Design Document
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A2 Extensions

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GitLab Repository:

https://mcsscm.utm.utoronto.ca/csc207_20239/group_78.git

SECTION 1: PROJECT IDENTIFICATION

The motivation behind this project is to enhance and extend the functionality of a2 by incorporating accessibility and gameplay features. These additions will significantly improve the user experience by introducing features such as text narration, interactive elements like trolls and a map, and the inclusion of items like potions. This expansion aims to make a2 more inclusive and engaging for a wider audience, thereby elevating the overall quality and enjoyment of the application.

SECTION 2: USER STORIES

Name	ID	Owner	Description	Implementation Details	Priority	Effort
Adding Soundroll	1.1	Goutham	As a developer, I want to block passages in my games with NoteTrolls so that gamers have fun trying to pass their challenges.	Modify submitEvent(), interpretAction(), movePlayer() to play a NoteTroll's challenge when attempting to move through a passage blocked by one.	3	2
Narrating Inventory	1.2	Goutham	As a non-sighted gamer, I need to know what objects are within my inventory so that I can drop them whenever I want.	Modify submitEvent() to articulate the player's inventory when the command is received.	3	2
Changing Font Size	1.3	Goutham	As a low vision gamer, I need to increase and decrease the font size so that I can read the text more easily in accordance with User Need 3.3.1 from the Technical Report on Accessibility Requirements for People with Low Vision.	Modify submitEvent() to change font size when the appropriate command is received.	3	2

Highlig ht Button	1.6	Jackso n	As a player with sight impairment, I want buttons to change colour so that I know which button I'm currently selecting.	Change the colour of the button selected by calling requestFocus() OR has a cursor on it. Button colour should have a contrast ratio of at least 4.5:1 to the default button colour.	4	6
Map Button	1.7	Jackso n	As a player, I want to press a button to have access to a map with every room shown on it, as well as an indication of which room I am currently in.	Draw a PNG of the map, where each room is a rectangle and each passage is a line. If a room requires "IN" or "OUT", then the room will be drawn within the room that the passages lead from. Place a dot in the middle of the room that the player is currently in.	1	8
Hint Button	1.8	Jackso n	As a player, I want to press a button to have access to a relevant hint when I'm stuck in order to progress through the game	Set predetermined checkpoints in a game (collected items, rooms taken, etc.). For each checkpoint, write a hint on how to get to the next checkpoint. Print out the hint in roomDescLabel when the hint button is pressed.	2	5
Quicks ave Button	1.9	Jackso n	As a player, I want to save my game with only one button press or mouse click.	Halve the width of the save button and fit the quicksave button next to it. Upon pressing the quicksave button, save the game without having to open a new window for the player to confirm the save.	3	1

Time-se nsitive Passag e	1.1 2	Goutha m	As a developer, I want to block passages at certain times so that rooms can only be accessed at certain times.	Modify submitEvent(), interpretAction(), and movePlayer() to block passages at the correct times.	3	2
Custom Synony ms	1.1 3	Goutha m	As a gamer, I want to add synonyms so that I can enter them in lieu of commands to achieve the same effect.	Modify interpretAction() to add the synonym when the appropriate command is received.	3	2
White/D ark Theme	1.1 4	Goutha m	As a gamer, I need to change the game theme between white and dark so that I can reduce eye strain during the night and increase readability during the day.	Modify submitEvent() to change the theme when the appropriate command is received.	3	2
Health Bar	1.1 5	Goutha m	As a developer, I need a health bar so that I can set the number of hearts, and put traps and trolls in passages to deplete it.	Modify loadGame() to load health, interpretAction() and submitEvent() to show health, trigger traps and register damage from trolls.	3	2
Notepa d	1.1 6	Goutha m	As a gamer, I want to write notes about the game so that I can review them later.	Modify interpretAction() to record notes and submitEvent() to show them.	3	2

