DETERGE

A Thesis Proposal
Presented to the Faculty of the
Information and Communications Technology Program
STI College Ortigas-Cainta

In Partial Fulfilment
of the Requirements for the Degree
Bachelor of Science in Computer Science

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December 16, 2022

ENDORSEMENT FORM FOR PROPOSAL DEFENSE

TITLE OF RESEARCH: **Deterge**

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In Partial Fulfilment of the Requirements
for the degree Bachelor of Science in Computer Science
has been examined and is recommended for Proposal Defense.

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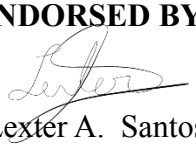

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This thesis proposal titled: **Deterge** prepared and submitted by **Van Beaufort L. Garcia; Charlene F. Perillo; and Gabriel Magwayen B. Garcia;** in partial fulfilment of the requirements for the degree of Bachelor of Science in Computer Science, has been examined and is recommended for acceptance and approval.

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Introduction

Deterge refers to the act of cleaning or purifying something to remove impurities, dirt, and other unwanted substances, including bacteria and viruses. Bacteria and viruses are microorganisms that exist everywhere, including soil, water, and the human body. Some viruses and bacteria are beneficial, while others can cause the common cold to illness or disease. In the Philippines, there are several active cases of viral and bacterial infection, including dengue, rabies, COVID-19, the flu, tuberculosis, and typhoid fever. In a meeting with officials from the Department of Health, President Marcos (2022) reminded them that even though the COVID-19 pandemic is still ongoing, other public health issues such as tuberculosis (TB) and the flu must not be forgotten. Vergeire (2022) stated that numerous diseases can be acquired from contaminated water. She warned the public to be cautious of waterborne diseases, such as typhoid fever, and vector-borne diseases, such as dengue. Vergeire also emphasized the severity of rabies, stating that it is a "very serious disease." People need to be aware of these infections and take steps to protect themselves from them. Deterge is a game where the goal of the player is to keep things clean and reduce the spread of disease and illness. Deterging involves washing or sanitizing a surface or object to remove impurities and pathogens such as the viruses and bacteria listed above.

This proposal focuses on giving awareness about different types of bacteria and viruses that can cause infectious diseases in humans. These include the dengue virus, which causes fever and severe muscle and joint pain; the rabies virus, which is transmitted through the saliva of infected animals and can cause inflammation of the brain; tuberculosis, a bacterial infection that primarily affects the lungs; the COVID-19 virus, which induces respiratory complications; typhoid fever, a bacterial infection that affects the intestinal tract and can spread through contaminated food or water; and influenza viruses, which are responsible for the common flu. The goal of the game is to provide information about the different types of viruses and bacteria that cause the infectious diseases mentioned above. It could also provide information on how these infections are transmitted and the symptoms they can cause, as well as steps individuals can take to

prevent exposure and seek medical treatment if necessary. In addition, the game could also highlight the importance of protecting vulnerable populations and minimizing the impact on society by preventing outbreaks and controlling the spread of disease.

To convey this information, the developers will develop a 3D desktop game called Deterge, which uses a combination of 3D graphics, animations, and interactive elements to make the information more engaging and entertaining for players. The game is intended for young adults aged 18 to 23, as this age group is most vulnerable to infections due to their habits where according to Cobe (2021), Gen Zers appear to consume alcohol more than their elders, and also prefer higher-quality alcohol. She stated a huge portion of Gen Zers reported smoking marijuana, and drank alcohol. Where, as stated by the National Institute on Alcohol abuse and Alcoholism (2020), misuse of alcohol makes the body more vulnerable to viral infections. It stated that Alcohol in the body tends to impair the body's immediate immune response to the pathogen, making it easier for an infection to develop.

Background of the study

Deterge is a game that aims to give awareness to its players about a select few viruses that are still active in the Philippines, namely: Tuberculosis, Covid-19, Rabies, Typhoid Fever, and Influenza.

Gen Zers, what many call those that are born in the generation Z, want to tackle challenges in a fully immersive environment that lets them conduct their research, make decisions, and take action. Not only do they find hands-on learning to be more effective, but Gen Zers also say it can help make learning more fun and interactive (Chalk, 2022).

The simplest form of active learning is game-based learning where according to Tamosevicius (2022), game-based learning is an active learning technique that uses games to improve student learning. The learning, in this case, comes from playing the game, which promotes critical thinking and problem-solving skills.

Harper et al. (2021) recruited a large international community sample (N = 324) to complete measures of self-perceived risk of contracting COVID-19, fear of the virus, moral foundations, political orientation, and behavior change in response to the pandemic. Consistently, the only predictor of positive behavior change (e.g., social distancing, improved hand hygiene) was fear of COVID-19. To further elaborate, according to Quadros et al. (n. d.), Studies have identified various domains of fear related to the fear of COVID-19 infection, such as fear of oneself or their family members getting infected, fear of having economic losses and being unemployed, or fear of avoidance behaviors toward gaining knowledge about the pandemic or fear of making decisions on showing or not showing actions like whether to visit parents or not, whether to look for information on death rates or not, etc.

The study shown proves that fear can affect a person's actions, especially when it comes to viruses. This fear can negatively affect a person's willingness to follow the proper behaviors of virus prevention which can lead to a higher chance of casualties due to viruses.

Over the last decade, the Philippine government has endeavored to eliminate TB. Despite

various government programs and efforts to facilitate the detection and treatment of TB, the Philippines is still struggling to meet this target (Kim, 2018).

Rabies remains a public health problem in the Philippines despite the widespread provision of rabies vaccines and rabies immunoglobulin (RIG) as post-exposure prophylaxis (PEP). Detailed descriptions of recent human rabies cases in the Philippines are scarce (Guzman, 2022).

Our results suggest that the numbers of excess deaths attributable to influenza in the Philippines are considerably greater than those recorded in the national death registry, especially among older adults and young children. These findings underscore the importance of prioritizing older adults and children less than 5 years of age for influenza vaccination, in line with recommendations by the World Health Organization (Cheng, 2020)

All rates are relative to the 18 to 29 years age group. This group was selected as the reference group because it has accounted for the largest cumulative number of COVID-19 cases compared to other age groups. Sample interpretation: Compared with ages 18 to 29 years, the rate of death is four times higher in ages 30 to 39 years, and 330 times higher in those who are ages 85 years and older (Centers for Disease Control Prevention (CDC), 2022).

According to Onuh (2021), Persons between the ages of 5 to 19 years old had more severe dengue (44.08%) than ages 19 years and above (43.28%), and ages 5 years and below (9.7%). About 47.77% of persons between the ages of 5 to 19 years old had moderate dengue compared to ages 19 years and above (38.46%), and ages 5 years old and below (13.76%).

Typhoid fever has changed its epidemiological patterns causing it to, not only affect children at the age of 5 and below but also, affect young adults. According to Paul (2017), the paediatric population is mostly affected by this disease, yet the disease is an important cause of morbidity and mortality in general adult populations also.

Overview of the current state of the technology

Project Zomboid

Design

Project Zomboid is an open world survival horror game in development by British and Canadian developer The Indie Stone. The Pre-alpha version of the game was released on June 20, 2011 and the alpha version was released on November 8, 2013.

Game Description

The game is set in the post-apocalyptic, zombie-infested exclusion zone of the fictional Knox Country, Kentucky, where the player is challenged to survive for as long as possible before inevitably dying.

Gameplay

In Project Zomboid, the goal of the player was to survive as long as he can in an apocalyptic and zombie-ridden area around the city of Louisville. The player can choose their character's appearance, occupation, and traits. In the game, the player has to manage their personal needs to stay alive through resting, scavenging for supplies, and using survivalist techniques.

Similarities to the game

The durability and insanity of items in the game will be similar to Deterge that affects the recovery of the character.

Plate Up

Design

PlateUp is a roguelite management game developed by It's happening and published by Yogscast Games. It was released on Steam for Microsoft Windows on August 4, 2022. The game allows multiple players to play from the same computer using various input methods. Both keyboards and controllers can be used at the same time.

Game Description

PlateUp is a Classic co-op cooking action game. You can start the business solo and see how things would go. Alternatively, you can bring up to three other players for a four-player challenge that consists of building, opening, and successfully managing a restaurant.

Gameplay

The players will cook and serve dishes, design and decorate the restaurant, and expand your culinary kingdom with new unlocks, abilities and dishes in procedurally-generated locations. The goal of the game is to achieve 5 stars in every run.

Similarities to the game

Deterge will have similarities to PlateUp game texture and the placement of objects on the tilemap. NPCs and characters also are similar to the color or the texture of the game.

Dead Rising

Design

Dead Rising is a series of action-adventure games created by Kenji Inafune. It was originally developed by Capcom until Capcom Vanncouver took over developing the franchise. This was first released on August 8, 2006 followed by Dead Rising 2 in 2010, Dead Rising 3 in 2013 and the lastest was Dead Rising 4 in 2016.

Game Description

Dead Rising is a 72 Hour Mode in which the main objective is to investigate the Willamette Parkview Mall within three days, before Frank can be rescued by helicopter.

Gameplay

The player must survive by scavenging for items around to fight zombies and hostile humans also known as psychopaths, while rescuing other survivors. In addition, the game features a set time limit, which the player will have to complete the story within before the time expires.

Similarities to the game

The Deterge game will have the same time limit to complete and will have similarities to the map style of Dead Rising game.

Objectives of the study

General Objective

To develop an entertaining 3D desktop game that would inform players about the active cases of infections and how to reduce the number of people becoming infected here in the Philippines.

The developers propose an entertaining desktop game about active cases caused by viruses such as Dengue virus (Dengue), Genus Lyssavirus (Rabies), Mycobacterium tuberculosis (Tuberculosis), SARS-CoV-2 virus (COVID- 19), Salmonella Typhi bacteria (Typhoid fever), and Influenza viruses (flu). In the gameplay, the player can learn about these viruses such as how they spread, how to stop the spread, what their symptoms are, and how they affect people.

