

Breach - GDD

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Game Overview

Game Concept

Breach is a 2D puzzle game where the player uses their ability to change seasons to solve puzzles. The player has to think about how the environment will change in the different seasons and use this to overcome obstacles, escape enemies and find the way to unlock the door and get out.

Feature Set

- Solve puzzles with your super power to change seasons
- Evade enemies
- Discover challenge rooms within a level
- Go back to the nineties with the retro-styled pixel art design

Genre

3rd person Puzzle game

Target Audience

Our target audience are mostly explorers of any age according to Bartle's Player Types for Gamification¹. This player type wants to discover new places and secrets. Not points or prizes but discovery itself is what explorers see as a reward. This is reflected in our design - it is based on levels that unlock after each other; the camera is zoomed on the character, so the player has to go around and to discover places in order to solve a level; there are no points/prizes but the player has to discover how to go through obstacles.

Game Flow Summary

In the interfaces, the player uses the mouse to select menu items and interacts primarily by clicking. Since the game is targeted at computer hardware and not consoles or mobiles, using the mouse is the most intuitive way of interacting with menus.

In gameplay, the player mainly moves around using the arrow keys or WASD. This is also the most intuitive way of moving around using the keyboard. It would also be possible to offer movement using a plugged-in console controller.

The player can open the season selection by pressing *Spacebar* and uses it to select different seasons which completely change the environment. The player does not have any weapons or methods of attacking enemies. Therefore, the player has to use creative solutions involving the environment in different seasons to evade or defeat enemies and solve puzzles.

¹ <https://www.interaction-design.org/literature/article/bartle-s-player-types-for-gamification>

The player can possess items which are picked up by walking over them. These items can be accessed via the inventory which is brought up by pressing *Left Alt*. This equips an item which is shown above the players head. Items are at the player's disposal for solving puzzles and some items may only be obtained from visiting different seasons.

Look and Feel

We had a clear idea about the look and feel of the game from the very beginning: we wanted to make it pixel art and mysterious. We also wanted it to be unique, therefore, we created all the graphics in the game ourselves - using Photoshop for the objects and the Pixilart online tool for the tilemaps. In order to achieve a unified look and mystery, we have used a soft, pastel palette²:



We often use the shades of purple in our game in order to create a mysterious feel.

Another very important choice is that the game is entirely 2D and top down. Together with the pixel art graphics, this design decision contributes to the retro look of the game, which reminds of the games from the nineties. We drew inspiration from other pixel art games, such as *Sword and Sworcery* and *Hyper Light Drifter*.

The main character as well as the enemies (the death metal enemy and the snakes in Level 2) are also meant to create a sense of mystery. They are all created in dark colors. The main character does not have a face, which again creates a feeling of unknown but also allows for every player to "identify" themselves with the character.

Most objects, especially, the ice wall and the lake in Level 1, the challenge room portal and the hint stones in Level 2 and the exit door in both levels aim to create mystery in the game. For example, the ice wall contains a religious element and the lake is inhabited by mythological creatures. Again, all these elements have different shades of purple.

Project Scope

Number of locations

The player can visit four different seasons which are versions of the same level. The player may also visit "challenge rooms" which are a kind of level-within-a-level/mini puzzle.

² <https://lospec.com/palette-list/mulfok32>

Number of levels

There are two levels up and running.

The first one is set in a safe environment and has simple puzzles. The player still can die if he tries to go in the lake while it is water. Hence it is supposed to be roughly at the beginning of the whole game to show the different mechanisms.

The second one proposes more challenging puzzles as well as enemies: the player can die. This level is set to be in the middle of the whole game.

We also worked on the design of a third level but we didn't implement it. It was supposed to be even more challenging and be located at the end of the whole game.

Number of NPC's

- Bees
- Snakes
- "Death metal" enemy. It represents some kind of mini-boss.

Number of collectible items

- Pickaxe
- Flower
- Key
- Torch

Number of intractable elements

- Apple
- Flower pot
- Fog
- Lake
- End-of-level door
- Icewall
- Trees
- Snake nest
- Hint stones
- Stone pile
- Wooden wall
- Tiles in the challenge room
- Vortex to the challenge room

Gameplay and Mechanics

Gameplay

Game Progression

The player progresses through the game by completing levels. After a level is completed, a new one unlocks. Progression can therefore be thought of as how many levels the player has completed which is how far the player has progressed through the game.

Level Structure

Each level has an exit that is locked. The player has to find a key, which may be hidden in a different season than the starting season, and unlock the door. To do this there are several obstacles that provide the player with items.

These items can be used to either unlock the door (in the case of the key) or help the player advance through the level so that the player may eventually find the key. Some levels may include a challenge room. Challenge rooms are a kind of sub-level which has to be solved by the player. By solving the puzzle in the challenge room the player will advance to new areas or obtain new items when returning the main level.

Challenge Room Structure

Challenge rooms are made of puzzles involving the seasons.

The one we implemented for the demo is a room filled with tiles that correspond to each season. When the player steps on a tile that matches the current season, the tile will be activated. If the season doesn't match then the tile shows an image of the "death metal" mini-boss, meaning that the challenge room has failed. If the player fails the room, he can either go out-and-in the room to reset it or restart the whole level.

Objectives

The main objective is to escape each level by finding the key to the exit door. This means that the player has to use their wits to find items and conquer obstacles all while evading the enemies.

Play Flow

Upon entering the game, the player can select a level to play that the player has unlocked (not implemented in demo). Upon starting a level, the player is placed into the world at a fixed location and will use their surroundings, season changing and wits to

solve the level. When, and if, the player solves the puzzle, they will unlock the next level and are immediately taken to the start of that level.

If the player quits the game, their intra-level progress is discarded. However, inter-level progress will be saved upon completing a level so the player can pick up where they left off.

Upon finishing the last level, the player will be greeted with a final cutscene / text (not in demo). At this point, the player has access to all the levels and can access these levels to replay them through the main menu (not in demo).

Physics

The physics in the game is quite simple. There are a minimal amount of collisions and the main collisions that occur are ones between the player and the level or between the player and the other items or enemies.

There is no gravity defined, the player only walks in two dimensions and it is a top-down view with no height layers or levels.

Movement

General Movement

The player moves around in two dimensions. The player can move freely within the constraints of the level structure by pressing the arrow keys or WASD.

Other Movement

The player will move/teleport through scenes and challenge rooms by finding (perhaps also unlocking first) the exit door or moving through the entrance of a challenge room.

Objects

Interacting with Objects

Some objects are solid and cannot be moved. Either this is part of the layout of the level and will forever remain immovable or they can be removed via a season change and perhaps some further interaction by the player.

Some objects can be removed by interacting if the player has the correct item equipped.

Actions

Switches and Buttons

On the main menu, there is a button for starting the game. In the full version, there will also be buttons and switches for settings and level selection etc.

On the UI, there are two main button-sets. The first one is the inventory wheel and the second one is the season selector. Both of these are called "wheels" as they are a collection of buttons displayed on the edge of a circle.