Statistics Display	1.17	Goutham	As a gamer, I want to view my gameplay statistics so that I can share them with others.	Modify interpretAction() to record statistics and submitEvent() to show them.	3	2
Game Troll	1.10	Haris	As a developer, I want to block passages in my games with GameTrolls so that players can play interactive games like tic-tac and win it in order to proceed.	Modify submitEvent(), interpretAction(), movePlayer() to play a Game Troll''s challenge when attempting to move through a passage blocked by on	3	4
Magical Objects	1.11	Haris	As a developer I want to add magical objects to the game so that a player can use them and decide to open a door blocked by a Troll or an Object. Once the magic potion has been used it will disappear from inventory.	Modify Player, movePlayer,interpretAction, submitEvent(), make Adventure Object an abstract class which is inherited by Normal Object and Magical Object, Implement the State Design Pattern.	6	7
Narrate Commands	1.17	Ryan	As a non-seeing gamer, I need to be able to know which commands I am a able to make in a given room	Modify submitEvent() to articulate the possible directions a player can go should they input the commands event	3	2
Adding StartOver	1.18	Ryan	As a developer, I want to be able to present the player the option to start the game over should they win, so that they can see if there is more than one unique way to beat the game. They should also be presented with this option should their character die, so they can start over	Add a StartOver button that reloads the game to a new TinyGame. Ensure the start over button only exists in rooms with a passage of FORCED 0.	3	2

Adding HelperTroll	1.19	Ryan	As a developer, I don't want there to only be mean trolls that block players from continuing, I also want there to be nice trolls, trolls that can either give them a hint as to where to go, or to give them an item that may help them on their adventure, so that there is more variety to the creatures they encounter while playing the game	Modify updateScene() when there is a passage with the word HELPERTROLL, display a troll, transport the player to a random room that contains an object, place that object in their inventory, and return them to the previous room	3	5
Adding Customization	1.20	Ryan	As a gamer, I want to be able to customize the menu of the game when it comes to the colour of the background, buttons, and the fonts used for the buttons and other text, so that I can have a more aesthetically pleasing game	Fit a Customization button in with the save, quicksave, instructions and load button. When clicked, have a menu that provides the user with a list of fonts and colours to choose.	3	5

Acceptance Criteria

Name	ID	Description
Adding SoundTroll	1.1	- Given that I am a gamer, when I enter a passage blocked by a NoteTroll, then I have to guess their pitch to proceed." - Given that I am a developer, when I add "/TROLL" to a passage in rooms.txt, then a NoteTroll will show up when a gamer tries to enter that passage.
Narrating Inventory	1.2	Given that I am a non-sighted gamer, when I type "INVENTORY", my inventory will be articulated from top to bottom as shown in the ScrollPane.
Changing Text Size	1.3	- Given that I am a low vision gamer, when I type "INCREASE FONT SIZE", text size will be increased by 1. - Given that I am a low vision gamer, when I type "DECREASE FONT SIZE", text size will be decreased by 1, but not below the default size (16). - Given that I am a low vision gamer, when I type "RESET FONT SIZE", text size will be decreased to the default size.

Highlight Button	1.6	● Given that I'm a player with sight impairment, when I press TAB, or hover over a button with my cursor, the button will change colour.
Map Button	1.7	● Given that I'm a player, when I press a button to open the map, a new pane will appear on my window that shows the map.
Hint Button	1.8	● Given that I'm a player, when I press a button to receive a hint, a hint will be shown to provide me with adequate knowledge to progress.
Quicksave Button	1.9	● Given that I'm a player, when I press a button to quick save, the game will save for me without having me confirm its filename.
Time-sensitive Passage	1.12	● Given that I am a developer, when I add /TIME-[TIME RANGE] to a passage in rooms.txt, the passage will be blocked over that time range. ● Given that I am a gamer, when I try to enter a time-sensitive passage, I will be unable to enter.
Custom Synonyms	1.13	Given that I am a gamer, when I type "ADD [SYNONYM]=[WORD]", I will be able to use SYNONYM in lieu of WORD when typing a command.
White/Dark Theme	1.14	Given that I am a gamer, when I type "CHANGE THEME", the theme of the game will be swapped to white theme if dark theme is currently enabled, and vice versa.
Health Bar	1.15	● Given that I am a developer, when I add /TRAP[NUMBER] to a passage in rooms.txt, the player will lose NUMBER hearts when trying to cross the passage. ● Given that I am a developer, when I add /TROLL[NUMBER] to a passage in rooms.txt, the player will lose NUMBER hearts when losing against the troll. ● Given that I am a gamer, when I type "CHECK HEALTH", x/total hearts left will be shown. ● Given that I am a gamer, when I lose all my health, the game will end.