Specific Objectives

1. **To propose an entertaining informative 3D desktop game.**
    - The developers propose an offline desktop game where players can learn while having fun. In the game, players take on the role of a healthcare worker treating infected patients. To accomplish this, the player must treat the symptoms of persons infected with the virus as well as solve the infection's source before it spreads and infects others. The player's mission is also to sanitize the source of the virus and other contaminated objects. This may involve cleaning and disinfecting objects like water tanks, food, bathroom door handles, and more to prevent the spread of the infection without getting infected. As the player progresses through the game, they will encounter increasingly challenging patients and situations that require them to use their knowledge and skills to effectively treat the infection.
2. **To inform the player of how a virus spreads and how to reduce the spread of the virus by engaging them in the treatment of patients who have contracted**

the said viruses.

- The developers will inform the players of the viruses in the form of treating patients in the game and decontaminating the contaminated sources that infected the patients. The player's knowledge will then be assessed in two different ways. First is through the use of side-objectives where they are tasked to complete a series of puzzles that test the knowledge they have attained in order to unlock alternative endings to the games. Second is through the ending where the player must go through all the knowledge they have acquired in order to defeat the main antagonist of the game.

3. **To give this generation a good idea of how viruses work to reduce the chances of them consuming misinformation on the internet.**

    - The developers propose a game to inform the player how harmful the viruses(Typhoid, Dengue, Rabies, Covid, Flu, and TB) are and how it can lead to serious consequences if ignored. These consequences include: death, illnesses, economic crisis, and much more. The player will be able to use the knowledge given to them to ensure that they know what to do and avoid cases where they say "Well, I read it on the internet", which is usually attributed to misinformations as stated by Camargo jr. (2020), "Algorithms created to enhance corporate gains from advertising create “bubbles” that prevent challenging views to effectively penetrate such groups, fostering an environment of positive reinforcement of all kinds of misconceptions." The developers make sure that the information in the game originates from credible sources, such as DOH websites and medical specialists consulted.

Scope and limitations of the Study

Scope

- **Main Menu**
    - The first screen the player will interact with to start a new game, select a level, and much more.
- **Pause Menu**
    - This menu will be shown whenever the player pauses in game.
- **AI**
    - The game will implement the use of A* algorithm to allow the NPCs to find the quickest path between two points.
- **Time Limit**
    - This will be used as a story support where the end of the timer means that the virus was not contained/treated fast enough and has spread outside of the school
- **Single Player**
    - The developers decided to go for a single player experience.
- **Auto Saving**
    - The game will use an auto saving system inorder to save the player's progress whenever an objective is completed.
- **Player Perspective**
    - The game will have an isometric camera perspective.
- **Virus**
    - The viruses listed here are chosen by what age they can infect and through

the answers of medical professionals.

- Mycobacterium tuberculosis (Tuberculosis)
- SARS-CoV-2 virus (COVID-19)
- Genus Lyssavirus (Rabies)
- Influenza virus (flu)
- Salmonella Typhi bacteria (Typhoid fever)
- Dengue virus (Dengue)

- **Vulnerability Meter**
  - This will indicate how vulnerable the player is to getting infected. This can be alleviated by finding various items throughout the map which can help reduce the player's vulnerability
- **Items**
  - There are items around the map that can aid the player in protecting themselves from getting infected by a virus/bacteria themselves. These include:
    - Masks
    - Gloves
    - Sinks
    - Rubbing alcohol
    - Lab Coats
- **Encyclopedia**

(Disclaimer: The developers do not promote self-medication. If infected by a virus or any sort of ailment, please consult a medical professional for help.)

Mycobacterium tuberculosis (Tuberculosis):

It's an infectious disease caused by the bacteria Mycobacterium tuberculosis. Tuberculosis generally affects the lungs, but it can also affect other parts of the

body.

Signs and Symptoms: Tuberculosis can infect any organ of the body, but it most commonly affects the lungs. Fever, chills, night sweats, loss of appetite, weight loss, and fatigue are common signs and symptoms. Significant nail clubbing is also possible. If the infection becomes active, it most usually involves the lungs. Symptoms may include chest pain and a persistent cough that produces sputum. In rare cases, the infection may erode into the pulmonary artery or a Rasmussen's aneurysm, resulting in massive bleeding.

Transmission: When a person with active pulmonary TB coughs, sneezes, speaks, or spit, they expel infectious aerosol droplets. Each one of these droplets may transmit the disease, since the infectious dose of tuberculosis is very small. People with prolonged contact with a person with TB are at particularly high risk of becoming infected, with an estimated 22% infection rate. A person with active but untreated tuberculosis may infect 10–15 (or more) other people per year.

Vaccination and Treatment: Bacillus Chalmette-Guerin (BCG) is the only available vaccine. In children, it reduces the risk of infection by 20% and the risk of infection leading to active disease by nearly 60%. BCG is only given to people who are at high risk.

Antibiotics are used to kill the bacteria in the treatment of tuberculosis. Effective TB treatment is difficult, due to the unusual structure and chemical composition of the mycobacterial cell wall, which hinders drug entry and makes many antibiotics ineffective.

As of 2010, the recommended treatment for new-onset pulmonary tuberculosis is six months of antibiotics containing rifampicin, isoniazid, pyrazinamide, and ethambutol for the first two months, and only rifampicin and isoniazid for the last four months. (DOH, 2022)

Coronavirus disease 2019 (COVID-19)

It is a virus-borne disease caused by the severe acute respiratory syndrome coronavirus 2(SARS-CoV-2). The first known case was discovered in December 2019 in Wuhan, China. The disease quickly spread throughout the world, resulting in the COVID-19 pandemic.

Signs and Symptoms: COVID-19 varied and depend on the variant contracted, ranging from mild symptoms to a potentially fatal illness. Symptoms may appear 2 to 14 days after virus exposure. Coughing, fever, loss of smell (anosmia) and taste (ageusia) are common symptoms, with less common ones including headaches, nasal congestion and runny nose, muscle pain, sore throat, diarrhea, eye irritation, toes swelling or turning purple, and breathing difficulties in moderate to severe cases. People infected with COVID-19 may experience a variety of symptoms, and these symptoms may change over time.

Transmission: COVID-19 is primarily transmitted when people breathe in air contaminated with virus-containing droplets/aerosols and small airborne particles. People who are infected expel those particles as they breathe, talk, cough, sneeze, or sing. Transmission is more likely when people are physically close. Infection can, however, spread over longer distances, particularly indoors.

Vaccination and Treatment: The first COVID19 vaccines were developed and made available to the public in 2020 as a result of emergency authorizations and conditional approvals. Initially, most COVID-19 vaccines were two-dose vaccines, with the single-dose Janssen COVID-19 vaccine being an exception. According to a study published in June 2022, COVID19 vaccines prevented an additional 14.4 to 19.8 million deaths in 185 countries and territories between December 8, 2020 and December 8, 2021.

Patients in the risk groups who have mild to moderate symptoms can take Nirmatrelvir/Ritonavir or Remdesivir, which reduces the risk of serious illness or hospitalization. The majority of COVID-19 cases are mild. Supportive care in these cases includes medication such as paracetamol or NSAIDs to relieve symptoms (fever, body aches, cough), adequate fluid intake, rest, and nasal

breathing. (DOH, 2022)

Rabies

It is a virus that causes encephalitis in humans and other animals. Rabies is a dangerous virus-borne disease. It infects both human and animal nervous systems.

Signs and Symptoms: In humans, the incubation period for this virus is typically 1-3 months. This period can last with just four days or as long as six years, depending on the location and severity of the wound, as well as the amount of virus introduced. The first symptoms of rabies are commonly nonspecific, such as fever and headache. As rabies progresses and causes inflammation of the brain and meninges, symptoms such as mild or partial paralysis, anxiety, insomnia, confusion, agitation, abnormal behavior, paranoia, terror, and hallucinations may occur.

Transmission: All warm-blooded animals, including humans, can contract the rabies virus and develop symptoms. The virus can infect most animals and spread the disease to humans. Domestic dogs are responsible for approximately 99% of human rabies cases worldwide. The virus is typically found in a symptomatic rabid animal's nerves and saliva. A bite is usually, but not always, the source of infection. In many cases, the infected animal is extremely aggressive, attacking without provocation and acting in an unusual manner.

Vaccination and Treatment: A regimen of four 1-mL doses of HDCV or PCEC vaccines should be administered intramuscularly to previously unvaccinated persons. The rabies vaccine is 100% effective if given right away, and it still has a chance of success if treated later. More than 15 million people are vaccinated after potential exposure every year.

The Milwaukee Protocol and the Recife Protocol are two treatment schemes proposed for treating rabies after the onset of symptoms. The Milwaukee Protocol puts a person into a chemically induced coma and uses antiviral medications to prevent fatal dysautonomia. The Recife Protocol adheres to the same principles

but differs in details such as sedation termination and supplemental medication.(DOH, 2022)

Influenza

It is an infectious disease caused on by influenza viruses and is generally known as the "flu". Flu is a respiratory infection that affects the nose, throat, and lungs.

Signs and Symptoms: The influenza incubation period is typically 1-4 days, but is most commonly 1-2 days. However, many infections are asymptomatic. Symptoms appear suddenly and are mostly non-specific, such as fever, chills, headaches, muscle pain or aching, loss of appetite, a feeling of discomfort, fatigue, and confusion. These symptoms are often accompanied by respiratory symptoms like a dry cough, sore or dry throat, hoarse voice, and a stuffy nose.

Transmission: Infected people can spread influenza viruses through breathing, talking, coughing, and sneezing, which spread respiratory droplets and aerosols containing virus particles into the air.

People who are infected can transmit influenza viruses through breathing, talking, coughing, and sneezing, which spread respiratory droplets and aerosols that contain virus particles into the air. A person can contract influenza by having a close contact with these particles.

