TEB1043: Object Oriented Programming

Group Project May 2025

Game Development with Unity

NAME	STUDENT ID	PROGRAM
ALHAM AQIF UZAIR BIN HAMIDI	24007454	Information Technology
ATIQAH SYAFFIA BINTI MOHD FAZELI	24007397	Information Technology
DAHLIA BINTI MOHD NAZARI	24007499	Information Technology
MUHAMMAD HAZYQ BIN ZULKARNINE	24007516	Information Technology
NURDARWINA SAFIAH BINTI ASWADIMANOR	24007943	Information Technology
NURFARAHIN AFIFAH BINTI RADZUAN	24008638	Information Technology

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DESCRIPTION

<u>Introduction</u>

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.

<u>Links</u>

YouTube video: https://youtu.be/Y0IYoStXviA

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

<u>Objectives</u>

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 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 enemies
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
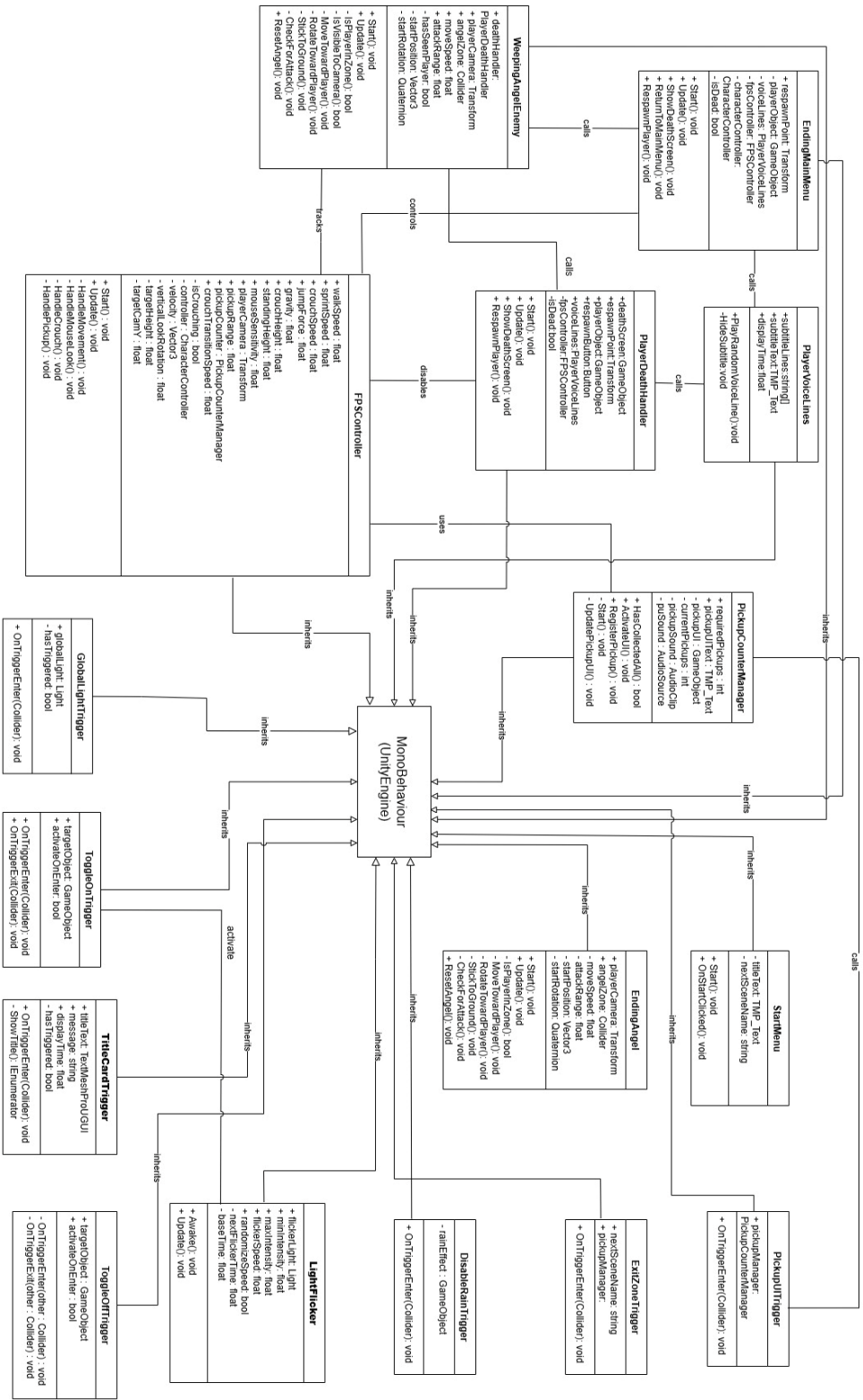
Play testers:

- 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

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

PlayerVoiceLines
- subtitleLines : string[]
- subtitleText : TMP_Text
- displayTime : float
+ PlayRandomVoiceLine() : void
+ HideSubtitle : void

PlayerDeathHandler
+ deathScreen : GameObject
+ respawnPoint : Transform
+ playerObject : GameObject
+ respawnButton : Button
+ voiceLines : PlayerVoiceLines
- fpsController : FPSController
- isDead : bool
+ Start() : void
+ Update() : void
+ ShowDeathScreen() : void
+ RespawnPlayer() : void

FPSController
+ walkSpeed : float
+ sprintSpeed : float
+ crouchSpeed : float
+ jumpForce : float
+ gravity : float
+ crouchHeight : float
+ standingHeight : float
+ mouseSensitivity : float
+ playerCamera : Transform
+ pickupCounter : PickupCounterManager
+ pickupRange : float
- 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

PickupCounterManager
+ requiredPickups : int
+ pickupUIText : TMP_Text
- pickupUI : GameObject
- currentPickups : int
- pickupSound : AudioClip
- psdSound : AudioSource
+ HasCollectedAll() : bool
+ ActivateUI() : void
+ RegisterPickup() : void
+ Start() : void
- UpdatePickupUI() : 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
+ Awake() : void
+ Update() : void
- OnTriggerEnter(other : Collider) : void
- OnTriggerExit(other : Collider) : void

LightFlicker
+ flickerLight : Light
+ minIntensity : float
+ maxIntensity : float
+ flickerSpeed : float
+ randomizeSpeed : bool
- nextFlickerTime : float
- baseTime : float
+ Awake() : void
+ Update() : void

DisableRainTrigger
- rainEffect : GameObject
+ OnTriggerEnter(Collider) : 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

StartMenu
- titleText : TMP_Text
- nextSceneName : string
+ Start() : void
+ OnStartClicked() : void

PickupUITrigger
+ pickupManager : PickupCounterManager
+ OnTriggerEnter(Collider) : void

MonoBehaviour (UnityEngine)

Relationships: calls, controls, tracks, disables, uses, inherits, 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