University of Nevada, Reno

College of Engineering, Department of Computer Science and Engineering

Project Gemini

Revised Concept & Project Management

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1. Abstract

Project Gemini is a 3D puzzle-adventure game currently in development in the Unity game engine. This game follows the player as they return to their childhood village which has fallen into disrepair due to seemingly supernatural forces. The player can interact with several of the residents while attempting to rebuild the town or they can progress toward removing the evil plaguing the land. The team plans to create two primary areas of the game: the village and a desert themed puzzle dungeon. The primary goal for this project is to create a fun and entertaining game that will further develop the skills that each of the team members possess. This paper serves to document the game in more detail as well as the contributions each member is making.

2. Project Description

As stated in the abstract above, Project Gemini is a 3D puzzle-adventure game being developed in C# and the Unity game engine. Project Gemini will have a voxelized art style created with the help of MagicaVoxel which is a voxel art tool that can export objects into Unity with few issues. The main goal of Project Gemini is to create an entertaining experience for those who play the game. The audience that the team is currently working to appeal to is those who have a desire to play story-driven games. Simultaneously we are working to create fun and interesting puzzles for those who enjoy games of a similar nature. If we were to give our game an ESRB rating we would most likely be aiming toward the 13 and up age range due to some of our deeper topics and possible use of more adult topics. The finished product that the team is aiming for by Innovation Day would be a completed village with an interesting series of puzzles within the dungeon. The village will serve as a hub for various quests in order to restore the village. The team is currently working to create as many of the art assets ourselves as possible. As such we are looking to create character models, buildings, and a multitude of various props that fit in line with the art style of the game. The player character will have several abilities in their repertoire while working through the puzzle as well. These abilities are linked to the idea of object creation through light, which furthers some of the team's narrative themes of the struggle of light against darkness. Alongside the mechanical aspect of the game, the team is working to create a strong narrative that revolves around growth and overcoming one's vices. As the main character returns to their home village it will be up to the player as to how much of the village is restored and if they truly leave the area better than they found it. The main technologies used in the creation of this game are the Unity game engine, MagicaVoxel for the creation of assets, Blender for various animations, and C# as the programming language being used. This product does not have any hardware components that are being created as the entire project is software focused. Project Gemini's dependability falls into two main categories, the saving system and ensuring a lack of unintended flaws. The save and load system has undergone an overhaul as the team has switched to using NewtonSoft JSON serialization which will help to serialize various portions of the project with a smaller chance for errors to occur. As a whole, the team is working to ensure as few bugs occur within gameplay for any possible users. This process is a continuous evaluation of each functionality we implement as each member of the team dives

into playtests. Furthermore the team is expecting to begin reaching out to various other individuals in order to gather playtest feedback in order to not only ensure that the gameplay is more engaging, but to ensure that any other flaws are fixed before the final product is released.

3. Significance

This project challenges the Project Gemini team to develop a playable video game with custom assets. Our video game explores the inner vices of the main character and these vices may resonate with the players as well. Socially, we hope to impact the players by creating relatable inner vices humans could face throughout their lives, and by defeating them virtually we hope to inspire players to defeat their unwanted vices physically as well. Also, by defeating these vices through entertainment the player will hopefully experience joy, satisfaction, and relaxation. Each team member's tasks and responsibilities deal with a significant component of video game creation and development. These significant components challenge us as game development engineers and as creative artists. For example, achieving the fluid character movement needed for the game required multiple versions and weeks of development. Another challenge was the constant development of an intriguing, fun, and interactive storyline for the player to experience. Overall these components and challenges better each team member for their future as game developers within the industry. Project Gemini's conception was inspired by other indie games such as *The Touryst, Little Nightmares,* and *Oxenfree.* These games include niche gameplay that focuses on world-building, strong storylines, multiple endings, and puzzle platforming. Although our game has similar components, our game tries to incorporate a unique and relatable storyline with unparalleled character abilities that help solve the puzzle platforming. These innovation characteristics set Project Gemini apart from others within the game industry. This also gives our game market potential if it is released on platforms such as Steam and Nintendo Switch because the accessibility of game engines like Unity and Unreal Engine has caused a boom in indie title releases. The boom of indie title releases alongside AAA titles has flooded the video game industry causing it to be more successful than the film industry. Even with the increase in video games within the industry, multiple indie titles have found success and the Project Gemini team plans on being the next success story in the industry. Also, by digitally releasing this game on digital platforms we hope to reduce the carbon footprint that physical copies of games can create. The team's goal for innovation day is to develop a publisher demonstration that includes all major components and features we plan on providing for the full game. Therefore, further development would have more gameplay in the form of dungeons and bosses that represent common inner vices. Also, higher quality assets could be further developed after this course.