Vaccination and Treatment: Annual vaccination is the primary and most effective method to prevent influenza and influenza-associated complications. Inactivated vaccines contain "killed" (i.e. inactivated) viruses, while live attenuated influenza vaccines (LAIVS) contain weakened viruses. New versions of the vaccines are developed twice a year, as the influenza viruses rapidly changes.

Treatment of influenza in cases of mild or moderate illness is supportive and includes anti-fever medications such as acetaminophen and ibuprofen, adequate fluid intake to avoid dehydration, and resting at home. (DOH, 2022)

Typhoid fever:

Salmonella serotype Typhi bacteria cause the disease. It is a bacterial infection that can spread throughout the body and affect a variety of organs. It can cause serious complications and even fatal if not treated promptly.

Signs and Symptoms: Untreated typhoid fever has three distinct stages that last about a week. During the first week, the body temperature gradually rises, with fever fluctuations, relative bradycardia, malaise, headache, and cough. In quarter of cases, there can be bloody nose, and abdominal pain is also possible. The person is oftenly too tired to get up in the second week, with a high fever in a plateau around 40 °C and bradycardia, typically with a dichotic pulse wave. A number of complications can occur in the third week of typhoid fever, including: continued high fever, dehydration and malnutrition, rash, intestinal hemorrhage, respiratory diseases, encephalitis, low platelet count, and so on.

Transmission: Unlike other Salmonella strains, there are no known animal carriers of typhoid. Humans are the only known carriers of the bacterium. S. enterica subsp. enterica serovar Typhi is spread by the fecal-oral route from people who are infected and from asymptomatic carriers of the bacterium. An asymptomatic human carrier is someone who is still excreting typhoid bacteria in their stool a year after the acute stage of the infection.

Vaccination and Treatment: There are two licensed typhoid vaccines for use in typhoid prevention: the live, oral Ty21a vaccine and the injectable typhoid polysaccharide vaccine. Both are effective and recommended for travelers to typhoid-endemic areas. Boosters are recommended every five years for the oral vaccine and every two years for the injectable form.

The only effective treatment for typhoid fever is antibiotic and oral rehydration therapy. Typhoid fever is usually not fatal if treated properly. Antibiotics such as ampicillin, chloramphenicol, trimethoprim-sulfamethoxazole, amoxicillin, and ciprofloxacin are commonly used to treat it. For surgical treatment, most surgeons

prefer simple closure of the perforation with drainage of the peritoneum. (DOH, 2022)

Dengue:

It is a tropical mosquito-borne disease caused by the dengue virus. Dengue is spread by several species of female Aedes mosquitos, most particularly Aedes aegypti.

Signs and Symptoms: The incubation period for Dengue varies from 3 to 14 days, but it is usually 4 to 7 days. People infected with the dengue virus are usually asymptomatic or have only mild symptoms such as a fever. Others have more serious illnesses, and a small percentage of them are life-threatening. Dengue symptoms include a sudden onset of fever, headache, muscle and joint pain, and a rash.

Transmission:

Dengue virus is primarily transmitted by Aedes mosquitoes, particularly Aedes aegypti. They usually bite in the early morning and during the night, or they can bite and spread infection at any time of day. A single bite can result in an infection. It can also be transmitted through blood products and organ donation.

Vaccination and Treatment: In the Philippines and Indonesia, an effective dengue fever vaccine is now commercially available. The vaccine is only recommended for people who have had a previous dengue infection or in populations where the majority (>80%) of people have been infected by the age of nine. Sanofi produces the vaccine under the brand name Dengvaxia. It's based on a weakened version of the yellow fever virus and each of the four dengue serotypes. According to studies, the vaccine is 66% effective and prevents more than 80 to 90% of severe cases.

There are ongoing efforts to develop antiviral drugs to treat dengue fever attacks and prevent severe complications. Carica papaya leaf extract has been studied and

used in hospitals for treatment. Studies have shown positive effects on clinical blood parameters as of 2020, but a beneficial effect on disease outcome has yet to be studied, and papaya leaf extract is not considered standard of care therapy. (DOH, 2022)

Limitations

- **Platform/OS Compatibility**
    - The game will only be compatible for Windows 7 and Windows 10, 64-bit operating systems due to the system requirements of the game engine which is Unity.
- **Key Binding customization**
    - The controls will be not customizable
- **Character Customization**
    - The game will not include any sort of character customization

Literature Review

Review of related literature, studies or systems

Action video game play facilitates the development of better perceptual templates

A study by Green, CS., Bavelier, D. et. al. (2014) acknowledges that playing action-oriented video games can improve attentional, perceptual, and cognitive task performance, mostly in part due to these types of games requiring the player to stay focused in the action on-screen, as well as being fast-paced in nature. The selected participants for the action-game players have found to have beaten those who don't, even in the long-term

Storytelling as a Health Teaching Strategy for Dengue Prevention and Control in the Philippines

According to Solidum, J. and Solidum, G. (2015), telling a story about controlling a viral outbreak, such as the study's example of Dengue, has proven effective towards teaching and disseminating information to people that might not learn a thing or two about the mechanics of such viral outbreaks. Such a teaching-learning strategy makes people improve their knowledge, all the while being engaged and having fun at the same time.

Airborne transmission of respiratory viruses.

This study by Wang, C. et. al. (2021) goes in-depth at how respiratory viruses spread in droplets generated through human actions like sneezing, as well as how long these droplets last in factors like distance between other persons, as well as how much open air is left in an indoor place. These give a clear picture as to how a particular area might contaminate the most people, and that is something that our game would take inspiration from.

The evolution of transmission mode

This study by Antonovics, J. et. al. (2017) links evolutionary mechanisms to a wide variance of transmission modes, and how scientists know about how such viruses and other similar pathogens spread and in what method do these organisms perform in order

to infect a person. It also gives insights about challenges in regard to the studies of transmission in the future, as more novel viruses with new modes of transmission not explored before in the scientific field might show up. There are many ways for a virus to spread, and some of them won't be the central focus of our game, but for the few that are present, these transmission modes, and how they evolve, are an important gameplay element.

Mathematical model and intervention strategies for mitigating tuberculosis in the Philippines

According to Kim, S. et. al. (2018), While the TB-DOTS course that is implemented in the Philippines has been considered to be successful, Tuberculosis has remained a public health threat that required concerted effort to intervene. Using a mathematical TB model with collected Philippine data, the study proposes that the usage of multiple control interventions can ease the burden of distancing control, as well as that enhancing active case finding control as a replacement for case holding control can potentially curb the spread of TB in the Philippines.

Here we go again: the reemergence of anti-vaccine activism on the Internet

An essay by Camargo Jr., K. (2020) puts forward the growing popularity of anti-vaccine activism, through the eyes of the writer in question as well as in literature. In the essay, he argued that the current social media landscape allowed fringe beliefs to gain popularity, where they are able to make these people stuck in their own belief bubble of sorts, and create their own personal world where challenging views are nullified in favor of those that engage the user. To make these people change their minds in regards to vaccines, there should be an avoidance of derogatory language repetition, a consideration of the emotional resonance of the forwarded ideas, and the avoidance of treating and giving attention to those that are "on the fence" as antagonists. In conclusion, whether or not the methods are effective in bringing these types of persons into approving the vaccine would take time, but the essay warned that if such activism isn't debated in public spaces, people would more so be inclined to believe that anti-vaccination is the truth.

Unwillingness to engage in behaviors that protect against COVID-19: the role of conspiracy beliefs, trust, and endorsement of complementary and alternative medicine

According to Soveri, A. et. al. (2021), amongst the people who have filled up a survey form, persons with faint beliefs on accepted studies in regard to medicinal advancements and strong beliefs in medical conspiracies would be more likely to treat protections against pandemics more negatively, and that they would hold such information as trusted for them enough to not change their minds when asked. Thus, it is recommended for health officials to build the trust of people through creation of communication strategies that can, if done correctly, make them trust what it's officiated in terms of pandemic response. With the creation of the game, we believe that our work would be used for learning, especially those who are confused about how an outbreak works, in a way that is backed up by sources that are scientifically proven, so that players can build trust to health protocols in the future.

Save the Children Philippines raises concern on increasing number of children with COVID-19; calls for immediate action and protection by government and general public

A press release by Save the Children (2021) stated that the Philippines charter has reported an increasing number of reported cases of COVID-19 amongst children and adolescents. The data that has provided by health officials showed that an estimate of over 48 thousand people under the age of 19 have contracted the virus. While those in the age group might experience mild symptoms as the effect of infection, Francisco, C. stated that such symptoms of children should never be disregarded, and that even though COVID-19 generally has less impact on an infected child's health, those with underlying diseases would experience severe illnesses. The non-profit, as said by Muyot, A., calls upon the government to ensure that every child in the country would continue to ensure their health safety through routine immunization as well as keeping an eye on the young population's nutrition, especially in times of pandemics.

Does your child have a good attention span?

This article from Oakridge International School (2022) correlates one's attention span towards learning, and with that in mind, a person is able to learn and gain knowledge if one is attentive towards the task at hand. To accomplish this feat, one of the things that is listed as a necessity to improve one's attention span is to turn such a mundane task, in this case raising attention to how a virus spreads through a particular area, into a game that people can play. If the game can engage the player in the situations given, then he or she will get the gist of how the game is played out, gaining knowledge at the same time.

Zika virus

According to the WHO (2022), the Zika virus is defined as a mosquito-borne virus that is transmitted by Aedes mosquitoes, and that usually people won't notice the symptoms, if they do, they might develop symptoms ranging from rashes to headaches that lasts up to 7 days. Such infections are associated with the development of Guillain-Barré syndrome, and on the onset of the 2016 outbreak, the WHO declared Zika-related microcephaly a Public Health Emergency of International Concern, as well as confirming the links between the Zika virus and congenital malformation.