On the inventory wheel, the buttons displayed are different items that the player has in their inventory and will be equipped when clicked. On the season wheel there are four buttons, each corresponding to a season that is selected if the player has season jumps left.

Picking Up, Carrying, Dropping and Using

Items can be picked up by the player by walking over them. This places the items in the players inventory which can be accessed by pressing *Left Alt*. This will bring up the inventory wheel for the player to select which item they want to equip.

Items cannot be dropped - once they are picked up, they will remain in the players inventory throughout the level. Items picked up in a level with a challenge room will also be available in the challenge room.

Once the item has been selected, it will hover over the player. If the player comes close to an interactable object and has the corresponding item equipped, then the item will be used and discarded automatically.

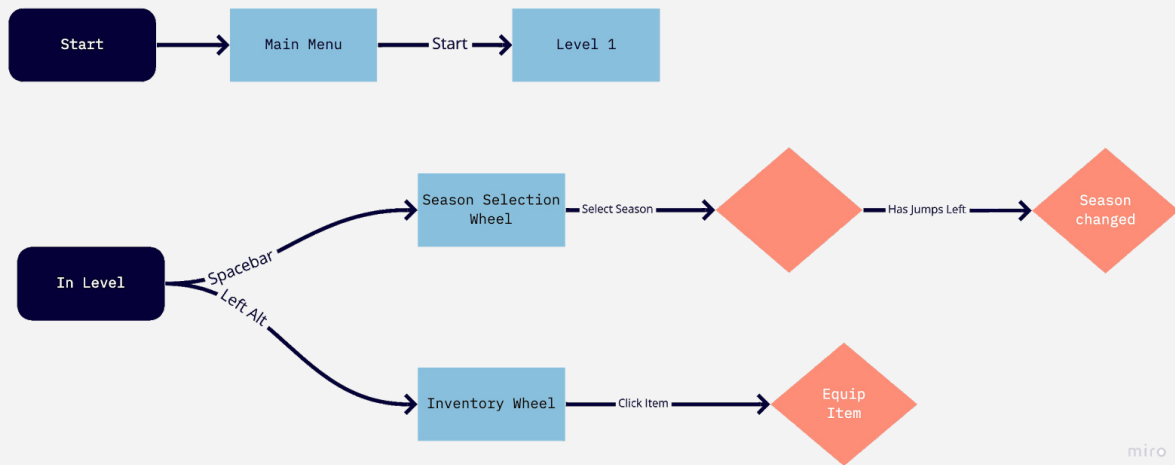
Combat

There is no combat from the players side. The player can, however, be attacked by enemies such as the snakes. The player has no direct defence against these attacks but rather has to evade the snakes by running away (the player is slightly faster) or out-wit. One way to out-wit the snakes are by changing to winter since then the snakes hibernate.

The player is very vulnerable since a one-hit means game over.

Screen Flow

Screen Flow Chart



Screen Descriptions

Main Menu Screen

The main menu screen features a play button in the demo. In the full version it should contain a level selector and an options screen.

Game Options

While in the demo there are no game options, in the full version of the game the player will find options of turning the music and the other sound effects on and off, changing the language etc.

Replaying and Saving

The player can replay and restart the level by pressing the R key.

The progression of the player is saved at the beginning of every level (not implemented in the Demo).

Levels

Level #1

Synopsis

The first level of "Breach" aims to introduce the player to the main mechanics of the game - moving around the level, the season change and the pick up and use of items from the inventory. It has 5 challenges, which need to be overcome either by using items from the inventory or by changing the season in order to reach the exit door. The player has four season changes in total.

This level is meant to be located at the beginning of the whole game.

Introductory Material

While we have not included any introductory material in our demo, the player needs to know that they have to change the environment (switch the seasons) in order to solve the challenges they will find.

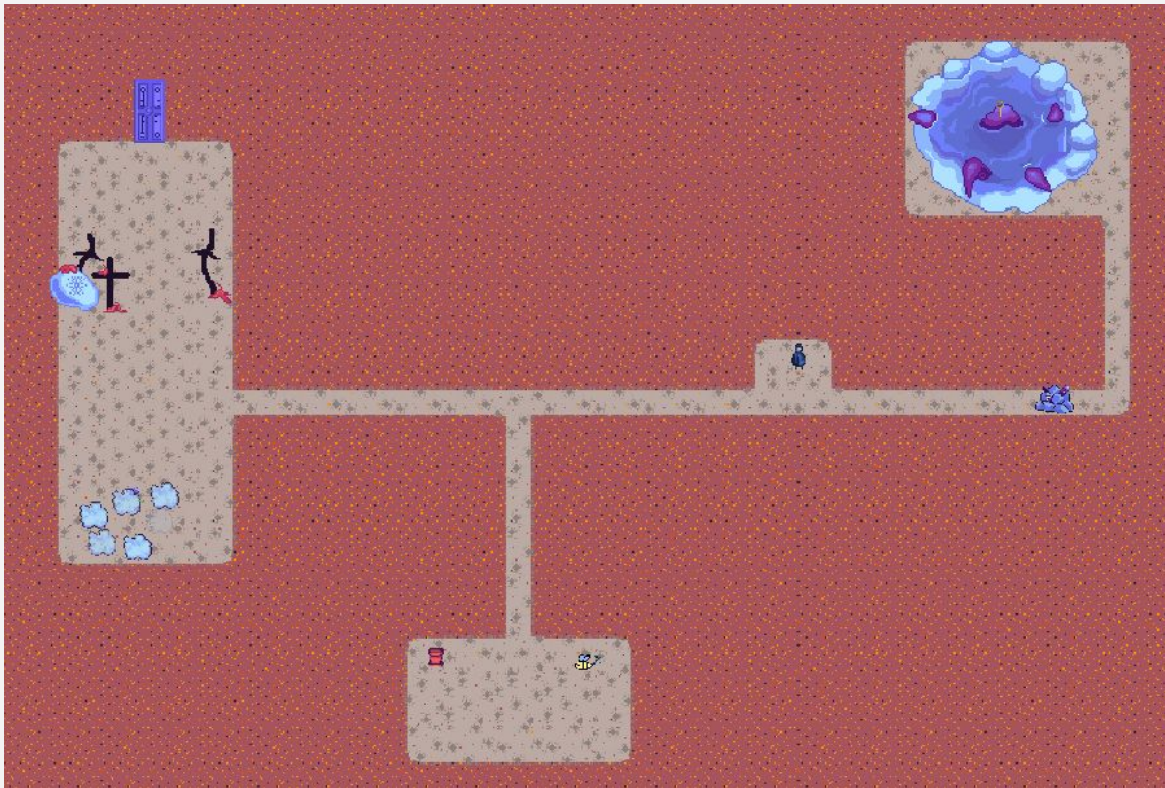
Objectives

The main objective of the level (just like in Level 2) is getting the key and reaching the exit door.

Physical Description

The look of the level is different depending on the current season since there is a different tilemap for every season. The objects that are common for all seasons and do not change are the flower, the flowerpot, the bee, the pickaxe, the stone pile, the key and the exit door. The lake is present in all seasons but it is frozen only in winter, The fog appears only in autumn, The icewall appears only in winter.

