Design Document

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AdventureGame Reloaded

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GitLab Repository:

https://mcsscm.utm.utoronto.ca/csc207_20239/group_21

SECTION 1: PROJECT IDENTIFICATION

The main motivation for this project is to enhance the user experience by acknowledging the varying visual and auditory abilities and preferences of players. Additionally, the project introduces innovative elements of interaction and inclusiveness, such as the implementation of lives, trolls and the scoring system. We are targeting accessibility problems by implementing auditory features such as Speech-to-text input, Closed Captioning, and adjustable volume, as well as visual features such as adjustable contrast, brightness, hue, and saturation, all available in an accessibility settings window in the GUI.

SECTION 2: USER STORIES

Group 21 User Stories

Name	ID	Owner	Description	Acceptance Criteria	Implementation Details	Priority	Effort
Speech-to-Text Input	1.1	Danyal	As a user who wants to input text using speech, I want to use a speech-to-text feature to convert my spoken words into written text, so I can easily enter text without typing.	Given that I am a blind user interacting with the game, I want to be able to speak my actions into the game without having to type my inputs which could pose difficulty sometimes.	Access an API for converting speech to text input. Offer a microphone icon beside the input field of the game. When the user is done speaking, enter that input as a command in the game automatically.	1	3
Accessibility Information	1.2	Danyal	As a user seeking accessibility information, I want the game to provide clear and comprehensive accessibility documentation, so I can understand how to use accessibility features effectively.	Given that I am a user with accessibility concerns, I want to be able to know all available accessibilities that are available to me so I can play to the fullest extent.	Game should include an button in the Settings Window, and when clicked, show accessibility information and features of the game	4	2
Settings Window	1.3	Danyal	As a player, I want to be able to change multiple settings in a dedicated window pane, such as volume, brightness, etc. along with being able to control all of the accessibility settings.	Given that I am a user with impairments, I want to be able to have a dedicated space where I can control all of the settings in one place.	Game should have a settings button in the GUI. Upon pressing, a window should pop up with sliders for volume, brightness, along with switches for various accessibility settings such as speech to text input, high contrast…	1	3
Contrast, Hue, Brightness, Saturation	1.5	Danyal	As a player with low vision/color-blindness, I want the option to enable a high-contrast mode, so I can better distinguish elements in the game's interface.	Given that I am a user with low vision/color-blindness, I want to be able to have the option for higher contrast for text and UI elements for a better visual experience.	Have an option for a “slider” within the settings window. When changed to the desired value, text and UI elements will change color to accommodate that type of setting.	2	3
Hearts	2.1	Arhum	As a player, I want to see how many hearts I have for my character so that when all my hearts are gone, the game will end and I will not get to play. There will be a “game over” screen that will show the score I ended the game with.	Given that I am a user that is playing the game, when I fight an enemy and take damage from it, I should lose a heart and that should be reflected on the GUI. When I lose all my hearts then	Create a variable in the player class that holds an int value representing the number of hearts. A function will draw a picture of hearts onto the canvas in the middle of the gridpane	2	4

				I should not be able to play the game and a new screen will be shown displaying text and the score my character ended with. Finally the application will end after 5 seconds.	depending on the variable. In the main update method, it will check character collisions with bullets shot from an enemy and depending on if the player is hit, it will update the health variable. Once the players health is 0 then in submitEvent there will be a function to remove all elements on the gridpane and add in “game over” text and show the players score that is stored in a variable.		
Surrounding Room Objects Potion	2.2	Arhum	As a player, I want an item that can be picked up so that I can see the items and whether there is a troll in the surrounding rooms around the players current room.	Given that I am a user who is inside a room. when I pick up the item into my inventory, it should show on the GUI the items in the surrounding rooms and whether there is a troll in the specific direction. The screen would only pop up for 5 seconds and then it would return back to the current game. Before it shows the screen to me, there should be an animation of a bottle being drunk on the screen with an audio playing in the background. Once I add it to the inventory the item should disappear from the inventory and ground.	This item is added to the item class and when it is added to the players inventory, it should display the objects in the rooms around the player. This should be in a list format and displayed in cell 1, 1 of the gridpane. Once the player clicks on the item on the floor, it should be removed from the inventory list of the player to get rid of the item. We check if there is a troll in a certain direction and if it is then we add a troll to the list.	2	6
GUI	3.1	Zayd	As a gamer, I’d like to play with engaging visuals and be able to use controls that I am already familiar with.	Given that I am a user, I would like to use familiar controls to control the game on screen	Create a map and characters and draw them on screen. Control what is drawn on screen based on the users input	4	5
Tutorial	3.2	Zayd	As a new player, I would like to be able to learn how to play the game before starting a new game	Given that I am a user, I must be aware of all controls, objectives and details before starting a game	A menu option titled tutorial should be created. This will send the player into a	1	2