Social Media Marketing and the Gen Z Attention Span

According to Sklencar, A. (2022), The average attention span of the target market of Gen Z or similar, is around 8 seconds. This is in part of the market's access to newer and faster technologies, especially the smartphone and social media. The author sees this attention span as a challenge and a benefit for brands to advertise what they are selling online to a mass market, but in the case of developing a game that is targeted towards Gen Z in mind, that means making sure that our target market remains engaged with the gameplay up until they reach the end goal, and that the game experience doesn't get dull before they could fully analyze how the game works and what is the message behind it.

Teaching the Next Generation: How Gen Z Learns

According to an article from Chalk (2022), Gen Z'ers grow up in a world where internet access is getting more of an importance, spending an approximate six hours a day on social media platforms, expects a personalized curation of things on the Internet that they would find interesting, and an urge for in-person communication. In terms of learning, they prefer to gain knowledge about specific topics through doing the tasks in their own way, watching an educational video, social learning and class interaction via social media sites and the like, learning at their own pace that is fit for one's needs, and learning on both online and offline situations. Since our target market is Gen Z, we have to take advantage of these answers in regard to how a Gen Zer learns in order to provide a game that is not only fun but is also inviting players to learn.

Why Is Game-Based Learning Important?

According to Tamosevicius, R. (2022), Game-based learning is one of the many active learning techniques that utilizes the medium of games for purposes of learning. Such learning comes from game-playing, and that can promote thinking critically and be better at problem-solving. Such gamification of learning has helped students get engaged in learning, as opposed to reading up on books and other similar material. Our game is an example of one that is made with this idea of Game-based learning in mind. Having the ability to take control of a virus and to see how it spreads as you progress through the game, we believe that the game experience would add a benefit to learning, in this game's case, about how an outbreak happens.

Study: Video gamers are faster learners, have stronger brains

From an article by Mckinney, C. (2017), German researchers Schenk, S. and Suchan, B. (2017) studied that people who are into games are better in situation analysis, knowledge generation, and factual categorization, especially when the situation is met with uncertainty, by comparing a select few who are active in gaming, and those who don't. Also in the same study, game players are found to have more activity in the hippocampus, usually linked towards memory and learning, believing that gameplay can exercise the brain's regions, not only for young people, but also for old people.

Playing video games could be good for young people, helping develop communications and mental adaptability skills

Barr, M. (2017), in a conducted trial for the accession of the effects of videogames amongst young people by the University of Glasgow, concluded that gaming can help the youth in developing skills that are fit for higher education, known in the article as "graduate attributes", a term describing skills like problem solving which are in similar capability as what a graduating student is considered desirable, and that these skills can develop in a short amount of time, since modern-day videogames require the player to adapt to the situations that the developers of these games have created.

How rabies can induce frenzied behavior

Hueffer, K. et. al. (2017) studied that Rabies can cause the host to change their behavior as a way for the disease to spread, through binding and inhibiting select brain receptors that take on the role as behavior regulators. Such effects interfere brain communication and thus result in frenzied behaviors that favor virus transmission. The research also reveals that the behavior of rabies as it traverses, as it added that glycoprotein can bind to nicotinic acetylcholine receptors in order for the virus to enter and hijack these muscle and nerve cells, and as it goes up to the host's head, it infects the brain as well as other tissues that exist. Such behavior of glycoprotein is almost identical to a snake venom's amino acid sequence that also inhibits NARs. In conclusion, the viruses collect within the spaces between brain cells, and that such changes in behavior work in making Rabies spread to other hosts.

Functional Fear Predicts Public Health Compliance in the COVID-19 Pandemic

A study by Harper, CA. et. al. (2020) believes that behaviors of people change when they are fearing of a global pandemic, and that out of this fear, they would treat public health recommendations from officials, cultural or governmental, as a must-do, and even if people are different in terms of what they stand in regard to political matters, such an event can bring people together for the sake of common human thought.

Influenza-associated excess mortality in the Philippines, 2006-2015

Cheng, K. et. al. (2020) stated that in the Philippines, Influenza-related deaths have not been quantified, and that the total death toll has exceeded far more than what has been recorded in national statistics, especially among older adults and young children. Through the usage of the binomial regression method, taking in factors like age groups, the type of flu, weather conditions, as well as the effects of Typhoon Haiyan and the 2009 flu pandemic, it has estimated that the total number of deaths caused by Influenza-caused symptoms have been higher than those recorded.

New Research Shows Learning Is More Effective When Active

According to Aupperlee, A (2021), It has shown that students who are engaged in active learning have shown an improvement in academic performance in comparison to traditional ways of learning, as a study from Yannier, N. and Koedinger, K. (2021) has stated. Such methods not only make such students get hands-on and minds-on, but also to get hearts-on with the topic at hand, thus providing support in emotional and social factors. To the researchers, such practices let students take control of the lesson at hand, and that it encourages them to think and achieve feedback through interactivity, as well as enhancing their creative mind, producing better outcomes than traditional learning.

Clinical, epidemiological, and spatial features of human rabies cases in Metro Manila, the Philippines from 2006 to 2015

Guzman, F. et. al. (2022) states that Rabies remains a problem in the Philippines' public health system even if the country has access to vaccines and medicines that combat rabies, especially in areas like Metro Manila and nearby areas where the incidence of rabies is high. During the 10-year testing period, cases of rabies remained continuous, with no notable drop in new cases as the years went on. The study also states that the number of cases that have been tested between 2006 and 2015 is the same as those who have been admitted in 1987 to 2006, and that few have received rabies medicine, with two that have been considered to be cases of PEP failure.

Risk for COVID-19 Infection, Hospitalization, and Death By Age Group

The CDC (2022) calculated that the rates for cases amongst all age groups are at 1x, rates for hospitalization range from less than 1x to 15x, and deaths range from less than 1x to

340x, and that it gradually increases as people get older. All rates that are calculated are relative to the 18-29 years old group, as it has accounted for the highest number of tested COVID-19 cases compared to other age groups.

Fear of COVID 19 Infection Across Different Cohorts: A Scoping Review

According to Quadros (n. d.), Psychological stressors like panic, fear, phobia, etc., are being substantially reported during the COVID-19 outbreak. In the prior outbreaks, fear of being infected was reported as the prominent suicide stressor. Therefore, fear of infection has become a concern in the context of the COVID-19 pandemic because it worsens emotion, cognition, and behavioral responses. Understanding the extent of fear of COVID-19 infection in various cohorts would aid in gauging the mental health services, which was a remedy in the present review.

Rabies

Cleveland Clinic states that about 2/3rds of people infected with rabies are of the furious kind, and that such infection causes them to experience aggressive and delirious symptoms. Others are paralytic, meaning that they experience grading weakness to paralysis from the affected bite to the entire body. Rabies can either last up to a week if it's furious, while the paralytic kind might last up to a month.

Drinking alcohol does not prevent or treat coronavirus infection and may impair immune function

The U.S. National Institute on Alcohol Abuse and Alcoholism (2020) announces that alcohol consumption does not protect a person from a viral infection, and that such consumption can make a person more susceptible to worsening a person's conditions in a viral infection. The fact is that alcohol in the blood is concentrated at the range of 0.01 -- 0.03%, which is very low to initiate antiseptic action, as well as that such misuse can impair cell functions in the lungs, to the point that the cells can't protect the lungs from infection.

Synthesis

The articles that are listed talk about four points in regard to the game that the developers are making. The first point is that it has to be accurate to how a virus transmits to others, as listed on the second and third studies which correlate to virology and the research of the mechanics of transmission. The second point is the differing perceptions in regard to pandemic response, either through fear of getting infected or believing in sources that are not confirmed as approved information by official health authorities. Third is the developers' target market's decreasing attention span, and the necessity to create material that pleases players who are interested in material that takes a short amount of time to adjust and play without issues. And the fourth point is the benefit of utilizing active learning as a way to get players engaged in science education in a simple and fun way, more specifically the study and research of how a virus spreads, as well as to properly convey our message of awareness that cannot be explained thoroughly if passive learning is applied.

To sum it up, the attention span of those in Generation Z, a generation that lives alongside Internet access, has dropped significantly, to the point that they could not comprehend information that can put their own lives in the safe zone. Meaning as time goes on, less people in the next generation would be aware about what to do in an outbreak.

However, studies have shown that utilizing video games as a teaching tool for learners and retainers of new knowledge, especially in terms of virus transmission, can benefit towards increasing awareness of future outbreaks, and that is what the developers are planning: to create a game that is playable, scientifically accurate, and enjoyable, for players to learn and have fun.

METHODOLOGY

Methodology

The developers are proposing a game that teaches players about how fast certain diseases spread, the many factors that contribute towards such spread, and how people in the community have reacted towards it. For the development of the game, the developers will use the Prototyping model as the preferred methodology. They will be guided by the model below throughout the development process

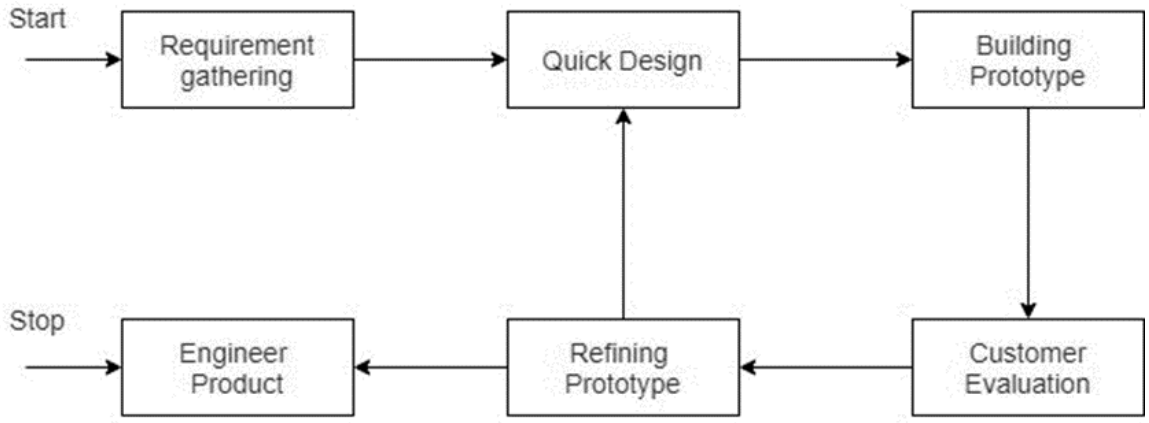

Figure 1 – Prototyping Model

Requirement Gathering:

The developers plan on creating a game that shows how a virus spreads and how to prevent it from spreading. They interviewed some professionals to determine which viruses to incorporate and how it can be translated as gameplay. To make the game much more interesting, the developers will integrate the idea of how a virus each has its own infectious period as a sort of countdown to how much time left the player has before the level ends. This decision has made the game into a time trial game where the objective is to infect as many people as possible.