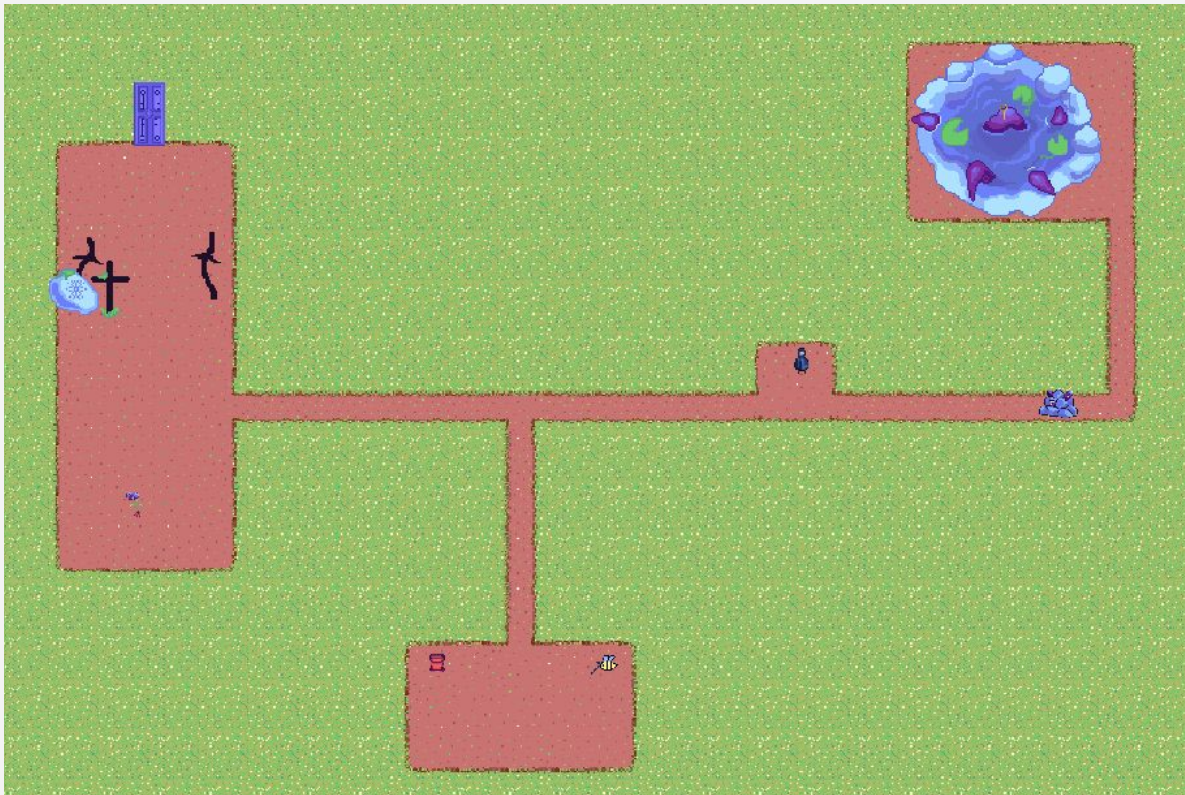
Autumn



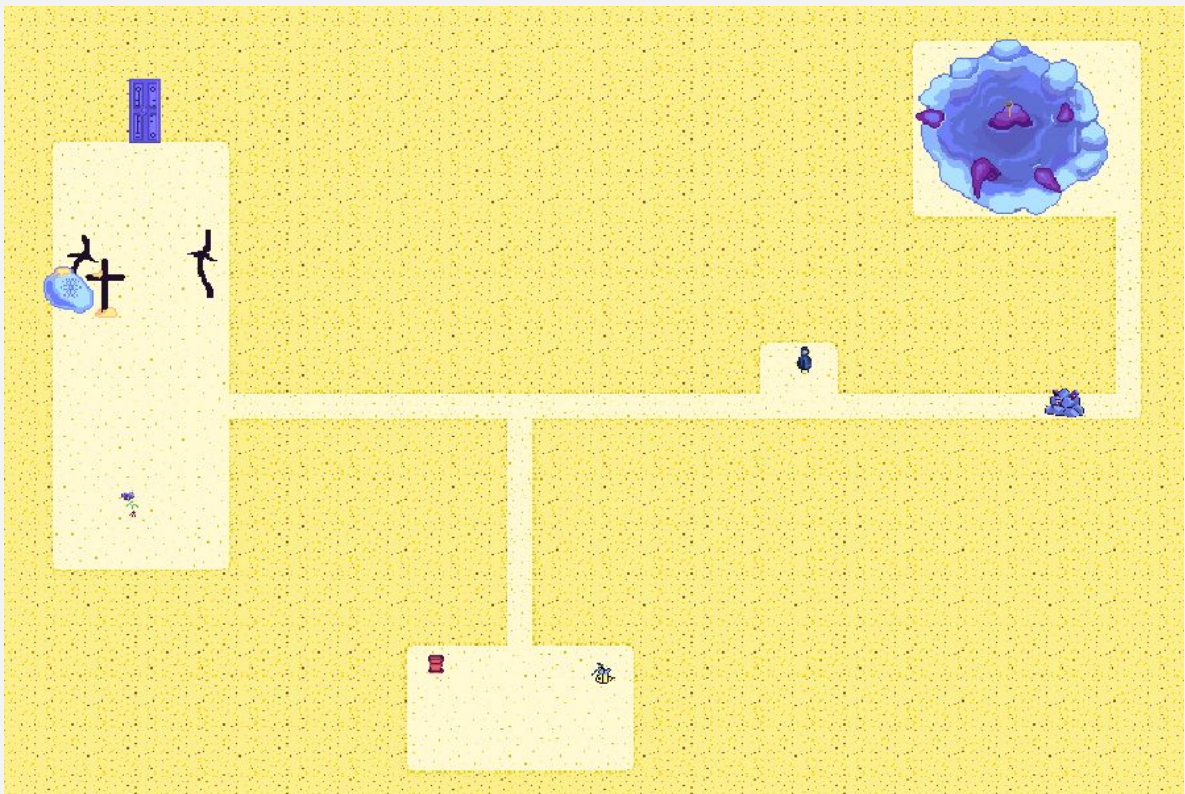
Winter



Spring

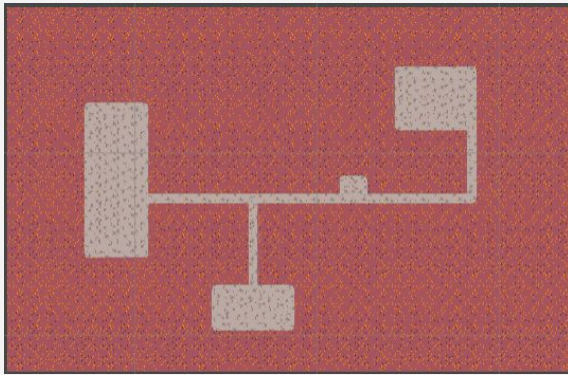


Summer

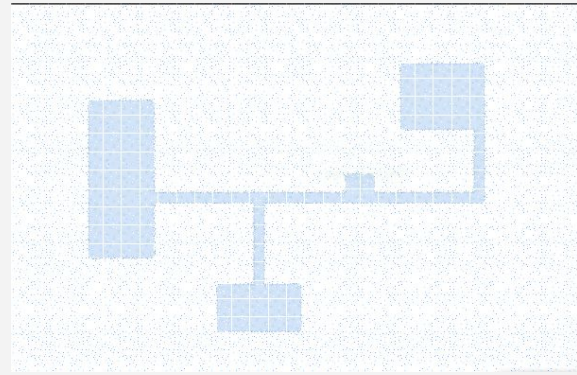


Map

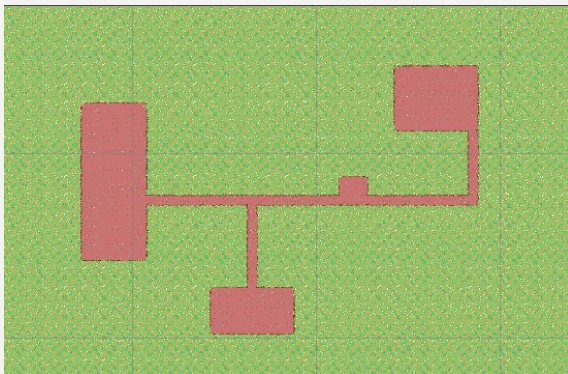
All four identical maps of Level 1 contain 4 areas connected through paths. The smallest area is where the player starts the game initially. All other 3 areas contain different challenges. The exit is at the top of the biggest area. In order to solve the challenges the player does not follow a linear way but has to rather go around and explore the different places and objects.



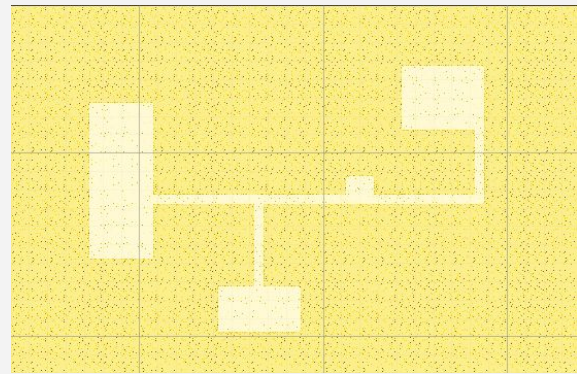
Autumn



Winter



Spring



Summer

Encounters

There are no encounters in level 1. The player does not meet any other characters nor enemies.

Level Walkthrough

The following walkthrough is how the game is planned to be played. However, this may strongly differ between players depending on the season they switch to, when they switch to it and the sequence in which they discover the different areas..

The gameplay starts with the player finding the fog and switching from autumn to any other season to remove the fog and grab the flower. Then, the flower must be brought to the flowerpot. When the flower grows, it attracts the bee and the player can take the pickaxe. The pickaxe can be used to break the stone pile and free the way to the lake. The only way for the player to step on the lake and get the key that is in the middle of it is to be in the winter season, when the lake is frozen. After getting the key, the player is

still expectedly in the winter season, so they will encounter the ice wall before the exit door. They have to change to any other season to melt the wall and reach the exit door. When they unlock the exit door with the key, the level has been completed.

