DESIGNING 3D HORROR SURVIVAL GAME "SURVIVING THE NIGHT INVASION" IS AVAILABLE ON THE WINDOWS PLATFORM

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ABSTRACT

The game "Surviving the Night Invasion" is a 3D game with the Horror Survival genre developed on the Windows platform. This is a single player game that use keyboard and mouse controller. This game presents a dark environment and night scenery. The player will have the perspective of main character (first person). In the design process, this game was created using the C# programming language and Unity Engine version 2022.1.15f1 (64-Bit). In this game the player is a person who stranded in an island full of zombies. The aim of this game is that the player has to find a vaccine before the infection rate reaches 100%. Beside that, the player have to turn on the generator so call for help and get out of the island. During the gameplay, the player must be aware of zombie's attack and to find shelter and resources to survive.

Keywords: Surviving the Night Invasion, Horror Survival, Unity, First Person, Zombie

1. INTRODUCTION

The development of technology has a significant impact on the gaming industry. In recent years, rapid technological advancements have brought about new innovations that influence the development of games. Thanks to the increased performance of computers and gaming consoles, video games have become more accessible and popular. Games are not only seen as entertainment, but also as a means of learning and enhancing creativity [1]

Survival horror games first emerged in the 1990s and have since continued to evolve, becoming one of the most popular game genres today an example of this is the game Sweet Home [2]. Improved graphics and audio have made the experience of playing survival horror games more tense and realistic. Survival horror games usually have themes that are scary, such as death, ghosts, monsters, and zombies. In these games, players must survive threats and find solutions to complete missions or solve puzzles in a tense environment, such as at night [3]

The design of the main character's point of view (first-person) in survival horror games makes players feel like they are experiencing the game directly. This increases the sensation and tension felt, making the gaming experience more intense and realistic.

Some similar games that have been popular are "The Walking Dead: Survival Instinct" In this game, players take on the role of Daryl Dixon, who leads a group of people to survive zombie

attacks [4] Another game is "Dayz," which is an apocalyptic survival game played in an open world Players must survive and interact with other players in a world filled with zombies [5]. And "7 Days to Die" is a unique concept survival horror game, where players must survive zombie attacks and natural threats within 7 days [6]

2. RESEARCH METHOD

To create a 3D horror survival game, a foundation of theory is needed as a reference for the design. Some key aspects to be explained in this section include the game genre, environment, game elements, technology used, and other relevant design considerations [7]

Design Methodology

Game design is an important part of the game development process. In this stage, the concept and ideas for the game are transformed into more detailed concepts and applied in game development [8] Here are several stages of game design [9]:

1. High Concept
   In this stage, the game concept is created clearly and understood by all parties involved in the game development. This concept includes the goals, theme, and type of game to be developed. The game designed is a 3D horror survival game, where players assume the role of a character on a zombie-infested island. They must search for a vaccine and activate a generator to survive and confront dangerous situations with skill and courage. Players can also explore the island to find items and resources that aid in their survival. This game is recommended for players aged 16 and above. The concept specifications for the designed game are as follows:
   a. Game Title   : Surviving the Night Invasion
   b. Genre   : Horror Survival
   c. Language   : English
   d. Target Audience   : Teenagers (17 years and above) to adults
   e. Number of Players   : Single player
   f. Graphics   : 3D
   g. Game Engine   : Unity
   h. Programming Language : C#
   i. Controls   : Keyboard and Mouse

2. Gameplay
   "Surviving the Night Invasion" is a horror survival game where players must survive amidst a zombie onslaught. Players will assume the role of a character stranded on an island infested with zombies in a dark and terrifying nighttime environment. To stay alive, players must remain vigilant against zombie attacks and strive to find sufficient shelter and resources. Additionally, players must maintain their stamina and health to avoid exhaustion and injuries. To evade the zombie virus, players need to search for vaccines and activate generators by exploring the island. Once the player has activated the generator, they can make their way to the lighthouse location to be rescued and escape the island, resulting in a game victory. However, if the infection level reaches 100%, the character will turn into a zombie, leading to a defeat and the end of the game.

