Grable**

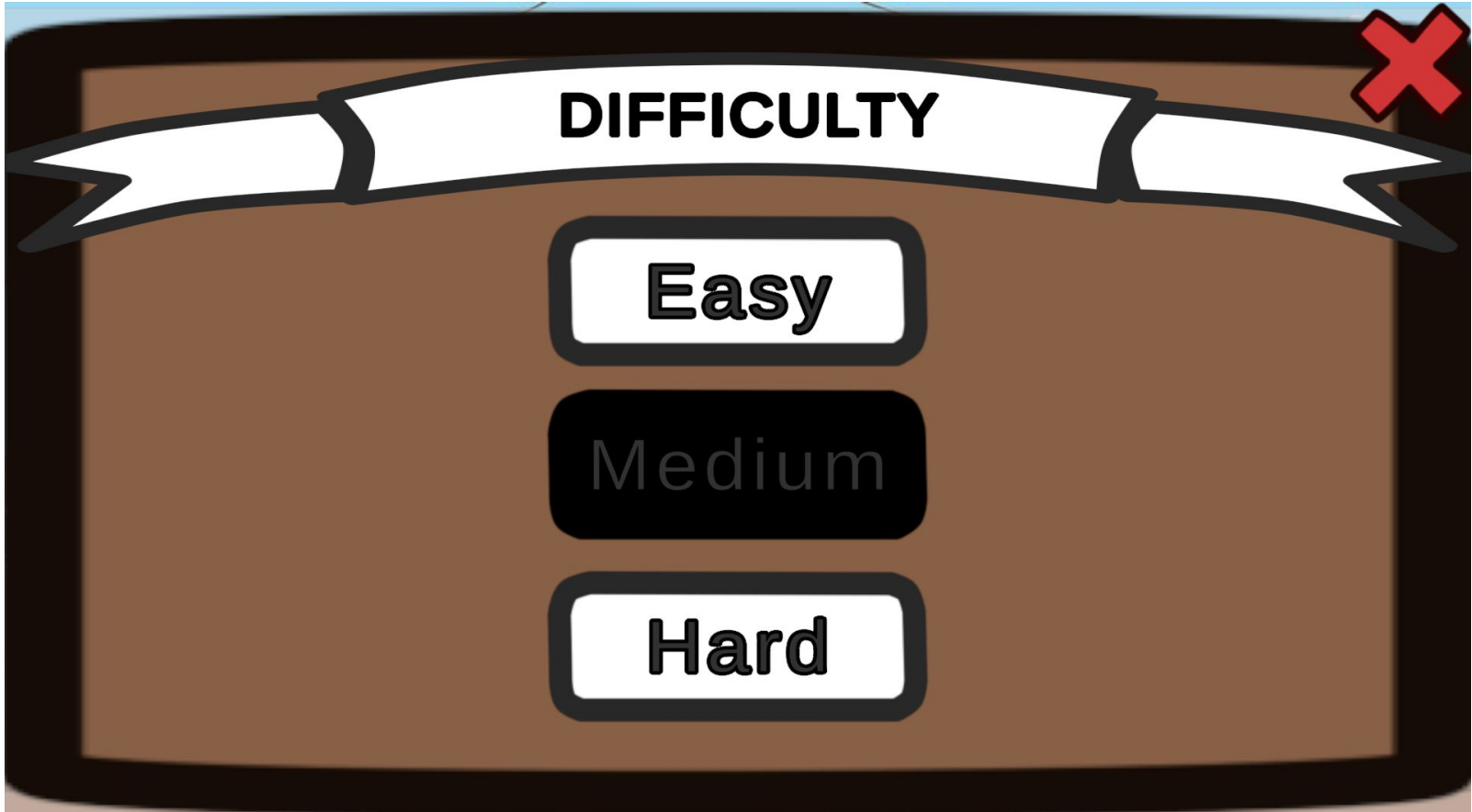
**PLAY**

**Controls**

**Difficulty**

**QUIT**

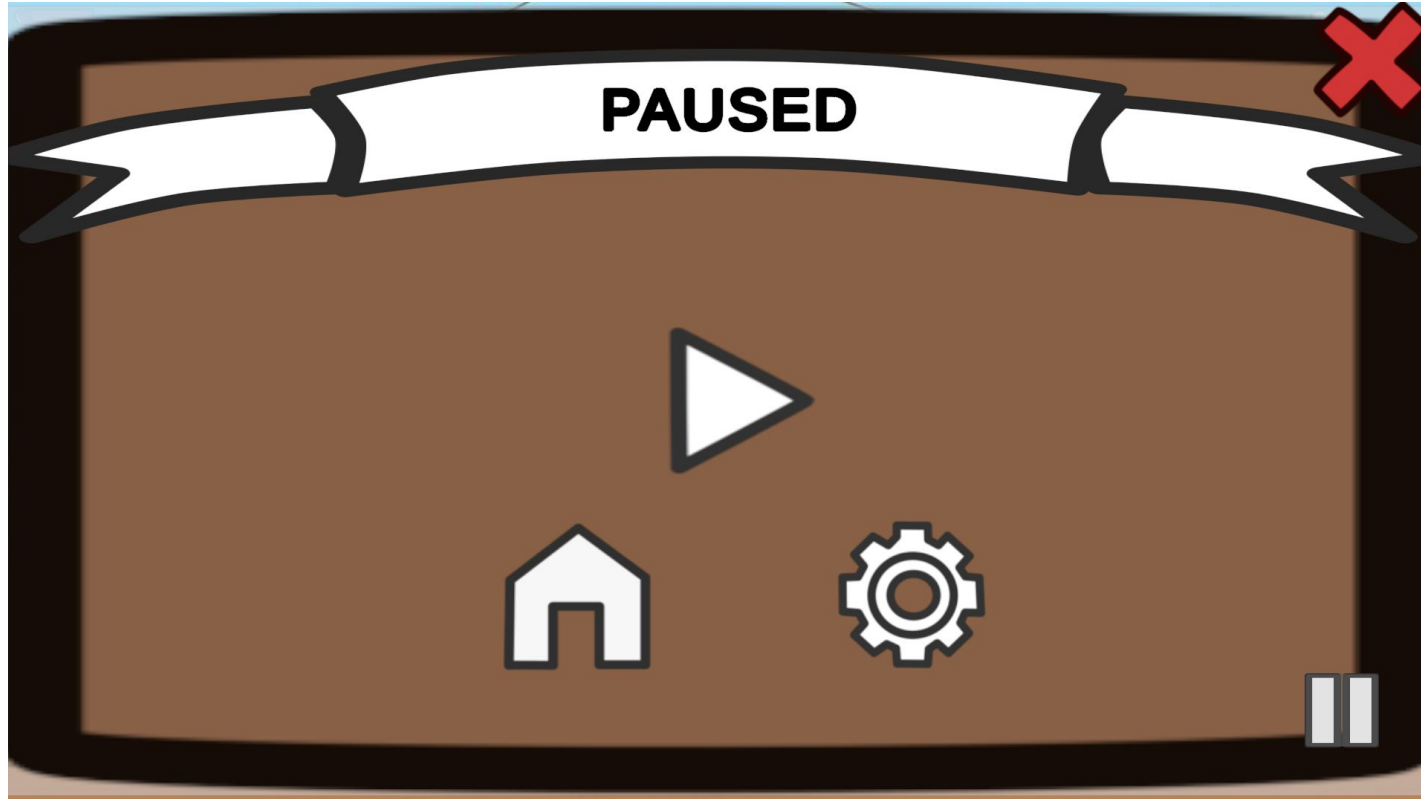
# Difficulty Selection



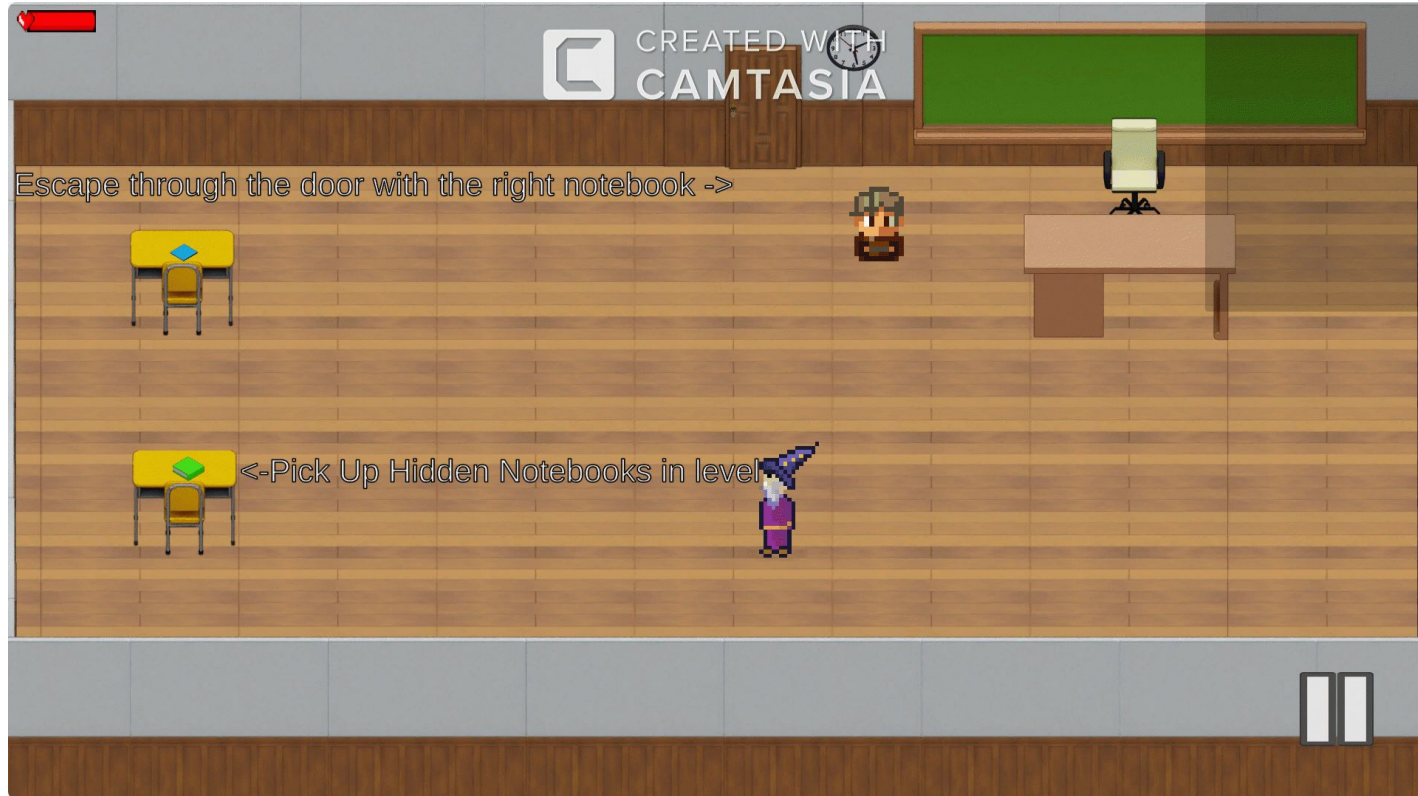
