Design, Development, and Implementation of a 2D Puzzle-Platforming Adventure Game

A Senior Project Submitted to the

Department of Computer Systems Engineering Technology

of the School of Engineering, Technology, and Management at the Oregon Institute of Technology

in partial fulfillment of the requirements for the Degree of

**Bachelor of Science**

Christopher Horenstein

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**Senior Project Approval Page**

The senior project of Christopher Horenstein for the Bachelor of Science degree was accepted by the evaluation committee and the Department of Computer Systems Engineering Technology at the Oregon Institute of Technology.

COMMITTEE APPROVALS:

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Jay Bockelman, Program Director (Oregon Institute of Technology)

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Reviewer 2 (Oregon Institute of Technology)

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Reviewer 3

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Reviewer 4

**abstract**

The abstract for the project goes here. The abstract serves as an executive summary of your project. It should include a brief introduction to the project, state its relevance, describe the design features, and provide a short summary or conclusion. The abstract should be structured in three or four paragraphs and it should not be longer than a page. It is typically written after you have completed the project. (1 page)

**acknowledgements**

The acknowledgements go here. You may want to check some acknowledgement sections in books or textbooks to get an idea of the tone and content of the typical acknowledgement. It may also be a good idea to take a look at some Master’s Thesis, Doctoral Dissertations, or other Senior Projects to get a sense of the tone and language typically used in the acknowledgments section. It is typically written after you have completed the project. (1 page)

**List of Acronyms**

**Acronym** Definition (The acronyms should be listed in alphabetical order)

**XNA** XNA’s Not Acronymed

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# Introduction

## Overview

In this chapter I will describe the platforms and main idea behind Ne+, as well as describe the target market for the project and some examples of similar products already available.

## Product Description

Independent game development has been made far more accessible than ever before thanks to technologies like XNA and the Windows/Xbox 360 platforms. With these new technologies comes the ability to quickly and efficiently create video games with very small teams and even be able to sell them through Microsoft’s Xbox Live Marketplace.

In the market today independent games fall into very few categories. There is a group of games that were created in very little time and contain no new concepts, and cheap or placeholder artwork; games that were created by one or two people and did not receive polish or further development by talented individuals. Another group of independent games, arguably the most successful, develops a new or somehow unique gameplay concept, and usually displays the concept and allows the player to interact with it through various puzzles that help the player to consider the concept’s intricacies.

Ne+ contains these characteristics – it is a game that is more about the gameplay than the story or graphics, although both are ideally satisfying for the average player. It introduces a concept based entirely around different lights creating different effects on their environments that the player is able to interact with. Many different puzzles will highlight the nearly endless possibilities the concept allows for, and the tools will also create a sort of sandbox for the player to interact with, although the main game will be entirely about progressing through environments linearly.

## Existing Products

*Braid* is one of the games that brought independent game development into the public’s eye. It illustrates many of the concepts that Ne+ aims to take advantage of – first and foremost, the gameplay is absolutely the heart of the game. Take everything else away, and we’re still left with the core of the experience. Ne+ aims to highlight gameplay in a similar way. It also is puzzle-based to illustrate the core concept most efficiently, which is how Ne+ presents its concepts as well. *Braid* also demonstrates an incredible polish, with beautiful visuals and audio, and while Ne+ artwork is not as intricate the end result relies heavily on lighting and should provide high-quality visuals and audio as well.



*Limbo* is another game that Ne+ is similar to – it is a sidescrolling platformer like Ne+, and uses puzzles to illustrate its main gameplay concepts. *Limbo* experiments with visual aesthetic, ambient sounds, and minimalism, which are all secondary but necessary elements of Ne+, and elements that I am experimenting with. It is almost entirely about players using logic to progress through the game’s environments, although the length of the game is slightly lacking. Ne+ will most likely end up to be about the same length given that I am the only developer working on it, which is another similarity between the titles.



## Summary

A short pitch as to why your project has merit and should be accepted. (1 page)

[This section should be written during the second or third term of the senior project sequence.]

## Report Outline

## This report is split into a few major sections. First, a background of the project will be given, followed by a functional description of the product, a detailed description of the product’s design and architecture, and finally test results, economics, and a summary of the report.

# Background

## Overview

In this chapter, I will discuss some of the relevant background information necessary to understand the rest of the report, as well as the project as a whole. The state of the art will be addressed, and finally I will summarize the major points of the chapter.

