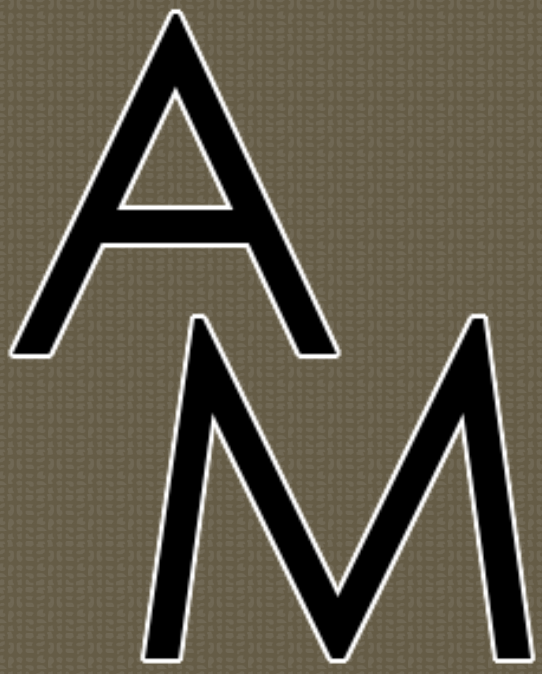


Ahura Mazda

By Cody Ferguson. Nov. 17, 2013 – Report #12

This document is a report, used to convey a proposal for the CSC 493: Senior Projects class. Inside information is provided to give purpose as well as described the fundamental thought process behind the project as well as the process of developing the actual deliverable.

Ahura Mazda

By Cody Ferguson. Nov. 17, 2013 – Report #12

Purpose #modified 10.27.13

The software to be written is a two dimensional platform game that will allow for a single player to adventure through a set of levels of varying difficulty, fending off enemies and clearing obstacles. In context, what the project Ahura Mazda aims to do is provide an experience that will be both enjoyable and challenging to the player, placing them into an environment that will interact with the player through the interface of gaming.

The primary goals of this project include the following: establishing a gauntlet-type game world that will require a measure of both patience and skill to progress and generating enough playable content and rewards that there is a drive for the player to commit to playing. The audience of this project can be narrowed down to players that enjoy single player experiences, with sliding platforms and enemies to fight. In essence, the project is about developing a gaming experience that will treat a player to a rich and challenging game world.

Functionality #modified 10.27.13

Ahura Mazda is to be written as a two dimensional platform game. Therefore, this project will have the expected functionality of allowing the user to move along the X and Y axes in the game space, as well as monitoring the player's effectiveness with a heads-up-display containing score, completion time and lives lost.

Milieu #modified 10.27.13

A well-known examples of similar products would be the Super Mario games, Castlevania games, and Ninja Gaiden games. In these games, there is a single main character whose goal is to stop a great evil and to do this the character must navigate in a two dimensional plane, jumping on various platforms and defeating monsters to reach the top of the tower, the deepest part of a cave or similar. This is similar because in Ahura Mazda, the player will have to navigate the levels and fight monsters to reach the end of the game.

Novelty #modified 10.27.13

The platform game idea is age-old and tested, therefore innovating the genre can be a blessing or a major mistake. However, Ahura Mazda is original in terms of the story presented to the player, learning from the best of the genre (see Milieu). To incorporate, or rather mesh, the major features of the best titles creates the novelty of the game. In doing so the experience provided for the user, if properly done, can be unique while familiar at the same time. Thus, the novelty explained is simply creating an all in one platform game.

Resources #modified 10.27.13

The resources to be used in this project are as follows:

- Unity3D Game Engine
- C# and JavaScript programming languages
- A growing list of sprite sheets from OpenGameArt.org

The goal is to program the game in C# and JavaScript, utilizing the Unity3D game engine to create game objects and attach the code scripts as well as create the game world through connected scenes. The game world will be made from a growing list of sprite sheets, textures and sound files from OpenGameArt.org, which once official will be made available.

