

Computer Games Development SE607

Technical Design Document

Year IV

Izabela Zelek

C00247865

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# 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 amount of children currently on a plant stem |
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|  |  |

# CRC Cards

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| --- | --- |
| Game Manager | |
| Responsibilities | Collaborators |
| Keep track of player money  Add gained money when the player is asleep  Controls random spawning of grass | CapsuleController |

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| --- | --- |
| Hoe Script | |
| Responsibilities | Collaborators |
| Spawns planting fields |  |

|  |  |
| --- | --- |
| Inventory | |
| Responsibilities | Collaborators |
| Spawns inventory in front of player |  |

|  |  |
| --- | --- |
| Slot | |
| Responsibilities | Collaborators |
| Checks for collisions  Adds/Removes item to/from inventory | Item |

|  |  |
| --- | --- |
| Item | |
| Responsibilities | Collaborators |
| Keeps track of the inventory slot it is in |  |

|  |  |
| --- | --- |
| FarmScript | |
| Responsibilities | Collaborators |
| Changes plant growth stage | TimeController  CapsuleController |

|  |  |
| --- | --- |
| SeedBagController | |
| Responsibilities | Collaborators |
| Checks that bag is above planting field  Spawns seeds falling down into field | PlantController  FarmScript |

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| --- | --- |
| SeedScript | |
| Responsibilities | Collaborators |
| Destroys seed when it hits the field |  |

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| TimeController | |
| Responsibilities | Collaborators |
| Keeps track of current time and day  Progresses time  Increases day number  Changes to day or night cycle |  |

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| --- | --- |
| RainController | |
| Responsibilities | Collaborators |
| Spawns water particle system from watering can |  |

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| --- | --- |
| CanController | |
| Responsibilities | Collaborators |
| Calls RainController to spawn water  Tells Farm field that its being watered | RainController  FarmScript |

|  |  |
| --- | --- |
| PlantController | |
| Responsibilities | Collaborators |
| Holds all prefabs of plant types and their growth stages |  |

|  |  |
| --- | --- |
| ButtonVR | |
| Responsibilities | Collaborators |
| Checks for collision with player hand  Spawns chosen seedbag when pressed  Decreases money | GameManager |

|  |  |
| --- | --- |
| FruitBundleController | |
| Responsibilities | Collaborators |
| Destroys bundle when not in use anymore |  |

|  |  |
| --- | --- |
| FruitController | |
| Responsibilities | Collaborators |
| Destroys stem when all fruit/veg have been picked  Unfreezes object to allow player pick up | MultiFruitStemController |

|  |  |
| --- | --- |
| MultiFruitStemController | |
| Responsibilities | Collaborators |
| Keeps track of all the fruit attached  Decreases count when a fruit is picked up |  |

|  |  |
| --- | --- |
| CapsuleController | |
| Responsibilities | Collaborators |
| Checks for collision with player  Updates time and day when collided with | TimeController |

|  |  |
| --- | --- |
| SellController | |
| Responsibilities | Collaborators |
| Destroys object when sold  Tells GameManager to increase money | FruitController  GameManager |