The minimum number of season changes is two. If the player removes the fog by switching to winter, the lake will be ready to walk on and then the player only needs to change from winter to any other season before the ice wall. Yet, the player can do 4 season changes maximally.

Level #2

Synopsis

Level 2 is meant to be harder than Level 1. While Level 1 introduces the main mechanics of the game, in Level 2 the player encounters also enemies and a mini-puzzle within the level - a challenge room. Level 2 is more dynamic and requires thinking fast in some situations.

In the full version of Breach, it would rather appear later in the game, when the player is already more familiar with the game.

Objectives

The main objective of the level (just like in Level 1) is getting the key and reaching the exit door.

Physical Description

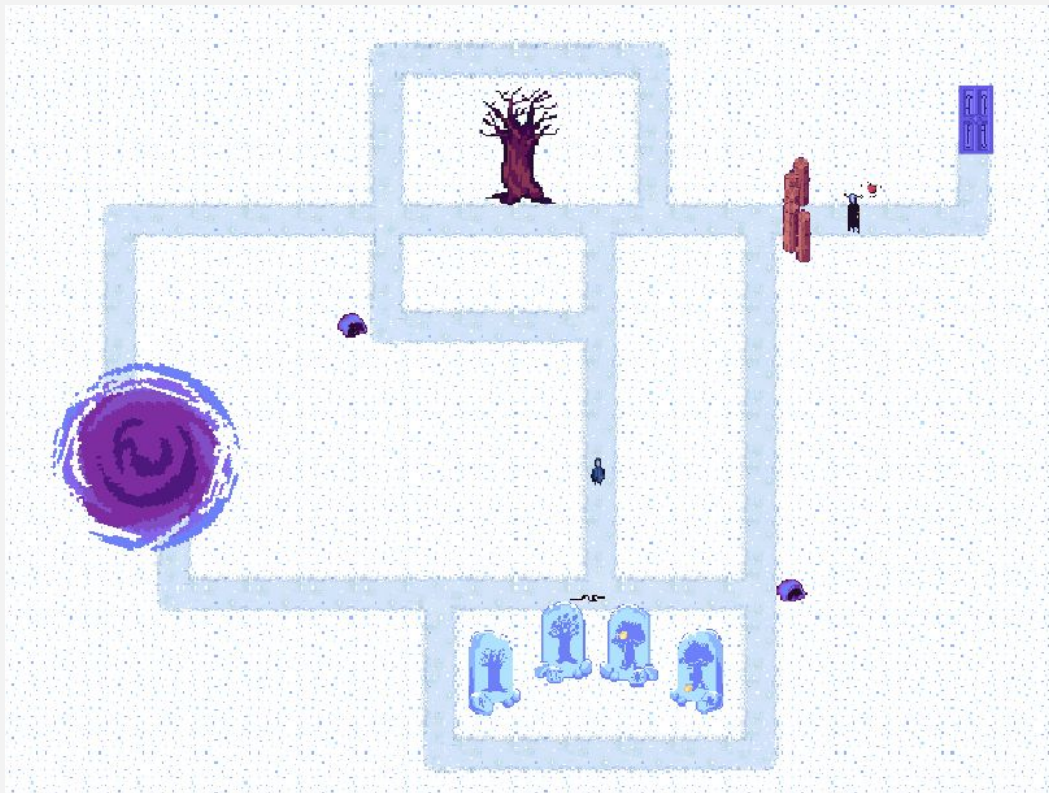
The look of the level is different depending on the current season since there is a different tilemap for every season. The objects that are common for all seasons and do not change are the snake nests, the wooden wall, the torch, the key and the exit door. The stones which contain hints on how to solve one of the challenges that are placed at the bottom of the level, are covered differently in every season - with red leaves in autumn, snow in winter, green leaves in spring and sand in summer. The apple tree has no leaves in winter and spring, but it has green leaves in summer and red leaves in fall. There is also a portal to the challenge room in the left area. The challenge room is all purple which transmits mystery³. When solving the challenge, the tiles color according to the season (red for autumn, blue for winter, green for spring, yellow for summer).