Challenges #modified 9.22.13

Challenges that can be foreseen are handling the scope of this project. From past experience in the game engines course at Berea College, deciding where to go with a project like a game and where not to go is a determining factor for the success of a project. In addition to the time constraints, designing and implementing the sprites as objects in three-dimensional space will prove challenging. As well, expanding and implementing game systems that are both rewarding and intricate will be challenging and time consuming.

Measures #modified 10.27.13

The measure of success for this project is two pronged, if a player has the ability to play through, without game related errors, a **single** level, and enjoy the experience then this project has succeed. Additional levels or other features are improvements that can be made after the basic game play and mechanics are fully tested and working.

Future Extensions #modified 10.27.13

Possible extensions include additional levels, improvements on the avatar's customization, and more rewards such as achievements for timely completion of objectives, setting high scores, or finding special objects in the world. Beyond those minor improvements, levels that the player has already completed can be made available in a more difficult form, allowing for more of a challenge as well as improved rewards for customization.

Inspiration

Motivation #modified 9/22/13

My personal motivation for this project is my love of gaming. I have played video games for a long time and contribute my graduation from high school to the playing of video games. Otherwise, I chose to make this project a game because, if there is one thing that I have learned about the game development industry is that if you have made a game and it works, then you are already ahead.

Profession #modified 10.27.13

Project Ahura Mazda is going to help my professional growth because I have aspirations of being a game designer/developer in the future. One of the main factors that a possible employer looks for in someone that is applying for a game design job is that they have the ability to create something. Therefore, creating a game world that is actually functional is my over-arching goal throughout this semester.

Vision and Scope #modified 10.27.13

Ahura Mazda, when finished, will present to the world an interesting take on the platform game playing experience in video games. By requiring that the player sometimes solve puzzles, with open ended puzzle solutions, to progress while fighting off monsters that attack in an almost unique way, the game will evolve with the player, as levels are completed.

Over the course of this semester, the game will be built from the ground up and potentially have five levels of play, all with platforms, monsters, and a storyline for the player to write. The scope of this project is large, but not unmanageable. To define the scope, the following are the major features that are to be implemented. The game will include a score system, moving platforms, movement in terms of jumping and running, as well as occasional puzzles that limit progress until completed. Functionality that is considered out of scope is custom-made art assets, more than five levels for the player to explore, and extensive customization systems for the player avatars, and achievements.

Software Requirements Specifications #modified 10.27.13

Below are the requirements for the software to be designed and implemented, Ahura Mazda.

Scenes

Number: **1.**

Statement: The Unity3D engine uses scenes to establish different levels or sections of the game. This step will design each scene, before filling each with content.

Evaluation Method: Scenes make logical sense in terms of flow, as well as being able to traverse from one scene to the next scene in that sequence.

Dependency: None. This is the first step.

Priority: **High.**

Requirement Revision History: **None.**

Puzzles

Number: **2.**

Statement: Puzzle design is an important part of this game, as the goal of each scene or level is to complete the puzzle to progress, therefore the game cannot be successful without properly designed puzzles for the player to solve.

Evaluation Method: Puzzles meet several criteria: Is the puzzle beatable? Is the goal straightforward, but are the solutions creative?

Dependency: Scenes, as these puzzles will connect the scenes.

Priority: **High.**

Requirement Revision History: **None**

Terrain

Number: **3.**

Statement: The underlying textures of each scene or level. This is paramount to setting the mood for the particular dungeon that the player is exploring.

Evaluation Method: Each scene has a distinct terrain, and the layout of these levels is appropriate, e.g. there is not lava tiles placed for the path that the player must utilize.

Dependency: Puzzles. The terrain is largely based on what the puzzle of the level is, as the terrain must mold into and be logically aligned with the puzzle's goal.

Priority: **Moderate.**

Requirement Revision History: **None.**

World

Number: **4.**

Statement: Previously mentioned puzzles and terrain, these are components of what is called the game world. The world however, is the look and feel of the game. How all of these are tied together to make an experience for the player.