This stage focuses on how players will interact with the game and how the game will unfold. There are several sub-stages within gameplay, namely:

a. Control Design

Control Design is the process of creating the control system for the game. This control system is used by players to control the character and interactions in the game. The controls used in the game "Surviving the Night Invasion" are keyboard and mouse. The mouse is used to control the player character's view and also to attack enemies. The mouse can also be used to select items in the inventory. The keyboard is used as the control device to move the player character and perform specific actions, such as opening the inventory and activating features like Nightvision and flashlight. The detailed key assignments can be seen in Table 1.

Table 1. Key Assignment Details

Key / Button	Function
Left Mouse Button	Attack / Select item in Inventory
Right Mouse Button	Aim, and Reload
Scroll Wheel	Adjust zoom level on NightVision
W	Move forward
S	Move backward
A	Move left
D	Move right
C	Crouch
E	Use item, weapon, open doors, and pick up interactable items
I	Open Inventory
F	Turn on/off Flashlight
N	Turn on/off NightVision
SPACE	Jump

b. Character Design

Character Design is the process of creating player characters and enemies in the game. These characters have their roles and functions within the game. The game "Surviving the Night Invasion" features two types of characters, namely the main character played by the player and the enemy. Here are the types of character design in the game:

1. Main Player Character
    The main player character is a human stranded on an island infested with zombies during the nighttime. The main character is designed from a first-person perspective, allowing the player to see the character's hands holding weapons or other items being used. The overall appearance of the character can be seen in Figure 2.

Figure 2. Main Player Character Design
[10]

2. Enemy Character
    he enemy characters in the game are the zombies that appear on the island where the main player character is located. The zombies are designed to have a frightening appearance, with pale skin and wounds on their bodies. The movements of the zombies are slow and uncoordinated, creating a more terrifying and challenging experience for the player. The enemy characters pose a significant challenge for the main player character as they strive to survive on the island. The enemy characters have initial status attributes consisting of Health, Damage, and Infection. The initial status can be seen in Table 2.

Table 2. Enemy Character Status Details

Name	Health	Damage	Infection	Speed
Zombie1	180	5	4	0.15
Zombie2	200	6	5	0.15
FemaleCopZombie	300	8	7	0.75
MaleCopZombie	320	10	8	1

c. Object Design

Object Design is the process of creating objects in the game, such as items. These objects have their respective roles and functions within the game. Game "Surviving the Night Invasion" features three types of object designs: Item objects, Weapon objects, and Ammo objects, each serving a specific function. The design of these objects in a game aims to provide gameplay variety and equip players with the ability to face challenges within the game. These objects can assist the main character in surviving and combating enemies. Here are the details of each object in the design of the game "Surviving the Night Invasion":

1. Item Objects

The specifications for the design of item objects used in this game can be seen in Table.

Table 3. Item Objects Details

Item object	Function
Flashlight	The flashlight is used to illuminate dark areas and help the player see any potential enemies around
NightVision	Night vision goggles are used to see in extremely dark places
Lighter	Combine this with a spray can to create a flamethrower. Combine with rags and a bottle to create a Molotov cocktail
Rags	Combine with a bottle and a lighter to create a Molotov cocktai
Health pack	Increases Health by 50%
Pills	Decreases Infection by 25%
Water	Increases Health by 10%, Decreases Infection by 10%
Apple	Increases Stamina by 100%
Bread	Increases Health by 15%, Decreases Infection by 15%.
Ration	Increases Health by 25%
BatteryFL	The BatteryFL is used to fully charge the flashlight battery to power the flashlight
BatteryNV	The BatteryNV is used to fully charge the night vision battery to power the night vision goggles
House Key	The house key is used to unlock all locked doors in the house

Cabin Key	The cabin key is used to unlock all locked doors in the cabin
Jerry Can	The jerry can is used to refuel the generator
Vaccines	Vaccines can cure the player from the zombie virus infection

2. Objek Weapon

The specifications of the item design used in this game can be seen in Table 4.