| Notepad	1.16	● Given that I am a gamer, when I type "NOTE [NOTE TEXT HERE]" a note with corresponding text will be recorded to a list. ● Given that I am a gamer, when I type "SHOW NOTES", all notes will be shown as a list.
Statistics Display	1.17	As a gamer, I want to view my in-game statistics so that I can track progress towards completing the game.
Game Troll	1.10	● Given that I am a player, when I enter a passage blocked by a Troll, I am prompted with an interactive GUI based game to play. If I win the game I will pass through the blocked path and reach the destination room. Otherwise I remain in the same room". ● Given that I am a developer when I add a Troll to a passage a GameTroll should show up.
Magic Potion	1.11	Given that I am a player, who has the magic potion in his inventory when I reach a blocked door. I am given the option to use my magic potion. If the magic potion is used I pass and reach the next room and the magic potion is removed from my inventory.
Narrate Commands	1.17	● · Given that I am a developer, when the player types in C or Commands, the game will display the list of possible commands for that room, and read them out loud to the player
Adding StartOver button	1.18	● · Given that I am a player, when I beat the game, I want to be able to click the StartOver button to restart at my most recent save file ● · Given that I am a player, when I die in the game, I want to be able to click the StartOver button to restart at my most recent save file.
Adding HelperTroll	1.19	● · Given that I am a player, I want to encounter a troll that is more friendly and offers me a hint or a random object. ● · Given that I am a player, when I type "Hint" at the prompt from the troll, I will be given a hint ● · Given that I am a player, when I type "Object" at the prompt from the troll, I will be given a random object that may help me on my adventure. ● · Given that I am a gamer, I want to be able to customize the colour of the background and buttons, as well as the font of the buttons and the text descriptions
	1.20	

| Adding Customization | ● · Given that I am a gamer, when I click the "customize" button, I want to be given a menu that shows me various background colours to pick from, various button colours to pick from, text fonts to pick from, and a "default" button that restores default customization settings |

Design Pattern #1: Memento Pattern

Overview: This pattern will be used to reset, increase, and decrease the font size for user story 1.3.

UML Diagram:
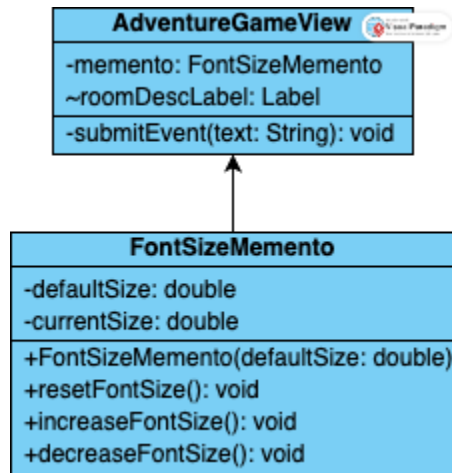
Implementation Details: The UML diagram outlines these main components:

- The *AventureGameView*, which includes submitEvent.
- Two attributes (*'defaultSize'* and *'currentSize'*). These will store the default font size and current font size.
- The *FontSizeMemento*, with constructor FontSizeMemento and methods resetFontSize, increaseFontSize, and decreaseFontSize, all of which have no return value.

When AdventureGameView is instantiated, a *FontSizeMemento* object with the default size will be instantiated and stored in the *memento* attribute.

When receiving the command "RESET FONT SIZE" in submitEvent, roomDescLabel will have its font size reset to the default size using resetFontSize, which will use the '*defaultSize*' attribute and set '*currentSize*' equal to '*defaultSize*'.

When receiving the command "INCREASE FONT SIZE" in submitEvent,

roomDescLabel will have its text size increased using increaseFontSize, which will increase '*currentSize*'.

When receiving the command "DECREASE FONT SIZE" in submitEvent, roomDescLabel will have its text size decreased using decreaseFontSize, which will decrease '*currentSize*'.

Design Pattern #2

Overview: This pattern will be used to implement magic potion for user story 1.11