Evaluation Method: The placement of trees and other environmental objects makes sense. This is to say, there is not a tree placed in lava. If the world does not seem illogical.

Dependency: Scenes, Puzzles and Terrain. This step is to combine all of these things and "breathe" life into a game world. Meaning that this will be the final aesthetic step.

Priority: **Moderate.**

Requirement Revision History: **None.**

Monsters
Number: **5.**

Statement: The enemies of the player, each level will have pre-defined enemy spawning or creating locations therefore this step is to plan and place these locations.

Evaluation Method: Do the monsters spawn too often? Are there too few enemies so that the level is too easy to complete?

Dependency: World, and all of its dependencies. These spawning locations will only make sense if there is a world to place them.

Priority: **High.**

Requirement Revision History: **None.**

Environmental Effects
Number: **6.**

Statement: Examples of this would be traps and dangerous terrain.

Evaluation Method: If there is a trap, it does damage to the person who has “stepped on” or “activated” it.

Dependency: World and Puzzles, these depend on a properly designed world, one that only effects the player when they go out of normal or expected boundaries.

Priority: **Low.**

Requirement Revision History: **None.**

Game Polish
Number: **7.**

Statement: This includes incorporating a storyline into the game, as well as achievements and rewards for obtaining them. Also, increased difficulty of levels.

Evaluation Method: Is the player exposed to a level’s virtual history? Can the player obtain an achievement, e.g. kill twenty of a certain type of enemy? Is there additional difficult added to a dungeon that requires a player to be more attentive?

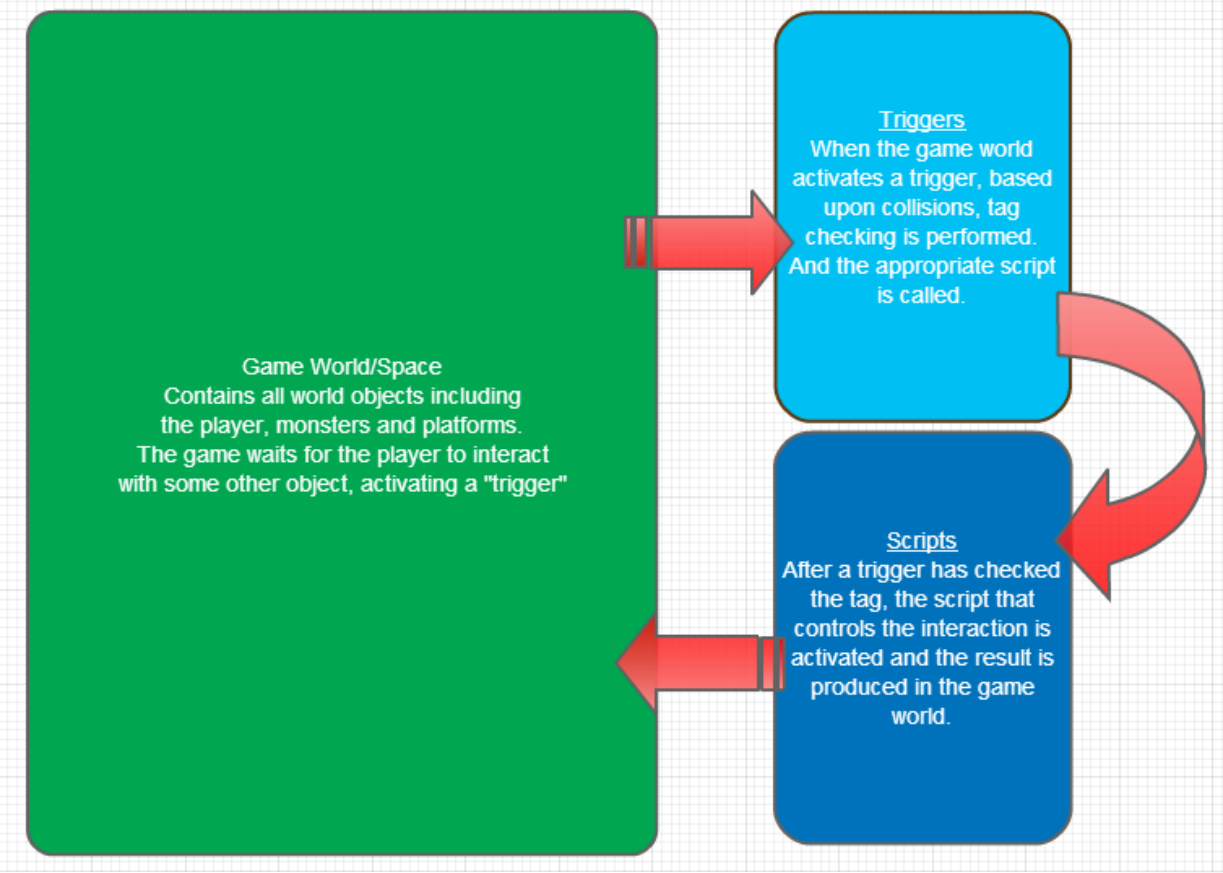
Dependency: Completion of the game. This requirement will only be met if the previous six requirements are completed.

