

Institiúid Teicneolaíochta Cheatharlach



At the Heart of South Leinster

Computer Games Development CW208

GDD

Year IV

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28/04/2022

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Acknowledgements

I would like to thank the following who assisted in completing this project including:

Michael who got me into using Godot.

The person that made this addon <https://github.com/Dracks/GodotGraphQL> for part of the blockchain integration.

The person that made this website with mutations and queries <https://kepithorstudios.com/graphbook%> for part of the blockchain integration.

I would also like to thank Godot docs <https://docs.godotengine.org/en/stable/index.html> for having their documents up to date.

Game Overview

This game is a 2D side scrolling game where the player controls a single character and goes through different levels of caves where he encounters different enemies and mineable token blocks. The further down the levels the player goes the harder it will get by increasing the number of enemies, but it will also increase the number of mineable tokens for greater award. When the player dies, he will lose all the tokens he has collected in the caves and the only way to save them is to go back to the main area but then the player must restart from the start in difficulty.

This however will not be as bad as the player can use tokens collected to upgrade his stats.

Feature Set

General Features

Decently sized levels up to 400x400.

Randomized level generation.

Upgrade tree system.

Integrated Blockchain.

Gameplay

Platformer based movement.

Different enemy types.

Harvestable tokens.

Unlimited number of levels.

The Game World

Overview

The world consists of a main area and levels. The main area/hub is a flat area where the player can move around on and has three accessible things: the shop, the upgrade shop, and the level/cave entrance. Each level is unique either custom made or randomly generated and has multiple of different enemy types and different number of harvestable tokens.

Shop

The spot on the right in the HUB area it allows the player to buy items that he can use in the game throughout the main area or all the levels.

Upgrade Shop

The spot on the left in the HUB area this place allows the player to buy/get upgrades for the player which changes different stats of the player.

Cave/Level entrance

This is the spot in the centre of the HUB area and allows the player to go into the first level to start going through all the game levels until he dies or decides to go back to the HUB.

The Physical World

Overview

The physical world in this game is the level, it consists of token blocks, enemies, and gateways. The first few levels are custom and everything after that is randomly generated each level has a different number of different enemies and a different number of tokens. The entrance gateway which is used to go back is always somewhere at the top of the level and the exit gateway used to go to the next level is always at the bottom of the level.

Key Locations

The most important locations in the level are the gateways at the top and bottom of the level these let you go back to the main HUB area or to go to the next level.

Other key locations are where the tokens are located as they are what is used for the shop and upgrading.

Travel

The player can move left and right and jump he also gets affected by gravity using arrow or wasd keys with space for triggering things and mouse to attack. He can walk around levels and manoeuvre through them, and access gateways at the top or bottom of the map for going back or to another level.

Scale

The world is a tile map of size up to 400 by 400 tiles and each tile 16x16 pixels. All characters and objects in the game are 16 by 16 except one enemy type.

Objects

The objects in the game are the token blocks and the enemies. The token blocks are in each level with an increasing amount in each level. The enemies have different types with their own stats and an increasing amount in each level.

Time

When the player goes into a level, he sees the layout around him and the way out, once he starts exploring the level, he will encounter enemies that he has to kill or out manoeuvre so that he takes the least damage and doesn't die. Another thing he will encounter will be token blocks that he will mine along the way to gather tokens so that when he decides to leave, he can save them in order to buy items or upgrade different stats. After this he will either go back to the entrance and go back to the main area or find the exit gateway which will bring him to the next level and then he can repeat this process.

Rendering System

Overview

This game is 2D so everything rendered will be from the side. As the game is made in Godot it will be using the Godot renderer which uses OpenGL.

2D/3D Rendering

This game is made in Godot, and it will use its game engines rendering system which is OpenGL 3.3.

Camera

Overview

The way the camera will work is that it will show around 20 blocks in the left and right sides and 10 in the up and down directions, and the camera will follow the player and have the player in the centre of the screen always.

Game Engine

Overview

Godot is a cross-platform, free and open-source game engine released under the MIT license. It can be used for both 2D and 3D game development. The programming language it uses is GDScript which is a dynamically typed and a high-level programming language loosely based on python.

Game Engine Use

The game engine will keep track of all the collisions in the game as well as creating a Perlin noise for random level generation and will keep track of all the tokens, enemies, cells, and the player in the game.

Collision Detection

This game engine handles multiple types of collisions between different types of objects. The collisions it handles in this game are all area collisions which trigger each time a different body of a certain type enters the current objects body.

The World Layout

Overview

The world consists of token blocks, enemies, and gateways. The tokens and enemies are randomly generated. The entrance gateway is always somewhere at the top of the level and the exit is always at the bottom of the level.

Game Characters

Overview

The character is and 16x16 knight 2D sprite that the player controls with movement to the left and right and jumping and he gets affected by gravity. The player has a sword, pickaxe and a teleport medallion, the player can use these anytime. He can also buy small and normal hp bottles to heal.

The player can also upgrade different stats by buying nodes on the upgrade tree in the upgrade store.

Enemies and Monsters

3 enemy types

- Basic (low health, low speed, random left and right movement, doesn't chase the player, player takes damage from walking into him)
- Normal (medium health, medium speed, random left and right movement and jumping when he hits a wall, stabs the player if the player is in front of him)
- Tank/Mini Boss (slow speed but high damage and health, stabs the player if the player is in front of him)

User Interface

Overview

The game uses the mouse to interact with all the interactable UI elements, all the other information is showed off in the UI/HUD to show which keys on the keyboard to use and the player uses the keyboard to control the player.

Weapons and Utility

Overview

The weapon in the game the player has is a sword and he also has a pickaxe and a teleport medallion for utility. The sword and pick can be upgraded in the upgrade tree in the upgrade shop in the main area.

Sword

The sword is the only thing that deals damage to enemies in the game. The damage can be increased in the upgrade shop by buying the attack upgrade nodes.

Pickaxe

The pickaxe is the only thing that deals damage to token block in the game. The damage can be increased in the upgrade shop by buying the mining upgrade nodes.

Medallion

This is an item the player can use at any time to go back to the main scene from anywhere in the game as the player.

Audio

Overview

The only audio in the game is the background music. This music is played in all the scenes of the game and the volume of this can be changed either in the main menu or any of the gameplay scenes.

Single-Player Game

Overview

The player goes through different levels with increasing difficulty to gather tokens to upgrade his stuff. He encounters enemies which he must kill or navigate around, and tokens to gather.

Hours of Gameplay

The first 5 levels should take anywhere between 20 to 30 min if the players just heads down to the end and once he reaches level 6 it should take longer as those levels are randomly generated so technically speaking the player has as much of hours of gameplay as he wants if he explores as much levels as he wants or replays the game multiple times.

References

Web-site

<https://docs.godotengine.org/en/stable/index.html>

<https://kepithorstudios.com/graphbook>

<https://github.com/Dracks/GodotGraphQL>