Virucide

By

Jan Orlan Cardona
Craig Aidan Padrigon
John Kenneth Daen
Mark Joseph Soledad

This is a software development project in partial fulfillment of the requirements for the course CS-118 Software Engineering 2

Background of the Study

During the time of Covid-19 lockdowns and the development of vaccines, individuals who have spent significant time on the internet may have come across various conspiracies regarding the vaccine. These include claims that the vaccine causes magnetic skin or that Bill Gates is using the vaccine to mind control and track people. Prior to this, there were already discussions about vaccines causing autism, which has since been proven false through numerous studies. The spread of these false claims can impact people's decisions on whether or not to get vaccinated. Studies have even shown that exposure to misinformation about the Covid-19 vaccine can lead to vaccine hesitancy among individuals (Neely et al., 2022; Albuquerque et al., 2021; Muric et al., 2021)

Statement of the Objectives

General Objective

This project aims to create a video game that can help increase vaccine acceptance among unvaccinated people and for vaccinated individuals to have an appreciation of the benefits of the vaccines.

Specific Objectives

Breaking down the general objective, the following specific objectives are identified:

1. To develop a survival platformer game with user friendly interface, animations, and sound.

2. To encourage positive behaviors that help prevent the spread of viral diseases.

3. To promote learning by educating the players of the viral outbreaks in human history.

Scope and Delimitation

The project is a 2D (two-dimensional) game of the survival platformer genre. It will include appropriate animations and sounds which improves user experience and enjoyment of the game. The game is single player only, offline, and can only be played on a Windows OS device with a mouse and keyboard or a game controller. The game can be played and finished in one sitting. To reach the proposed development timeline and budgetary constraints the game will use most of the game assets that are available online.

The game will encourage positive behaviors that help prevent the spread of viral diseases which includes avoiding contact with the virus, wearing masks, lockdowns, and Vaccinations. The game will allow the player to get vaccinated in the game. There are three vaccines which are the first dose, second dose, and the booster shot. However, these vaccines will not be named to avoid brand association of its real world counterpart. The idea is that the player has the freedom to choose the vaccine they want and not what the game tells them to get.

To promote learning, during gameplay the player is able to collect objects that contain information about the viral outbreaks in human history. It would contain information about the name of the virus and its disease, the symptoms of the disease, how many were affected and other known facts about the virus.

Game Mechanics

There is a viral outbreak of the Coronavirus. The player's goal is to survive and navigate their character to safety by going through a series of obstacles while avoiding contact with contaminated surfaces and airborne viruses.

The character can run, jump, climb, and dash to navigate the level to avoid contact with the virus. A direct contact would reduce the character's health points. When the character's health reaches zero, the character dies and would have to restart from the beginning of the level.

The player can increase their total health points by wearing a face mask or by getting vaccinated in game. The player can choose to not get the vaccine but they would not get any added protection from the virus. There are three collectable vaccines in the game. The first dose, second dose, and the booster all of which increases the total health points of the character.

Aside from the vaccine there are also other collectibles scattered throughout the level which contains information about other viral outbreaks in history.

The game has three chapters, the player can only unlock the next chapter once they've completed the previous chapter. The chapters drive the progression of the game.

Chapter 1 is titled "Outbreak". There is a viral outbreak of the coronavirus and the city is on lockdown. The player then must get back to their home safe without getting in contact with the virus.