³ <https://www.canva.com/learn/color-meanings-symbolism/>

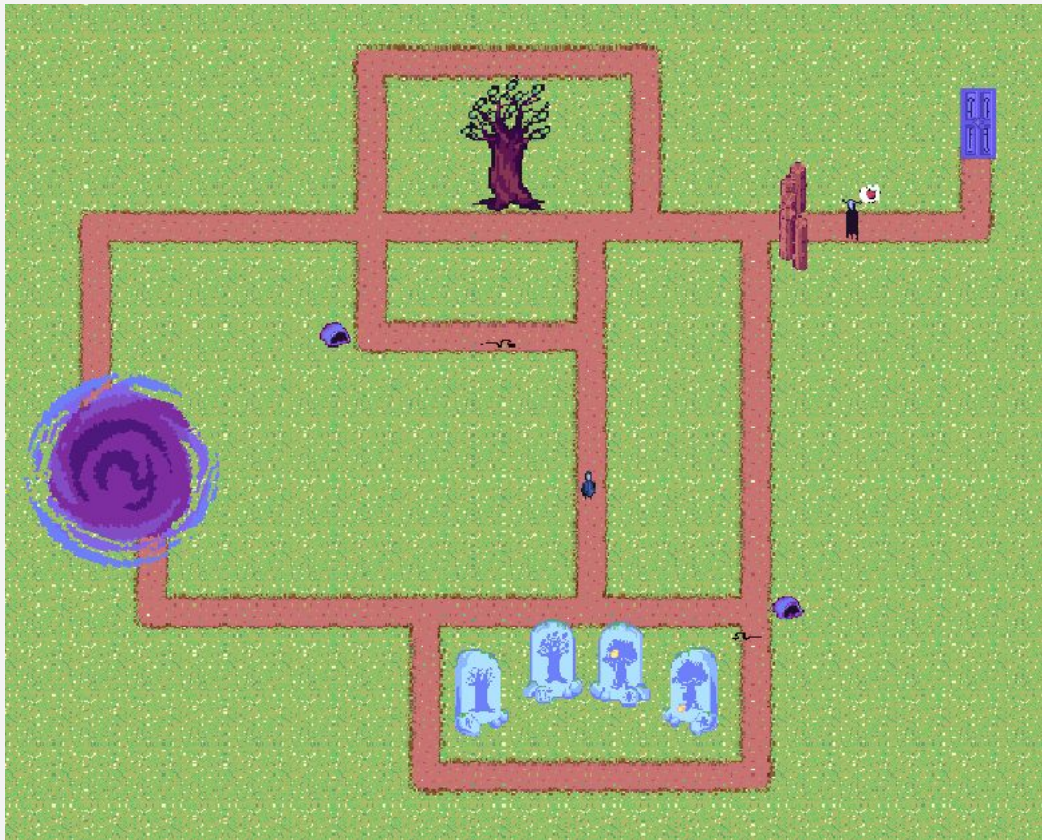
Autumn



Winter



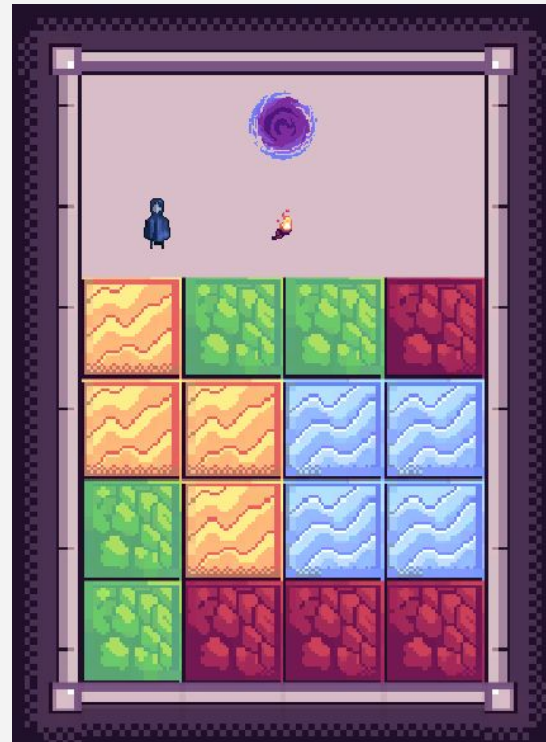
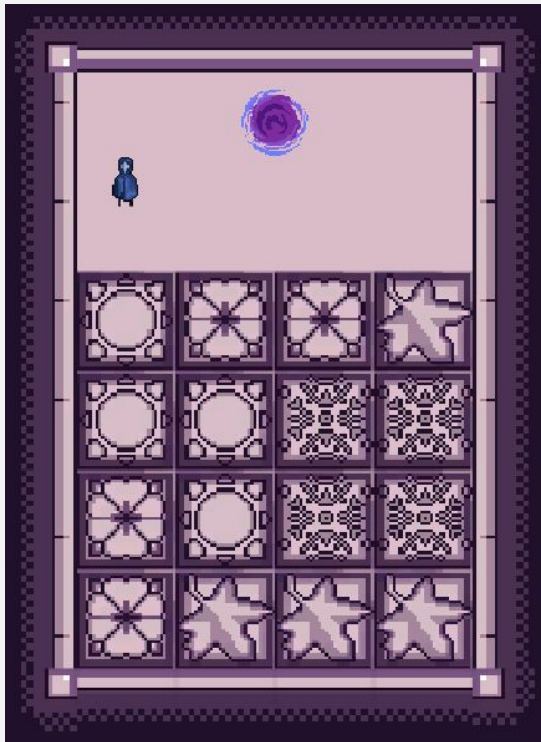
Spring