					special playground map where instructions will be given so the player can familiarize themselves by playing through a level that does not count for points		
Closed Caption	3.3	Zayd	As a user with hearing disabilities, I would not like to be at a disadvantage by not hearing in-game dialogues or audio queues.	Given that I am a user with a hearing impairment, I would like to be able to visually see any audio that may be played	When an audio queue is set to play, display a text box that shows what the audio says or sounds like.	3	2
Difficulty	3.4	Zayd	As a player, I'd like to fight different levels of bosses with different weapons to make the game more adventurous.	Given that I am a player that faces multiple bosses in the game as I advance, I want it to become more challenging to make the game more engaging	Create a weapon object that is placed in a different room. Create different types of trolls that are placed further into the game	2	3
Start page	4.1	Takia	As a player,I want a start page that contains the name of the game and buttons for play, instructions, and scoreboard so that the game looks more professional.	Given that a player starts the game, they will arrive at the start page where they can choose to play the game, view instructions or check previous score and accessibility information.	A new gridpane will be created and the necessary buttons will be added to the gridpane and the gridpane will be swapped with the gridpane containing the GUI components of the rooms once the player clicks the play button.	2	4
Score	4.2	Takia	As a player, I want to see the previous high scores so that I can track my progress within the game with every action I do.	Given that a user wants to see previous scores, when they click the scoreboard button, then a screen with previous high scores should appear	Add a scoreboard button to the landing page of the game, which, when clicked, will take the player to the scoreboard page that displays high scores from the files.	1	5
Name Registration	4.3	Takia	As a player, I want to add a new personalization feature where I can register my name before starting the game so that a customized gaming experience is offered..	Given a player opts to register their name and a dialog box appears for user input, the name attribute of the current player should be updated according to the input.	Create a registration button which clicked will display a text box and take input from the users which will be saved as the name attribute in the player class	2	1

Group 21 Acceptance Criteria

The Acceptance Criterias for the user stories are documented in the List/Scenario format below:

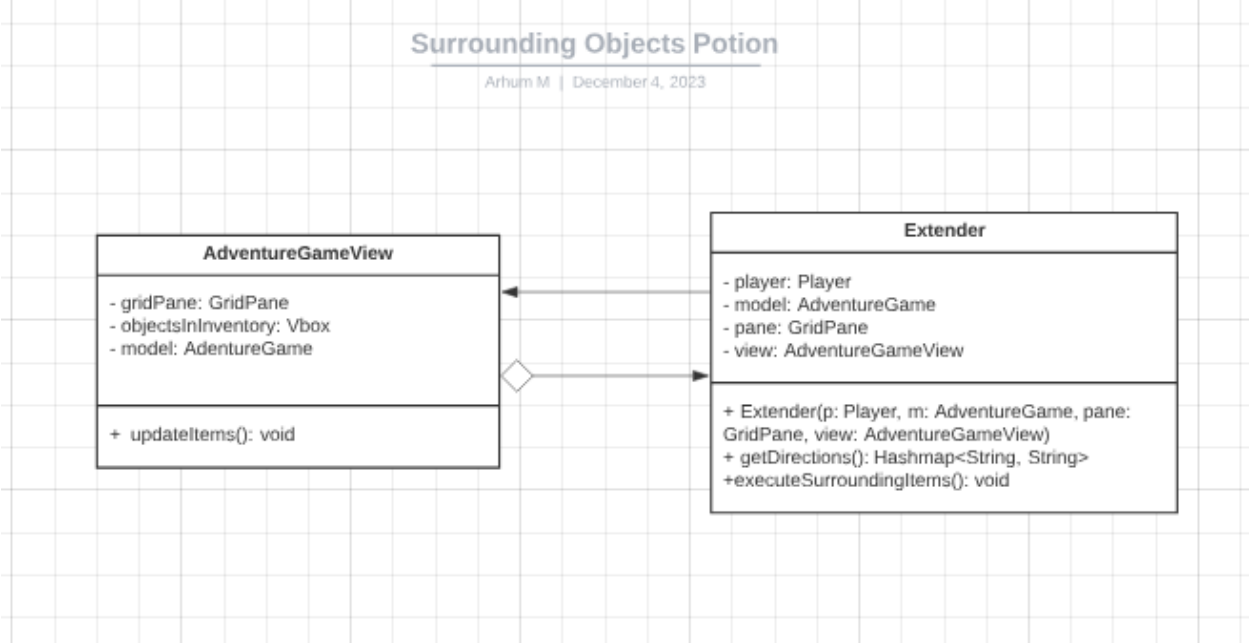
Name	ID	Description
Speech-to-text Input	1.1	User input can be recorded by pressing a microphone icon button on the GUI beside the text input field. Users are aware when recording of voice starts when the microphone icon is pressed. User speaks into their microphone The Users speech is then shown in the text input field. If successful, after a few seconds, the User proceeds with said action in the game. If unsuccessful, User must re-record voice input after a few seconds.
Accessibility Information	1.2	Given that I am a user with accessibility needs. When I press a “accessibility information/settings” button on the GUI, or navigate to settings by other means (Speech-to-text for example). Then I will be presented with all the accessibility features that are implemented in the game through text.
Settings Window	1.3	Given that I am a user that wants to change certain aspects of the games visuals, audio, etc. When the user interacts with the settings window. Then the user should be able to modify and customize various application settings, with changes taking effect immediately or after confirming the modifications.
Contrast, Hue, Brightness, Saturation	1.5	Given that I am a user that wants higher/lower contrast, hue, brightness, or saturation for better visibility When the user selects the level of each slider in the settings window and hits the “save” button. Then the application's user interface should switch to corresponding setting configuration. There should be a noticeable difference between text, images, and the background and should be consistent with any changes in the game's GUI.
Hearts	2.1	Given that I am a user that is playing the game, when I fight an enemy and take damage from it, I should lose a heart and that should be reflected on the GUI. When I lose all my hearts then I should not be able to play the game and a new screen will be shown displaying text and the score my character ended with. Finally the application will end after 5 seconds.
Surrounding Room Objects Potion	2.3	Given that I am a user who is inside a room. when I pick up the item into my inventory, it should show on the GUI the items in the surrounding rooms and whether there is a troll in the specific direction. The screen would only pop up for 5 seconds and then it would return back to the current game. Before it shows the screen to me, there should be an

		animation of a bottle being drunk on the screen with an audio playing in the background. Once I add it to the inventory the item should disappear from the inventory and ground
GUI	3.1	Given that I am a player playing the game, I want to be able to use controls that I am familiar with and also have the game look visually appealing so that I am engaged in its content.
Tutorial	3.2	Given that I am a user playing the game for the first time, When I click the tutorial button, Then I should be able to play a tutorial before entering a new game so I can familiarize myself with the controls, objective and UI of the game.
Closed Caption	3.3	Given that I am a user with a hearing disability, When audio is being played Then subtitles should be displayed transcribing or describing the sound being played to provide the same experience without sound.
Difficulty	3.4	Given that I am a player that faces a troll further into the game, When I have the required weapon, Then I should be able to use the weapon to defeat the harder troll.
Start page	4.1	Given that I am a user that wants to play the game When I start the game, Then I should arrive at the start page from where I should be able to choose to play the game, view instructions or check previous score and accessibility information.
Score	4.2	Given that I am a user that wants to see previous scores When I click the scoreboard button, Then a screen with previous high scores should appear.
Name Registration	4.3	Given that I am a player that wants to register my name When I click “Register Player’s Name” Then a dialog box should appear for user input and my name should be updated according to the input.