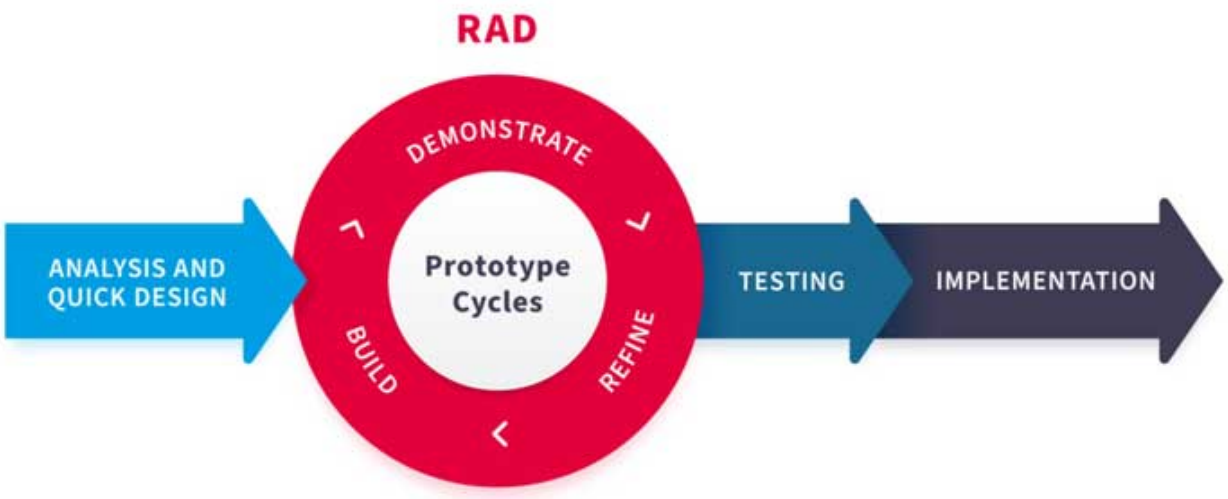
Chapter 2 is titled "Grocery". The lockdown has been lifted and player has to get to the grocery store to buy foods and other necessities.

Chapter 3 is titled "Coming Home". After getting groceries, the player has to get back home safe.

The game is finished after beating all the chapters.

Software Processes

Rapid Application Development (RAD) Model



Simon, L. (2021). [Stages in the Rapid Application Development].Waybinary.https://www.waybinary.com/what-is-rapid-application-development/

We've adapted the RAD methodology in our software development process. It allows us to develop software much more quickly than traditional software development models. This is because RAD emphasizes rapid prototyping and iterative development.

Analysis and Quick Design:

1. On this phase of the development we've Identified the goals, objectives, and constraints of the game. The project's focus is to increase vaccine acceptance among unvaccinated people and for vaccinated people to have an appreciation of the benefits of the vaccine.

2. We've also brainstormed some ideas about what the game would be about, what is the game mechanics and how it helps toward achieving our goals.

3. Diagrams were made such as the Use Case Diagram, Activity Diagram, Class Diagrams etc.

Prototype Cycles:

1. **Build:** We build prototypes of the different components of the game such as the player character, the viruses, the game level etc.

2. **Demonstrate:** We then test each of the component and experiment to see if there are any bugs or there is some fine tuning to be done.

3. **Refine:** For some components we parametrized the attributes so that it is easier to debug and make changes. eg. For the player character, we can adjust the movement speed, jump height, gravity etc.

Construction:

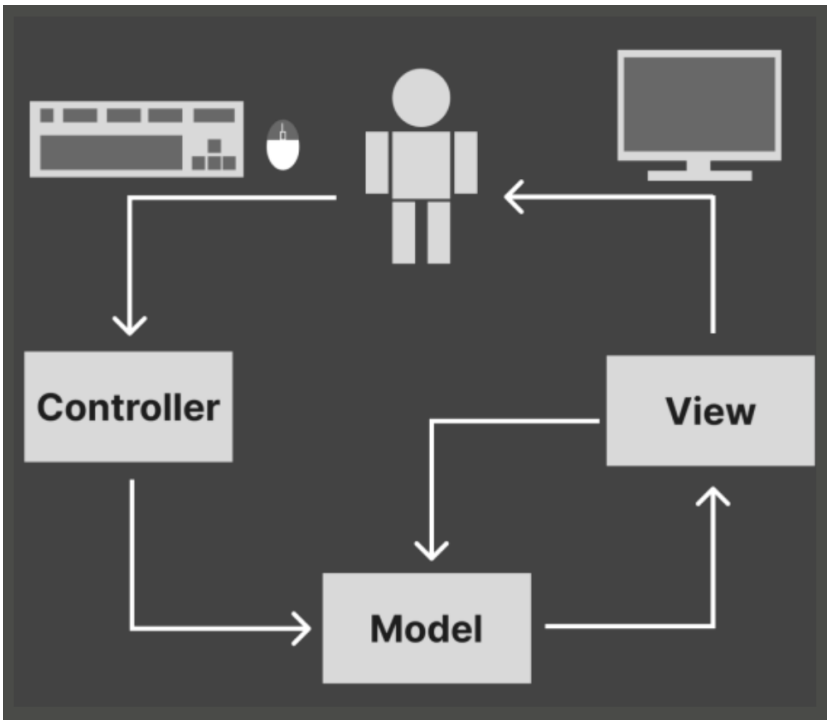
We then Integrate all the prototype components of the project to make a working game for testing. We test the game from start to finish to look for adjustments and to identify and resolve any bugs or issues.

