TEB1043: Object Oriented Programming

Group Project May 2025

Game Development with Unity

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TABLE OF CONTENTS

DESCRIPTION

Introduction

For this project, we aim to demonstrate key dynamics Object Oriented Programming principles, such as inheritance, polymorphism, and encapsulation in game development. We explored the core of game design, development, and implementation by designing a non-linear multilevel horror game. By using Unity, a game development hub, and Visual Studio, we developed a 3D game that involves atmospheric exploration, item collection, and dynamic enemy AI. For this, our team had to learn all the elements of these sites, from making and placing objects, animations, and to connect it all, scripting.

The game is a first-person collection horror inspired by the horror game Slender: Eight Pages where the player needs to collect specific items while navigating a progressively unsettling and bizarre environment, all while avoiding enemies. The goal is to escape without being caught, relying on situational awareness, timing, and critical thinking to survive and escape.

Links

YouTube video: https://youtu.be/Y0lYoStXviA

Github: https://github.com/vausschnitt/Lighthouse-LVL.git

Objectives

1. Develop a Modular & Scalable Horror Game using Object-Oriented Principles
    - A fully playable horror game was developed with six distinct levels, each featuring unique environmental designs and challenges.
    - Apply object-oriented programming concepts such as inheritance, polymorphism, encapsulation and abstraction to create reusable and efficient systems for player movement, enemy AI, item collection, and UI management.
    - The project's development was supported by strategically creating skeleton code, UML, and application code.
2. Implement Immersive Horror Mechanics & Atmosphere
    - Unique horror game mechanics blended with core object-oriented programming principles were incorporated into creative strategies to advance through the game.
    - Immersive audio & visuals promote dynamic lighting, sound effects, and ambient noise is used to enhance tension and fear throughout the game.
3. Deliver a Polished and User-Friendly Experience
    - The gameplay is reinforced with structured programming scripts to ensure the game runs smoothly.
    - A clear UI system with a start screen and in-game HUD were developed to enhance accessibility.
    - Performance is optimized through efficient scripting and collision detection.

Main Features

1. Player movement with jump and crouch
2. Collect counter with UI
3. Enemy mechanic (weeping Angel)
4. Non-linear level design
5. Box colliders with trigger to activate certain enemy
6. Adaptable and modular level design

TEAM ORGANIZATION AND CONTRIBUTIONS

Team Structures & Roles

Game Designers:

- Whole Team: (collaborative ideas, design, mechanics, and level concepts
- Individual Level Owners:
    - Level 1: Nurdarwina Safiah
    - Level 2: Nurfarahin Afifah
    - Level 3: Dahlia
    - Level 4-6:
        - Atiqah Syaffia
        - Muhammad Hazyq
        - Alham Aqif Uzair

Programmers:

- Nurdarwina Safiah
- Alham Aqif Uzair
- Dahlia
- Muhammad Hazyq

Sound Designers:

- Nur Farahin Afifah
- Atiqah Syaffia

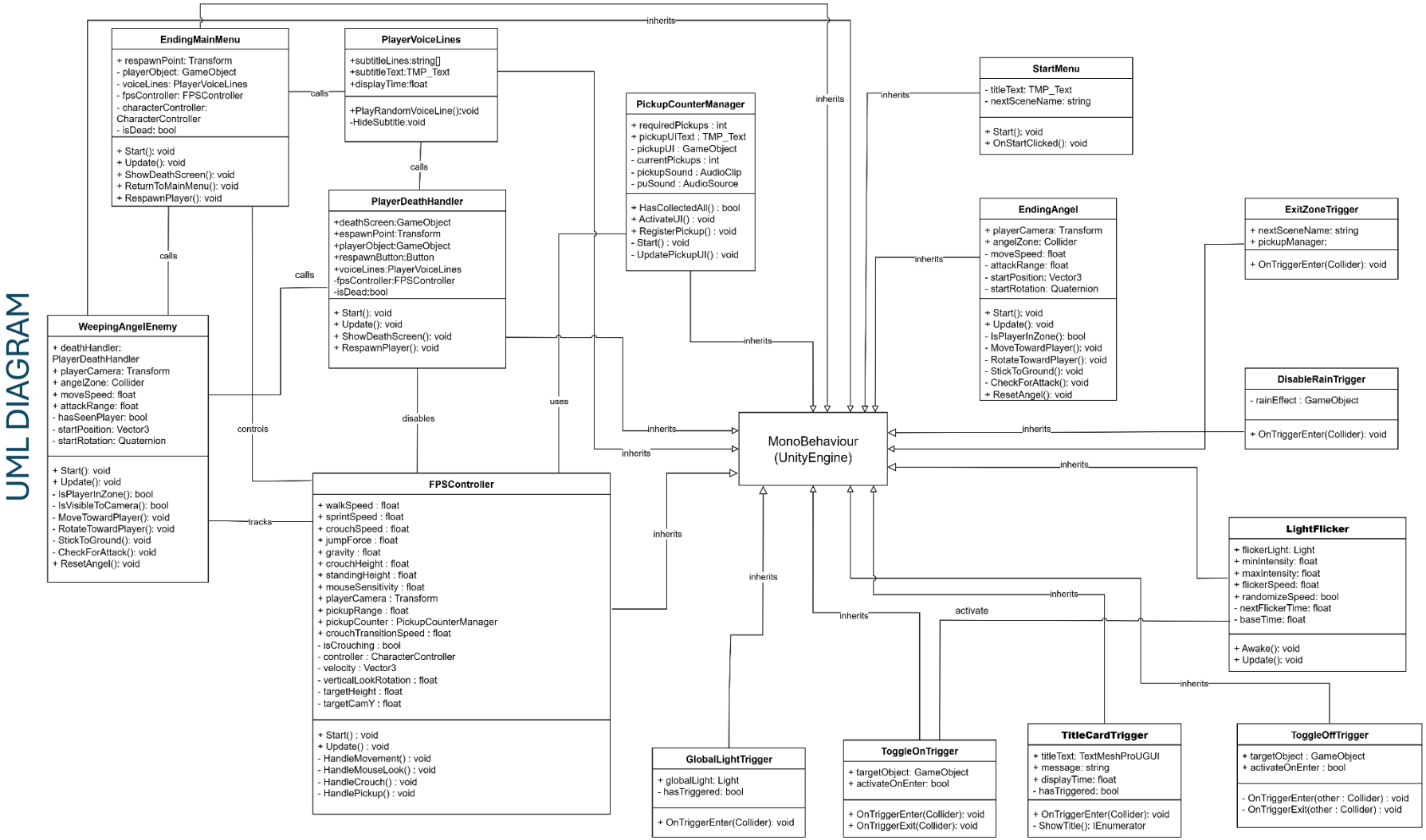
Play testers:

- Alham Aqif Uzair
- Dahlia
- Muhammad Hazyq
- Atiqah Syaffia

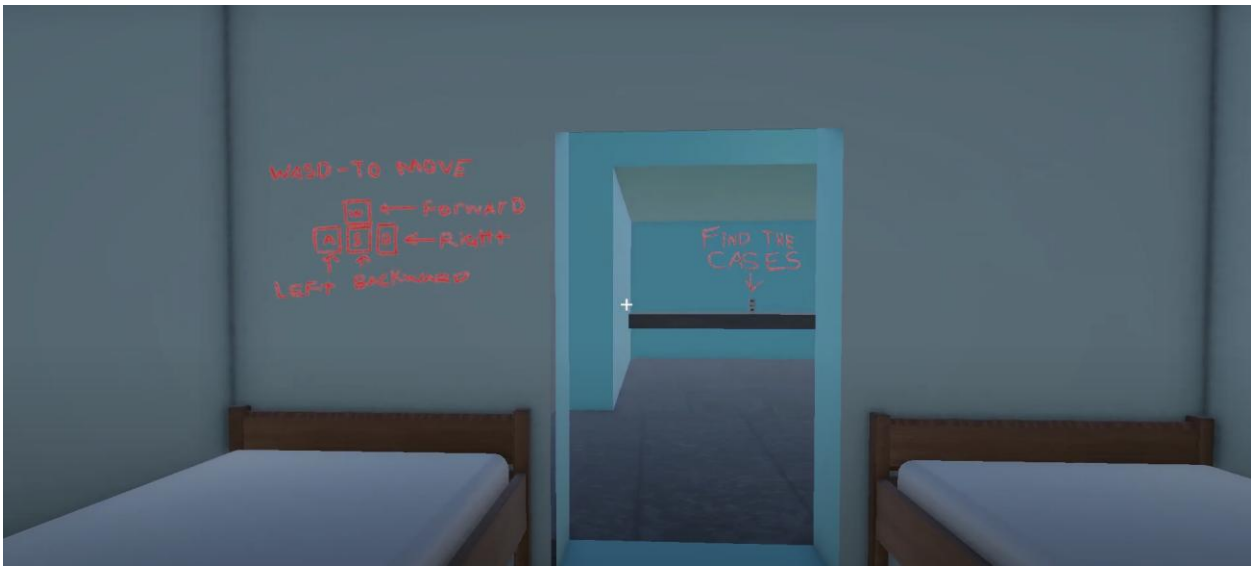
Collaboration Tools:

- Shared files: WhatsApp, Telegram, and Discord
- Word Sharepoint
- Draw.io (flowchart maker)
- Lucidspark (early planning)

UML DIAGRAM

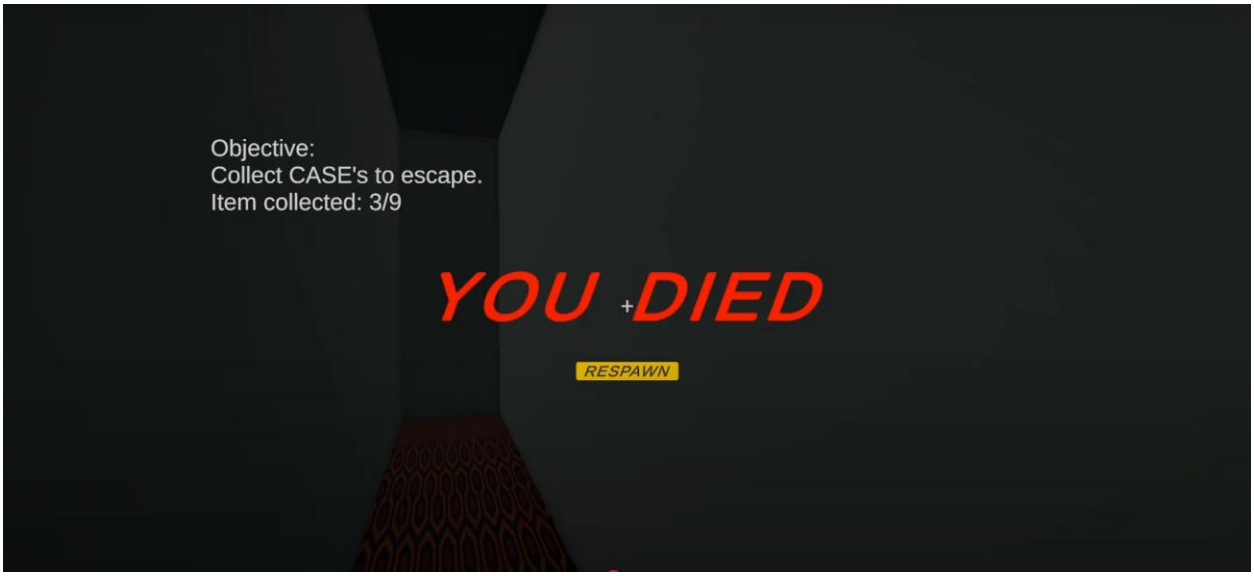

EndingMainMenu
+ respawnPoint: Transform
- playerObject: GameObject
- voiceLines: PlayerVoiceLines
- fpsController: FPSController
- characterController: CharacterController
- isDead: bool
+ Start(): void
+ Update(): void
+ ShowDeathScreen(): void
+ ReturnToMainMenu(): void
+ RespawnPlayer(): void
PlayerVoiceLines
+subtitleLines:string[]
+subtitleText:TMP_Text
+displayTime:float
+PlayRandomVoiceLine():void
-HideSubtitle:void
PickupCounterManager
+ requiredPickups : int
+ pickupUIText : TMP_Text
- pickupUI : GameObject
- currentPickups : int
- pickupSound : AudioClip
- puSound : AudioSource
+ HasCollectedAll() : bool
+ ActivateUI() : void
+ RegisterPickup() : void
- Start() : void
- UpdatePickupUI() : void
StartMenu
- titleText: TMP_Text
- nextSceneName: string
+ Start(): void
+ OnStartClicked(): void
PlayerDeathHandler
+deathScreen:GameObject
+espawnPoint:Transform
+playerObject:GameObject
+respawnButton:Button
+voiceLines:PlayerVoiceLines
-fpsController:FPSController
-isDead:bool
+ Start(): void
+ Update(): void
+ ShowDeathScreen(): void
+ RespawnPlayer(): void
EndingAngel
+ playerCamera: Transform
+ angelZone: Collider
- moveSpeed: float
- attackRange: float
- startPosition: Vector3
- startRotation: Quaternion
+ Start(): void
+ Update(): void
- IsPlayerInZone(): bool
- MoveTowardPlayer(): void
- RotateTowardPlayer(): void
- StickToGround(): void
- CheckForAttack(): void
+ ResetAngel(): void
ExitZoneTrigger
+ nextSceneName: string
+ pickupManager:
+ OnTriggerEnter(Collider): void
WeepingAngelEnemy
+ deathHandler: PlayerDeathHandler
+ playerCamera: Transform
+ angelZone: Collider
+ moveSpeed: float
+ attackRange: float
- hasSeenPlayer: bool
- startPosition: Vector3
- startRotation: Quaternion
+ Start(): void
+ Update(): void
- IsPlayerInZone(): bool
- IsVisibleToCamera(): bool
- MoveTowardPlayer(): void
- RotateTowardPlayer(): void
- StickToGround(): void
- CheckForAttack(): void