SECTION 3: SOFTWARE DESIGN

GROUP 21 DESIGN PATTERNS & UML DIAGRAMS

Design Pattern #1: Extension Object Pattern



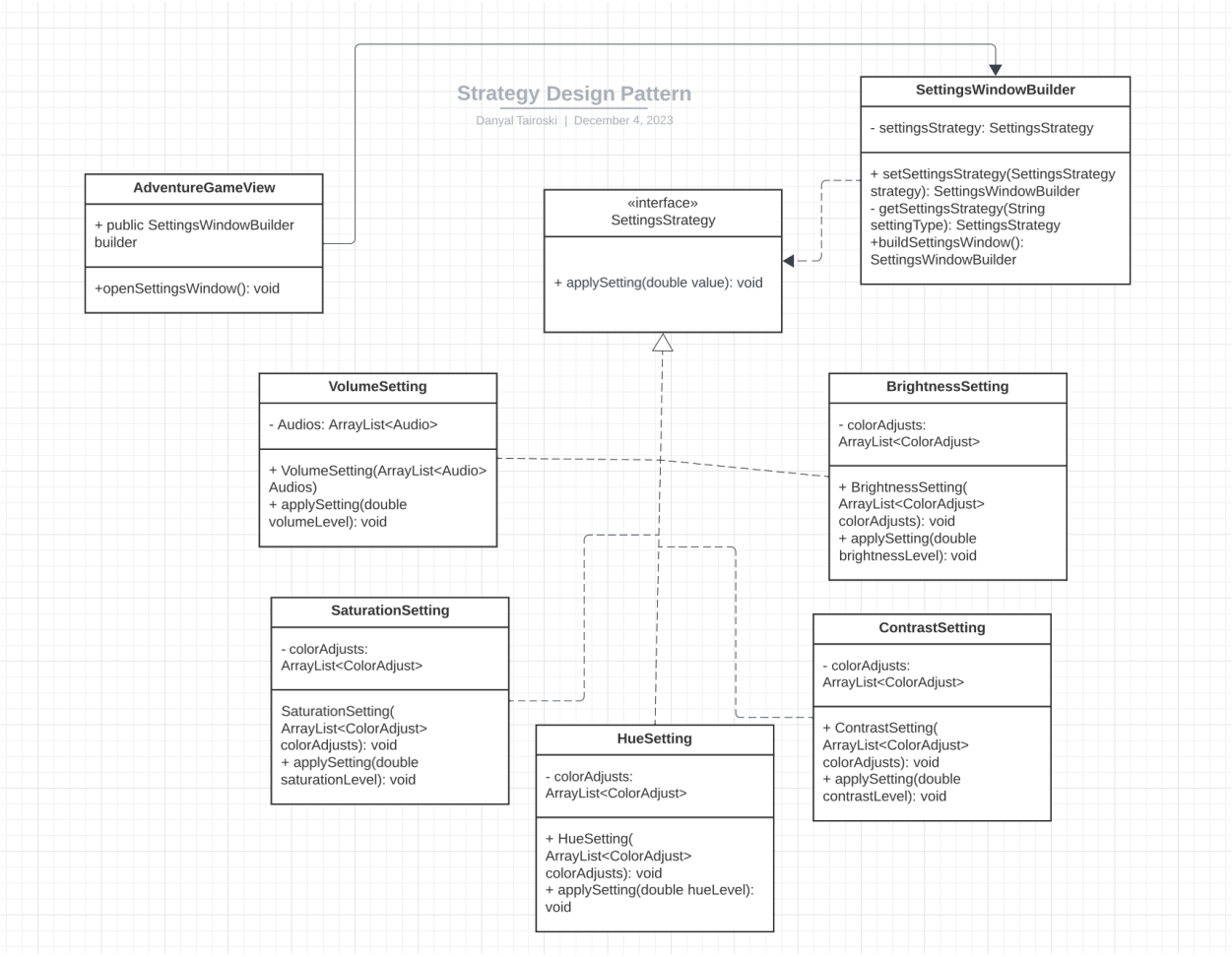
Implementation Details: The UML diagram outlines these main components:

- The *AdventureGameView* class, which is the main viewer where we can visualize our game during playtime. All the methods that are needed to run gameplay are in this class. During gameplay, when a player picks up an object from the floor, it will check if the object is a potion. If true, then it will call on the Extender class to create the functionality of the item. There is one method related to this feature: updateItems.
- The *Extender* class, which adds functionality to the specific buttons that represent the AdventureObjects. There are two methods: getRooms and execute.

Based on if the item is on the floor and added to the players inventory, which is a

mouse event, the Extension object would be called in the adventureGameView method updateItems. This will add the functionality to the specific object while it is placed into the inventory. Extending AdventureGameView will allow a more streamlined implementation. Extender will take the AdventureGameView object and add the functionality to it in its own class. An animation of a drinking potion will play to create a more immersive experience. Then the items and trolls from the surrounding rooms will be printed in the middle of the GUI with their corresponding direction. After it is complete, it will return to normal gameplay. This will not affect any of the already implemented code.