UML Diagram:
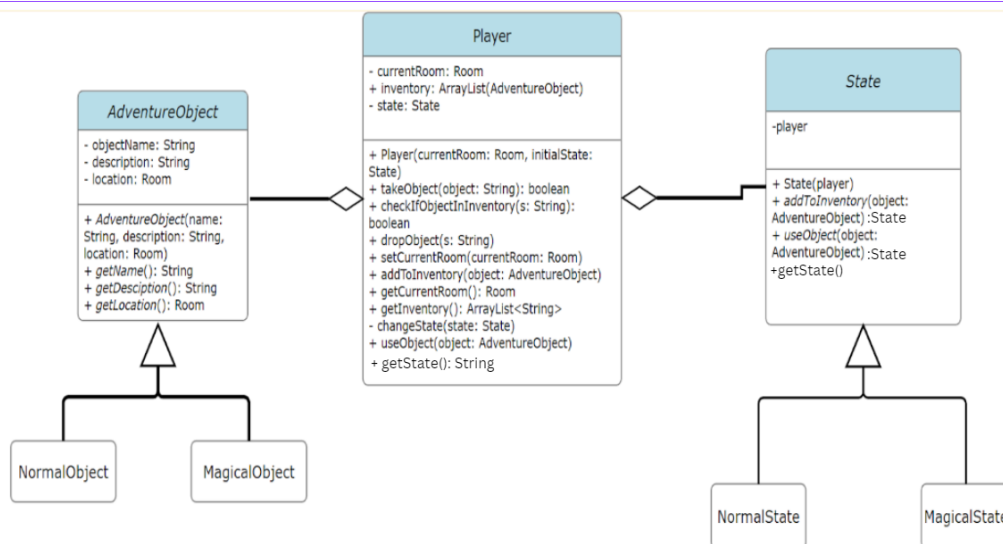
Implementation Details: The UML diagram outlines these main components:

- The *AdventureObject,* which is an abstract class and in inherited by NormalObject and MagicalObject
- The Player class which has 3 attributes currentRoom which indicates the current room the Player is in, the inventory which is the list of all AdventureObjects the Player has, state which indicates the State of the player. The player class also has some methods in order to perform actions.
- The abstract class State which is inherited by NormalState and MagicalState. It has a method addToInventory which adds an object to players inventory and checks if the object is a MagicalObject if it is and the player is not

already in MagicalState it calls changeState and changes the state of player to MagicalState.

- The abstract class State also has a method useObject() that removes the object from inventory if the object is a MagicalObject. If it is not a magicalObject it does not remove it from players inventory. Then it checks if there are still MagicalObjects in the player's inventory. If there are no MagicalObjects and if the player is in MagicalState it calls changeState and changes state of player to NormalState.