# Game Start/Tutorial Level



# Player Selects Pause menu

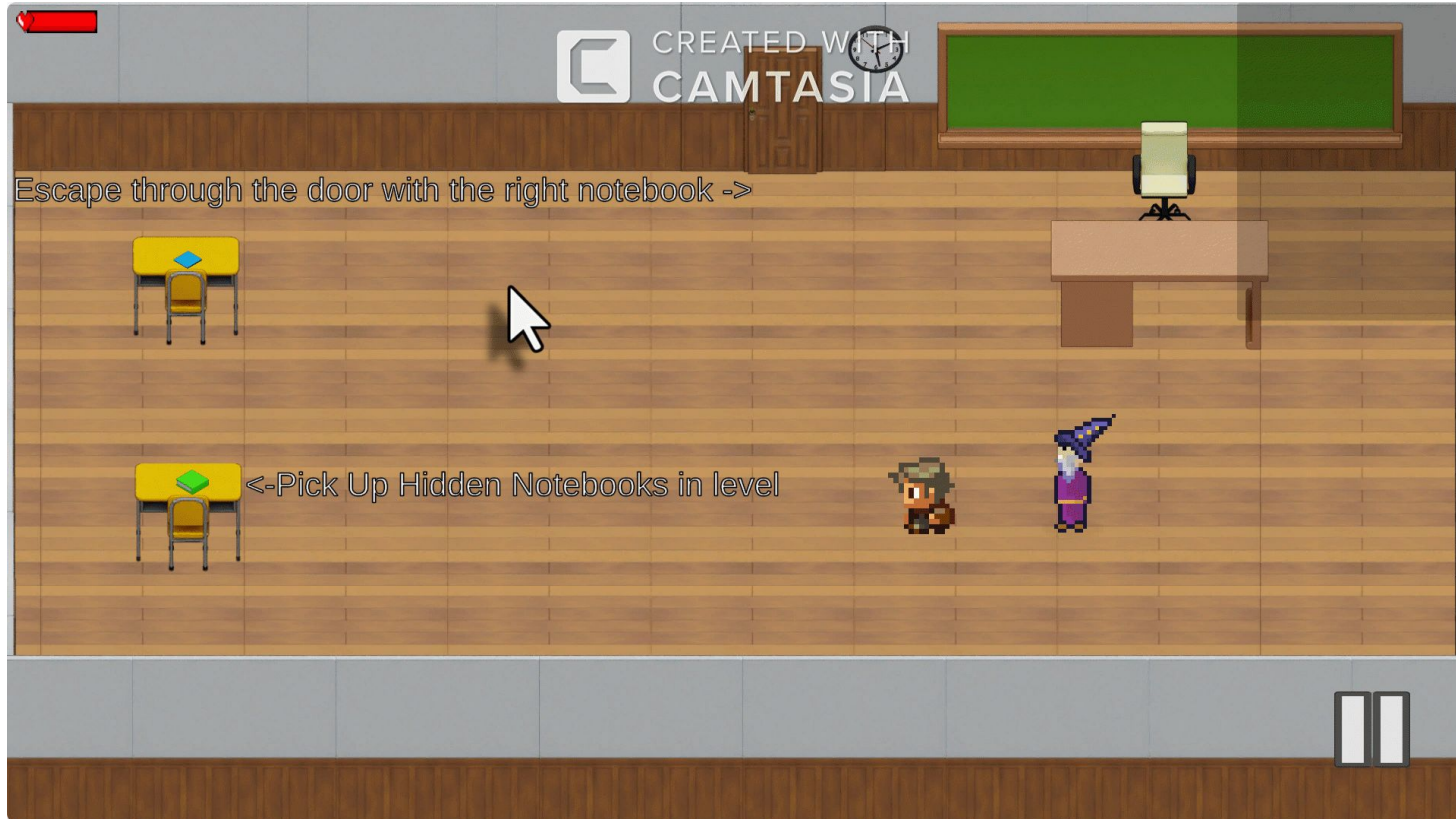


# Enemy Patrolling

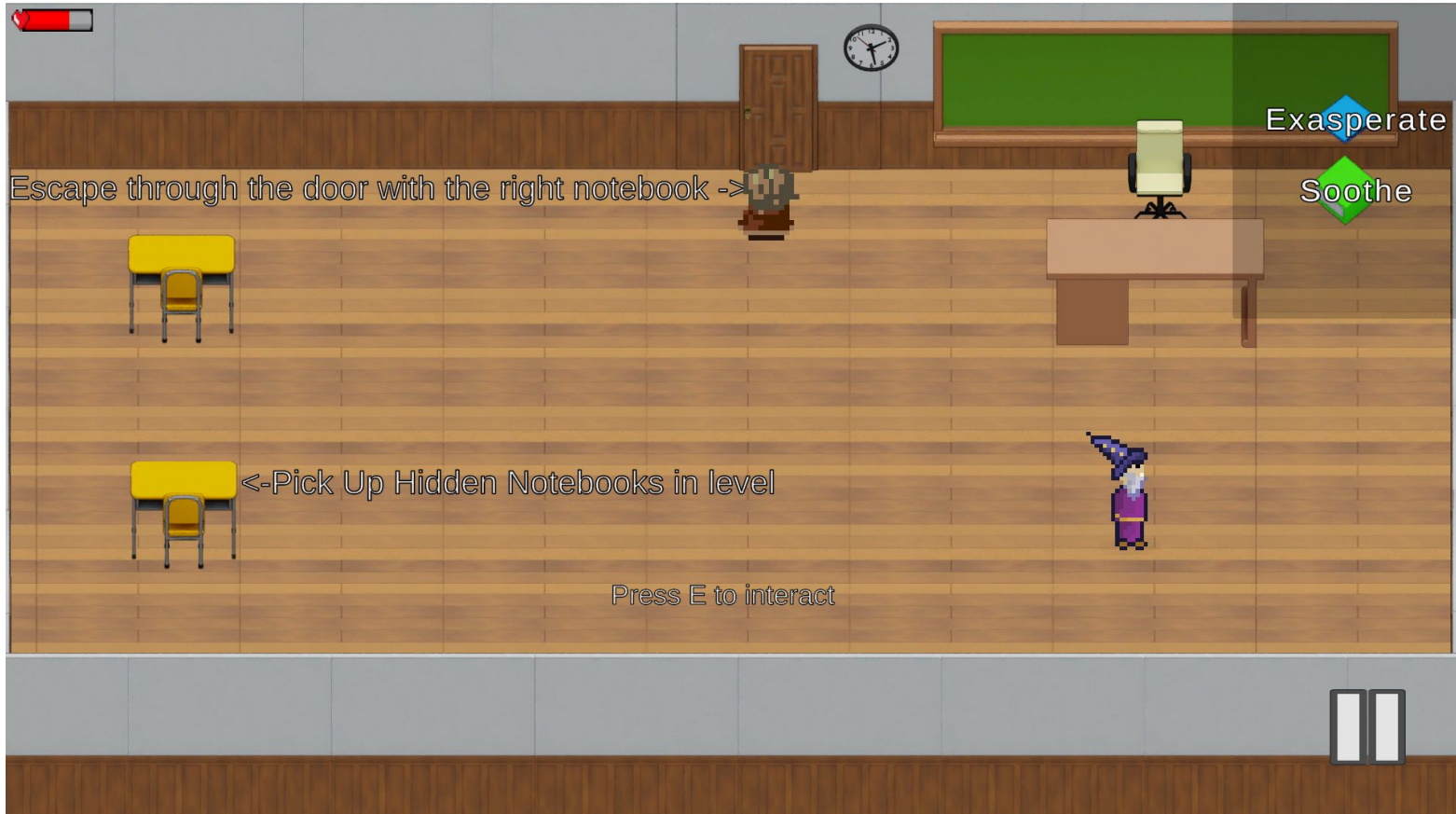