Priority: **Low.**

Requirement Revision History: **None.**

System Design and Architecture #modified 10.27.13

The system design and architecture below contains a diagram displaying flow of control in the game controlled by the Unity3D Engine. Additionally, a description of the general components or pieces follows. This information is relevant from: October 27, 2013.



- Game World/Space
    - The game world is the scene in Unity3D in regards to the hierarchy of game objects in the world. This contains the play space, where the interactions and the results take place.
- Triggers
    - Jumping from the game world, these triggers are imbedded into scripts and onto game objects in the form of colliders. Even if a trigger is activated, the appropriate tag must be present on the object in the game colliding with it before the script is executed.
- Scripts
    - The scripts control the interactions between objects. Therefore, when a trigger executes the script, or calls of its execution, the situation is first assessed and the result is returned in the game world. An example would be the player attacking a creature object, the effect of the attack is based on the trigger accepting the appropriate tag and the script performing the correct calculations to determine the damage, before altering the game space.

Implementation #modified 10.27.13

The growing list of files that comprise the game and their accompanying descriptions, the purpose of this section is to provide an at-a-glimpse of the overall hierarchy.

- AhuraMazda/README.txt
    - Contains the Installation Guide, Author information and the controls for the game.
- AhuraMazda/Asset Dump
    - This directory is the "dump" of all of the asset files that have been collected either for testing inside of the game or for actual use in the game. These files are not actually inside of the project's directory, when utilizing an asset from this folder it is copied to the inside of the Unity3D project's correct sub directory.
- AhuraMazda/AhuraMazdaGame
    - This directory contains the project and all files used for its creation as of October 27, 2013. Most of the files here are generated by Unity3D, and as such only the directories that are user created will be mentioned below.
    - Assets/Materials
        - This subdirectory contains the materials of the game, these include the textures being overlaid onto game objects as well as pre-fabricated objects created to be used. It is important to note that by creating a prefab of an object created in a scene, all scripts, and materials or otherwise will be included with every instance of the object.

- Assets/Music Files
    - This subdirectory contains the music and sound effects used in the project, and potentially the game. Some of the files included here are not used in every scene.
- Assets/Scenes
    - This subdirectory contains the scenes currently used in the game. As of October 27, 2013, there is one function scene, which is used as a tutorial setting for the player.
- Assets/Scripts
    - This subdirectory contains the scripts used or created for the game. Each of the scripts has its own accompanying documentation explaining the code through inline commenting and header information.
- Assets/Standard Assets
    - This subdirectory contains the character controllers, including prefabrications provided by Unity3D.
- Assets/Textures
    - This subdirectory contains textures, used to create the materials for the game. These are the images that the determinate for the quality of a material. Textures can be used on multiple materials, each with a different purpose as simple as a different tiling resolution.

