Multiplier

Real Time Strategy Unit Balancing Tool

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# Abstract

The purpose of this project is to evaluate whether or not having additional game features makes the game itself more appealing to the players.

The game is a real time strategy game, with 3 game modes: Singleplayer, Multiplayer, and Simulation. There is a Tutorial provided in the game to help with the process of helping the players to understand the game rules, and how the game works.

The game unit editor, allowing players to fully customize the attributes of the game units. This feature is present in Singleplayer, Multiplayer, and Simulation Mode, thereby giving players the ability to customize and play around in any of the three modes provided.

To evaluate how appealing a game can be by adding an additional feature, there will be two versions of the game, a game build with the game unit editor, and another build without the game unit editor included. Analyzing how much time players have spent playing the game modes and editor will give a conclusion to see if the evaluation suggested is true.

# Acknowledgements

I would like to thank Dean O’Donnell as supervisor for providing guidance, and Brian Moriarty and Charles Rich as readers for providing assistances.

I would like to thank the volunteers and testers for their feedback. Their feedback helped to improve the game, and made the game as it is.

# Introduction

## Inspiration

The term, “Real-Time Strategy,” is used to describe a subgenre of Strategy games as “a type of strategy game where it closely resembles reality, in which time is limited, and if the player loses time, their opponents may have already taken advantage of it.”2 In other words, real-time strategy games are games where players execute their actions in real time, without pausing or taking turns. The term was used since the late 1980s, at the time for describing what an action strategy game, *Cosmic Conquest* plays like in the table of contents of the publication magazine, *BYTE*.[[1]](#footnote-1) However, the cofounder of Westwood Studios, Brett Sperry, is mainly credited for using the term to market their game, *Dune II*.[[2]](#footnote-2) This is what we used to define the “real-time strategy” genre in video games.

In a real-time strategy game, players devise intricate strategies to take advantage of what they believe their opponents will do without any prior knowledge.[[3]](#footnote-3) These strategies usually involve applying upgrades which helps to make their units perform better than they would expect the performances of their opponents’ units, or playing mind games to deceptively lure their opponents to their downfall.[[4]](#footnote-4)

When evaluating mind games, it is pretty difficult to say which player is better than the others, when all players do not have any prior knowledge of the situation. We can therefore assume each player have equal, negligible levels of certainty to successfully execute mind games for tricking and deceiving others. This way, we are able to simplify many factors based on player intuition and subjective decisions that other players may or may not dare to play. Instead, we look to evaluating performances based on upgrades being applied to game units, in which the process of improving game unit performances fares with how well a player is when compared to the rest of the players or enemies. This is more apparent when players are confronted with other players with stronger army compositions and higher tiered units.[[5]](#footnote-5)

## Game Balance

Real-time strategy games are notoriously known for their high difficulty when it comes to game balancing.[[6]](#footnote-6) Players can choose amongst various factions and units with different strengths and weaknesses, developers must carefully test all potential interactions and ensure they are balanced and fair across different types of terrain, maps, game modes, and scenarios. Here, there is a particular interest in the concept of Nash equilibrium[[7]](#footnote-7), and related concepts of dominant strategies, in which there exists an equilibrium state where no players can benefit from changing their strategies. Meaning, players will tend to gravitate towards the most optimum strategy, or the dominant strategy. The existence of such strategy saps away the potential for choice, thus making the game boring to play.6

Here, we look into balancing the game by having very few strategies for players to choose from, and allowing as few dominant strategies as possible, in order to minimize factors that may hinder the evaluations. We also look into the option of allowing players to balance their units, to see if this increases the potential choices of strategies the players can choose from, so the players will not be bored by the game and lose the game’s appeal.

# Related Works

Prior works and research findings are to be placed in this section. In this case, may include prior game design analytics and postmortems, as well as developer conclusions and focus of problems that arise in other works.

# Game Design

This section contains the design document of the project. Each subsection goes further into detail of portions of the whole project design.

Can include UML diagrams of game logic workflows, and other aspects of the game (aesthetics, core, etc.)

