Portfolio

1. Space Contagion

Space Contagion is a small game project that I developed during my First Year of University. The main goals of the project were to create a short, immersive, and well-structured story-based game in a simple online game engine called Bitsy.

Within the folder named *'1. Space Contagion'* are **two** files.

- A text document named *'Space_Contagion_Bitsy.txt'*, which contains all the code that the game needs to run on the Bitsy website. (To run the game, copy and paste the entire contents of the text document into the 'Game Data' window, and then simply select the 'Play' button on the top right of the page. Only the arrow keys are required to play the game.)
- A PDF file named *'Space Contagion.pdf',* which contains a short document that provides the description for the game.

2. Solved

Solved is a small design-based project that I developed during my Second Year of University. The project focuses on the design process of a game concept that I made. The concept is of a story/mystery/puzzle game that takes place in 1930s London, where the player takes the role of a police investigator and must solve crimes in an open-world environment.

Within the folder named *'2. Solved'* are **four** files.

- A PDF file named *'Design Proposal.pdf'*, which is the initial proposal document that outlined the main features and mechanics that the game would include, as well as the context and backstory.
- A PDF file named *'Game Treatment - Concept & Context.pdf'*, which is the design document that expands on the initial proposal by further detailing the plot and goals for gameplay.
- A PDF file named *'Game Treatment - Character & Function.pdf'*, which is the design document that profiles a few of the key characters that would appear in the game.
- A PDF file named *'Game Treatment – Gameplay & Mechanics.pdf'*, which is the design document that details the fundamental game mechanics that would be needed in the game.

3. Unity Game Prototype

During my Final Year of University, I was tasked with creating a game prototype in Unity. This project required the completion of three separate assignments: a graphics showcase, where my goal was to create a visually appealing game environment within Unity by using various graphical and rendering

techniques; an interaction showcase, for which I added features that utilised Unity's physics engine in particular ways; and a final prototype, for which I focused primarily on gameplay values and objectives.

The game I produced showcases an open terrain that I created and added textures to. It features a dynamic lighting system, where the sun and the moon are parallel directional lights that I scripted to rotate around the game world. The time of day is also displayed on the user interface. The scene also includes a vast lake in the centre, a terrain feature which prompted the experimentation and later implementation of mechanics including underwater visuals and 'water physics' that only occur when the player is submerged. For example, the underwater visuals mechanic utilises a particle system that is enabled as soon as the player's view is beneath the water level and is likewise disabled when above it. I also developed my own artificial intelligence non-player character (AI NPC) behaviour within this prototype; it features wolf NPCs that have a simple condition-based behaviour pattern that utilises Unity's Navmesh functionality. When the player is out of range, the wolves are programmed to wander by setting their NavMeshAgent waypoint parameter to a random position within a set radius around them. When the player is in range of any of the wolves, their waypoints are set to the player's position and they begin pursuing the player while they remain in range. Also used were several models and animations that I found on the Unity Asset Store, as well as several sound effects that I found online; I scripted these animations and sounds myself.

I incorporated many other features during this game's development. Some of these went beyond the requirements of the three assignments, particularly features that I enjoyed experimenting with. For example, I added my own buoyancy physics for when the boat model interacts with the lake. This feature and several others are explained more thoroughly in the accompanying documents.

Within the folder named *'3. Unity Game Prototype', there are* **four** folders.

- **Three** folders for each assignment, named:
  - *'Graphics Showcase'*
  - *'Interaction Showcase'*
  - *'Gameplay Prototype'*

  (Each of these **three** folders contain **two** files: an MP4 video showcasing the relevant techniques used in the prototype; a PDF document describing these techniques in detail.)
- **One** folder named *'Scripts'*, that contains **22** files; these files are all the C# scripts that were used in the prototype.

4. Creative Visualisation

One of the modules that I completed during my Final Year of University required me to create an art piece that visualised some form of data. My art piece depicts a dataset that includes the lifespan of characters within J.R.R. Tolkien's fictional world of Middle Earth. The art piece was created using a software called 'Processing' in which I used Java to code exactly what I wanted the art piece to show. The files appended show the final art piece as well as all its accompanying documents.

Within the folder named *'4. Creative Visualisation'* there are **seven** files.