4. Legal and Ethical Aspects

When developing a game, a variety of assets are needed, including 3D models, user interface (UI) sprites, music, and sound effects. However, using assets from the internet can raise legal concerns regarding commercial use. To avoid such issues, we have taken several steps to ensure compliance with copyright law. One way we did this was by creating all of our 3D models and some of our sprites. Additionally, we purchased UI sprites that came with a commercial license, which allows us to use them for commercial purposes.
Music and sound effects also fall under copyright law, and game developers must ensure that their assets are legally allowed to be used for commercial purposes. To ensure this, we enlisted the help of a former UNR student who has allowed us to use his custom-made music. This helps us ensure that we follow copyright laws and do not infringe on anyone else's rights.

5. Changes and Progress since the Initial Project Concept

Project Concept:

Our project has made significant progress since we first started brainstorming in the summer of 2022. Our original idea was an endless dungeon crawler focused on satisfying combat and endless replayability which evolved into a game with zero combat with a slower pace and more focused on problem and puzzle solving. Theme and setting are something that has also been in constant flux moving from a detective noir style to a more relaxed feel. The core of the game has always been stead in that that major conflict would be between the main character the the grims which are physical manifestations of negative character traits or sins such as Greed. The player character is internally flawed and must work through those barriers to save his home town.

Project Artistic Vision:

We wanted the project to be a custom and unique game without resorting to flipping a bunch of assets from the Unity store. To balance this desire of custom art and maintain the ability to scale our game appropriately we decided on a 3D art voxel style. This has definitely come with its own challenges especially in the scope of development time. Artistically the project has evolved from very basic and undetailed block out meshes to fully scaled buildings all with unique detail and style.

Project Engineering:

The Engineering standard of our code has improved significantly and we have made a conscious effort to reduce dependency throughout our project as much as possible. A few systems to highlight are the ScriptableObject (SO) event system and the AI Behavior tree. With our SO event system we can send out calls to listeners without causing error and crash if no listeners are present in the scene. This makes testing a breeze because when we first started to bring the character controller into a new scene it required 9 dependent objects that also needed to be present in that scene to prevent crashes and game breaks. This has significantly improved our development time of new features and is prone to fewer bugs that can impact player experience. When first concepting our project we had many ideas for AI controlled events like villager schedules, AI character follow, and even boss mechanics. This started to grow out of scope potentially becoming several dozen classes of unique AI behavior used only a handful of times. To avoid this we came up with an AI Behavior Tree similar to other common game engines like Unreal Engine (UE). This allows us to create reusable small nodes of code to perform actions or make decisions all based in a clean and simple hierarchical tree structure. This has opened many opportunities to add additional AI behavior with very minimal; development time.

6. Project Responsibilities

Lauren Davis

The major components Lauren has focused on include creating 2D art for cutscenes of the game, developing the save and load system for the multiple players/games, and creating some of the dungeon levels. The drawing of the intro cutscene provided an artistic challenge to accurately display the storyline of the main character to foreshadow the inner vices they will face. Lauren is still working on developing cutscenes if and when they are needed to demonstrate what happened in an artistic way that does not include the player. The save and load system has also been fully developed to save player data for later play and reload the data when needed to offer users replayability and a relaxing experience. Each dungeon level provides a different puzzle and/or sequence of platforms for the user to overcome with a variety of obstacles such as mazes, arrow traps, and spikes which Lauren has been involved in incorporating and developing for various levels.

Nathan Evans

Nathan's major responsibilities include project management, systems engineering, and narrative design. Nathan is generally in charge of scheduling and leading meetings and making sure all tasks are completed and fit together well within the project. This is accomplished through use of a discord server used for both text and voice communication as well as Trello, a Kanban Board style task tracker. For systems Nathan was responsible for many prototype features that have been approved on as well as the AI Behavior Tree System. Nathan's final responsibility with the help of the others on the team has been narrative, theme, and settings design.

Allen Ma

Allen's role in this project includes the movement system, the camera system, the character creations, and the animations for the player and NPCs. The movement system was done using Unity's physics system, which includes rigidbodies and colliders that allow the player to interact within the world. The input system for movement also used Unity's built in input system which allows you to assign certain key presses to certain functions like moving, jumping, running, etc. As for the character models, they were all built in MagicaVoxel, which allows us to create stylized voxel characters from which we can export to different animating programs like blender and Mixamoo.

Christopher Trimble

The subsystem that Chris is in charge of for our project is the UI/UX and sound system. The UI/UX systems within the game contain the in-game menu's player heads-up display and the game's starting menu. Chris has to make sure these displays are easy to navigate and have some user accessibility, like that of sound effects on button hover. Some of the subsystems within the UI are tabs, buttons, pages, and the instantiation of dynamically loaded information. Another system that Chris is in charge of is the sound system making sure that sound effects and music play in the correct spots within the 3d landscape and on the menus. The sound system incorporates a script called sound manager that regulates the volume of all sound assets and locations to which the settings within the UI system control the volume level.

