CMPT 106

Project Proposal

**Creating a Three-Dimensional Game**

**for Personal Computers**

**using the Unity and Blender Programs**

**Group Zeta**

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**Objective:**

Group Zeta will create and deliver a three-dimensional, multi-level, single-player, platformer game that reflects the expertise in basic game design which the team has learned in using the Unity and Blender game creation programs, together with the C# programming language. This game is intended to be used by the general public, particularly those with personal computers. By the end of the semester, the team will have invested its time and effort in:

1. Inventing ideas on what the game is and what it should be composed of,
2. Describing the narration and flow of each level of the game,
3. Learning the different tools provided by the Unity and Blender programs, particularly in basic scripting and basic modelling,
4. Thinking critically in approaching different problems with creating a game,
5. Designing and programming the game, and
6. Communicating and collaborating amongst its fellow members.

There will be low monetary expenditure spent to download and operate Unity and Blender.

**Introduction and Background:**

1. The History of Unity

The company of Unity Technologies was founded by David Helgason, Nicholas Francis and Joachim Ante on August 8, 2004. The three coincidentally acquainted each other over “a Mac OpenGL post, [written by Francis, requesting] assistance with a shader system he was trying to implement into his game engine.” [1] (cited in John Haas 2014) What initially started out as a simple appeal for technical aid eventually developed into an aspiration to build “a tool to make games.” [1] (cited in John Haas 2014) Now, the company’s product, Unity, also known as Unity3D, is an IDE designed to build two-dimensional and three-dimensional games for various electronic platforms, such as android, personal computers, PlayStation etc. Unity 1 was 1, 2, 3 and 4 were, respectively, introduced in 2005, 2007, 2010, and 2013. The newest version, Unity 5, was released to the public for free in March of 2015. “Worldwide, Unity takes … 45% share of the full feature game engine market [and it is] approximately three times that of [its] closest competitor.” [2]

B. The History of Blender

Ton Roosendaal is the original creator of Blender. The development of the Blender software started in 1995 when NeoGeo, the company Ton co-founded and worked for at the time, decided it needed a 3D software tool upgrade. That is how Blender was born. Later in 1998, Ton established a new company called NaN, short for Not a Number. In 2000, Ton wanted to build “a free creation tool for interactive 3D content.” [3] Unfortunately, NaN shut down in 2002 due to depressing sales and economy. Then in May, the Blender Foundation was created to find public donations and restart the company. Within seven weeks, a sum of $100,000 Euros was raised. As a result, NaN reopened and Ton released Blender to the public. “Blender development continued since that day driven by a team of far flung dedicated volunteers from around the world.” [3] The company has produced several short animation movies and open games over the years, such as “Elephants Dream”, “Big Buck Bunny” and YoFrankie!” [3] Now, Blender is the “the largest open source tool for 3D creation.” [3]

C. Description of the Problem

Each member of Group Zeta will contribute in making a 3D game, complete with challenges for the main player to overcome, increasing difficulty for every consecutive level, and a gaming environment suited for the audience.

**Design & Deliverables:**

This project will produce a game that involves the player interacting with the main character using input keys. The main character has to fight enemies, collect weapons and items, and find the key to unlock the gate to the next level. The creation of this game also challenges the group to use the skills that the members of Group Zeta have learned - particularly in camera movement, animation, interaction with enemies, scripting using C#, updating the user interface, and narration/storytelling.

Group Zeta will primarily be divided into three sub-groups: the modelling and armature team, the scripting and game design team, and the special effects team. Specific descriptions of each of these sub-groups are provided in the “Timeline and Milestones” section below.

**Success Criteria:**

Elements that can be used to determine the game’s success are its story plot, user friendliness, character art, color and design of the baseline environment, smoothness of the gaming experience, sound effects, budget and expenditure, as well as the amount of time spent to develop the project.

The following items consist the solid foundation needed to successfully reach the objective:

* The game will consist of a main character that the player can control, and he will have the given ability to walk, jump, and travel across platforms. In each of these movements, the main character must model the physical actions made by the human body (i.e. Walking requires legs raising, knees bending, arms swinging, etc.)
* To increase interaction in the game, the player also has the ability to pick up objects off the ground. With this, the main character can collect various weapons that he can use to attack enemies.
* There will be three types of enemies: melee, range and boss (who can be seen during the final level). The enemies will be designed to pursue upon detection and attack the player.
* At the end of each level, there will be a bolted gate which requires a key to unlock and it will be the player’s mission to locate and secure the item.
* The camera will be coded so that it will always lock on the main character’s third-person point of view (i.e. it moves where the player moves and it rotates where the player rotates)
* Amongst the deliverables, there will also be a user interface, which includes a scoreboard, health bar, pause menu, etc.
* The game will be located inside a mysterious cave, and the game begins as the main character is trapped inside the deepest levels of the cave. It is the main character’s mission to escape the cave in order to survive. This means that there should be visually interesting environments that contribute to the story.
* The game will only have two levels - one regular level and one boss level.
* The game performs stably and runs smoothly, with as few bugs as possible.