Known Bugs and Other Issues #modified 11/17/13

This section of the report represents the ongoing pursuit of achieving a perfectly balanced and bug-free game. Below is a bulleted list of the known bugs, and a list of other issues that have been recognized as further development has been done. All current known bugs and other issues are of the current beta version: Ahura Mazda 1.40a.

Known Bugs

- The player collider and the edge of a static platform's collider, upon connecting can cause the player to hang, producing a similar effect to the wall-hanging/climbing, which is also undesired.

Other Issues

- The player sprite currently has a glow effect, due to rendering issues with the transparency and detecting the edge of the actual sprite figure. This causes the player to "pulse" when the animation is played through.
- There are no menu interactions for the player, creating a rather unfriendly game.
- Game platforms are potentially too small, too fast, and otherwise unreachable at points. This creates a situation that is undesirable for any game. Game balance will be a prevailing issue in all builds of the project.

Test Plan

The software being designed in this project is a game, therefore the test plan is to engage people interested in play-testing the game during the "extended beta" phase, in which the only improvements to be made are those reflecting the game balance as opposed to actual bug fixes. This does not exclude hot-fixing content, which can be similar to bug fixes, but in that they are not game-breaking and only require a small tweak to repair. Regardless, the plan for testing Ahura Mazda is to pool a group of people that have both gaming experience and non-gaming experience.

This is for two reasons, the experienced players will establish a bar at which the game can be played at a competitive level and the inexperienced players will establish a level at which the average or casual player can play the game. Both types of feedback are necessary for game balance, considering that the audience of a platform video game is wide and incredibly general due to the arcade nature of the genre.

Test Cases

Test Case 1: "Platforming"

- **Testing**:
    - Using the appropriate movement keys, the player character can land onto and walk around on platforms.
- **Steps**:
    - Move the player character near a platform.

- Jump using the spacebar key and move toward the platform.
- Walk around on the platform.

- **Desired Results**:
  - The player character will land on the platform, not falling through, and be able to walk across the platform only falling off of the edges if the player character moves too far.
- **Tested and functioning correctly as of 11/1/13**

Test Case 2: "Defeating Enemies"

- **Testing**:
  - The player character can utilize jumping to "attack" enemies by landing on their heads – killing/destroying them.
- **Steps**:
  - Approach an enemies in the game world
  - Jump, aiming the player characters feet to connect with the top of the enemy
  - The enemy should be destroyed
- **Desired Result**:
  - The enemy game object is destroyed, unable to harm the player and yielding points.
- **Tested and functioning correctly as of 11/1/13**

Test Case 3: “Player is constrained to the game world”

- **Testing**:
    - The player character simply is destroyed and spawned again after exiting the appropriate world parameters.
- **Steps**:
    - Place the player character at the edge of a platform or climb to a height out of the range of actual play
    - Jump off or climb higher
    - “Respawner” game object’s collider catches the player
    - Player is spawned back at a check point.
- **Desired Result**:
    - The player character is spawned at the check point upon breaching the level limit threshold.
- **Tested and functioning correctly as of 11/1/13**

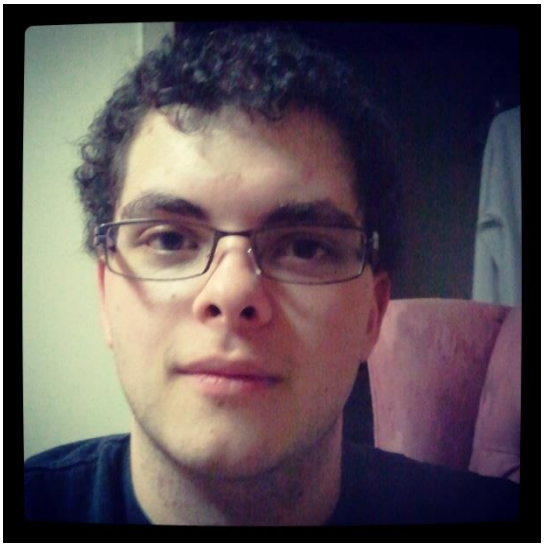
Software Demo

This section will be updated as more demo content is generated and bugs, if any, that are produced are resolved. The purpose of the software demo concerning a video game is to explain design choices, capabilities, and most of all how to play the game. Inside of this demo, uploaded to the author’s YouTube channel, both the engine used for development and the implemented gaming solution will be covered throughout the demos that ensue. More importantly, gameplay will be discussed and provide a possible point of reflection to the author for improvement. It is

important to note that this information will be public on YouTube with commenting enabled, in case anyone wishes to produce feedback concerning the game. Below is the link to the channel playlist where all of the practice demos will be uploaded.