Quick Design:

The developers took inspiration from the Martial art action game called "SIFU" when designing the map layout and game feel. And crossed it with "Animal Crossing" for its

simplistic textures and used the NPC interaction and pathfinding from "Yandere Simulator".

Building the prototype

The developers use prototypes in testing and validating the ideas of the team and user. It is used in various stages of the development phase to detect and solve any issues that may arise before the implementation or deployment.

Customer Evaluation

The developers use the feedback to help shape the final outcome of the game. By doing so, they can ensure that the game satisfies the needs of the customers.

Refining the prototype

Using the feedback received, the developers adjust the prototype to accommodate the customer's needs. However, if the prototype already accommodates the needs of the customers, the developers will continue refining it into the final product without changing too much of the core aspects of the game.

Engineer Product

Product engineering refers to the transition from a prototype or test product into a marketable finished product.

A* Algorithm

The A* algorithm is used in finding the shortest path between two points. The developers will apply this algorithm for the NPCs that roam around the map. This will be used to direct an NPC to their corresponding tasks which depends on what type of NPC they are.

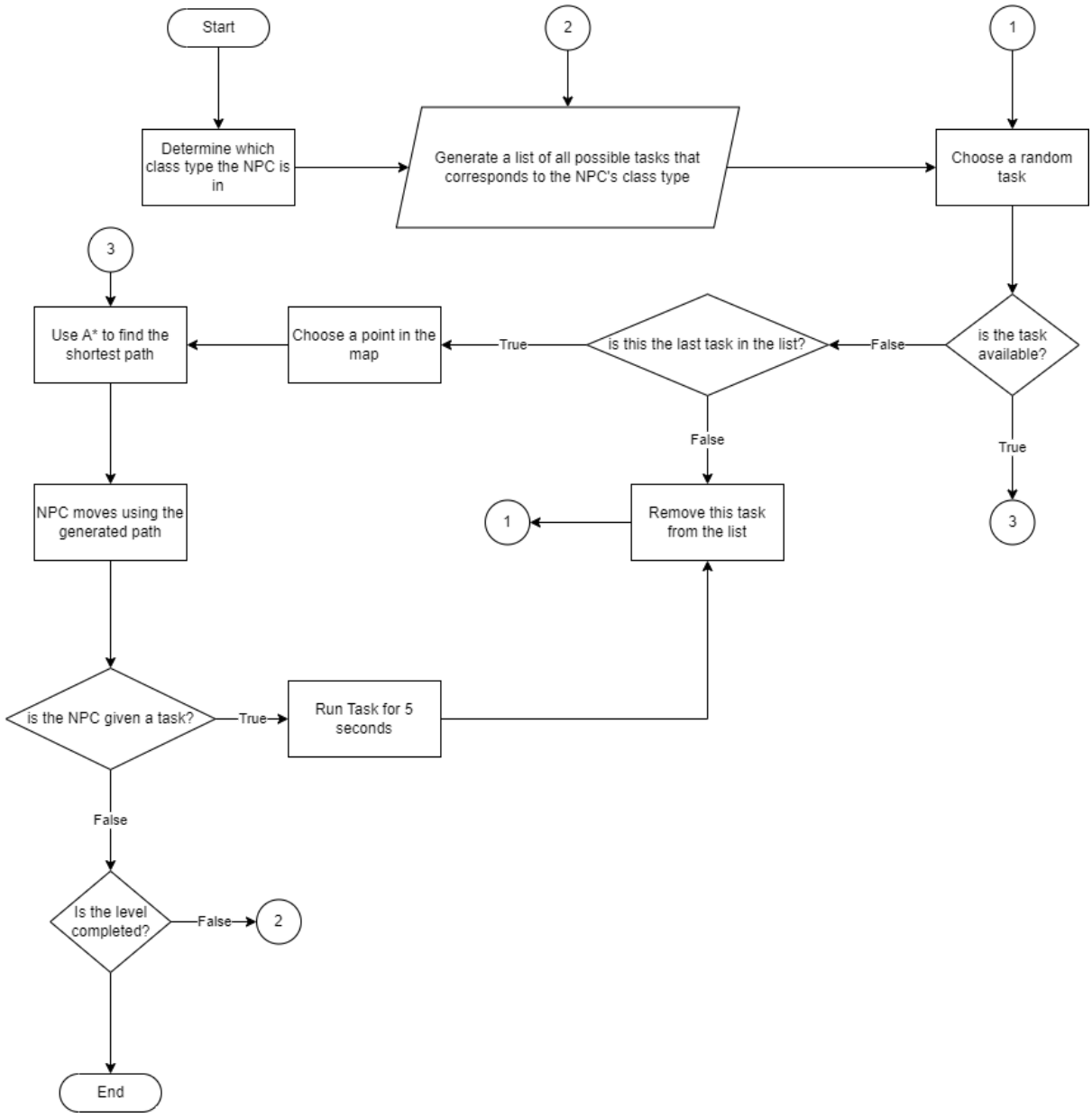

Figure 1 – A Algorithm*

Hardware/Software

Hardware	Software
GTX 1050 TI	Unity
Intel Core I3 9100F	Blender
16Gb Ram	Visual Studio Code
2Tb HDD + 128Gb SSD	Audacity
BM 800 Condenser Microphone	Voicemeeter
Konzert PMP-4+	
Samson SR850	

- Unity - this will be the game engine the developers will use to create the game.
- Blender - the developers will use blender to create the characters and items inside the game.
- Visual Studio Code - the developers will use visual studio code when creating the backend of the game as it has a lot of useful features.
- Audacity - the developers will use audacity to record and edit the audio needed for the game.
- Voicemeeter - this software will be used to apply a balanced eq for the headphones to have a flat audio output for monitoring purposes.

Calendar of Activities

Brainstorming

In this activity, the developers must collaborate and exchange their ideas in order to gather information for an educational game. The developer came up with the idea of developing a 3D game that will inform players about diseases and the importance of the government's protocol. ("All of the Developers are present on this activity").

Presentation of Proposed Titles

In this activity, the developers must propose a title for their game and create detailed information about it. The developers must present their recommended titles to their advisors at the designated time. ("All of the Developers are present on this activity").

Adviser Approval

In this activity, the Advisor must read and understand the detailed information that the developers provided for him to be able to decide if it is valid or invalid. ("All of the Developers are present on this activity").

Data Gathering

The developers were asked to create a questionnaire for both types of data gathering, which leads to having 14 questions for the survey and 13 for the professional interview. ("All of the Developers are present on this activity").

Creating of Document

Following their advisors' instructions and recommendations, the researcher started gathering information they needed for their study. ("All of the Developers are present on this activity").

Table 1 - Gantt chart of Activities

MONTH		September 2022				October 2022				November 2022				December 2022				January 2022			
WEEK	Person Assigned	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Data Gathering																					
Interviews	Everyone																				
Survey	Everyone																				
Chapter 1																					
Introduction	Perillo																				
Background of the study	Garcia, Van																				
Overiew	Everyone																				
Objectives	Everyone																				
Scopes & Limitations	Garcia, Van																				
Chapter 2																					
Review of Related	Garcia, Wayen																				
Synthesis	Garcia, Wayen																				
Chapter 3																					
Methodology	Garcia, Van																				
Hardware & Software	Garcia, Van																				
Calendar of Activities	Perillo																				
Budgetary Estimate	Everyone																				
Human Resources	Perillo																				
Finishing																					
Revisions	Everyone																				
Prototyping																					
Pre - Production	Everyone																				

Ongoing finished/completed

Table 2 –Budgetary Estimate

Thesis 0

Quantity	Budget Items	Approximate Cost
3	Food Expenses	₱3,400
1	Electricity Expenses	₱2,200
3	Transportation	₱3,100
3	Document	₱2,000
1	Internet	₱1,500
Total:		₱12,200

Thesis 1

Quantity	Budget Items	Approximate Cost
3	Food Expenses	₱3,400
1	Electricity Expenses	₱2,200
3	Transportation	₱3,100
1	Internet	₱1,500
Total:		₱10,200

Quantity	Budget Items	Approximate Cost
3	Food Expenses	₱3,400
1	Electricity Expenses	₱2,200
3	Transportation	₱3,100
3	Document	₱2,000
3	Book Binding	₱1,500
1	Internet	₱1,500
Total:		₱13,700

Human Resources

Resource Persons

- **Abigail V Javier**

  - a nurse with 16 years of medical experience at Countryside Medical Clinic

- **Ma. Ruby Famorcan**

  - a nurse with 15 years of medical experience at Sycip, Gorres, Velayo & Co.

- **Erica Reyes**

  - a medical technologist with 5 years of medical experience at St. Joseph Medical Clinic.

- **Jagmis, Pauleen Pilar**

  - a medical technologist with 5 years of medical experience at Aborlan Medicare Hospital.

- **Mareu Fritz C. Ladera**

  - a physician with 8 years of medical experience at Alpha Diagnostic Clinic, Inc.