Implementation:

This is when we the release the beta version of the game to gather feedback from players and then update the game as needed. Optimizing to improve stability and maintainability as we finalize the product for an official release.

Architectural Style

Model-View-Controller



Why Model-View-Controller?

In a video-game we have what is called the frame rate or the fps (frames-per-second). These frames are the View that is being displayed to the player through the monitor or other output device. A typical monitor can display 60 frames per second but some displays can go 144hz or even 240hz, which displays more information per second. So in a model-view-controller, every frame we display the view of of the model or our game state. and our state changes depending on the controller input. and the cycle repeats.

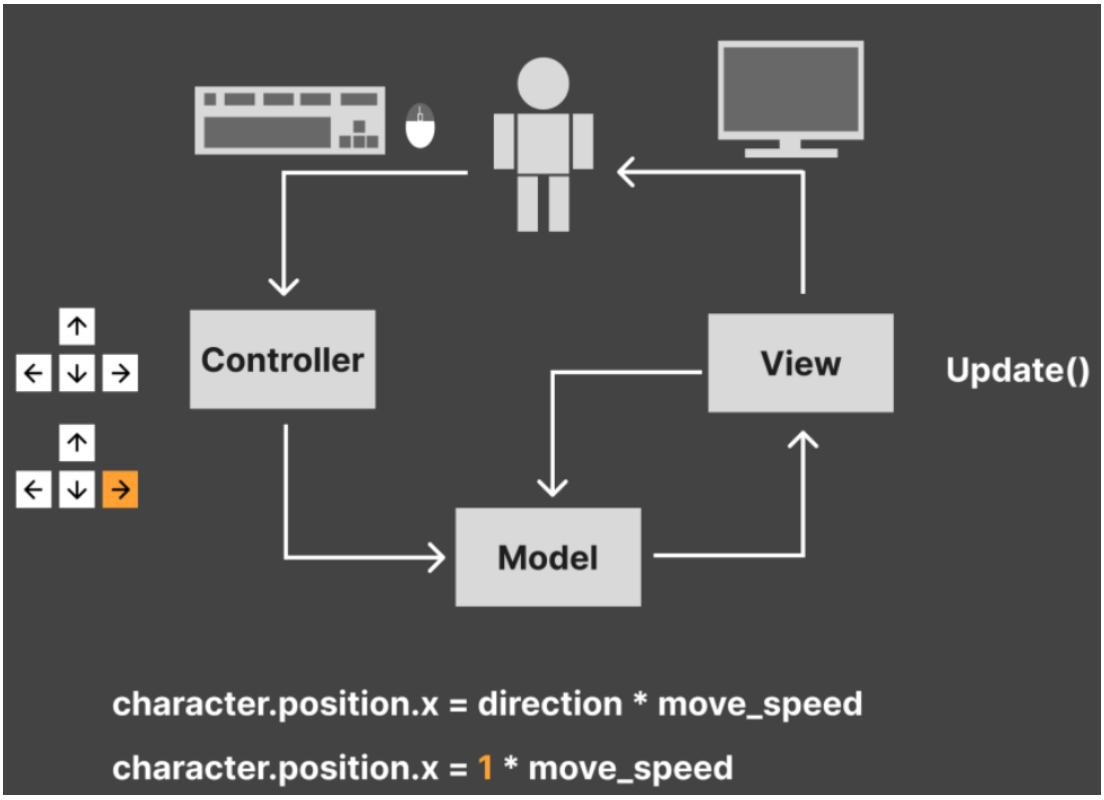
Model - Represents the game logic and data, such as the game mechanics, player scores, and progress. It is responsible for handling game events, updating the game state, and communicating with the components of the game.

View - The view is the representation of the Model or state of the game. It is the viewport of the game where in the menus, buttons, the character, enemies, gameplay etc are drawn. It draws the game object onto the screen, their position on the screen, size and scale. It is responsible for displaying the game state or the Model to the player.

Controller - Interface of the user to the model, this is what the user uses to interact with the game, it may be a keyboard and a mouse or a gamepad controller. Depending on the key input of the player through the character controller, it would reflect those changes to the Model and outputted onto the screen through the View.