Design Pattern #2: Strategy Pattern



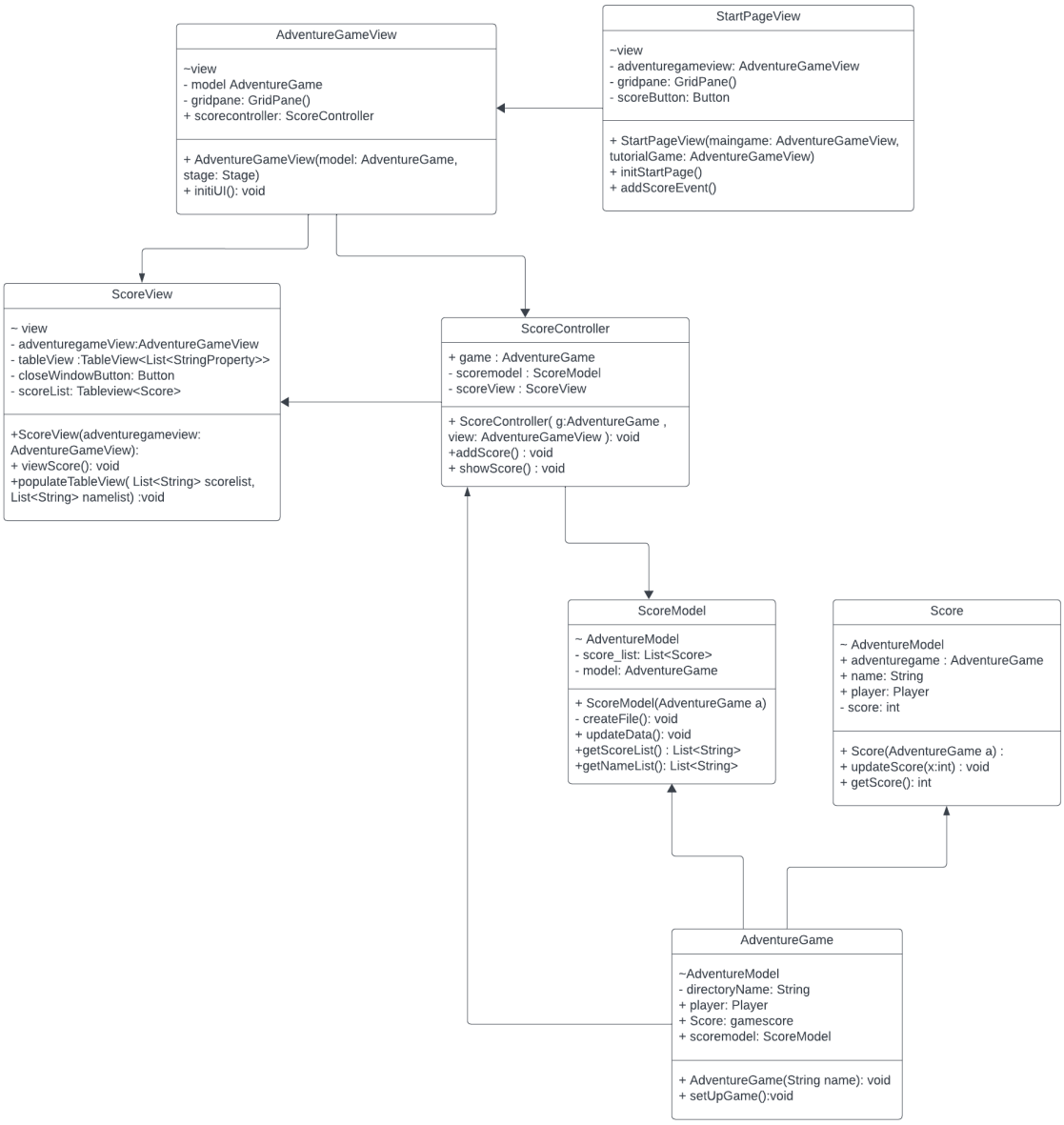
Implementation Details: The UML diagram outlines these main components:

- The *SettingsStrategy* interface, which includes one methods: applySetting()
- Multiple implementations of the interface according to our user stories (i.e. BrightnessSetting, VolumeSetting, etc.)
- The *SettingsWindowBuilder* class, which builds the Settings Window. It depends on the SettingsStrategy interface and the 5 implementations of it, which can be configured as sliders in the SettingsWindow
- The *AdventureGameView* class, which will execute adjustments based on each implementation of the AdjustStrategy Interface.

Based on an action in the AdventureGameView GUI, implementations of the AdjustStrategy will be called upon, to which they will either increase or decrease

the specified action (i.e. if the user increases font size, AdjustFontSize.increase will be called in AdventureGameView with the increment).