# Enemy Chasing Player

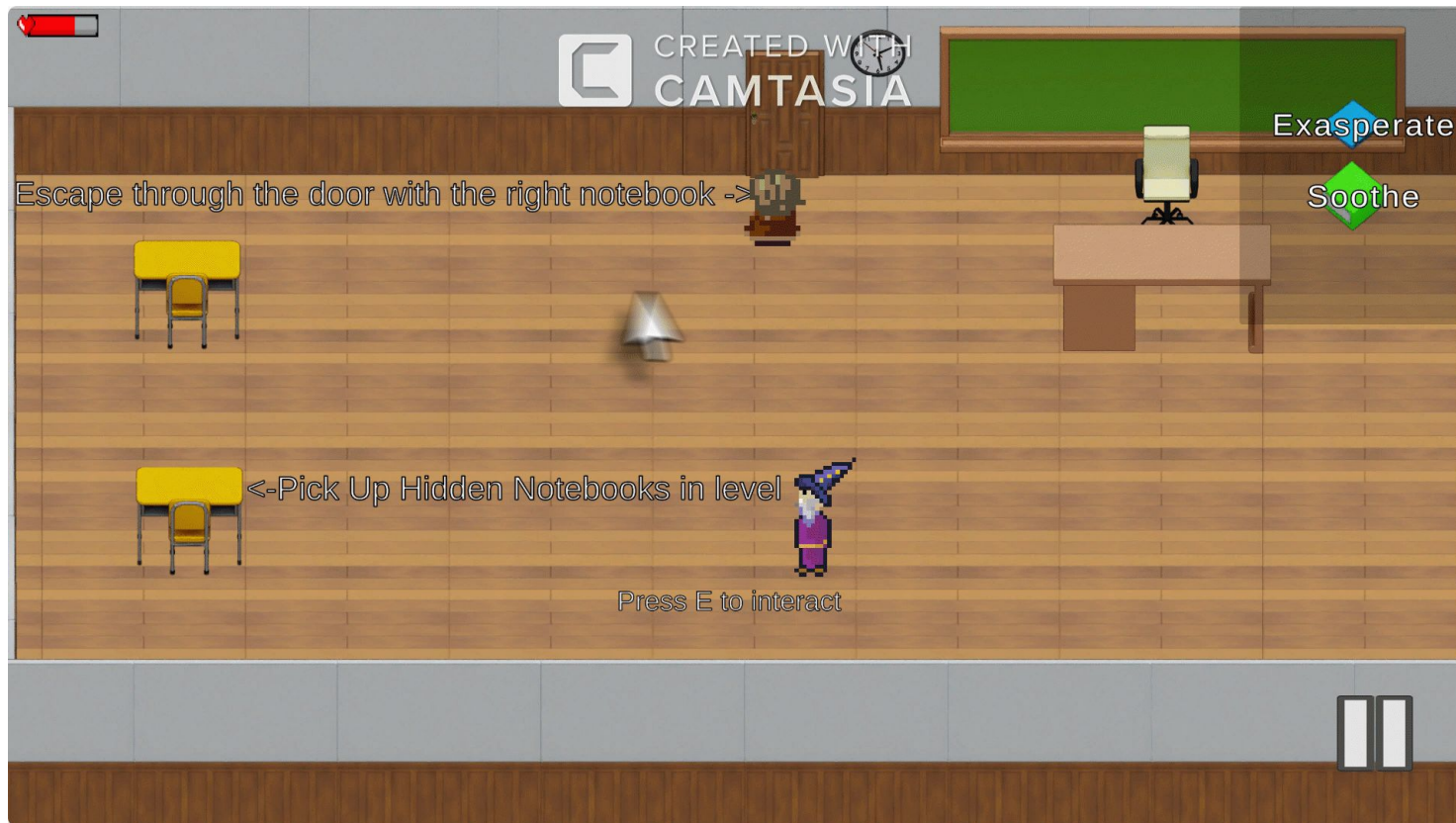


# Player Picks up Items on level





# Player Selects correct items



# Player Moves to next level

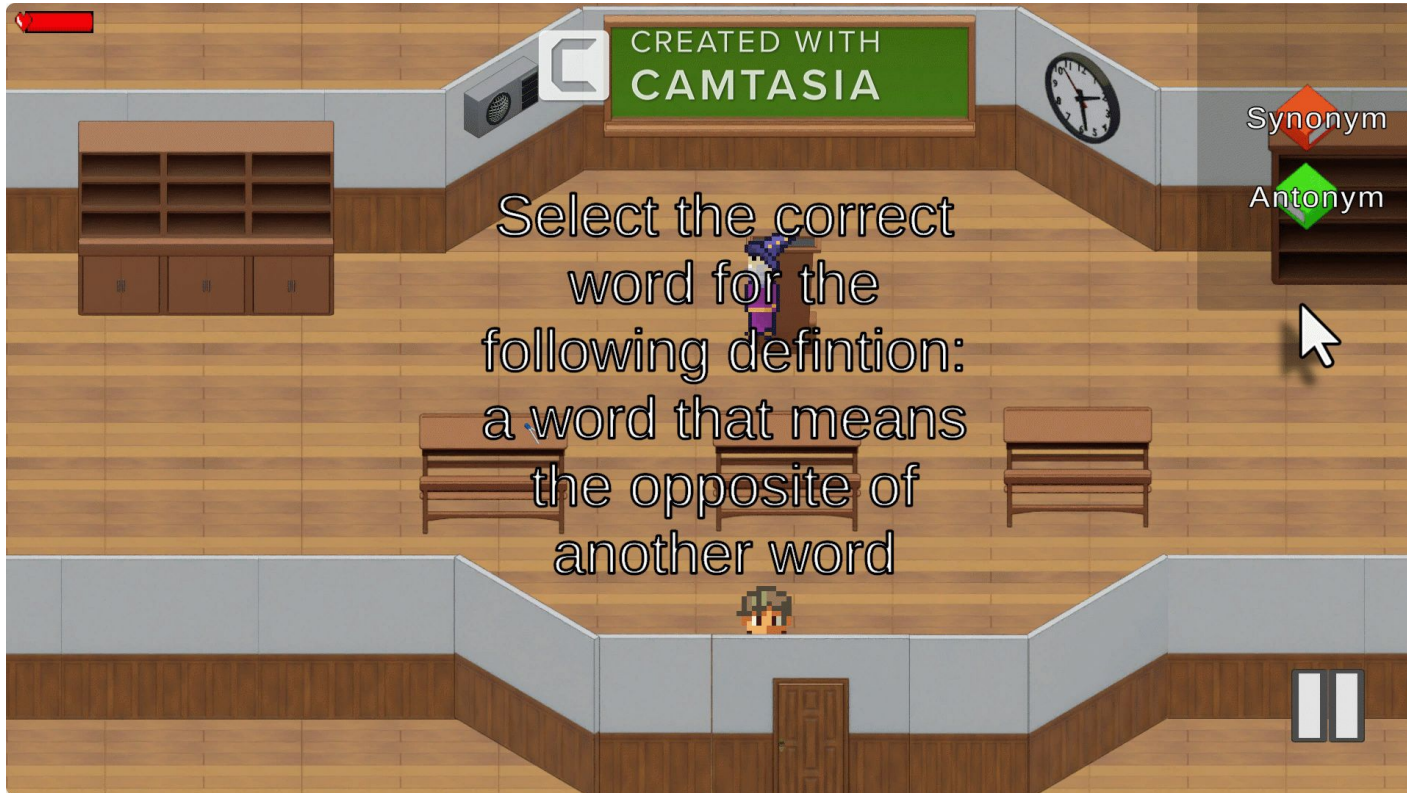


# Player Loses all health





# Player Beats the last level



# Improvements

- More Complicated Grammar Questions
- Bigger levels
- Better movement with sprint
- The keys/books used at other different places such as:
  - Opening other rooms
  - Safe boxes

# Future Features

- The gameplay was inspired by Escape Room games, would focus more on different puzzles
- There will be a different enemies such as:
  - An enemy that pickpockets the player their keys
  - An enemy that blinds you for certain amount of time
- Score system
- Progress tracker
- Sound system

# Acknowledgements

- We gratefully acknowledge and appreciate the participation of our customer, Dr. James Daly from the University of Massachusetts Lowell