Abigail V Javier

Ma. Ruby Famorcan

Jagmis, Pauleen Pilar

Mareu Fritz C. Ladera

Erica Reyes

Curriculum Vitae of

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EDUCATIONAL BACKGROUND

Level	Inclusive Dates	Name of school/ Institution
Tertiary	2021	STI Ortigas Cainta
Vocational/Technical	N/A	
High School	2014 - 2018	Mona Lisa Academy
Elementary	2008 - 2014	Mona Lisa Academy

PROFESSIONAL OR VOLUNTEER EXPERIENCE

Inclusive Dates	Nature of Experience/ Job Title	Name and Address of Company or Organization
N/A	N/A	N/A

Listed in reverse chronological order (most recent first).

AFFILIATIONS

Inclusive Dates	Name of Organization	Position
N/A	N/A	N/A

Listed in reverse chronological order (most recent first).

SKILLS

SKILLS	Level of Competency	Date Acquired
Programming	Intermediate	2017

TRAININGS, SEMINARS OR WORKSHOP ATTENDED

Inclusive Dates	Title of Training, Seminar or Workshop
N/A	N/A

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EDUCATIONAL BACKGROUND

Level	Inclusive Dates	Name of school/ Institution
Tertiary	2021	STI Ortigas Cainta
Vocational/Technical	N/A	N/A
High School	2014 - 2018	Himanag National High School
Elementary	2008 - 2014	Himanag Elementary School

PROFESSIONAL OR VOLUNTEER EXPERIENCE

	Nature of Experience/ Job Title	Name and Address of Company or Organization
N/A	N/A	N/A

Listed in reverse chronological order (most recent first).

AFFILIATIONS

Inclusive Dates	Name of Organization	Position
N/A	N/A	N/A

Listed in reverse chronological order (most recent first).

SKILLS

SKILLS	Level of Competency	Date Acquired
Programming	Basic	2021
Designing	Intermediate	2018

TRAININGS, SEMINARS OR WORKSHOP ATTENDED

Inclusive Dates	Title of Training, Seminar or Workshop
N/A	N/A

.

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EDUCATIONAL BACKGROUND

Level	Inclusive Dates	Name of school/ Institution
Tertiary	2021	STI Ortigas Cainta
Vocational/Technical	N/A	N/A
High School	2013 -2015	Casimiro A. Ynares National High School
Elementary	2011 - 2013	Philippians Montessori School

PROFESSIONAL OR VOLUNTEER EXPERIENCE

Inclusive Dates	Nature of Experience/ Job Title	Name and Address of Company or Organization
N/A	N/A	N/A

Listed in reverse chronological order (most recent first).

AFFILIATIONS

Inclusive Dates	Name of Organization	Position
N/A	N/A	N/A

Listed in reverse chronological order (most recent first).

SKILLS

SKILLS	Level of Competency	Date Acquired
Documentation	Intermediate	2017
Programming	Basic	2021

TRAININGS, SEMINARS OR WORKSHOP ATTENDED

Inclusive Dates	Title of Training, Seminar or Workshop
N/A	N/A

ADVISER'S ACCEPTANCE FORM

NAME OF PROPONENTS: **Van Beaufort L. Garcia**
Charlene F. Perillo
Gabriel Magwayen B. Garcia

APPROVED RESEARCH TITLE: **Deterge**

AREA OF STUDY: **Game**

CONFORME:

Lexter A. Santos
Thesis

APPROVED BY:

Merriam T. Muyco **Date:**
Thesis Coordinator

NOTED BY:

Salvador T. Gascon, Jr.
Program Head

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APPENDIX A – INTERVIEW RESULT

1. Give bacteria or viruses that are still relevant in the Philippines.

Javier, Famorcan, Reyes, Jagmis And Ladera:

Dengue virus (Dengue)	**Salmonella Typhi bacteria (Typhoid fever)**
SARS-CoV-2 virus (COVID-19)	
Genus Lyssavirus (Rabies)	**Mycobacterium tuberculosis (Tuberculosis)**
Influenza viruses (flu)	

2. Have you ever treated or assisted in the treatment of this bacteria or virus?

Jagmis, Pauleen Pilar:

Mycobacterium tuberculosis (Tuberculosis) - YES

Mareu Fritz C. Ladera:

Influenza viruses (flu) - YES

Erica Reyes:

SARS-CoV-2 virus (COVID-19) - YES

Abigail V Javier:

Genus Lyssavirus (Rabies) - YES

Dengue virus (Dengue) - YES

Ma. Ruby Famorcan:

Salmonella Typhi bacteria (Typhoid fever) - YES

3. Can you describe in a few sentences the life cycle of bacteria or viruses?

Jagmis, Pauleen Pilar:

Mycobacterium tuberculosis (Tuberculosis) - TB bacteria spread through the air from one person to another. When a person with TB disease of the lungs or throat coughs, speaks, or sings, TB bacteria can get into the air. People nearby may breathe in these bacteria and become infected. The incubation period usually lasts

about 3-9 weeks. Most people with tuberculosis will need to take antibiotics for at least 6 months to be cured.

Mareu Fritz C. Ladera:

Influenza viruses (flu) - lasted for 5 to 7 days depends on your immune system

Erica Reyes:

SARS-CoV-2 virus (COVID-19) - 5 days after exposure for some people it shows a significant signs and symptoms like fever sore throat, runny nose and cough that last for about 7-14 days

Abigail V Javier:

Genus Lyssavirus (Rabies) - incubation period in humans is typically between 20 and 90 days

Dengue virus (Dengue) - One would typically experience symptoms after 4 days of contracting dengue

Ma. Ruby Famorcan:

Salmonella Typhi bacteria (Typhoid fever) - The incubation period is usually 1-2 weeks, and the duration of the illness is about 3-4 weeks

4. Is the bacteria or virus contagious?

Jagmis, Pauleen Pilar:

Mycobacterium tuberculosis (Tuberculosis) - YES

Mareu Fritz C. Ladera:

Influenza viruses (flu) - YES

Erica Reyes:

SARS-CoV-2 virus (COVID-19) - YES

Abigail V Javier:

Genus Lyssavirus (Rabies) - NO, It cannot be spread directly from person to person

Dengue virus (Dengue) - NO, It cannot be spread directly from person to person

Ma. Ruby Famorcan:

Salmonella Typhi bacteria (Typhoid fever) - YES

5. How does the bacteria or virus usually spread?

Jagmis, Pauleen Pilar:

Mycobacterium tuberculosis (Tuberculosis) - Through direct contact, droplets, and airborne.

Mareu Fritz C. Ladera:

Influenza viruses (flu) - Through droplets, airborne, and direct contact

Erica Reyes:

SARS-CoV-2 virus (COVID-19) - Through droplets and direct contact

Abigail V Javier:

Genus Lyssavirus (Rabies) - Through vector borne

Dengue virus (Dengue) - Through vector borne

Ma. Ruby Famorcan:

Salmonella Typhi bacteria (Typhoid fever) - Through direct contact.

6. At what age is a person more vulnerable to the bacteria or virus?

Jagmis, Pauleen Pilar:

Mycobacterium tuberculosis (Tuberculosis) - All age groups are at risk but it mostly affects adults during their productive years ranging from 50-70 years old.

Mareu Fritz C. Ladera:

Influenza viruses (flu) - any age with low immune system

Erica Reyes:

SARS-CoV-2 virus (COVID-19) - Depends on the exposure even a newborn can acquire.

Abigail V Javier:

Genus Lyssavirus (Rabies) - Depends on the exposure to wild animals

Dengue virus (Dengue) - Anyone bit by an infected mosquito

Ma. Ruby Famorcan:

Salmonella Typhi bacteria (Typhoid fever) - All age groups are at risk but depends on the exposure to infected person and contaminated food

7. How do you treat people affected by the bacteria or virus?

Jagmis, Pauleen Pilar:

Mycobacterium tuberculosis (Tuberculosis) - by examining thoroughly the sample from the patient and by giving proper and reliable results

Mareu Fritz C. Ladera:

Influenza viruses (flu) - if not severe, supportive management

Erica Reyes:

SARS-CoV-2 virus (COVID-19) - Mostly we let them isolate for weeks if not that serious

Abigail V Javier:

Genus Lyssavirus (Rabies) - we inject a series of shots to prevent the infection from taking hold

Dengue virus (Dengue) - We tell the patients to treat any symptoms that may occur

Ma. Ruby Famorcan:

Salmonella Typhi bacteria (Typhoid fever) - we tell the patients to drink more water and follow the prescribed medication.

8. Can you give examples of medications and/or prescriptions used for treatment?

Jagmis, Pauleen Pilar:

Mycobacterium tuberculosis (Tuberculosis) - Rifampicin, Isoniazid, Pyrazinamide, Ethambutol

Mareu Fritz C. Ladera:

Influenza viruses (flu) - antiviral drugs

Erica Reyes:

SARS-CoV-2 virus (COVID-19) - Paracetamol to relieve the fever

Abigail V Javier:

Genus Lyssavirus (Rabies) - Postexposure prophylaxis

Dengue virus (Dengue) - acetaminophen to control the fever and reduce pain

Ma. Ruby Famorcan:

Salmonella Typhi bacteria (Typhoid fever) - Ceftriaxone, Azithromycin (Zithromax)

APPENDIX B – SURVEY QUESTIONNAIRE

1. **How old are you?**
    - 16 - 18
    - 19 -22
    - 23 and above
2. **At what academic level are you in?**
    - Junior High School
    - Senior High School
    - College
    - Other
3. **How often do you visit a medical professional whenever you feel ill?**
    - Always
    - Rarely
    - Never
4. **How often do you take vitamins?**
    - Just once a day
    - Twice a day
    - 3 or more times a day
    - Doesn't consume supplements
5. **Which of these viruses do you know about?**
    - ☐ Mycobacterium tuberculosis (Tuberculosis)
    - ☐ SARS-CoV-2 virus (COVID-19)
    - ☐ Genus Lyssavirus (Rabies)
    - ☐ Salmonella Typhi bacteria (Typhoid fever)
    - ☐ Influenza viruses (flu)
    - ☐ Dengue virus (DENV).
6. **Do you frequently follow the proper procedures when preventing the spread of a virus?**
    - Yes
    - No