Design Pattern #3: Model-View-Controller(MVC) Pattern

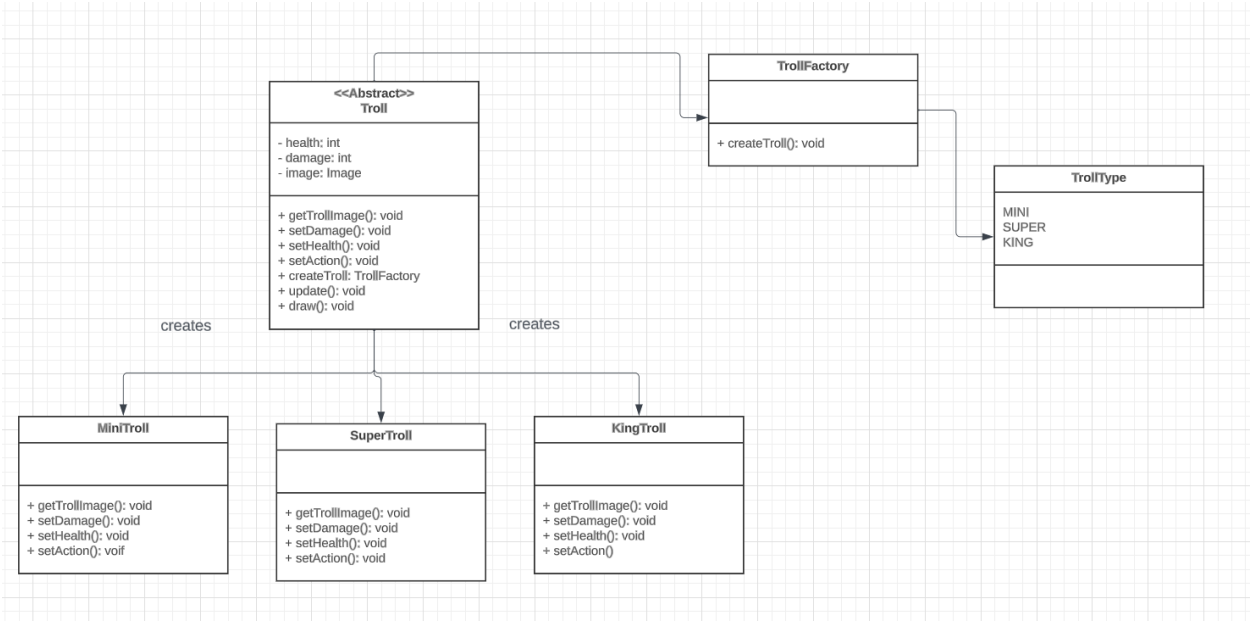


Implementation Details:

Here an MVC pattern is used to manage the scoring system of the game which has three tasks: displaying the score, storing the score, and managing the flow between these two functions.The UML diagram outlines these main components:

- The *ScoreModel* Class, which holds the data(score) and the application logic, includes four methods: createFile, updateData, getScoreList, getNameList. The createFile method creates the file that stores the data.The updateData method upon receiving a request from the *ScoreController class* , updates the score whenever a score related event occurs. This class uses the Score class to calculate score and stores all of the scores of a specific AdventureGame to the score_List. Here the *Score* class is a part of an *AdventureGame* class and each *Game* has one score associated with it. The getScoreList and getNameList methods return the list of scores and names to the *ScoreController class* which then the *ScoreController class* gives to the *ScoreView* Class.
- The *ScoreView* Class has the responsibility of showing the highscores when the user wants to view the highscores. The *ScoreView* Class gets data and state from the *ScoreController* Class.
- The *ScoreController* class coordinates with *ScoreModel* Class to update the score when an event that affects the score occurs. This is executed by the updateScore method whereas the showScore method takes requests from the AdventureGameView and asks The *ScoreView* Class to display the scoreboard.

Design Pattern #4: Factory Pattern



Implementation details: The UML diagram outlines these main components:

- Troll is the abstract class that represents all the common properties between all the trolls
- As part of the factory design pattern, TrollFactory is a separate class that is responsible for creating instances of the different trolls based on the TrollType
- MiniTroll, SuperTroll and KingTroll are all the different types of trolls in the game
- TrollType is an enum that represents the different trolls. The game requests a specific troll through this enum.
- The troll that is created is then sent to the game and put in the correct room to be fought in the game.