**FACULTY
OF MATHEMATICS
AND PHYSICS**
Charles University

BACHELOR THESIS

Name Surname

Thesis title

Name of the department

Supervisor of the bachelor thesis: Supervisor's Name

Study programme: study programme

Study branch: study branch

Prague YEAR

I declare that I carried out this bachelor thesis independently, and only with the cited sources, literature and other professional sources. It has not been used to obtain another or the same degree.

I understand that my work relates to the rights and obligations under the Act No. 121/2000 Sb., the Copyright Act, as amended, in particular the fact that the Charles University has the right to conclude a license agreement on the use of this work as a school work pursuant to Section 60 subsection 1 of the Copyright Act.

In . . . . date . . . .

Author's signature

Dedication.

Title: Thesis title

Author: Name Surname

Department: Name of the department

Supervisor: Supervisor's Name, department

Abstract: Abstract.

Keywords: key words

Contents

1. Introduction

- strategy games are popular among some players

- trying new strategies and adaptation is fun - in multiplayer, you have to adapt to other players' strategies - multiplayer means against NPCs or other players

- tower defense is a subgenre of RTS where you do tower defense things, but it's single player

- make it randomized to force exploration - a rogue-like

- each full campaign should last 1 to 2 hours - enough time to explore the strategy, but possible to play in one sitting and if you fail, you didn't lose hours of progress

- this is a combination that hasn't been explored much - it is possible it doesn't work well, however it is worth exploration, because these two genres seem to compliment each other

1.1 Original vision

- player hops from planet to planet with their spaceship, stopping to refuel on each one. Here they have to defend until they get enough fuel to move on

- build economic buildings, build towers, defend against waves - balance economy, defense and offense

- each planet will have different terrain and attackers

- slowly, they will acquire new blueprints for defensive towers, economic buildings and other upgrades. These will be randomized, so you can't rely on the same strategy every time

- along the way, there will be events, shops, harder battles and other anomalies that the player can choose to interact with

- there will be some sort of story motivating why the player is going on this perilous journey

1.2 Current scope and goals

- a prototype

- playable battles - we can start play testing the core gameplay

- all necessary battle systems to add more content later

- progressing through levels and collecting blueprints to test which blueprints work well (provide new strategies, are balanced)

2. Game Design

2.1 Design goals

- strategically interesting
    - make the player explore different strategies
    - make exploring different strategies fun, provide a sandbox
    - provide a challenge
    - motivation throughout the campaign
    - some of our goals are achieved very well in other games of the relevant genres

2.1.1 Slay the Spire

- a rogue-like deck-building game where you fight monsters and bosses, campaign is about 1 hour long, split into 3 acts, each ending with a boss

    - fights are *strategically interesting* because you have to balance defense and offense - some enemies get stronger throughout the fight - in our game you have fuel mining as offense and defensive towers as defense

    - you have to *explore different strategies* because you get different cards every time - in our game you'll get different blueprints every time

    - *exploration is fun* because there are cards and relics which fundamentally change they way your deck works - make blueprints that have unique effects that change the way you play

    - *provide a challenge* after you beat the game, which is not easy, you can play on a higher ascension - we can have a similar system

    - *motivation throughout the campaign* is at first achieved by the increasing difficulty - you always want stronger cards. When you're playing on higher difficulty, there is this interesting trade-off between short-term and long-term power - you want cards to survive the next few fights, but they will be duds later; you also want cards which will have greater synergy in the future, but don't help you right now.

2.1.2 Plants vs. Zombies

- a tower defense game where you defend your house from zombies by planting unusual plants, campaign is 50 levels long and supposed to be completed over many sittings

    - *strategically interesting* because you have to balance defense and economy - in each level, you want plants that help you in the short term while you build your economy and plants which are more expensive, but effective once you can afford them - economic buildings, so you have to balance short-term and long-term power

    - you have to *explore different strategies* because you have to adapt to different zombies and nighttime levels - different attackers with various abilities

2.2 Overview

Already described in the introduction - what do I do?

2.3 Battle

2.4 World

2.5 Resources

2.6 Blueprints and placement

2.7 Economic buildings

2.8 Attackers

2.9 Towers

2.10 Abilities

2.11 Graphical user interface

2.12 Camera controls

2.13 Events and shops

2.14 Campaign

2.15 Meta-progression

2.16 Visual style

3. Analysis

3.1   Game Engine

- unity because of familiarity

3.2   Attacker movement

- free movement with individual pathfinding X
    - linear lanes (like in Plants vs. Zombies) X
    - paths reflecting your buildings X
    - predefined paths ✓
    - branching

3.3   World

- what should it work like?
    - free placement X
    - grid of tiles ✓
    - hexagons X
    - squares ✓
    - 3D ✓

3.4   Procedural level generation

- make each level unique
    - one random seed dictates entire campaign

3.5   Random number generation

- unity random X
    - system random X
    - custom random ✓
    - why LCG

3.6   Path generation

- describe the algorithm here or in chapter 4?

3.6.1   Path visualization

- line renderer ✓
    - why does it look this way

3.7 Terrain generation

- fractal noise X
    - WFC ✓

3.8 Resources and obstacles

3.9 Terrain types

3.10 World builder

3.11 Attacker wave generation

3.12 Simulation

3.13 Visuals and interpolation

3.14 Attacker targeting

3.15 Game events

3.16 Range visualization

3.17 Selection

3.18 Blueprints

3.18.1 Dynamic descriptions

3.18.2 Attacker stats

4. Developer Documentation

4.1 Unity

4.2 Scenes

4.2.1 Battle

4.2.2 Loading

4.2.3 Main Menu

4.3 ???

5. User Documentation — Designer

5.1   Terrain Types

5.2   Blueprints

5.2.1   Buildings

5.2.2   Towers

5.2.3   Abilities

5.3   Attackers

5.4   ???

6. User Documentation — Player

6.1 ?Introduction

6.2 ?Controls

6.3 ?Mechanics

7. ?Playtesting

Conclusion

7.1   Goals

7.2   Future Work

Bibliography

List of Figures

List of Tables

List of Abbreviations

A. Attachments

A.1 First Attachment