+ ResetAngel(): void
MonoBehaviour (UnityEngine)
DisableRainTrigger
- rainEffect : GameObject
+ OnTriggerEnter(Collider): void
FPSController
+ walkSpeed : float
+ sprintSpeed : float
+ crouchSpeed : float
+ jumpForce : float
+ gravity : float
+ crouchHeight : float
+ standingHeight : float
+ mouseSensitivity : float
+ playerCamera : Transform
+ pickupRange : float
+ pickupCounter : PickupCounterManager
+ crouchTransitionSpeed : float
- isCrouching : bool
- controller : CharacterController
- velocity : Vector3
- verticalLookRotation : float
- targetHeight : float
- targetCamY : float
+ Start() : void
+ Update() : void
- HandleMovement() : void
- HandleMouseLook() : void
- HandleCrouch() : void
- HandlePickup() : void
LightFlicker
+ flickerLight: Light
+ minIntensity: float
+ maxIntensity: float
+ flickerSpeed: float
+ randomizeSpeed: bool
- nextFlickerTime: float
- baseTime: float
+ Awake(): void
+ Update(): void
GlobalLightTrigger
+ globalLight: Light
- hasTriggered: bool
+ OnTriggerEnter(Collider): void
ToggleOnTrigger
+ targetObject: GameObject
+ activateOnEnter: bool
+ OnTriggerEnter(Collider): void
+ OnTriggerExit(Collider): void
TitleCardTrigger
+ titleText: TextMeshProUGUI
+ message: string
+ displayTime: float
- hasTriggered: bool
+ OnTriggerEnter(Collider): void
- ShowTitle(): IEnumerator
ToggleOffTrigger
+ targetObject : GameObject
+ activateOnEnter : bool
- OnTriggerEnter(other : Collider) : void
- OnTriggerExit(other : Collider) : void
inherits
calls
uses
controls
disables
tracks
activate

SCREENSHOTS




Objective:
Collect CASE's to escape.
Item collected: 2/3


Objective:
Collect CASE's to escape.
Item collected: 4/6


Objective:
Collect CASE's to escape.
Item collected: 3/9
YOU DIED
RESPAWN


Objective:
Collect CASE's to escape.
Item collected: 7/9


Objective:
Collect CASE's to escape.
Item collected: 8/9


THANKS FOR PLAYING
VILLAGE 5
H(ORROR)
Credits:
Alham Aqif Uzair Bin Hamidi
Atiqah Syaffia Binti Mohd Fazeli
Dahlia Binti Mohd Nazari
Nurdarwina Safiah Binti Aswadimanor
Nurfarahin Afifah Binti Radzuan
Muhammad Hazyq Bin Zulkarnine
Restart Game