- Maybe

7. **Rate your knowledge of how to prevent viruses.**

   I don't know anything about it

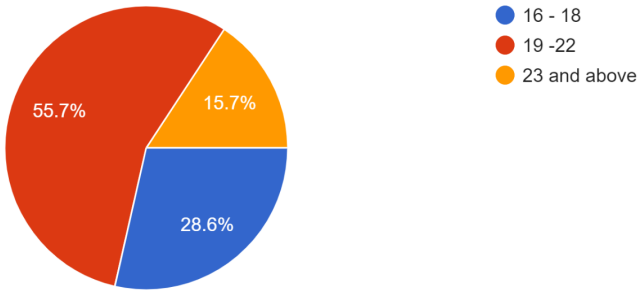
   - 1
   - 2
   - 3
   - 4
   - 5
   - 6
   - 7
   - 8
   - 9
   - 10

   I am well versed about it

APPENDIX C – SURVEY RESULT

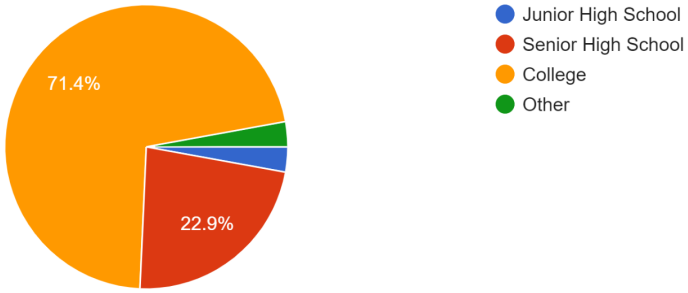
How old are you?

70 responses



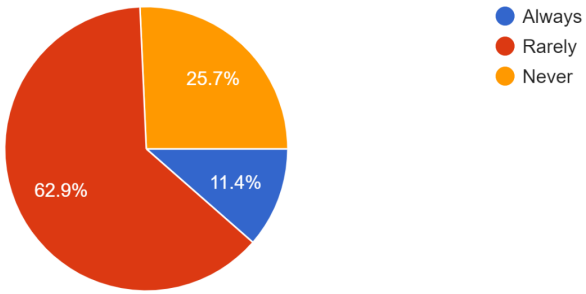
At what academic level are you in?

70 responses



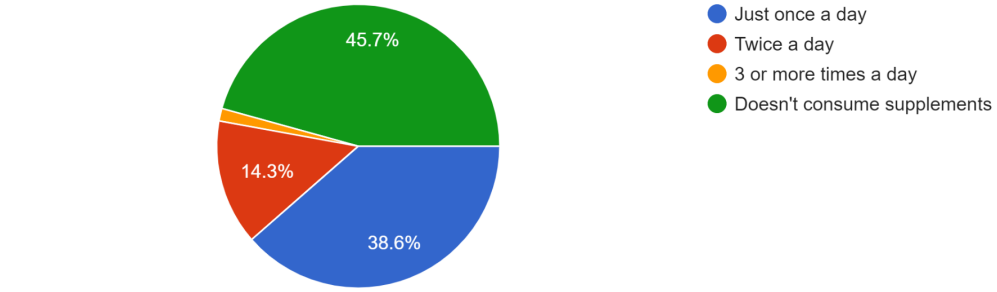
How often do you visit a medical professional whenever you feel ill?

70 responses



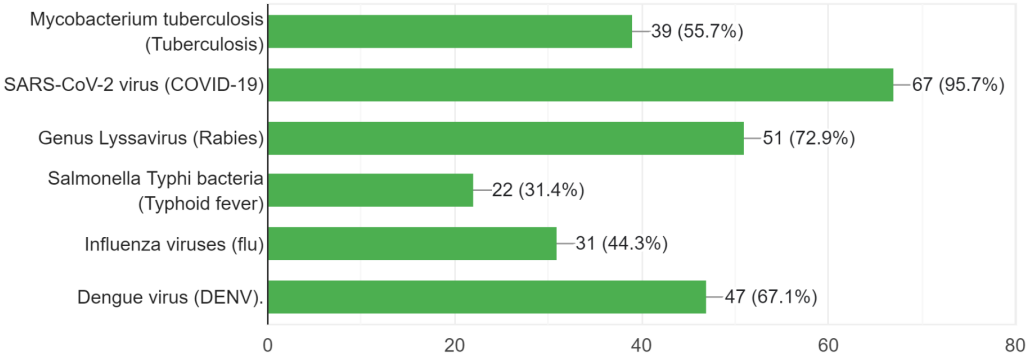
How often do you take vitamins?

70 responses



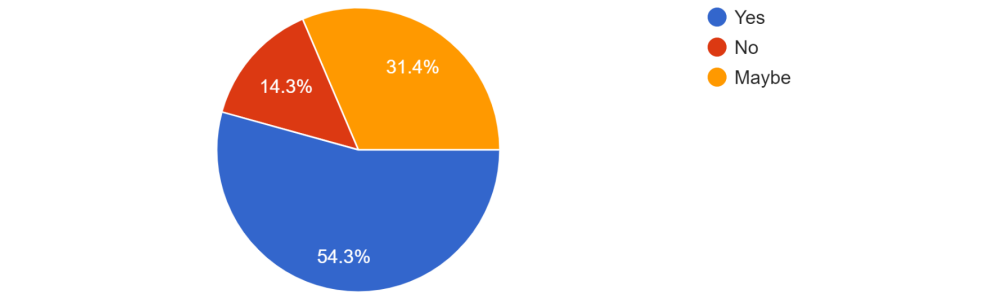
Which of these viruses do you know about?

70 responses



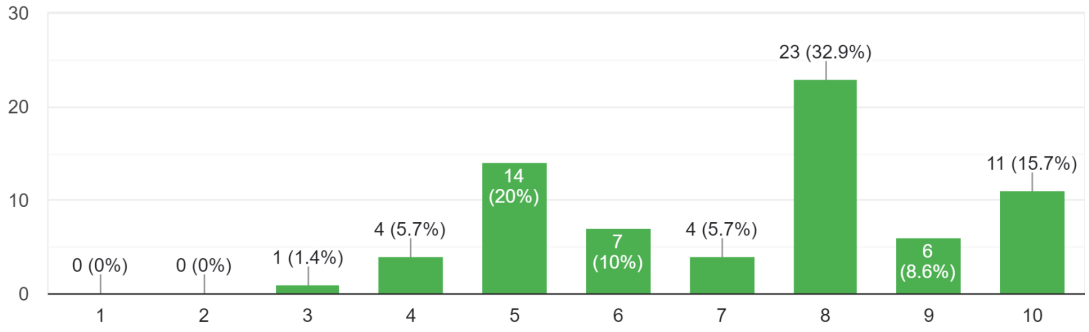
Do you frequently follow the proper procedures when preventing the spread of a virus?

70 responses



Rate your knowledge of how to prevent viruses.

70 responses



GAME DESIGN DOCUMENT

1. Title Page

1.1. Game Name

Deterge - virus treatment and prevention

2. Game Overview

2.1. Game Concept

- A singleplayer isometric simulation game where you take on the role of a doctor named Jason. The main goal of Jason is to help treat the people that have contracted viruses inside the school. However, it is later revealed that the virus was not a natural occurrence, but a plot made by Dolos, who is the main villain of the story.

2.2. Genre

- Simulation, Isometric

2.3. Target Audience

- The target for the game are Gen Zers around the age of 18 - 23. The reason for this decision is the fact that Gen Zers are more vulnerable to infections due to their alcohol intake which can lessen the immunity of the body (National Institute on Alcohol Abuse and Alcoholism, 2020) (Cobe, 2021).

2.4. Game Flow Summary

After starting the game, the player is greeted with a title screen where they can press any key to continue. They will then be shown to a few options: Continue, New game, Options, and Exit Game.

The game is an objective-based game where the player is given objectives they have to complete along with side objectives.

