

Computer Games Development SE607

Technical Design Document

Year IV

Izabela Zelek

C00247865

[24/04/2023]

Contents

[1. Project Overview 2](#_Toc133418781)

[1.1. Programming languages 2](#_Toc133418782)

[1.2. Tools and Technology 2](#_Toc133418783)

[1.3. Feature List 2](#_Toc133418784)

[1.4. Scripts 3](#_Toc133418785)

[1.5. CRC Cards 6](#_Toc133418786)

# Project Overview

As the only farmer in this peaceful village, the player will plant crops and sell them to the population, while also engaging in a variety of activities. The player has the freedom to customize their environment using the Level Editor, located inside their house. This Level Editor allows the player to select and place objects, move and rotate existing objects, summon new NPCs, and create custom NPC paths.

# **Programming languages**

* C#

# Tools and Technology

* Unity Engine – A cross-platform game engine which offers features such as audio, animation, and physics, among others. It allows for input from a mouse, keyboard, game controllers and also touch for mobile development.
* Oculus Quest 2 – A virtual reality (VR) headset with inbuilt movement tracking which allows you to fully immerse yourself in available game. It is a successor of the original Oculus Quest. The Oculus Quest 2 comes with two controllers which allow you to interact with the game world.
* XR Toolkit (free Unity package) – A tool for developers which aids them in creating immersive VR experiences. It provides features such as teleportation, controller-based movement, 3D audio, hand tracking and object interactions (such as picking up items).

This is a pc tethered VR Game. It was built with the intention of playing with a cable attached VR headset, however playing on a standalone headset without attachments is possible.

# Feature List

|  |  |
| --- | --- |
| Day/Night Cycle | Shopkeeper NPC schedules |
| NPC schedules | Sleeping mechanic |
| Vehicles | Inventory System |
| Level Editor- Object Placing | Level Editor- Object Rearranging |
| Level Editor – NPC Spawning | Level Editor – Custom NPC paths |
| Seed Planting | Plant Watering |
| Plant Harvesting | Buy/Sell Mechanic |
| Tree Chopping | Grass Collecting |
| Animal Care and Item Collection | |