https://www.youtube.com/playlist?list=PLANcKFg1VkNhJ_v5pSbrz3QVO50-zI-lr

About the Author



I'm a senior computer and information science student at Berea College. My home town is Spotsylvania, Virginia but I came to Berea from Bardstown, Kentucky. I enjoy playing video games, playing racquetball, hiking and playing Dungeons and Dragons (4th edition).

To: Mario Nakazawa, Project Director

From: Cody Ferguson

Subject: Titan Quest

Date: September 2, 2013

Accomplishments

This reporting period, I have accomplished the formulation of a concept for a video game, Titan Quest, and the completion of this report concerning a more detailed explanation of the concept.

Challenges

During the reporting period the major challenge was deciding on what the project was going to be, only recently had I come to a decision on the project's concept.

Time Spent

Approximately four hours of work was put into the creation and submission of this report, but that was essentially all of the time spent during this reporting period.

Goals

The goals for the following week are to close the researching period for finding a game engine to build the game from and finalize the decision for the language being used. Additionally, in terms of actual game design all maps, textures, and other assets will be either found or made and then compiled for future use to eliminate the possibility of being too art-centric. Finally, the code base will start being built and other planning documents will be stored there.

To: Mario Nakazawa, Project Director

CC: James Peruggia

From: Cody Ferguson

Subject: Titan Quest

Date: September 8, 2013

Accomplishments

During this reporting period I have come to some conclusions on what software to use for the further development of this project. For instance, I will be using Unity3D, which has a great amount of resources for making 2D games in the 3D space which will also leverage my familiarity with the software. In addition, I have collected and investigated links to websites that provide open source sprites and sprite sheets. No actual code has been written yet, however the language has been decided: C# with Unity3D using either MonoDevelop or Visual Studio 2012 Express. As well I have made updates to the challenges section outlining what I now see as challenges as well as updating my purpose to reflect the proper connectivity to be expected for the game.

Challenges

Challenges during this particular reporting period were finding and making decisions for the future of the project. In addition, I have researched further into networking and discovered that the libraries available for communication over a UDP network are going to be challenging to understand.

Time Spent

Week #2 Hours: 4.5

Total Hours: 8.5

Goals

My goals going into this next reporting period are to begin working on the overall design and implementation of the game world, resulting in five levels or dungeons completed and the addition of characters into the game world.

To: Mario Nakazawa, Project Director

CC: James Peruggia

From: Cody Ferguson

Subject: Titan Quest

Date: September 15, 2013

Accomplishments

This reporting period, I have further specified what the game will be like in terms of requirements and have identified a more defined scope for the project. Outlined above, in the Software Requirement Specifications, is the majority of the project's work this period. Additionally, the title scene for the game has been designed and warrants a new title. The game has been modified from "Tiamat: The Quest" to "Titan Quest" for the sake of making a more catchy or sensible name for the game.

Challenges

I did not meet my goals from the previous period, however, I have further ironed out how to complete those goals through adjusting the focus of the game. Now that I am better prepared, last week's goals are now much less difficult to complete.

Time Spent

Week #3 Hours: 3

Total Hours: 11.5

Goals

The goals from the previous week were incomplete, this means that they will be carried over. However, the step-wise design of the project has restructured what should be accomplished and when. Therefore the goals for this coming week are to complete the scene design, puzzle design and implement the terrain. Last week's goals were actually too large in scope.

