

UNIVERSITY OF PIRAEUS

DEPARTMENT OF INFORMATICS

**Fantasy Auto Battlefield,**

an Auto Battler Card Game

This dissertation is submitted for the degree of

*Bachelor in Software Engineering and Intelligent Systems*

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Abstract

The subject of this dissertation is the development of the game *Fantasy Auto Battlefield*. *Fantasy Auto Battlefield* combines elements from the *Card Game* and *Auto Battler* genres, and more information about those will be given in the introductory chapter. During the development of the program, special emphasis was given to the creation of an easy-to-learn and easy-to-use method of card creation, so that possible future developers may have the necessary tools to easily create new cards.

In the second chapter, there will be an analysis of the reasons for using the Unity 3D game engine and and an overview of some of its features that were used during the development of *Fantasy Auto Battlefield*.

In the third chapter, an overview of the game rules and goals will be given. *Fantasy Auto Battlefield* is a game that pits the human player versus an AI player, with both players playing cards until at least one of the bases is destroyed.

The subject of the fourth chapter, will be the design of the user interface and what needs and choices lead to its development. Included there, will be an overview of the general user interface, as well as the card design.

In the fifth chapter, there will be a detailed overview of the code base. A short description will be given for every script developed and then a more comprehensive analysis of the main scripts will follow. Moreover, in this chapter the AI behavior logic will be analyzed and an overview of the used assets will be given.

Following the above, a game session will be showcased, accompanied by pictures as the player makes progress during a match of *Fantasy Auto Battlefield*.

Keywords

Unity, Design Patterns, Card Game, Auto Battler, Board Game, Hexagons

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# Introduction

*Fantasy Auto Battlefield* was developed in the Unity 3D game engine using C#, and is a game that was built for the Windows operating system.

## The genre of the game

*Fantasy Auto Battlefield* combines elements from the *Card Game* genre and the more recent *Auto Battler* genre.

The first modern trading card game (TCG), *Magic: The Gathering* was published by *Wizards of the Coast*, Inc in 1993, and since then has inspired a great number of card games such as the more recent *Hearthstone* digital card game developed and publish by *Blizzard*.

Drawing inspiration from those predecessors, *Fantasy Auto Battlefield* supplies the player with a deck of cards, from which he draws cards and plays them by expending a resource called *Mana*. Each card may be a unit (or building) with its own stats, placed on the game’s board, or a spell card which affects the game’s board without leaving a “body” behind.

Some differences can be drawn from those games though, as the *Mana* resource here is generated by a flat amount each turn up to a maximum number that can be stored, whereas in the “*Magic: The Gathering”* for example the player needs to draw mana cards which after being played are replenished each turn. Another difference, is that in *Magic: The Gathering* and *Hearthstone* after the player draws all of his deck, they either lose or begin to take damage. In *Fantasy Auto Battlefield*, when the deck is empty, the player’s discard pile is shuffled into it.

*Fantasy Auto Battlefield* also draws inspiration from the *Auto Battler* genre. *Auto Battler* is a relatively new sub-genre of strategy video games that features chess-like elements where players place pawns on a board. The pawns after their placement, act autonomously according to some internal logic by moving and fighting opposing pawns.

The *Auto Battler* genre was popularized by games such as the *Dota Auto Chess* (which is actually a mod for the *Dota 2* game) and the *Teamfight Tactics* developed by *Riot Games.*

Similarly to those games, *Fantasy Auto Battlefield* has pawns that act autonomously although with more restraints as, for example, their movement is restricted on a single column of a hexagonal board.

# Chapter 2 - Why use Unity?

As mentioned before, the game engine that was chosen for the development of *Fantasy Auto Battlefield* is Unity 3D. Among its advantages, the Unity game engine boasts that it is royalty-free, a rich asset marketplace with even free assets, and, of course, the use of C# a modern and powerful Object-Oriented Programming (OOP) language.

Among the best features of Unity, I consider the *Monobehaviour* base class from which every Unity script derives. Using *monobehaviour’s* Awake(),Start(), and Update() methods, programming the behavior of game objects becomes effortless.

On the other hand, Unity also has two other features that greatly ease the usage of memory and those are the *Scriptable Objects* and the *Prefabs*. Both of those provide a way to implement templates for data fragments and game objects respectively, reminiscent of the *Flyweight* design pattern. Both *Scriptable Objects* and *Prefabs* were used extensively in the development of *Fantasy Auto Battlefield*.

Finally, a special mention should go to Unity’s extensive and comprehensive documentation which along with Unity’s forums, contain a wealth of information and problem-solving topics.

# Chapter 3 – Rules and Gameplay

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# Chapter 4

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