# Scripts

|  |  |
| --- | --- |
| **Script Name** | **Functionality** |
| ActivateTeleportationRay | Handles enabling or disabling the teleportation ray upon button press |
| AnimalShop | Handles the purchase and spawning of farm animals |
| AnimateHand | Handles hand animations upon press of controller buttons to add immersion |
| AnimController | Handles the eye animations for falling asleep and waking up |
| AxeController | Handles the functionality of the axe object |
| BirdController | Handles the behaviour of birds upon being hit by bullet |
| BirdFormController | Handles the movement of a flock of birds |
| ButtonVR | Handles the purchase and spawning of plant seeds |
| CanController | Handles the functionality of the watering can |
| CapsuleController | Handles interaction with sleeping capsule by bed which allows for sleep and time skip |
| FallController | Handles catching objects which fall out of world border and sets position of object to ground level |
| FarmScript | Handles the change of states in planting fields |
| FruitBundleController | Handles destruction of plants with multiple fruit |
| FruitController | Handles behaviour of fruit when harvested |
| GameManager | Handles player money, entering and leaving the map editor, and bird flock spawning |
| GrassCollider | Handles initial spawn collisions of grass |
| HoeScript | Handles the functionality of the hoe object |
| HouseController | Handles teleportation of player when entering capsule to enter or leave player house |
| InventoryVR | Handles enabling or disabling inventory upon button press |
| Item | Handles determining whether current object is being held or in inventory slot |
| LargeItem | Old unused script - left in for archival and version control purposes. Provides a record of the previous versions and iterations of the project. |
| MapCapsule | Handles entering the map/level editor |
| MapEditor | Handles all interactions with the Map/Level Editor - including placing objects, rearranging objects and spawning NPCs |
| MultiFruitStemController | Handles keeping track of the number of children currently on a plant stem |
| NPCContoller | Handles the wander steering behaviour of NPCs and avoiding objects in front of them |
| NPCCreator | Handles the spawning of new NPCs when selecting the option in the Map/Level Editor |
| NPCHouseController | Handles the pairing between the NPCs and their houses |
| ObjectAvoid | Old implementation of the Object Avoidance steering behaviour - left in for archival and version control purposes. Provides a record of the previous versions and iterations of the project |
| ObjectAvoidance | Handles the avoidance of objects for the NPCs |
| ParkerPathMover | Handles the path following steering behaviour of visiting NPCs |
| PathCellController | Handles the cells in each possible NPC path. Specifies the amount of time spent loitering at the cell, |
| PathDecor | UNUSED Handles the drawing of a line to follow the custom path - left in for archival and version control purposes. Provides a record of the previous versions and iterations of the project. |
| PathFollowing | UNUSED Handles the ability to draw the custom paths with a mouse - left in for archival and version control purposes. Provides a record of the previous versions and iterations of the project |
| PathMover | Handles the path following steering behaviour of civilian NPCs |
| PlantController | Handles the storage of all possible plant types to stop constant loading of prefabs |
| RainController | Handles the water particle system that plays when the watering can is above a planting field |
| RoadCellController | Handles the cells in each possible vehicle path. Specifies whether the cell is at a traffic light or is a parking space. Keeps track of all paths that share the common cell. |
| SeedBagController | Handles the interaction with the seed bag- Instantiates seeds when the bag is tipped over the planting field |
| SeedScript | Handles the destruction of the falling seed when it hits the farm ground |
| SellController | Handles the selling of produce and picked up items |
| SellItemController | Handles storing the price of the item when sold |
| ShopGateController | Handles the animations of the shopping stalls opening and closing |
| ShopKeeperMover | Handles the path following steering behaviour of shopkeeper NPCs |
| Slot | Handles the interactions and item holding of a slot in the inventory |
| StreetLampController | Handles the turning on and off of the streetlamps at appropriate times |
| TimeController | Handles the passage of time, changing day to night and night to day, and random grass growing each day |
| TrafficLightController | Handles the traffic light system, decides which lights turns green and turns the others red. |
| TreeController | Handles the lifespan of a tree. Keeps track of the life count and destroys the tree and instantiates a random nr of logs once it lost all lives |
| VehicleCollision | Handles the stopping of vehicles when a car, NPC or player is in front of it, plays honk audio. |
| VehicleController | Handles the spawning of new vehicles and assigning road paths. |
| VehicleMover | Handles the path following steering behaviour of vehicles |
| WalkController | Handles the walking audio. |

# CRC Cards

|  |  |
| --- | --- |
| ActivateTeleportationRay | |
| **Responsibilities** | **Collaborators** |
| Enables and Disables teleportation ray upon button press |  |

|  |  |
| --- | --- |
| AnimalShop | |
| **Responsibilities** | **Collaborators** |
| Handles the purchase and spawning of farm animals  Takes money from player account | GameManager |

|  |  |
| --- | --- |
| AnimateHand | |
| **Responsibilities** | **Collaborators** |
| Handles hand animations upon press of controller buttons to add immersion |  |

|  |  |
| --- | --- |
| AnimController | |
| **Responsibilities** | **Collaborators** |
| Handles the eye animations for falling asleep and waking up |  |

|  |  |
| --- | --- |
| AxeController | |
| **Responsibilities** | **Collaborators** |
| Handles the functionality of the axe object  Checks for hit with trees | TreeController |

|  |  |
| --- | --- |
| BirdController | |
| **Responsibilities** | **Collaborators** |
| Handles the behaviour of birds upon being hit by bullet |  |

|  |  |
| --- | --- |
| ButtonVR | |
| **Responsibilities** | **Collaborators** |
| Handles the purchase and spawning of plant seeds | GameManager |

|  |  |
| --- | --- |
| BirdFormController | |
| **Responsibilities** | **Collaborators** |
| Handles the movement of a flock of birds |  |

|  |  |
| --- | --- |
| CanController | |
| **Responsibilities** | **Collaborators** |
| Handles the functionality of the watering can | RainController |

|  |  |
| --- | --- |
| CapsuleController | |
| **Responsibilities** | **Collaborators** |
| Handles interaction with sleeping capsule by bed which allows for sleep and time skip | TimeController  AnimController |