Table 4. Weapon Object Details

Weapon Object	Description	Damage	Range	Ammo
Knife	A fast weapon for close combat. It is silent and deals 30 damage per attack.	30	1	-
Cleaver	An effective weapon for close combat. It deals 45 damage per strike.	45	1	-
Bat	A deadly weapon for close combat. It is equipped with nails hammered into wood, dealing 60 damage per hit.	60	1	-
Axe	A heavy and slow weapon for close combat. It is lethal, dealing 100 damage per strike.	100	1	-
Gun	A firearm for both close and long-range combat. It holds 15 bullets per clip. Body shots deal 50% damage, while headshots deal 100%.	Body shots deal 50% damage, while headshots deal 100%.	5	15
Shotgun	The shotgun can deliver deadly attacks at both close and long ranges. At close range, it deals 100% damage to multiple enemies.	At close range, it can inflict 100% damage.	3	4

Spray Can	Combine this with a lighter to create a flamethrower. It is suitable for close-range combat.	After combining it into a flamethrower, it can burn zombies for 5 seconds and inflict 25% damage per second.	-	-
Bottle	Throw this to distract enemies, or combine it with rags and a lighter to create a Molotov cocktail.	After being combined into a flamethrower, it can burn zombies for 5 seconds and inflict damage of 25% per second.	-	-

3. Weapon Ammo Object
   The specifications of the item object design used in this game can be seen in Table 5.

Table 5. Ammo Object Details

Objek Ammo	Description	Function
Gun Ammo	Increases the number of bullets in the Gun weapon	Adds 12 rounds of ammunition per use
Shotgun Ammo	Increases the number of bullets in the Shotgun weapon	Adds 8 rounds of ammunition per use

d. Level Design
   Level Design is The planning stage that focuses on creating the layout of the game environment. Level design serves to depict the game world and the places where players will play. In the game "Surviving the Night Invasion," players are able to freely explore the game environment in an open-world setting. The environment in the game is composed of various locations, including forests and villages. The overall concept of the Level Design can be seen in Figure 3.
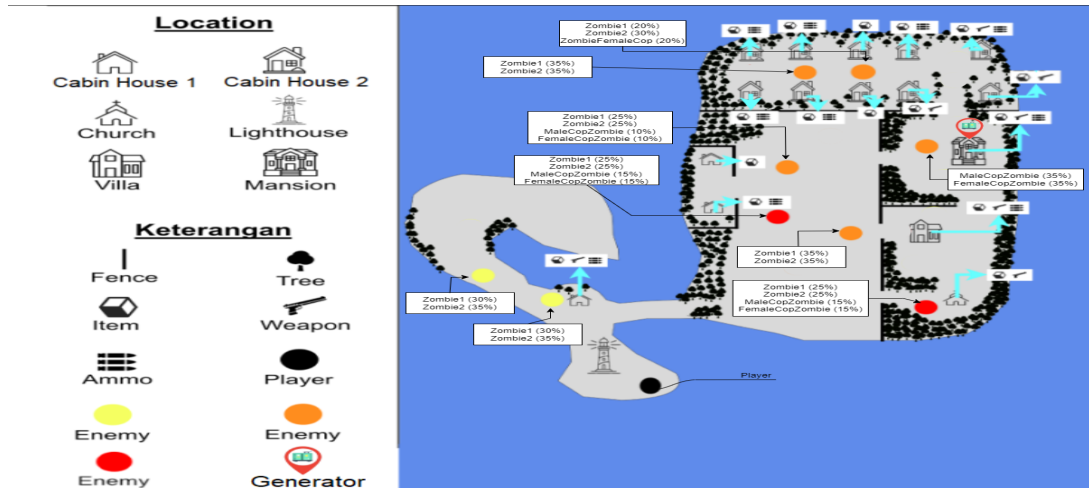
Figure 3. Concept of the entire level design

Here are the color dots indicating the percentage of enemy respawn:

Table 6. Explanation of Enemy Respawn Percentage Points

Color Dots	Percentage
(yellow dot)	65%
(orange dot)	70%
(red dot)	80%

3. Audience

Audience is the stage determines the target players for the game. The target players can be determined based on age, gender, and player interests.The target players and audience of the game "Surviving the Night Invasion" are adults aged 18 and above. This is because the game contains violence, blood, and content that may not be suitable for children and teenagers below that age.