For example:

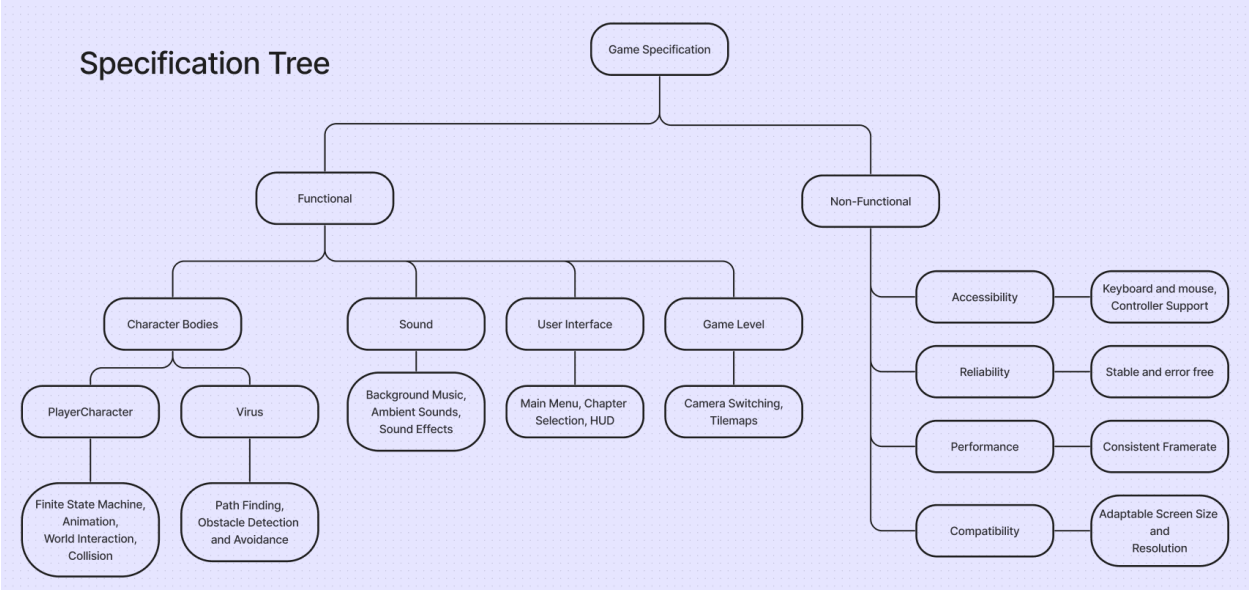
For when we want to move our player to right by pressing the Right Arrow Key on the keyboard (Controller,) the Model will change so that the next character position along the x axis increases by what movement speed we have initially defined. This change is then Viewed by the user on the next frame update.



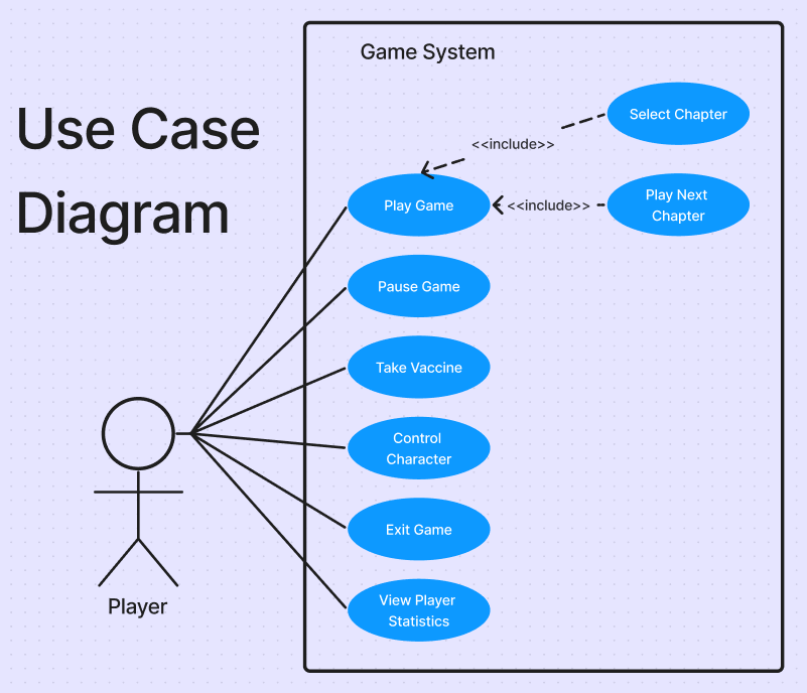
Proposed Timetable

PROCESS	FEBRUARY				MARCH				APRIL			
	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
Background and Project Statement												
Software Methodology and Architecture												
Requirements Analysis and Specification												
Software Development												
Software Testing and Evaluation												
Re-design and Re-construction												
User's Manual												