|  |  |
| --- | --- |
| FallController | |
| **Responsibilities** | **Collaborators** |
| Handles catching objects which fall out of world border and sets position of object to ground level |  |

|  |  |
| --- | --- |
| FarmScript | |
| **Responsibilities** | **Collaborators** |
| Handles the change of states in planting fields  Spawns new plant objects | TimeController  CapsuleController |

|  |  |
| --- | --- |
| FruitBundleController | |
| **Responsibilities** | **Collaborators** |
| Handles destruction of plants with multiple fruit |  |

|  |  |
| --- | --- |
| FruitController | |
| **Responsibilities** | **Collaborators** |
| Handles behaviour of fruit when harvested | MultiFruitStemController |

|  |  |
| --- | --- |
| GameManager | |
| **Responsibilities** | **Collaborators** |
| Handles player money, entering and leaving the map editor, and bird flock spawning | CapsuleController  BirdFormController |

|  |  |
| --- | --- |
| GrassCollider | |
| **Responsibilities** | **Collaborators** |
| Handles initial spawn collisions of grass |  |

|  |  |
| --- | --- |
| HoeScript | |
| **Responsibilities** | **Collaborators** |
| Handles the functionality of the hoe object  Creates planting fields |  |

|  |  |
| --- | --- |
| HouseController | |
| **Responsibilities** | **Collaborators** |
| Handles teleportation of player when entering capsule to enter or leave player house |  |

|  |  |
| --- | --- |
| InventoryVR | |
| **Responsibilities** | **Collaborators** |
| Handles enabling or disabling inventory upon button press |  |

|  |  |
| --- | --- |
| Item | |
| **Responsibilities** | **Collaborators** |
| Handles determining whether current object is being held or in inventory slot |  |

|  |  |
| --- | --- |
| LargeItem | |
| **Responsibilities** | **Collaborators** |
| Old unused script - left in for archival and version control purposes. Provides a record of the previous versions and iterations of the project. |  |

|  |  |
| --- | --- |
| MapCapsule | |
| **Responsibilities** | **Collaborators** |
| Handles entering the map/level editor | GameManager |

|  |  |
| --- | --- |
| MapEditor | |
| **Responsibilities** | **Collaborators** |
| Handles all interactions with the Map/Level Editor - including placing objects, rearranging objects and spawning NPCs | PathCellController  NPCCreator  GameManager |

|  |  |
| --- | --- |
| MultiFruitStemController | |
| **Responsibilities** | **Collaborators** |
| Handles keeping track of the amount of children currently on a plant stem  Decrements children |  |

|  |  |
| --- | --- |
| NPCContoller | |
| **Responsibilities** | **Collaborators** |
| Handles the wander steering behavious of NPCs and avoiding objects in front of them | TimeController |

|  |  |
| --- | --- |
| NPCCreator | |
| **Responsibilities** | **Collaborators** |
| Handles the spawning of new NPCs when selecting the option in the Map/Level Editor | PathMover |

|  |  |
| --- | --- |
| NPCHouseController | |
| **Responsibilities** | **Collaborators** |
| Handles the pairing between the NPCs and their houses | PathMover  ShopKeeperMover  NPCController  TimeController |

|  |  |
| --- | --- |
| ObjectAvoid | |
| **Responsibilities** | **Collaborators** |
| Old implementation of the Object Avoidance steering behaviour - left in for archival and version control purposes. Provides a record of the previous versions and iterations of the project | NPCContoller |

|  |  |
| --- | --- |
| ObjectAvoidance | |
| **Responsibilities** | **Collaborators** |
| Handles the avoidance of objects for the NPCs | PathMover  NPCContoller |

|  |  |
| --- | --- |
| ParkerPathMover | |
| **Responsibilities** | **Collaborators** |
| Handles the path following steering behaviour of visiting NPCs | PathCellController |

|  |  |
| --- | --- |
| PathCellController | |
| **Responsibilities** | **Collaborators** |
| Handles the cells in each possible NPC path  Specifies the amount of time spent loitering at the cell, |  |