Eric Valdez

The main tasks that Eric is responsible for are the light abilities for the characters as well as a majority of the assets being created. These responsibilities provide both a technical challenge as well as an artistic one. The light abilities are currently a collection of scripts encompassing the creation of objects such as an elevator and a crate which can be used to hold down pressure plates. These scripts are further expanded upon with various scripts being needed for levers, buttons, doors, etc. All of these objects are currently expected to be introduced into the puzzle dungeon being created. As for the art assets, Eric is currently working with MagicaVoxel to create voxelized props and buildings for both the village and the dungeon. Eric has also been working on the resource mechanics in regards to rebuilding aspects of the village. These include smaller scripts allowing the player to chop trees, break rocks, and collect various materials.

7. Project Monitoring and Risks

To ensure we manage the project's progress and complete the project on time we have been using multiple tools to aid us. The biggest tool we use is Discord, where we set up two meetings a week to catch up on what we have done individually and to assign tasks for the next week. The next tools we use are Trello and Miro. These websites allow us to document all of the tasks, what tasks are assigned to whom, and when those tasks are completed. The last way we ensure the project is completed is by having a meeting with our advisor, who gives us advice on what to do and a timeline for what things should be done in the project every month until innovation day.

Risk Register:

Risk ID		Current Risk							Residual Risk		
	Risks	Likelihood 0-5	Impact	Severity	Status	Owner	Raised	Mitigation Strategies	Likelihood	Impact	Severity
RP 01	Overscope	3	4	12	Open	NA	NA	Have hard deadlines for content. Cut corners until you have a playable product. See what tasks needs to be done and put those on the project timeline first.	2	3	6
RP 02	Poor Time Management	3	5	15	Open	NA	NA	Create schedules and timelines for assignments to be turned in. Set certain hours for project work.	2	4	8
RP 03	Technical experience	2	3	6	Open	NA	NA	Research more about Unity. See what tools it has and how to utilize them.	1	2	2
RP 04	Artisitic experience	5	4	20	Open	NA	NA	Learn how to use asset creation platforms or acquire assets off of the Unity store.	4	3	12
RP 05	Poor Communication	2	4	8	Open	NA	NA	Have a dedicated platform where all communication is done through. Schedule days across the week to have meetings to catch up on project progress.	1	3	3
RP 06	Copyright law	2	3	6	Open	NA	NA	Cite any art, sound, and code assets used in the project or get free assets that aren't connected to copyright laws.	1	2	2
RP 07	Poor Management	2	4	8	Open	NA	NA	Have a dedicated team leader who helps schedule meeting times, project deadlines, and project assignments. Be respectful to each others time and	1	3	3
RP 08	Unexpected External Risks	3	4	12	Open	NA	NA	Example risk: Unity cloud service could switch to a different platform and it could cause errors in the project where the project is saved. Solution: Use a LTS version and have backups of the project.	2	4	8

Table 7.1: Risk Register

8. Accessibility

The Importance of Accessibility in Video Games and Software:

Accessibility is a vital aspect of software development, particularly in the gaming industry. Ensuring that video games and software are accessible to all users, including those with disabilities, promotes inclusivity, equality, and user satisfaction. It also opens up the market to a broader audience, leading to increased engagement and user satisfaction.

The Industry's Response to Accessibility:

The gaming industry has recognized the importance of accessibility, and many major companies are taking steps to make their games more accessible to everyone. For example, Naughty Dog's The Last Of Us 2 has been praised for its accessibility features, including high contrast modes and audio cues to help players navigate the game.
Additionally, Microsoft has developed the Xbox Adaptive Controller, a specialized controller designed specifically for individuals with disabilities. The controller features large buttons and a variety of inputs, including ports for external buttons and joysticks, making it easier for players with physical disabilities to play their favorite games.

Our Commitment to Accessibility:

Our team is dedicated to ensuring that our video game is accessible to everyone. We have already implemented several accessibility features, including individually adjustable volume levels and on-screen prompts and hints. We also have plans to include a color-blind mode and selectable difficulties in the future. By the time our game is released, we aim to have a comprehensive set of accessibility features that will allow anyone to enjoy our game.

9. Team Contributions

Lauren Davis

1.5 hours - Significance, Project Responsibilities(Lauren), References

Nathan Evans

1 hour - Project Progress, Accessibility, Project Responsibilities (Nathan)

Allen Ma

1.5 hours - Project Monitoring and Risks, Project Responsibilities (Allen)

Christopher Trimble

1.5 hours - Legal and Ethical Aspects, Project Responsibilities (Chris)

Eric Valdez

2 hours - Abstract, Project Description, Project Responsibilities (Eric), General Formatting

10. References

Gamerant [Website]. (2021). https://gamerant.com/best-games-with-accessibility-features/
Oxenfree [Video Game]. (2016). Glendale, California: Night School Studio.
Little Nightmares [Video Game]. (2018). Tokyo, Japan: Bandai Namco Entertainment Inc.
The Touryst [Video Game]. (2019). Munich, Germany: Shin'en Multimedia.