## Background Information

To understand Ne+, it is necessary to understand the concept behind its gameplay. Video games, like all software, has the potential to be extremely dynamic in nature, providing an excellent and unique experience to every user while still adhering to some framework that provides a product’s utility in one way or another. With Ne+, the entire game is focused around the idea of different colors of lights implementing different effects on the game objects they touch. Some might even create physical entities in the game world, like a light that projects a light platform. This provides a very strong framework for endless possibilities based on creating components and letting them interact, and that concept is an important piece – the main driving force – behind the project.

## State of the Art

The state of the independent game development community is incredibly strong, which is part of the reason that Ne+ is at all possible. With games like *Braid* and *Limbo* providing very strong single player experiences from very small development teams, the state of the art is such that, with the help of open-source technologies and Microsoft’s XNA technology with platforms like Windows 7 and the Xbox 360, it is perfectly possible for a single person to create a game from start to finish in a reasonable development time as contrasted with similar tasks years ago.

## Summary

With the core concept of Ne+ being component-based and providing an excellent framework on which the rest of this report and the game itself are based on, as well as the knowledge of the current state of affairs for small development teams which are now able to do much more than they could at one point, now is the time for independent developers such as myself to embark on projects like Ne+.Functional Description

## Overview

Provide an overview of the chapter here.

[This section should be written during the first or second term of senior project sequence.]

## Functional Description

## Block Diagram

Include a block diagram of your design and explain it. (1-2 pages)

[This section should be written during the first or second term of senior project sequence.]

## Summary

Summarize the chapter

[This section should be written during the first or second term of senior project sequence.]

# Detailed Description

## Overview

Provide an overview of the chapter here.

[This section should be written during the second or third term of senior project sequence.]

## Detailed Description

Provide a functional description of your design. Make sure to include pictures and figures of your design. (3-5 pages including figures)

[This section should be written during the second or third term of senior project sequence.]

## Architecture

Include relevant architecture elements of your design and explain them. (3-5 pages including figures)

[This section should be written during the second or third term of senior project sequence.]

## Summary

Summarize the chapter

[This section should be written during the second or third term of senior project sequence.]

# Test Results & Validation

## Overview

Provide an overview of the chapter here.

[This section should be written during the second or third term of senior project sequence.]

## Test Plan

Describe your test plan and validation study.

[This section should be written during the second or third term of senior project sequence.]

## Test Results

Include figures, screen shots, usability results, etc. of your test results. (3-5 pages)

[This section should be written during the second or third term of senior project sequence.]

## Discussion

Provide a discussion of your test results. Does your design meet all the specifications? (2-5 pages)

[This section should be written during the second or third term of senior project sequence.]

## Summary

Summarize the chapter

[This section should be written during the second or third term of senior project sequence.]

# Economic and IP Analysis

## Overview

Provide an overview of the chapter here. For some projects, this chapter may not be relevant.

[This section should be written during the second or third term of senior project sequence.]

## Engineering Economic Analysis

Include the details of a basic engineering economic analysis. Make sure to include the cost of parts, R&D, engineering time, etc. (1-2 pages)

[This section should be written during the second or third term of senior project sequence.]

## Intellectual Property Analysis

Address any issues related to intellectual property here. These may include Copyright, Trademark, Patent, or Trade Secret considerations that have affected your project or should be taken into consideration. (1-2 pages)

[This section should be written during the second or third term of senior project sequence, but issues should be checked during the design process.]

## Summary

Summarize the chapter

[This section should be written during the second or third term of senior project sequence.]

# Summary

## Overview

Provide an overview of the chapter here.

[This section should be written during the third term of senior project sequence.]

## Project Summary

Provide a summary of the project. (1 page)

[This section should be written during the third term of senior project sequence.]

## Future Direction

Discuss potential future directions or possibilities for improvement. (1 page)

[This section should be written during the third term of senior project sequence.]

## Concluding Remarks

Include some concluding remarks.

[This section should be written during the third term of senior project sequence.]

References

Include references using IEEE transactions citation format here.

Appendix

Use the appendix to attach additional schematics, code, and other relevant reference material that has not been included as part of the report. If these documents are to be printed separately and attached with the rest of the report *a posteriori,* please use this section to create a table of contents and provide a short explanation/overview of each of the documents attached.