- A PDF document named *'ResearchTechnicalPlan.pdf'*, which was the research plan that I wrote prior to beginning work on the art piece itself. This comprises background information about

the topic, the dataset that I would be using, inspiration for the art piece, design ideas, and two excerpts from my Five Design Sheets, which include the initial ideas and the final design.

- A PDF document named *'LifespansInMiddleEarth-DataArt.pdf'*, which is the final art piece that I submitted.
- An MP4 video named *'LifespansInMiddleEarth-Video.mp4'*, which shows the entirety of the code that I wrote, the code being run, and the main aspects of the code fully commented.
- A PDF document named *'LifespansInMiddleEarth-LabelInfo.pdf'*, which is a brief accompanying document that displays glanceable information about the art piece.
- A PDF document named *'LifespansInMiddleEarth-Report.pdf'*, which is the final report that provides in-depth details about the different aspects of the art piece, the data that it uses, and the code layout and function.
- A PDE file named *'LOTRLifespan.pde',* which is the source code for my data art piece that can be opened in the Processing application.
- A TXT document named *'LOTRLifespan.txt',* which contains the same source code for the data art piece in plain text format.

5. Lunar Mortis (Group Project)

During my Final Year at University, I was involved in a group project in which our team of four students was tasked with fully designing and developing a functional game. Most of the design work was completed during my First Semester. We held team meetings every week and kept brief production diary entries that described the work we had completed. Eventually, we devised an initial game concept named *'Lunar Mortis'* that we showcased in the form of a presentation to our lecturer, followed by the creation of a complete Game Design Document. During my Second Semester, we split ourselves into four main roles: Unity programmer, 3D modeller, story writer, and sound designer/composer. I took the role of sound designer/composer. We held meetings at least once per week where we discussed every aspect of the game's design, how we would deliver it successfully and on time, and where we worked to compile a collaborative progress report to be submitted to our assessors by the end of each week. Near the end of the year, we pitched our game to a group of lecturers in the form of a gameplay demo video and presentation, after which we answered any questions the lecturers had and listened to their feedback.

The full original soundtrack that I composed for this project can be found via this YouTube link.

Within the folder named *'5. Lunar Mortis (Group Project)'* there are **two** folders.

- A folder named *'Game Design Module'* which contains **three** files: a PowerPoint file named *'GameConceptPres.pptx',* which is the initial game concept that my team and I presented to our lecturer; a PDF document named *'GameDesignDocument.pdf',* which is the final detailed document that we wrote at the end of the first semester; and a text document named *'Production Diary – All Entries.txt'* containing all the production diary entries that were recorded over the first semester.
- A folder named *'Game Production Module'*, which contains **four files**: a folder named *'Progress Reports'* containing **eight** PDF documents that include the group reports we submitted each week during development; a folder named *'Complete Sounds'*, which contains **47** WAV files – a complete list of the sound effects that I created for the demo – all of which I sourced, mixed, and edited myself. The folder also includes an MP4 video named *'Lunar Mortis*

Demo.mp4', which was the gameplay demo video that we presented during our final pitch; and a PowerPoint file named *'Lunar-Mortis.*pptx', which was the presentation for our pitch.

6. Dissertation

For my Final Year Dissertation, I created a Unity plugin that could work in tandem with a popular AI image generator called *'Stable Diffusion'*. My goal was for the functionality of Stable Diffusion to be fully accessible within Unity's interface, and for generated images to be easily imported and used for texturing. One major requirement I set myself was to give the user the ability to fully utilise the plugin and for them to never have to leave the Unity environment. I implemented Stable Diffusion to my project by programming a HTTP POST function into the plugins primary C# script. This made it possible for the plugin to send and receive web requests to the LocalHost, where a build of Stable Diffusion can be hosted by the user. This therefore incorporated the full Stable Diffusion functionality into Unity without requiring the user to leave the engine. Further details regarding the methods and implementation can be found in my Dissertation write-up.

Within the folder named *'6. Dissertation'* there are **three** files.

- A PDF document named *'Poster.pdf'*, which is the poster that I produced to present the concept for my Dissertation project. My poster was displayed at an expo that my University held in March 2023, where our University lecturers and visitors from different industries had the opportunity to view our posters and ask us questions.
- A PowerPoint file named *'Oral_Presentation.pptx'*, which I used to present my Dissertation project to my two examiners. Following my presentation, I then answered any questions they posed.
- A PDF document named *'Dissertation.pdf'*, which contains my Dissertation write-up in full.