|  |  |
| --- | --- |
| PathDecor | |
| **Responsibilities** | **Collaborators** |
| UNUSED Handles the drawing of a line to follow the custom path - left in for archival and version control purposes. Provides a record of the previous versions and iterations of the project |  |

|  |  |
| --- | --- |
| PathFollowing | |
| **Responsibilities** | **Collaborators** |
| UNUSED Handles the ability to draw the custom paths with a mouse - left in for archival and version control purposes. Provides a record of the previous versions and iterations of the project |  |

|  |  |
| --- | --- |
| PathMover | |
| **Responsibilities** | **Collaborators** |
| Handles the path following steering behaviour of civilian NPCs | TimeController  PathCellController |

|  |  |
| --- | --- |
| PlantController | |
| **Responsibilities** | **Collaborators** |
| Handles the storage of all possible plant types to stop constant loading of prefabs |  |

|  |  |
| --- | --- |
| RainController | |
| **Responsibilities** | **Collaborators** |
| Handles the water particle system that plays when the watering can is above a planting field |  |

|  |  |
| --- | --- |
| RoadCellController | |
| **Responsibilities** | **Collaborators** |
| Handles the cells in each possible vehicle path. Specifies whether the cell is at a traffic light or is a parking space. Keeps track of all paths that share the common cell. |  |

|  |  |
| --- | --- |
| SeedBagController | |
| **Responsibilities** | **Collaborators** |
| Handles the interaction with the seed bag- Instantiates seeds when the bag is tipped over the planting field | FarmScript |

|  |  |
| --- | --- |
| SeedScript | |
| **Responsibilities** | **Collaborators** |
| Handles the destruction of the falling seed when it hits the farm ground |  |

|  |  |
| --- | --- |
| SellController | |
| **Responsibilities** | **Collaborators** |
| Handles the selling of produce and picked up items | GameManager  FruitController  SellItemController |

|  |  |
| --- | --- |
| SellItemController | |
| **Responsibilities** | **Collaborators** |
| Handles storing the price of the item when sold |  |

|  |  |
| --- | --- |
| ShopGateController | |
| **Responsibilities** | **Collaborators** |
| Handles the animations of the shopping stalls opening and closing | TimeController  GameManager |

|  |  |
| --- | --- |
| ShopKeeperMover | |
| **Responsibilities** | **Collaborators** |
| Handles the path following steering behaviour of shopkeeper NPCs | TimeController |

|  |  |
| --- | --- |
| Slot | |
| **Responsibilities** | **Collaborators** |
| Handles the interactions and item holding of a slot in the inventory | Item |

|  |  |
| --- | --- |
| StreetLampController | |
| **Responsibilities** | **Collaborators** |
| Handles the turning on and off of the street lamps at appropriate times | TimeController |

|  |  |
| --- | --- |
| TimeController | |
| **Responsibilities** | **Collaborators** |
| Handles the passage of time, changing day to night and night to day, and random grass growing each day |  |

|  |  |
| --- | --- |
| TrafficLightController | |
| **Responsibilities** | **Collaborators** |
| Handles the traffic light system, decides which lights turns green and turns the others red |  |

|  |  |
| --- | --- |
| TreeController | |
| **Responsibilities** | **Collaborators** |
| Handles the lifespan of a tree. Keeps track of the life count and destroys the tree and instantiates a random nr of logs once it lost all lives |  |

|  |  |
| --- | --- |
| VehicleCollision | |
| **Responsibilities** | **Collaborators** |
| Handles the stopping of vehicles when a car, NPC or player is in front of it, plays honk audio | VehicleMover |

|  |  |
| --- | --- |
| VehicleController | |
| **Responsibilities** | **Collaborators** |
| Handles the spawning of new vehicles and assigning road paths | RoadCellController |

|  |  |
| --- | --- |
| VehicleMover | |
| **Responsibilities** | **Collaborators** |
| Handles the path following steering behaviour of vehicles | RoadCellController  TrafficLightController |

|  |  |
| --- | --- |
| WalkController | |
| **Responsibilities** | **Collaborators** |
| Handles the walking audio |  |

# UML

Due to the large size of the UML files, all UML files are located in a folder named “UML”.