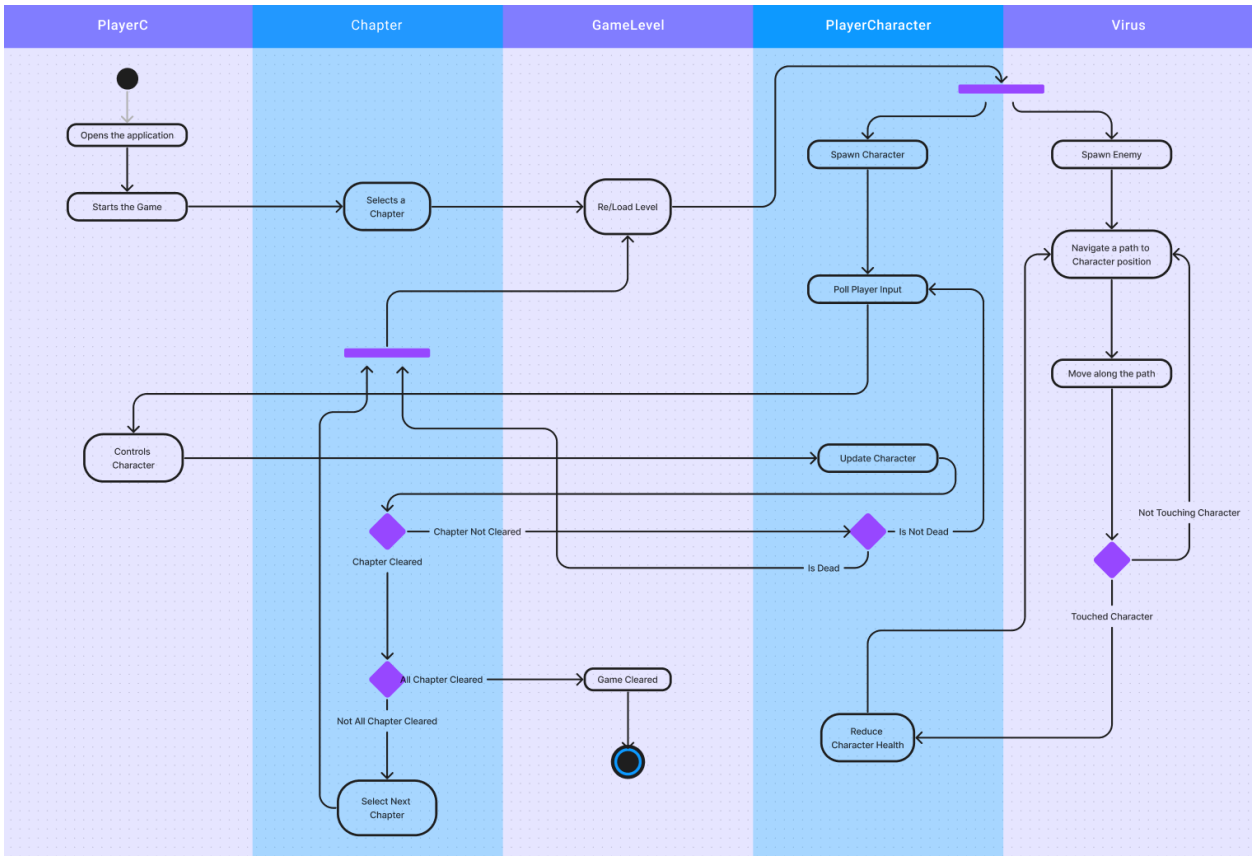
Specification Tree



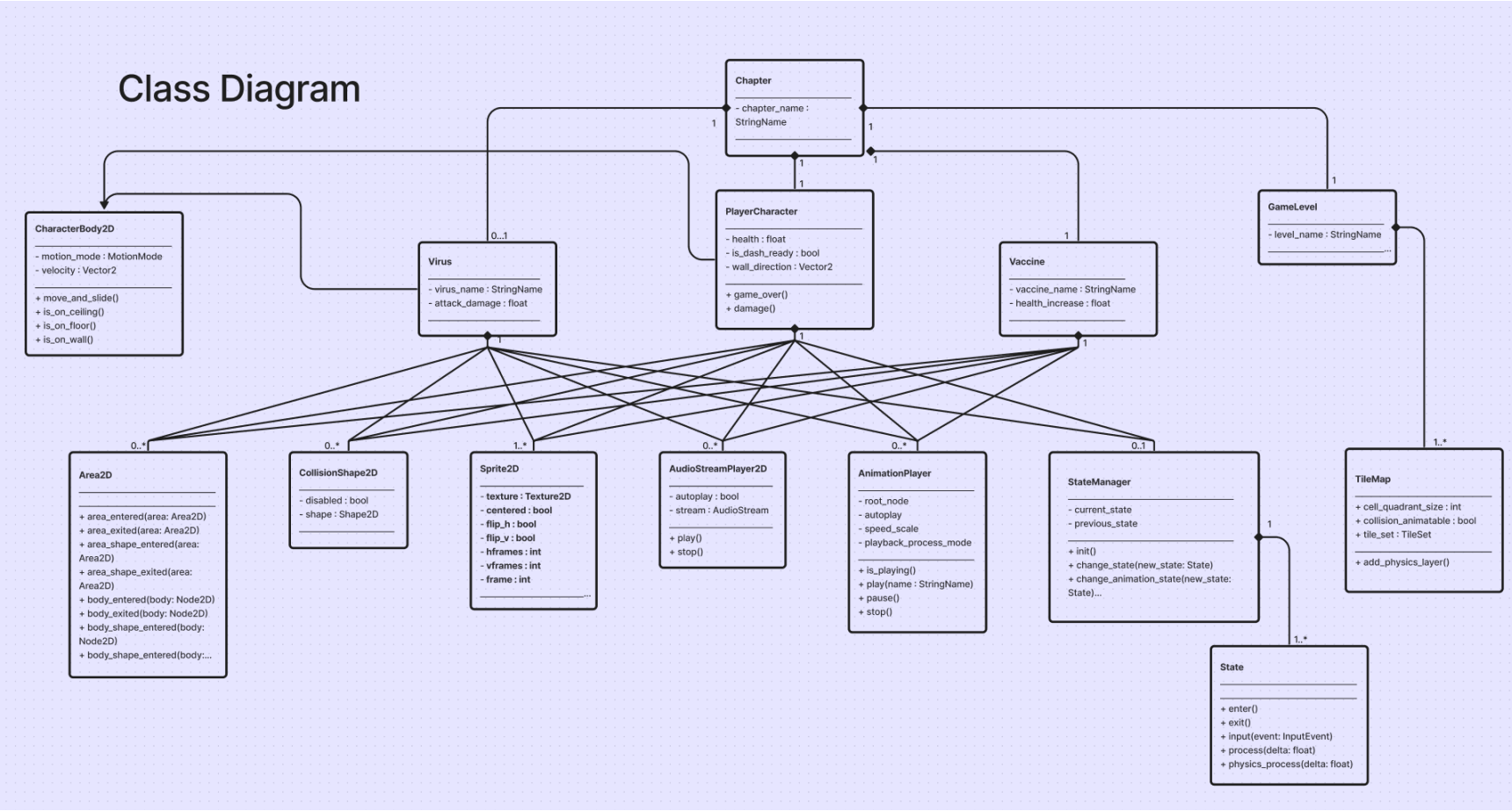
Use Case Diagram



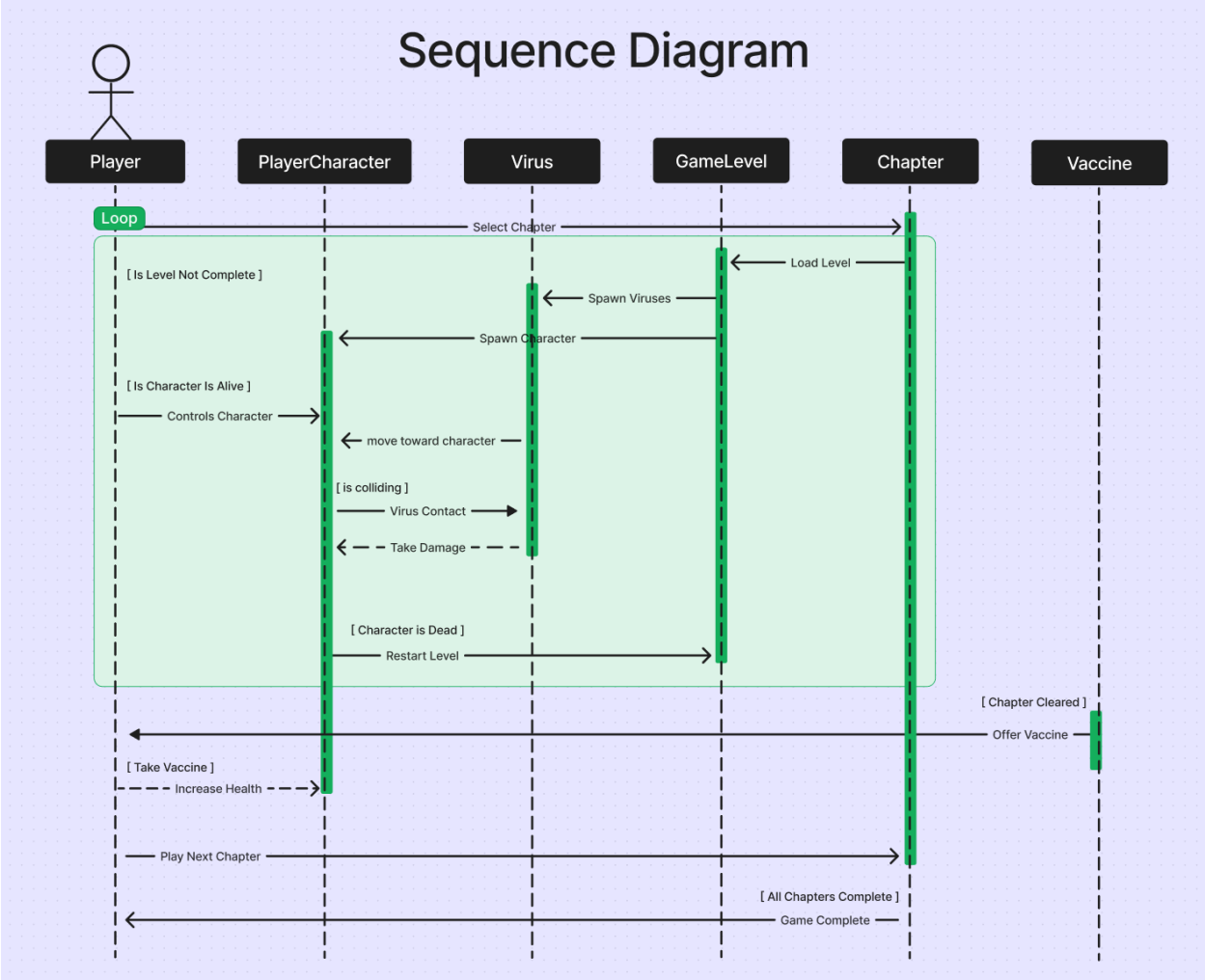
Activity Diagram



Class Diagram



Sequence Diagram



References

Muric, G., Wu, Y., & Ferrara, E. (2021). COVID-19 Vaccine Hesitancy on Social Media: Building a Public Twitter Data Set of Antivaccine Content, Vaccine Misinformation, and Conspiracies. JMIR public health and surveillance, 7(11), e30642. https://doi.org/10.2196/30642

Neely, S. R., Eldredge, C., Ersing, R., & Remington, C. (2022). Vaccine Hesitancy and Exposure to Misinformation: a Survey Analysis. Journal of general internal medicine, 37(1), 179–187. https://doi.org/10.1007/s11606-021-07171-z

de Albuquerque Veloso Machado, M., Roberts, B., Wong, B. L. H., van Kessel, R., & Mossialos, E. (2021). The Relationship Between the COVID-19 Pandemic and Vaccine Hesitancy: A Scoping Review of Literature Until August 2021. Frontiers in public health, 9, 747787. https://doi.org/10.3389/fpubh.2021.747787