## Overview

## Game Mechanics

## Other Things Worth Mentioning

# Resources

This section contains any game assets used in the project. Includes current assets and unused assets, as well as sections explaining the uses of the assets in general. Should go more in detail.

# Tools

This section discusses the use of Unity, and all resources related to Unity, Unity Networking, shortcomings and issues with Unity, and other advice worth sharing.

# Evaluation

The meat and grits of this paper. State the project’s goal, and come up with the hypothesis that goes into evaluating the project to be successful or failure. Subsections must go into detail of how the evaluation is done, and so forth.

## Research Method

## Research Question

## Result / Conclusion

# Postmortem

Typical game postmortem structure goes here. For reference, see Gamasutra postmortems.

## What went right?

## What went wrong?

## What did I learn?

# Conclusion

This section contains the final evaluated answer to the hypothesis stated in the Evaluation section. Shortcomings of this project is also included in this section. Make sure limitations are noted. Never gimp out on the details.

# Future Work

State the endless possibilities this project could have, assuming there are no deadlines and unlimited budgets are given. State when this project is deemed complete, and state what possible research can be made and for what other purposes.

Uncertain if this section should contain Github project repository links, and explanation on how to use the project.

# References

Blizzard Entertainment. (2009, March 24). *Rookie Mistakes*. Retrieved from Battle.net: https://web.archive.org/web/20090324034745/http://classic.battle.net/war3/basics/rookiemistakes.shtml

Byte Publications. (1982, December). Table of Contents. *Byte: The Small Systems Journal, 7*(12), p. 5. Retrieved March 20, 2016, from https://archive.org/stream/byte-magazine-1982-12/1982\_12\_BYTE\_07-12\_Game\_Plan\_1982#page/n3/mode/2up

Egenfeldt-Nielsen, S., Smith, J. H., & Tosca, S. P. (2012). *Understanding Video Games: The Essential Introduction* (2nd ed.). New York, NY: Routledge.

Geryk, B. (2001, June 11). *A History of Real-Time Strategy Games*. Retrieved from Gamespot: https://web.archive.org/web/20010611023323/http://gamespot.com/gamespot/features/all/real\_time/index.html

Kleinberg, J. (2011, September 23). *Networks: Course Blogs for INFO 2040/CS 2850/Econ 2040/SOC 2090*. Retrieved from Cornell University: http://blogs.cornell.edu/info2040/2011/09/23/real-time-strategy-and-game-theory/

Lahiri, S. (2010, October 4). *Mind Games of a Tactical Kind*. Retrieved from Slant Magazine: http://www.slantmagazine.com/house/article/mind-games-of-a-tactical-kind-ruse

Nash, J. F. (1950, January 15). Equilibrium Points in N-Person Games. *Proceedings of the National Academy of Sciences of the United States of America, 36*(1), 48-49. Retrieved March 26, 2013, from http://www.jstor.org/stable/88031

# Appendices

The first appendix should be the IRB questionnaires handed to the testers/volunteers. This is important. Can be split up into multiple appendices in case 1 section is not enough.

Any other following sections can have anything I want that is related to this whole project, even if it is irrelevant but useful resources. This includes project documents, documentation and API manuals, game art, conceptual designs, irrelevant sketches, notes, scrawls, etc.

Proposals can also be added into the appendices, but it must be marked as old, new, or anything in between. (Uncertain if that is the case.)

Nothing stops me from adding nothing, though.

1. (Byte Publications, 1982) [↑](#footnote-ref-1)
2. (Geryk, 2001) [↑](#footnote-ref-2)
3. (Kleinberg, 2011) [↑](#footnote-ref-3)
4. (Lahiri, 2010) [↑](#footnote-ref-4)
5. (Blizzard Entertainment, 2009) [↑](#footnote-ref-5)
6. (Egenfeldt-Nielsen, Smith, & Tosca, 2012) [↑](#footnote-ref-6)
7. (Nash, 1950) [↑](#footnote-ref-7)