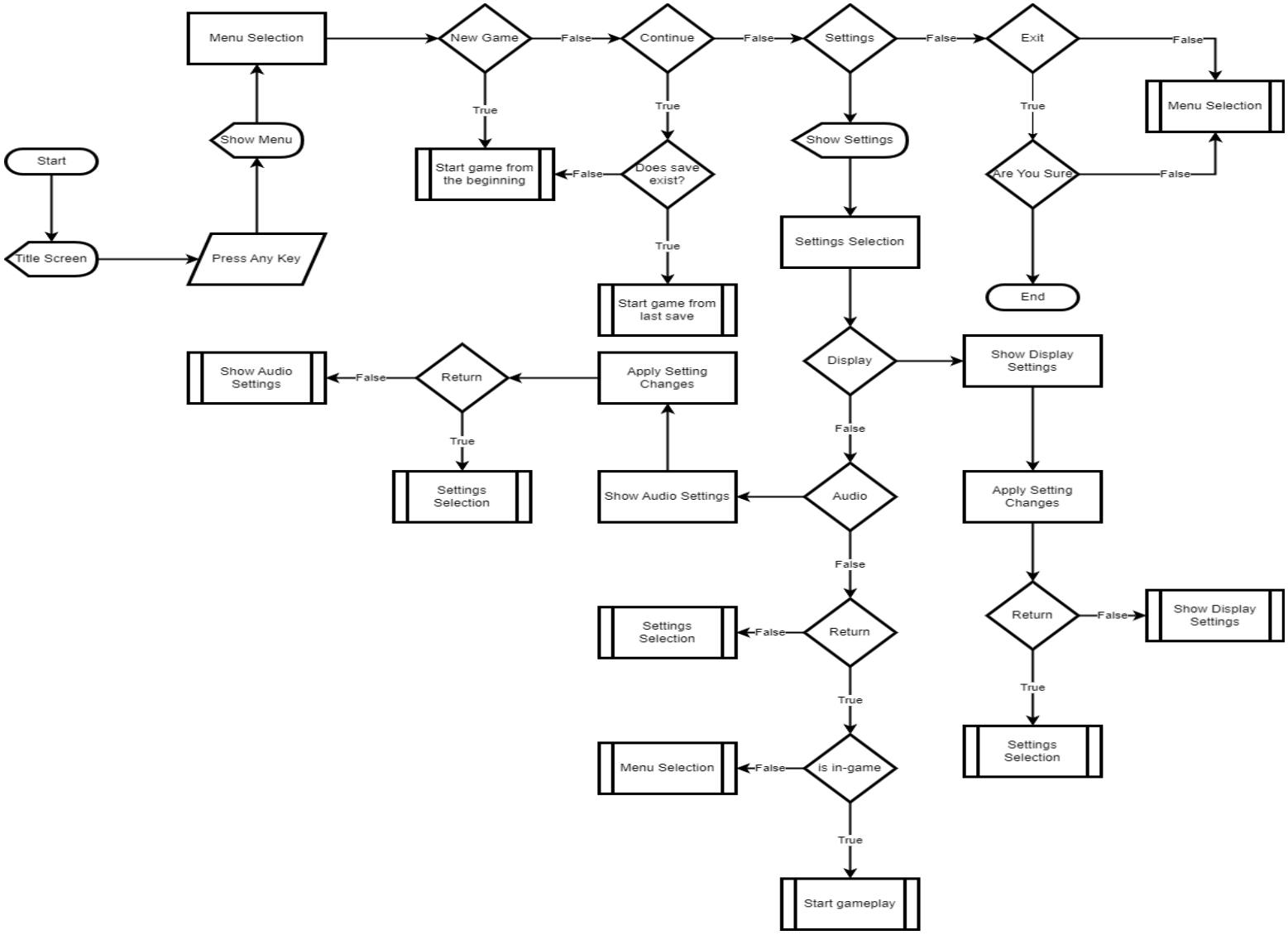


Figure 1 – Game Flow

2.5.Look and Feel

- The game will have an isometric perspective. It is inspired by the cooking PlateUp! from the texture and the isometric perspective.

3. Gameplay and Mechanics

3.1. Gameplay

- The game is a simulation, isometric game where they are to treat people that have contracted a virus. The player will use their medical knowledge as a doctor to treat the people and solve how the virus spread in the first place.

3.1.1. Game progression

- The game will be an objective-based story where the player must complete a series of objectives along with side objectives.

3.1.2. Mission/Challenge Structure

- The game will incorporate a time limit system where they must finish all the objectives inside a given time. Along with a constant maintenance of

proper hygiene to avoid getting infected yourself.

3.1.3. Objectives

- The game will have two main objectives. First is to treat the people in need. Second is to solve how to treat the main cause of infection. Along with the main objectives the developers will also add side objectives. These side objectives will serve as a form of assessment of knowledge. To go into further detail on how the side objectives would assess the player, each side objective will task the player to answer some given questions using the knowledge they have gained through the main objectives. Examples of this are “What are the symptoms of (virus)?” or “How does (virus) spread?” or “How does one reduce the chance of getting infected by (virus)?”. Similar to side objectives, another way of assessing the player will be in the form of a boss battle. The boss/antagonist will attempt to infect the player and the player must respond accordingly.

3.1.4. Play Flow

Player starts the game, cutscene will start showing how the player character went to the school for a seminar and how the character found out that there is a virus spreading among the students.

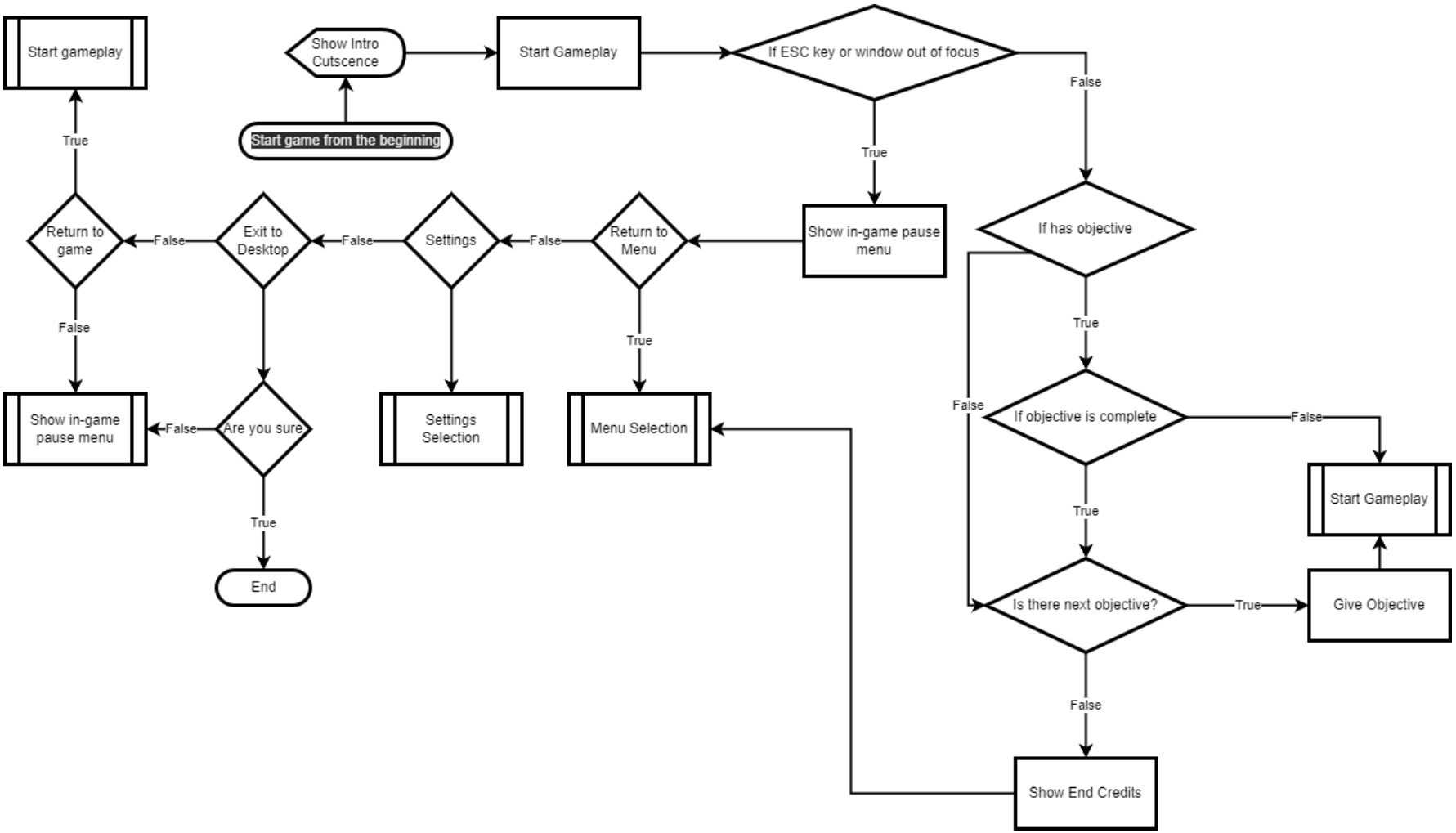


Figure 4 – Play Flow

3.2.Mechanics

The player will use WASD to move around, E to interact, and ESC to pause. As the camera is isometric, it will not be movable in any way. The player will roam around the school treating patients and searching for the cause through those patients by asking them or by determining it through the symptoms.

3.2.1. Environment Objects

- Masks, sink, gloves meant to use for yourself in order to avoid contracting any virus a person has while you treat them.

3.3.Game Options

- Aspect Ratio - This controls the width and height of the game screen to fit the player's computer requirements.
- Screen Resolution - This controls how many pixels to render on the screen at any given time.
- Master Volume - This is the overall volume control
- SFX Volume - Sound Effect Volume
- BGM Volume - Music Volume

3.4.Replaying and Saving

- Replaying can be done by pressing continue in the main screen. Saving can be done through the use of the pause menu.

4. Story, Setting, and Character

4.1.Story and Narrative

- You play as a doctor who went to a school for a seminar with students. However you soon found out that there is a virus among the students. You cure them as much as you can, however, you found out that the virus was spread by someone intentionally.

4.2.Game World

4.2.1. General look and feel of world

- The game will take inspiration from PlateUp! for its camera perspective which is an isometric top-down view and along with its color coded NPCs.

4.2.2. Areas

- The main setting of the game is a school. The main areas in the school include an infirmary, canteen, rooftop, restrooms, and more.

4.2.3. Characters

- Protagonist:

  Jason - a doctor who went to the school for a seminar

- Antagonist:

  Dolos - the main villain who started the spread of virus

5. Interface

5.1.Visual System

Infection Risk Meter:

- Shows how close you are to getting infected by a virus.

Objective Tracker:

- Shows your current objective.

Pause Menu:

- Accessible in games where they can use the ESC button or lose focus of the game window.

5.2.Control System

The player will control their character using keyboard and mouse.

WASD - player movement

E - Interaction

Shift - Run

ESC - Pause menu

5.3.Audio, music, sound effects

- Music will be taken from a royalty free music source. Other sound effects and such will be provided by the developer.

5.4.Help System

- The player will be given hints during load screens.

6. Artificial Intelligence

6.1.Non-combat and Friendly Characters

- The NPCs will have their own tasks and can be found walking around the map.

6.2.Support AI

Pathfinding:

- For pathfinding, the developers opted to use A* algorithm. This will make it simpler to assign NPCs to different tasks by assigning certain areas for NPCs to be in.

7. Technical

7.1.Development hardware and software, including Game Engine

Hardware	Software
● GTX 1050 TI ● Intel Core I3 9100F ● 16Gb Ram ● 2Tb HDD + 128Gb SSD ● BM 800 Condenser Microphone ● Konzert PMP-4+ ● Samson SR850	● Unity ● Blender ● Visual Studio Code ● Audacity ● Voicemeeter