To: Mario Nakazawa, Project Director

CC: James Peruggia

From: Cody Ferguson

Subject: Titan Quest

Date: September 22, 2013

Accomplishments

This reporting period, all of the sprites required for the first level and second level of the game have been collected, and spliced for usage. Additionally, the process for using sprites in a 3D space has been implemented. Research also into the networking capability of Unity3D has been done, and found to be a difficult task or one that must be purchased. Therefore the networking portion of Titan Quest is no longer a part of the project. Additionally, rolling changes have been made to the report's sections, updating the game from multiplayer to single player. In regards to actual game implementation, a small demo demonstrating collisions of a player character and monster has been implemented. However, the implementation is very basic, and simply a practice/test for building functionality.

Challenges

Challenges this reporting period were understanding the construction of two-dimensional objects inside of three-dimensional space with the Unity3D Game Engine. Otherwise, the work has gone smoothly.

Time Spent

Week #4 Hours: 5

Total Hours: 16.5

Goals

Implementation of the first level completely, including the puzzle triggers and a more functional combat system. Additionally, the inclusion of "health bars" and damage functionality along with "damage text" to display the amount of health being lost during combat with monsters.

To: Mario Nakazawa, Project Director

CC: James Peruggia

From: Cody Ferguson

Subject: Titan Quest

Date: September 29, 2013

Accomplishments

This week, there were no major developments, however I am beginning to get the sprites inside of the space to work. Additionally, combat has made great strides and should be both more accurate and engaging by the time I present the new build. Inside of this build the map has been improved in that there is now a map, as opposed to green tiles everywhere.

Challenges

This reporting period has been smooth and the only challenges have been aesthetic, involving the design and layout of the first level and displaying the animations of the character models in the 2d space properly.

Time Spent

Week #5 Hours: 7

Total Hours: 23.5

Goals

Complete the level, as I did not fully complete the level this time around and finish/touch up on the combat system to incorporate more accurate damage and representations of what is happening in the fights, for example combat damage text which is also incomplete. In addition, I would like to have the character generation scene in place, even if the values are placeholders for a later, better implementation.

To: Mario Nakazawa, Project Director

CC: James Peruggia

From: Cody Ferguson

Subject: Ahura Mazda

Date: October 27, 2013

Accomplishments

Over the past few weeks I have created a new game from the ground up, changing not only the purpose, but jumping into an entirely different genre. In this particular week, I have not resolved the bugs, but I have design the next level which will make its debut at the next presentation. Additionally, I have become to work on the heads up display though no notable progress has been made. A side note, I have created a new logo for the project, updated in this executive section. Sections of this report were also rewritten this week, reflecting the new design goals for the project, almost every section needed an update outside of the personal motivations which remain the same.

Challenges

The major challenges that I face now are design based. The game itself has simple bugs to resolve, though they are taking a bit longer to resolve than originally thought. Overall however, the design challenges ahead play into the idea of game balance and player enjoyment. I don't want an easy game, but I don't want an impossible one – this is a problem for many developers, even in the AAA companies.

Time Spent

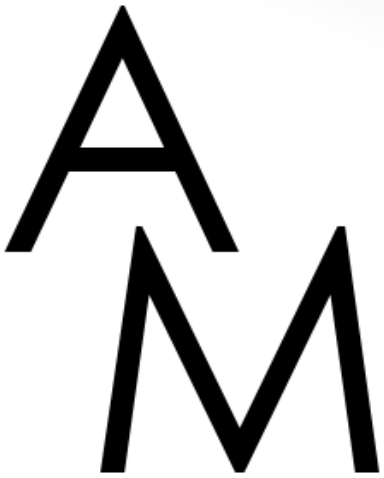
Prior to shifting to the new genre, 23.5 hours of work had been put into the development of the game. Below are the new statistics:

Week #6/7: 12.0 hours, week #8: 15.0 hours, week #9: 3.0 hours.

Total: 53.5 hours.

Goals

My goals for the coming days are simple, I need to implement the HUD and fix the errors in the game. As well, once this is completed the game will enter into a sort of extended Beta phase, in which I will need to recruit some play-testers and improve the overall game balance.