These next few items consist the additional features that can be added to the game if the team wants the game completely polished and if there is still time:

* The game can have around five levels and a storyline to give life to the game. Each level has a unique scene of the cave.
* Food can be added to the player’s health, and this can be time-constrained. In order for the player to get food, he must fight enemies as quickly as possible.
* The team can also add a beginning and an ending scene.
* Background music, sound effects, and other special effects can be added.

**Timeline & Milestones:** *(Original timeline can be found in PowerPoint presentation)*

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| --- | --- | --- |
| * Week 2 | Group members reach agreement on a game as a final medium for the project. | |
| * Week 3 | Brainstorm ideas for the game & decided which platform to use. (Unity & Blender) | |
| * Week 4 | Plan on the game’s baseline for the design of the environment. (for a rough picture of the entire game); plan what additional features we may want to add  The team is divided into three sub-groups:   * Modeling Team - Ellie, Josh, and Lee Young * Scripting Team - Cate, Patrick, and Lawrence * Sounds and Special Effects Team - William | Watch tutorials on Unity (for the scripting team) and Blender (for the modeling team). |
| * Week 5 | Determine the specific assets, materials, animations, sounds and additional effects to design for the game. Integrating the Blender character models with the Unity game.   * Modeling Team - modelling the player character; providing armature to the player’s walking and jumping animation * Scripting Team - creating a basic four-walled room with different platforms and holes; fixing the camera to the player with regards to his position and rotation * Sounds and Special Effects Team - beginning the Project Proposal |
| * Week 6 | Finalize the project proposal and the PowerPoint for the presentation.   * Modeling Team - modelling two enemy characters and two weapons; providing armature to the enemy’s walking and jumping animation * Scripting Team - coding how the player character can interact with enemies and pick up objects * Sounds and Special Effects Team - polishing the Project Proposal and creating the PowerPoint presentation * **First Milestone: creating a demo game for the Project Proposal** |
| * Week 7 | * Modeling Team - modelling gate, keys, and various cave walls * Scripting Team - continuing on coding interaction; coding on transition from one level to the next * Sounds and Special Effects Team - planning and brainstorming audio tracks | |
| * Week 8 | * Modeling Team - re-modelling the player and enemy characters (if necessary); starting to model the boss and assets of the boss level * Scripting Team - creating the scene of the cave using pieces of cave walls provided by the modeling team * Sounds and Special Effects Team - planning and brainstorming audio tracks | At this time, project baseline should be done. |
| * Week 9 | * *Modeling Team joins with Scripting Team*   + Scripting the User Interface and its coordination with other assets   + Scripting the boss level and the end of the game * Sounds and Special Effects Team - start working on audio. |
| * Week 10 | * *Modeling Team joins with Scripting Team*   + Continuing scripting the UI and boss level   + Adding in the health component to the player * Sounds and Special Effects Team - finish on audio * **Second Milestone: Building the solid, basic game**   *(Note: If the second milestone is not yet done by Week 10, it is okay to extend this until the end of the semester, disregarding the tasks of the following three weeks.)* |
| * Week 11 | * All Teams   + Discuss on contents of the five levels; start working on the five levels   + Start planning on contents of the poster | |
| * Week 12 | * All Teams   + Continue building the five levels | |
| * Week 13 | * All Teams - Poster. If possible, improve the game. (Polish design & animation, add supplementary audios for better effects) * **Final Milestone: A complete, sound 3D game** | Additional (contingency) |

Modeling Team: Ellie, Josh and Lee Young

Use Blender to create models of the enemies and the player, along with the animation of the character’s body parts when using melee and range weapons to execute attacks; modeling the different elements of each level - door, key, etc. - and rocks needed for the environment.

Coding/Scripting Team: Cate, Patrick and Lawrence

Use Unity to design the environment, position the cameras and lighting positions; write the scripts for the baseline and movements of various rigidbodies.

Music/Sound Effects/Miscellaneous: William

Create / find music that’s suitable for the game.

*Note: Group Zeta also meets during Fridays to work on projects and clarify some concerns.*

**Budget:**

The budget will be low. The group will not spend any money to purchase the software we are going to use for the project. Unity 5 and Blender be downloaded from the official websites for free. In addition, the group asked permission to use the assets and environments from Unity’s online Asset Store for external and decorative purposes of the game.

**References:**

[1]E. Fear, 'United they stand', *Develop-online.net*, 2009. [Online]. Available: http://www.develop-online.net/analysis/united-they-stand/0116643. [Accessed: 08- Oct- 2015].

[2]J. Haas, 'A History of the Unity Game Engine', Worcester, 2014. [Accessed: 8- Oct- 2015].

[3]Unity3d.com, 'Unity - Fast Facts', 2015. [Online]. Available: https://unity3d.com/public-relations. [Accessed: 8- Oct- 2015].

[4]B. Foundation, 'History - blender.org - Home of the Blender project - Free and Open 3D Creation Software', *blender.org*, 2015. [Online]. Available: http://www.blender.org/foundation/history/. [Accessed: 08- Oct- 2015].