Summer

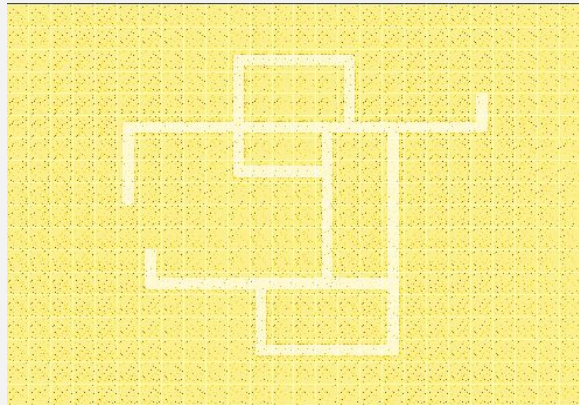
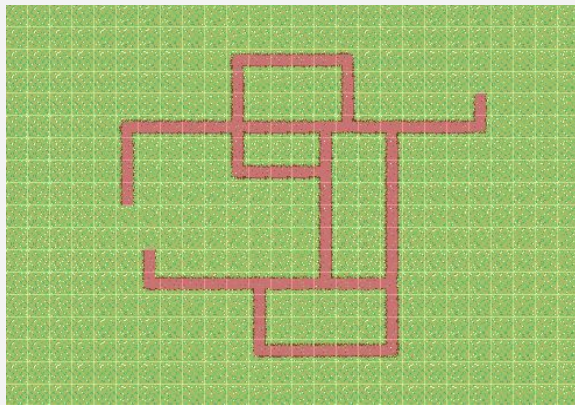
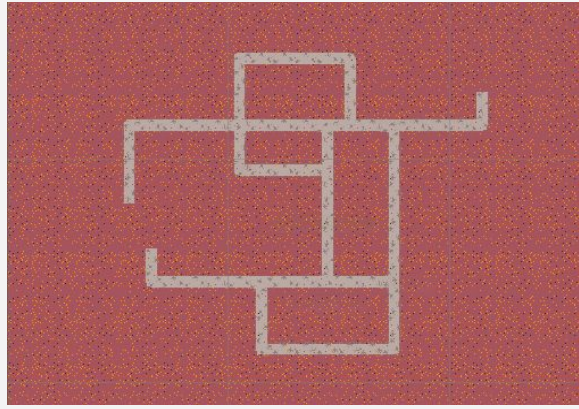
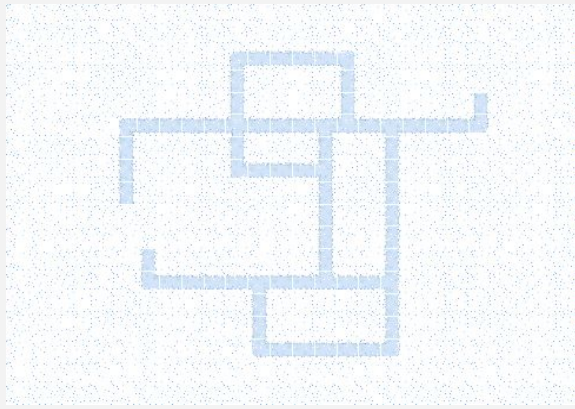


Challenge Room before solving it (left) and after solving it (right)



Map

In contrast to Level 1, Level 2 has only paths (no bigger areas). The player starts the game from the middle of the map. This level also includes more paths for the player to explore, but the player does not necessarily have to go through these paths to pass the level. The area where the path stops is where the portal to the challenge room is located. The exit door is at the right top corner of the map. In order to solve the challenges the player does not follow a linear way but has to rather go around and explore the different places and objects.



Encounters

In Level 2, the player will first likely encounter one or both snakes. They have been programmed using AI and will start chasing the player if they "see" them (so only if the player passes by a snake when the front of the snake is oriented towards the player). The snakes will also find the shortest existing path to chase the player, so they will even change direction to follow the shortest path. If the player changes the season to winter, the snakes go to sleep in their nests. If the player gets "touched" by the snake, they will die and would have to restart the level.

The other encounter is with the death metal enemy right before the exit door. This enemy is also a keeper of the key for the exit door. Just like the snakes, it will find the shortest path to chase the player. If the player gets "touched" by the death metal enemy, they will die and would have to restart the level. This enemy has a thought bubble showing that it wants an apple. It will only then stop chasing the player, when the apple falls from the tree and he finds it, so the player has to also pass by the apple right before the enemy to make him reach the apple.

Level Walkthrough

The following walkthrough is how the game is planned to be played. However, this may strongly differ between players depending on the season they switch to, when they switch to it and the sequence in which they discover the different areas..

The gameplay starts with the player finding the challenge room, if they manage to run away from the snakes. The snakes can also be put to sleep when the player changes the season to winter. In the challenge room, the player has to color the different tiles based on the sign of each tile by changing the seasons. If the player needs to start over, they can go out of the challenge room through the portal and go back. When the mystery of the room is solved, the player gets a torch. Then they have to head to the wooden wall before the exit and use the torch to burn it. Right after, the death metal enemy starts chasing the player. The player has to be quite fast to not get caught by the enemy. In order to stop him, the player has to switch from exactly from summer to autumn and pass by the tree so that the enemy comes to the tree - the apple then falls, the enemy finds it and then the player can safely approach the enemy and get the key. There are two hints for this challenge. First, the enemy has a thought bubble with an apple; second, at the bottom of the level there is a hint of four stones, showing that the apple is there only in summer and autumn and that it falls when the season changes from summer to autumn. After getting the key, the player can unlock the door and pass the level.

The minimum number of season changes is six. The challenge room requires at least 4 changes (one for each season) and then two changes have to be done (to summer and then to autumn) so that the apple falls. Yet, the player can do 10 season changes maximally.

Level #3

Synopsis

Level 3 hasn't been implemented, but we still drafted its design.

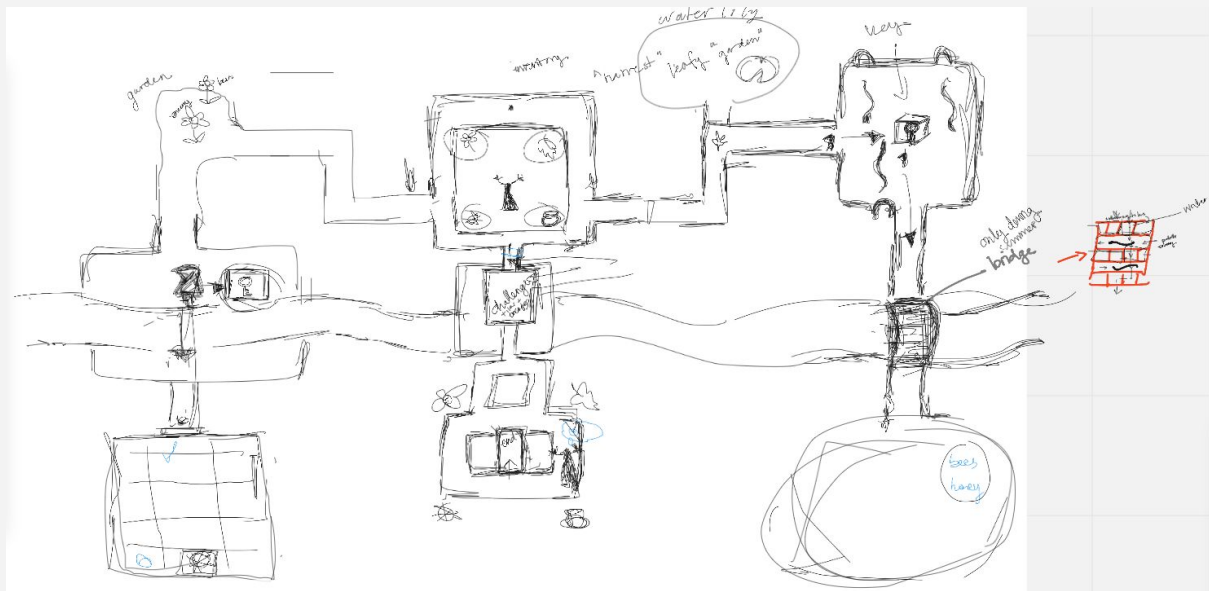
It was supposed to compile a lot of the challenges encountered before in the game while also mixing them. This level was also supposed to offer a mini-boss puzzle where the player has to accomplish a series of tasks while being chased by the mini-boss. This level would then offer a lot more pace than the previous levels.

