**Developing Sword of Time: A Thesis in Gameplay Mechanics and Systems Design**

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**ABSTRACT**

Sword of Time este un joc video 2D platformer rogue-like realizat ca parte a lucrarii mele de licența, explorând mecanici de gameplay și design-ul sistemelor. Principalul obiectiv al acestei lucrări a fost crearea unui joc dinamic și generat procedural care prezintă o provocare pentru jucători prin mecanici legate de manipularea timpului și a formei jucătorului precum și generarea aleatorie de niveluri. Toate aceste elemente îl provoacă pe jucător să gândească atât creativ cât și strategic pentru a completa obiectivul jocului. Sword of Time combină platforming-ul cu elemente de progress de tip rogue-like, ce crează o buclă de repetiție unică la fiecare încercare.

Procesul de dezvoltare a avut loc în Game Engine-ul Unity, punând accent pe algoritmi de generare procedurală, abilități controlate de jucător și un sistem de combat. Elemente cheie de design ce au prezentat o provocare sunt cele precum crearea unui mediu de joc și a unor mecanici balansate, astfel asigurând ca fiecare parcurgere a jocului este atât provocatoare cât și plină de recompensă. Jocul prezintă mecanici precum wind-dashing, derularea înapoi a timpului, varietate în inamici, obiecte și niveluri ce devin progresiv mai grele și necesită o adaptare strategică.

Rezultatul acestui proiect este un demo Sword of Time, unde jucătorii pot naviga prin niveluri generate procedural, învingând inamicii și depășind obstacolele din cale folosind abilități și obiecete pe care le obțin. Această lucrare concluzionează prin o analiză a eficienței sistemelor de jocuri, precum și sugestii pentru dezvoltarea viitoare ce va extinde narativa cât și raza de interacțiune a jucătorului.

**ABSTRACT**

Sword of Time is a 2D platformer rogue-like video game developed as part of my thesis exploring gameplay mechanics and systems design. The primary objective of this research was to create a dynamic and procedurally generated game experience that challenges players with time-based mechanics, randomly generated levels that challenge the player to think both creatively and strategically. Sword of Time combines the thrill of platforming with rogue-like progression elements, creating a unique loop of discovery and challenge.

The development process utilized the Unity game engine, focusing on procedural generation algorithms, player-controlled abilities and combat systems. Key design challenges included creating a balanced game environment and mechanics, thus ensuring that each playthrough is both challenging and rewarding. The game features mechanics such as wind-dashing, enemy variety, items and progressively harder environments that require adaptive strategies.

The outcome of this project is a playable demo of Sword of Time, where players can navigate through procedurally generated levels, overcoming enemies and environmental obstacles using the abilities or items they acquire. This thesis concludes with an analysis of the effectiveness of the game systems and suggestions for future development to expand the scope of player interaction and narrative depth.

# INTRODUCTION (14 pt, Bold, Uppercase, Center)

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## Context

Nowadays, the video game industry has become one of the most significant sectors in digital entertainment. Modern technologies and game engines allow for the creation of complex and immersive interactive experiences. In this current context, developing a video game is more of a technological and creative challenge that combines knowledge from a wide range of areas such as programming, graphic design and user psychology.

## General Information

This thesis presents the development and design process of the video game Sword of Time, a 2D platformer with action elements that also combines key particularities from the rogue like genre. The video game is developed in the Unity Engine and the programming language used for the scripting being C#. The game follows a warrior who must pass through different levels that are riddled with obstacles and enemies in order to get the stones of time. The warrior collects the stones of time by defeating the boss of each world. Once he completes the world by defeating the boss, he moves on to the next one trying to pass through that world’s specific obstacles. The gameplay emphasizes precise movement control, a time rewinding mechanic, intelligent enemy interactions and a wind-dashing mechanic that allows you to pass through enemies and objects.

## Theme and Game Name

The theme of this thesis is Developing Sword of Time: a deeper dive in Gameplay Mechanics and Systems Design. The central focus is the creation of a 2D platformer that mixes with elements of the rogue-like genre, while also exploring how different gameplay mechanics and procedural systems can enhance platforming gameplay.

## Game Type

Sword of Time is a 2D rogue-like platformer. It integrates action-oriented platforming with procedural generation and time-based mechanics such as rewinding, dashing and combat interactions.

## Target Audience

The game is aimed at players aged between 16 to 35 who enjoy challenging, strategic and skill-based games with high replay value. Fans of games like Dead Cells, Hollow Knight and Hades, who appreciate fast-paced combat, progression systems and unique mechanics will find Sword of Time engaging.

## Motivation and Objectives

The motivation behind this project stems from the desire to realize my own creativity in this part of the industry. A hobby of mine is playing video games, so taking into account the multitude of games I have played, I know what I enjoyed seeing in such a project. Thus, I wanted to make my own creation and ensure I could develop a video game that I would enjoy playing anytime. This thesis also aims to bridge theoretical research and practical implementation by using Sword of Time as a case study in system-driven game design. Key objectives included building a cohesive game loop, balancing the procedural randomness with fairness and designing mechanics that reward both reflexes and strategy.

## Player Objectives Within the Game

Players are tasked with surviving as long as possible while progressing through procedurally generated levels. They must defeat enemies, avoid traps and collect items that give them access to unique abilities. The player’s ultimate goal is to master the game’s systems, learning to make use of the powers they obtain and overcome the challenges presented their way.

## Thesis Structure

***Chapter 2*** presents a study of similar rogue-like platformers, highlighting core mechanics and design approaches.

***Chapter 3*** explores the theoretical foundation and tools used in development, including the game engine, design principles and game system.

***Chapter 4*** details the design methodology and proposed mechanics, illustrated with diagrams and system breakdowns.

***Chapter 5*** tackles the implementation specifics, including code and game logic.

***Chapter 6*** evaluates the project through testing and feedback

***Chapter 7*** concludes the thesis with a reflection on the development process, lessons learned and ideas for future updates.

## 2.0 Similar Games

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Figure 1 – Example of a figure (source: The Scientific Bulletin of the UPT – series Building Engineering – Architecture, issue 2/2010)

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Table g. Example of a table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Yield stress, fy [N/mm2] | | Tensile strength, fu [N/mm2] | |
| Element | Mill certificate | Coupon tests | Mill certificate | Coupon tests |
| Beam IPE360 | 285.0 | 329.8 flange  348.4 web | 427.0 | 463.2 flange  464.0 web |
| Column HEB300 | 311.3 | 313.0 flange  341.8 web | 446.0 | 449.8 flange  464.4 web |
| End plate | 281.0 | 248.3 | 424.7 | 416.0 |
| Cover plate | 296.0 | 273.2 | 443.0 | 436.7 |

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(1)

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