4. Hardware and Software

The stage of determining the required specifications of the hardware and software to ensure smooth and unhindered gameplay.In game development, hardware and software play a crucial role. Details about the hardware and software used in game development, as well as the minimum specifications to run the game, can be seen in Table 4.

Table 4 Hardware Specifications

Processor	Intel Core i5-8250U CPU @ 1.60Ghz
RAM	12 GB
VGA	NVIDIA® GeForce® MX150
Storage	1 TB SSD

Operation System	Windows 11 Pro
Other	*Keyboard* and *Mouse*

The software used is Unity Engine for game design.

Horror Survival

Horror-survival games often feature eerie atmospheres, dark environments, and tense music and sound effects. These games also frequently explore themes of darkness, death, destruction, and uncertainty. Players are often confronted with challenging monsters that are difficult to defeat, and they must utilize limited resources to survive. Some examples of famous horror-survival games include "Resident Evil," "Silent Hill," "Outlast," "Dead Space," "Amnesia: The Dark Descent," and "Alien: Isolation." These games offer challenging and thrilling gameplay, complex stories, and tense atmospheres, providing players with intense and immersive experiences.

3. RESULTS AND DISCUSSIONS

"Surviving the Night Invasion" is a 3D horror survival game that can be played on the PC platform with Windows 10 operating system. This game is designed as a single-player experience where players take on the role of a character stranded on an island infested with zombies. Players must survive, search for a vaccine to fight the zombie virus, and activate a generator to escape the island and defeat the threatening zombies. They can freely explore the island to find items and resources that aid in their survival.

Layout Design

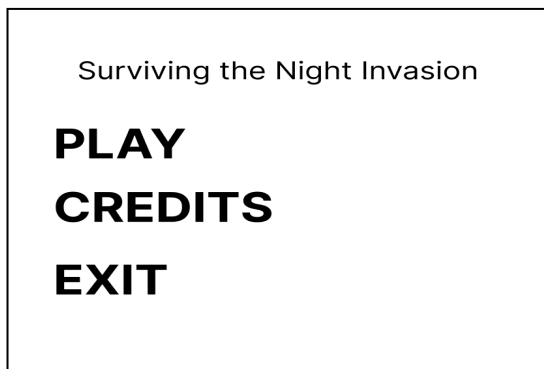Based on the process design above, a design for the game "Surviving the Night Invasion" is created as follows.
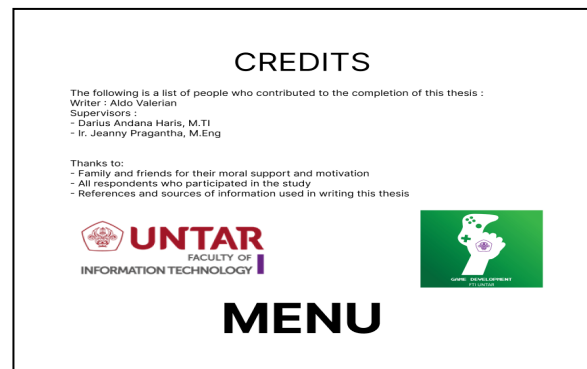