In the whole game, this difficult level would be roughly at the end of the game.

Objectives

The main objective of the level (just like in Level 1) is getting the key and reaching the exit door.

Draft



Encounters

Similar to Level 2, the player will have two encounters in Level 3. In the top right area of the game the player will have to survive passing by the snakes in order to get the key in the middle of the area. Like in Level 2, the snakes hide in winter, however, the key is in a frozen cube in winter, so the player needs to avoid the snakes in order to get the key.

Then, at the exit door the player will encounter the death metal enemy. This time, in order to stop the death metal enemy from chasing them, the player has to have collected 4 items, which are also shown in the upper middle square area. This area is only a hint, showing approximately where and what should the player find in order to stop the death metal enemy: a snowflake (bottom left), a flower (top left), a leaf (top right) and a honey pot (bottom right).

Just like in Level 2, if the player gets caught by the enemy or touches the snakes, they die and have to start the level over.

Level Walkthrough

The following walkthrough is how the game is planned to be played and since level 3 is only a draft, it is very rough. However, this may strongly differ between players depending on the season they switch to, when they switch to it and the sequence in which they discover the different areas..

The player has to gather the 4 items displayed in the hint at the beginning of the level to be able to stop the death metal enemy waiting at the exit door (see Encounters). The flower can simply be found on the way and grabbed. There are two challenge rooms in this level. For the one that can be seen at the bottom left the player needs to get the key that is next to the river right before the room. The key can be taken only in summer,

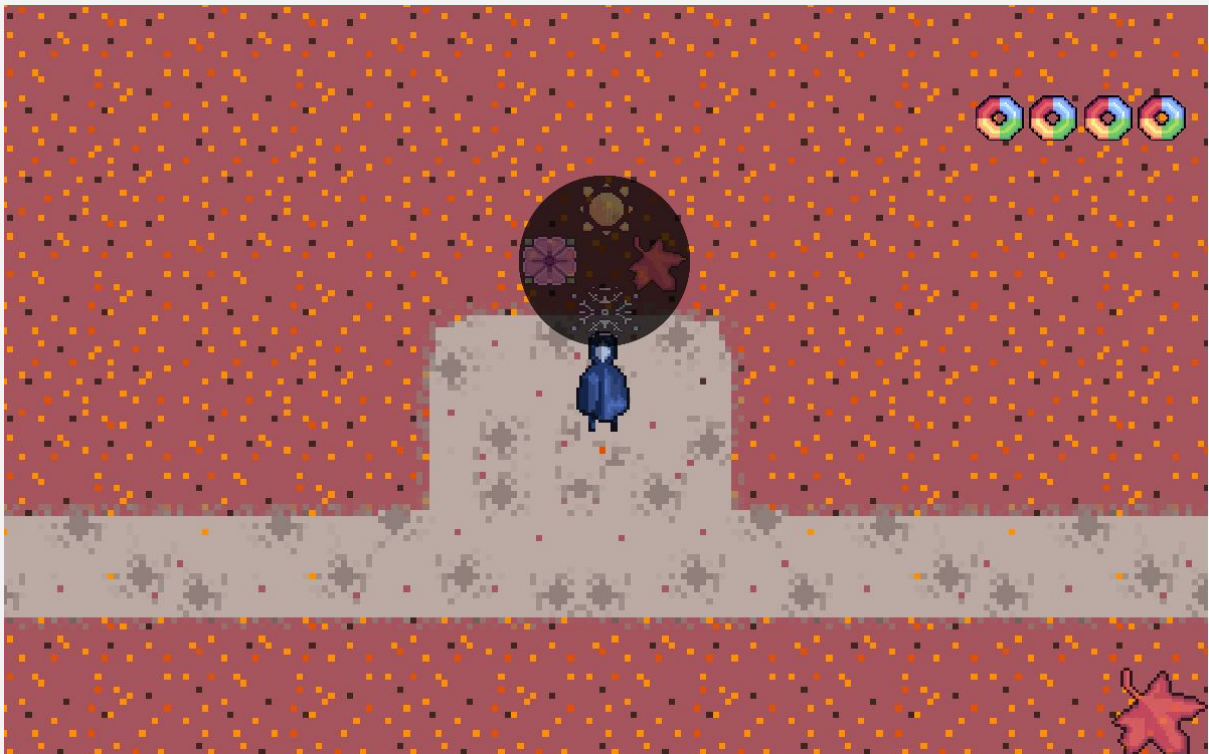
when the river has less water because otherwise it will be at the bottom of the small pond next to the river. Solving the challenge room adds a snowflake to the inventory. On the other side of the level before the snakes, the player can collect the leaf. Then, there is an area where the key to the exit door is surrounded by snakes. As explained in the previous paragraph, the player has to avoid the snakes to get the key and changing to winter does not work because they fall asleep but at the same time the key freezes. In order to cross the river on the right side of the level the player has to change the season to summer, when a bridge appears. Then, the player gets to the honey pot which is guarded by the bees. The player needs to change to winter so that the bees are not active. After collecting the flower, the snowflake, the leaf and the honey pot, the player has to bring them in the middle of the game, where they will also encounter the death enemy. The four objects have to be then placed in the four corners of the area where the death enemy is. Right before this area, the player has to go through another challenge room with changing tiles. After beating the enemy, the player can use the key they have collected to unlock the exit door and pass the level.

Interface

Visual System

HUD

Overview



Jump Counter



Jumps Depleted



Actual Season



Season Wheel



Item Wheel



Next Level



Game over



Main menu



Rendering System

The first layer on top of everything in the game is the HUD. In other words: The number of season changes left, the inventory/season wheel, the display of the current season, the end-of-level text & buttons and the game over text & buttons.

The last layer is composed of the background, represented by the paths and the “grass” areas.

All the other items are in between them in terms of rendering. More specifically, we tried to create a feeling of depth and 3D by creating the sprites of the elements with a certain perspective and also by displaying the player in front or behind an object depending on its position relative to the object (see example below).