Design Pattern #3: Strategy Pattern
Overview: This pattern will be used to implement magic potion for user story 1.9
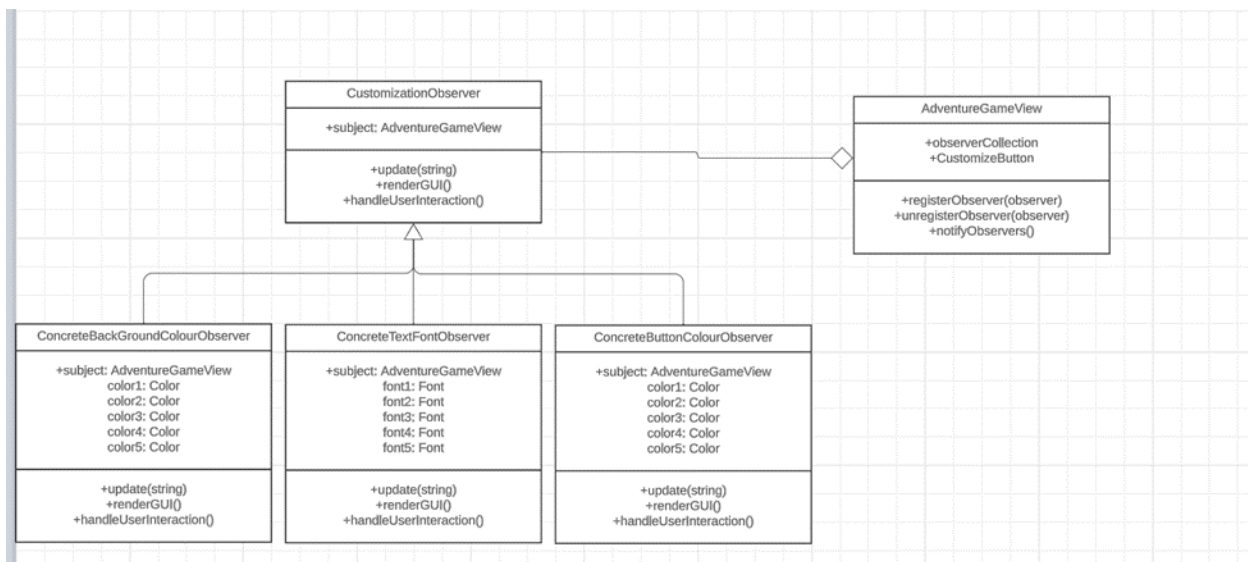**UML Diagram:**
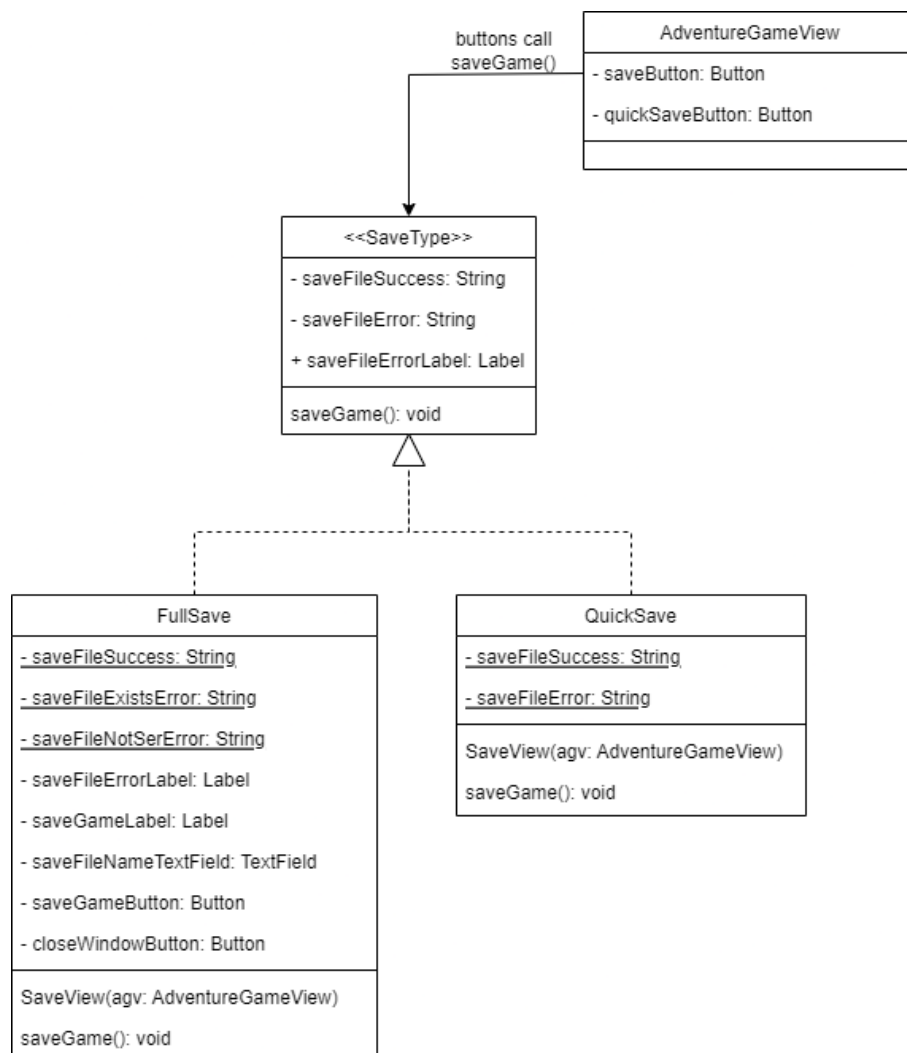
Implementation Details:

- The SaveView class will be split into two different classes - FullSave and QuickSave. Both classes will implement the SaveType interface, which contains an abstract method called saveGame().
- The FullSave class will contain everything that the original SaveView class implemented.
- The constructor of the QuickSave class will not implement a window for the player to save their game. Instead, the class will save the game upon pressing quickSaveButton and output either a success message or an error message in the roomDescLabel of AdventureGameView.
- The AdventureGameView class includes the two buttons (one for regular save, another for quick save) that will call saveGame() from the respective class.

Design Pattern #4: Observer Pattern

Overview: This design pattern will be used to implement customization for user story 1.20

UML Diagram:

Implementation Details: The UML Diagram outlines these main components:

· The *AdventureGameView,* which aggregates the *CustomizationObserver* class, it also will contain a CustomizeButton, much like the saveButton, loadButton and helpButton, the customizeButton will load a menu that will house the GUI elements that *CustomizationObserver* and its subclasses will instantiate

· The *CustomizationObserver* class, which inherits the *ConcreteBackGroundColourObserver, ConcreteTextFontObserver,* and *ConcreteButtonColour* observer respectively, the methods it will have are update(string) which will be used by the concrete observers to update the elements in AdventureGameView they observe, renderGUI(), which will create the menu window of the Customization menu, and handleUserInteraction() which will handle any button clicks from the presented options

· The *ConcreteBackgroundColourObserver*, which will have five pre-selected colour choices as arguments, an update(string) that will update the background of the AdventureGameView window to whatever the chosen colour string is, a renderGUI() which will add the buttons to the *CustomizationObserver's* menu, and handleUserInteraction() which will handle button clicks.