To: Mario Nakazawa, Project Director

CC: James Peruggia

From: Cody Ferguson

Subject: Ahura Mazda

Date: November 3, 2013

Accomplishments

The game now has a basic HUD, displaying the score and the time for the level the player is playing in. Additionally, the next level has been textured and filled with enemies, however the balance of the level is not exactly amazing.

Challenges

There have been no challenges, at this point in development the game has become more about game balance and the placement/control of objects in the game environment, and very few scripts need to be written from this point, if any at all.

Time Spent

Week #10: 5 hours

Total: 58.5 hours.

Goals

My goal for the next week is simple. Three more levels with more monsters and some form of ranged attack if there is time after generating this content. Beyond that, I would like to create some method or scene for storing the high scores of the player, to be displayed once the player has fulfilled a random criteria. These are part of the “Game polish” step in the development process, and contribute to the game being in its extended beta phase. As the last goal, I would like to assemble a core group of testers to play the content in the builds I begin to push.

To: Mario Nakazawa, Project Director

CC: James Peruggia

From: Cody Ferguson

Subject: Ahura Mazda

Date: November 12, 2013

Accomplishments

I have worked more on the HUD for the game, but this week has been about making the player character bounce off of the heads of the enemies they squish. This has been designed and approximately half implemented.

Challenges

There have been no challenges, at this point in development the game has become more about game balance and the placement/control of objects in the game environment, and very few scripts need to be written from this point, if any at all.

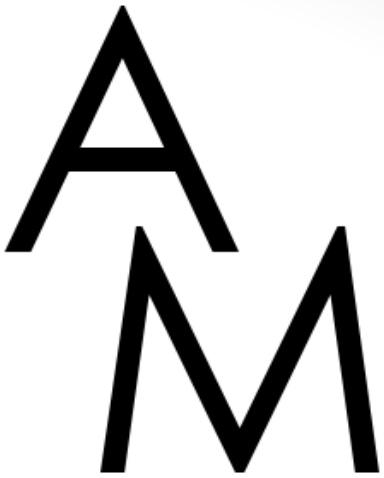
Time Spent

Week #11: 2 hours

Total: 60.5 hours.

Goals

The goals are to finish the HUD and “bounce” effect and finish generating some more playable content (levels) before the presentation/demo stage of the course.



To: Mario Nakazawa, Project Director

CC: James Peruggia

From: Cody Ferguson

Subject: Ahura Mazda

Date: November 12, 2013

Accomplishments

The heads up display of the game is implemented and menus are on their way! The player should have a much more friendly gaming experience, however is currently incapable as selecting when to start playing, when to stop (outside of closing the window), and so on – which are functions of a menu. Sprites still have some issues but will be resolved (glow effect – but remember that the artistic component of this project is not meant to be in scope). Unity3D has released a new build this past week, and I have become to explore the new functionality provided. A demo video is in its final stages of editing and will be posted to the supplied channel link in the Software Demos section before class on 11/19/13. Another enemy has been implemented and a new level has been added. Score still counts down too quickly, but that is not much of a concern. I have begun designing the poster for the poster session as well. Expect an updated repository at that same point in time with all of the aforementioned changes!

Challenges

There have been no challenges, at this point in development the game has become more about game balance and the placement/control of objects in the game environment, and very few scripts need to be written from this point, if any at all. My challenges has been few and far between, therefore I have kept the same message!

Time Spent

Week #12: 7 hours

Total: 67.5 hours.

Goals

I have given up on the bounce effect, which is in reference to the milieu is a function of the character Mario in Super Mario, who when stomping an enemy would bounce from the opponent. This is because I have other focuses right now, both aesthetic and functional that I believe trump this functionality in importance. Therefore I am setting my goals as implementing the menu system for the game, the new title screen and adding the indicators for the player progression that I have been neglecting for far too long. I will most likely revisit the bounce effect toward the end of the next reporting period and if I have finished it or made progress I will finish it before the final demo and beta build is released.