Figure 4. Main Menu Module Design
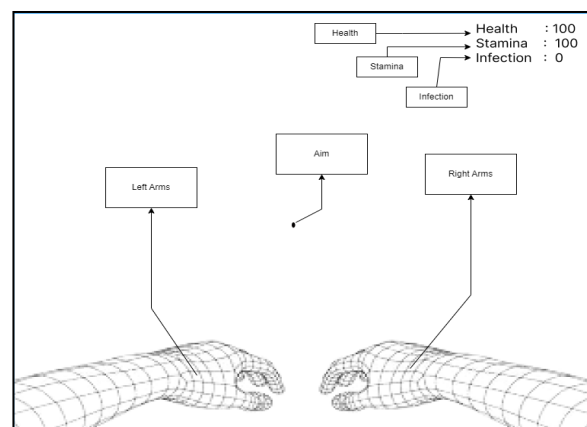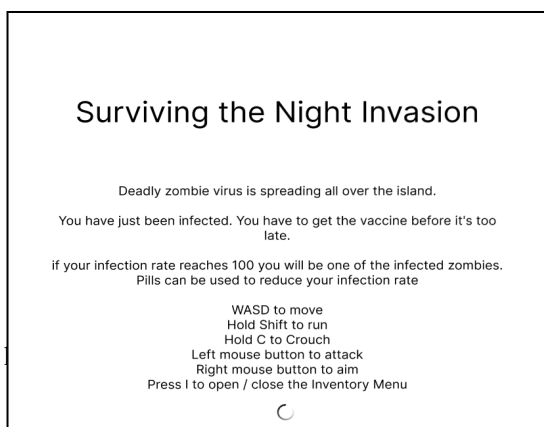

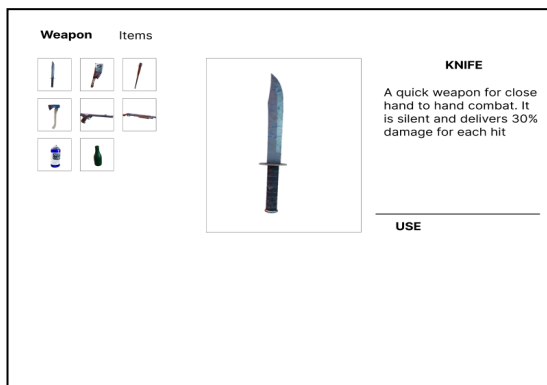Figure 5. Credits Module Design

Figure 6. Loading Screen Module Design

Figure 7. In-Game Design

Figure 8. Weapon Menu Module Design

Figure 9. Items Menu Module Design
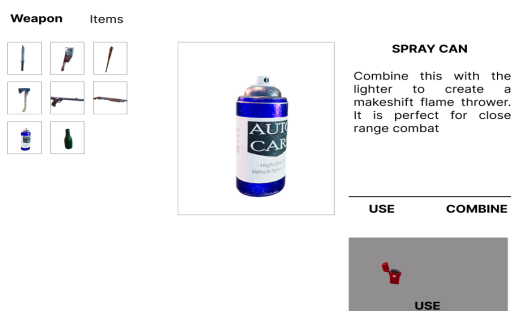
Figure 10. Combine Molotov Module Design

Figure 11. Combine Flamethrower Module Design

PAUSE

RESUME

MENU
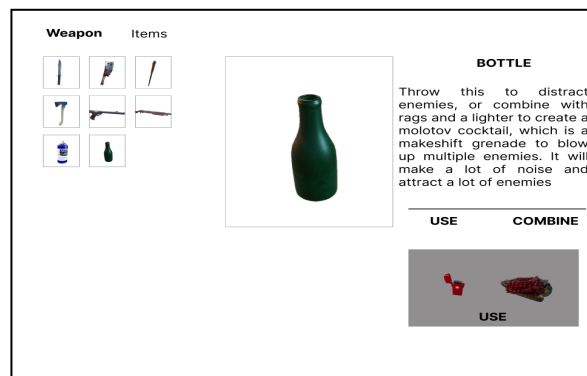
Figure 12. Pause Menu Module Design

SUCCESS!

You have obtained the vaccine and have turned on the generator

Player has successfully avoided the zombie virus and managed to escape on a boat

MENU

Figure 13. Finish Module Design

YOU HAVE DIED!

MENU

Figure 14. Defeat Module Design

Design Layout in the game "Surviving the Night Invasion" is divided into several modules, including the Main Menu module, Credits module, Loading Screen module, In-game module, Pause module, Defeat module, and Finish module. The explanations of each module's design layout are as follows :

1. Main Menu Module

    The Main Menu module is the initial screen that appears when the game is launched. It includes the game title "Surviving the Night Invasion" and three main menus: Play, Credits, and Exit. The Play menu is used to start the game, the Credits menu displays the names and contributions of the development team, and the Exit menu is used to exit the game.