· The *ConcreteTextFontObserver*, which will have five pre-selected font choices as arguments, an update(string) that will update the font of all the text in the AdventureGameView window to whatever the chosen font string is, a renderGUI() which will add the buttons to the *CustomizationObserver's* menu, and handleUserInteraction() which will handle button clicks.

· The *ConcreteButtonColourObserver*, which will have five pre-selected colour choices as arguments, an update(string) that will update the colour of all the buttons in the window of the AdventureGameView window to whatever the chosen colour string is, a renderGUI() which will add the buttons to the *CustomizationObserver's* menu, and handleUserInteraction() which will handle button clicks.

Design Pattern #5 Simplified builder Pattern:

Overview: After initially attempting to use an observer pattern for user story 1.20, a simplified version of the builder pattern ended up being closer to what was implemented

UML Diagram:
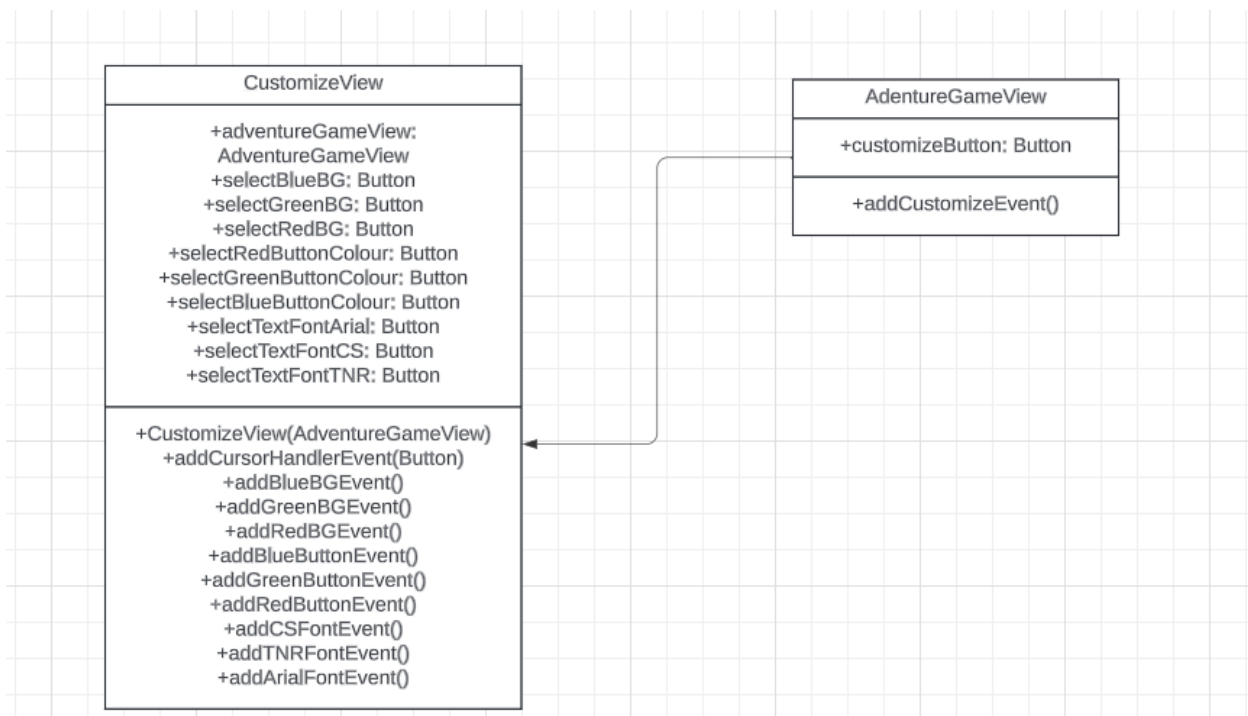
The builder pattern followed allowed for segmented, one by one construction of each button, each button getting the specific event added sequentially