2. Credits Module

    The Credits module presents a list of names and contributions of the writers and mentors involved in the game's development. It aims to give recognition and gratitude to those who have contributed to the game.

3. Loading screen Module

    The Loading Screen module appears after the player presses the Play button. It provides a brief explanation that the island is infected with a zombie virus and the main character is also infected. The objective is to find a vaccine. It also mentions that reaching 100% infection level will turn the player into a zombie and pills can be used to decrease the infection level. The loading screen also provides information about the game controls, such as WASD for movement, holding Shift to run, holding C to crouch, left mouse button to attack, right mouse button to aim, and pressing I to open/close the inventory menu. At the bottom of the screen, there is a loading icon indicating that the game is loading before entering the In-game module.

4. In game Module

    The in-game module presents a first-person view design, allowing players to see only their right and left hands. Additionally, at the top right corner of the game screen, there is an initial status display for the character, consisting of Health, Stamina, and Infection. Health represents the character's health and indicates how much damage the character can sustain before dying. Stamina depicts the character's energy level for actions such as running and attacking. Infection indicates the amount of virus that has entered the character's body. Furthermore, within the design layout of the in-game module, there are several other design layouts, including the inventory menu design for weapons, the inventory menu design for items, and the combine menu design in the inventory. Here are explanations for each design layout.

    a. Weapon Menu Module

        The inventory display in the Weapon menu features various weapons available in the inventory. Users can choose a weapon, and a large image of the selected weapon will

appear in the center of the screen. To help users become more familiar with the weapon, a brief description of the weapon will be positioned to the left or right of the image.

b. Items Menu Module

The inventory display in the Items menu is created in a similar manner. In the inventory view, there are various items available. Each player can select an item, and a large image of the chosen item will appear in the center of the screen. To ensure users understand the function of the item, a brief description will be located to the left or right of the image.

c. Combine Menu Module

The inventory display in the Combine menu appears when objects can be combined, such as using a Spray Can to create a flamethrower or combining a bottle to make a Molotov cocktail. This menu will appear below the object's description in the bottom-right corner. The purpose of this display is to provide users with the option to combine multiple items and create new, more useful items.

5. Pause Module

The Pause module is designed to display the word "PAUSE" in the center of the screen, aiming to inform the user that the game is in pause mode. In this module, there are two menu options available for the user, namely "Resume" and "Menu". The "Resume" button is intended to return the user to the game after pressing it, while the "Menu" button is intended to open the main menu of the game.

6. Finish Module

The Finish module in the game "Surviving the Night Invasion" displays the message "SUCCESS!" as an indication that the player has successfully completed the main mission, which is to obtain the vaccine and activate the generator. Below it, there is text information saying "You have obtained the vaccine and have turned on the generator", providing confirmation that the player has successfully obtained the vaccine and activated the generator. Then, below that, there is the text "Player has successfully avoided the zombie virus and managed to escape on a boat". There is a "MENU" button that can be used to return to the game's main menu. This module's display gives the player a sense of accomplishment and provides a satisfying conclusion after completing the main mission, while also offering the option to return to the main menu and start a new game or exit the game.

7. Defeat Module

The Defeat module appears when the main character in the game is defeated or killed in battle against zombies. This module informs the player that the main character has died and displays a button to return to the main menu. The module includes the text "YOU HAVE DIED!" and a "MENU" button that players can press to return to the Main Menu module. The Defeat module essentially provides players with an opportunity to restart the game from the beginning or choose to exit the game.

4. CONCLUSIONS AND SUGGESTIONS

Based on the above explanation, it can be concluded that "Surviving the Night Invasion" is a 3D horror survival game that can be played on the PC platform using the Windows 10 operating system. In this game, players will assume the role of a character stranded on an island infested with zombies. The player's task is to survive by searching for vaccines to fight the zombie virus, activating the generator to escape the island, and defeating the threatening zombies.

This game provides players with the freedom to explore the island freely with the goal of finding items and resources that can aid in their survival. With elements of survival and combat against zombies, the game offers an intense and challenging experience for players.

ACKNOWLEDGEMENT

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