Player behind the tree

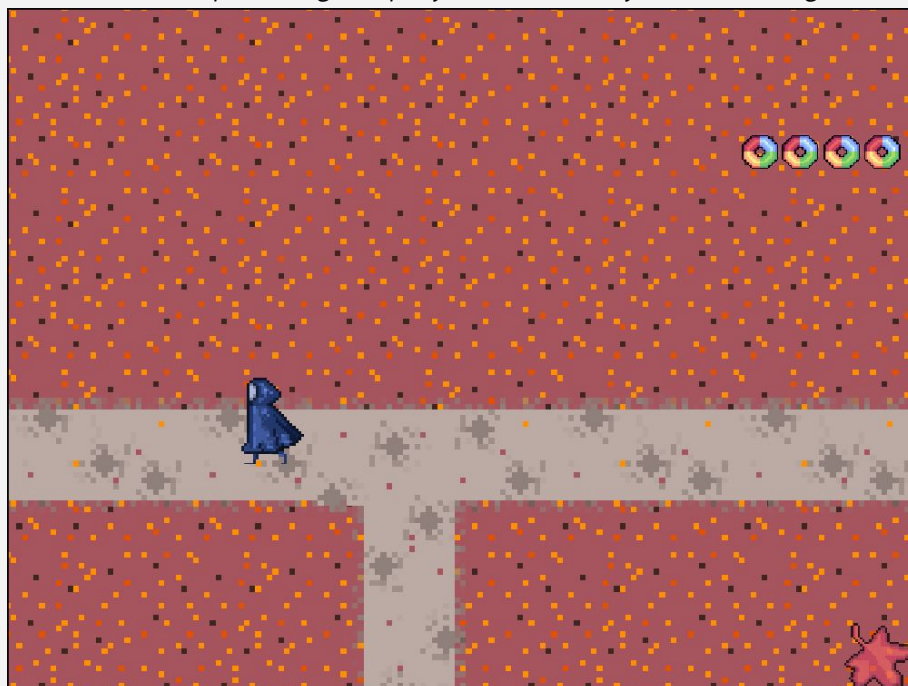
Player in front of the tree



Camera

The camera is centered on the player and tracks him as he moves. The camera also has a delay effect when tracking the player to create a more immersive experience (see picture below).

Camera following the player with a delay when moving



For that we used a Unity built-in library called Cinemachine that allows the setup of all these functionalities very easily.

Music

There is background music playing in both levels, which reflects the pixel art game style, which Christina made especially for our game.

Sound Effects

When the player changes between seasons, this is indicated by a "switching" sound⁴.

Artificial Intelligence

Enemy AI

Snakes

The snakes switch state between a simple patrol routine and a chase mode whenever the player is in sight.

Two patrol types have been implemented:

- "Ping-pong" patrol: used when the enemy goes back and forth between two places.
- "Circle" patrol: used when the enemy patrols in a circle shape, meaning that when the final destination has been reached, the enemy goes back to its starting position before redoing the patrol again

In level 2, one snake uses the "ping-pong" patrol and the other one the "circle" patrol.

The snake switches to chase mode whenever the player is in its sight angle and range, and no obstacles are in between them (obstacle = anything that is not a path). Its sight angle is set to 120°. If the player succeeds to get out of the snake's sight, then the snake keeps chasing the player for an additional 2 seconds. If within these 2 seconds, the player hasn't been within sight, then the snake drops the chase and resumes its patrol where he left it.

A third behavior for the snake is to hibernate whenever the season is set to winter. In that case, the snake drops its patrol (or chase) and goes straight to its nest where he sleeps. He then becomes totally harmless. If the season is changed again, then the snake resumes its patrol (doesn't chase the player again, unless the conditions for the chase are fulfilled).

⁴ Source for this sound: <https://freesound.org/people/GameAudio/sounds/220166/>

Death metal mini-boss

This enemy is more challenging than the snakes for the player since whenever it is triggered, it chases the player indefinitely until a certain condition is fulfilled. That means he doesn't have any sight range or angle and knows where the player is at any time.

In level 2, this enemy is blocked by an obstacle (wooden wall). Whenever this obstacle is destroyed, he starts chasing the player. The only way to get rid of him is to make the apple from the tree fall on the ground. In that case, he will stop chasing the player and will go for the apple. Whenever the apple is reached, he becomes totally harmless and drops the key to unlock the door of this level.

In other levels, this enemy type would be reused but the condition for him to stop chasing the player would be different every time.

Non-combat Characters

Bees

The bees are just "obstacles" that prevent the player from reaching an object. They do not kill you if you get close. For example in level 1, the bees are hovering over the pickaxe: the player cannot reach it while the bees are there.

The global mechanism for the bees would be to plant a flower in a jar, which would attract the bees on this flower and hence free the item they were guarding.

Support AI

Characters and Collision Detection

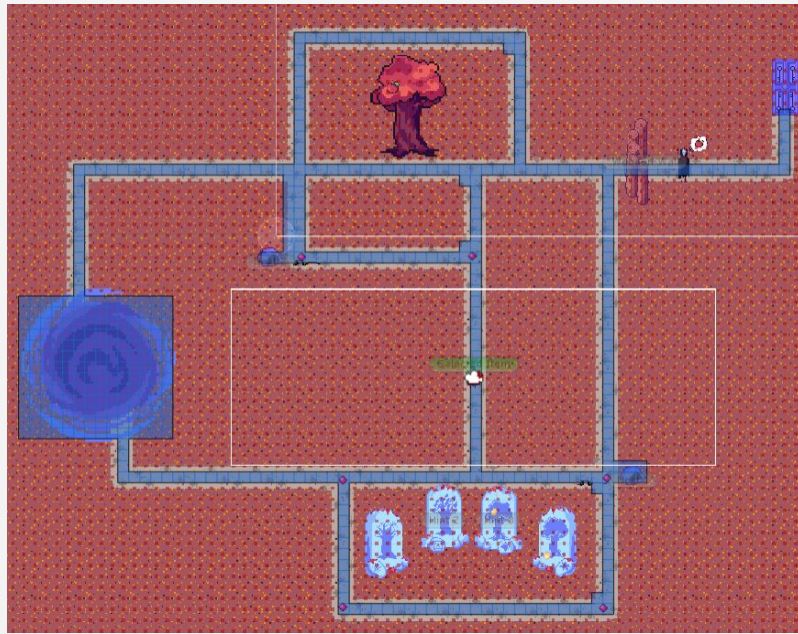
Every character and obstacle has a box collider. This acts as a collision detection and prevents any character from going through a wall for example.

Pathfinding

All enemy AI use a simple pathfinding method to reach their destination (whether it is the player or a waypoint for the patrol). For that, we use a library that provides us with all the basic pathfinding system, especially using A*.

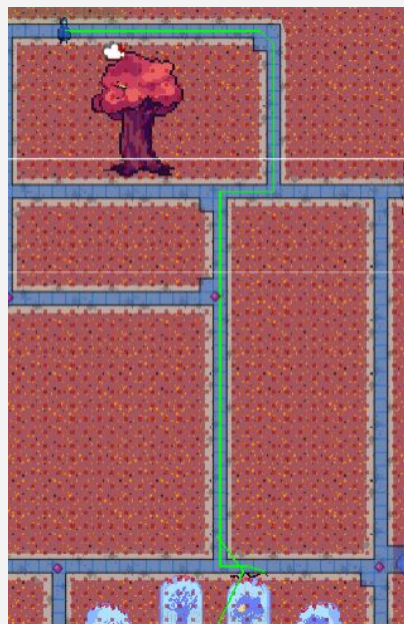
This library uses a grid that we have to place on top of our scene in Unity. We can adjust the size and the number of boxes that compose the grid. Then this grid "scans" the level and only highlights the boxes that do not collide with a list of items we selected (all the gameobjects with a layer "Obstacle" for example). The result only shows the area where the enemies that use pathfinding can go through (see picture).

Highlight of the "walkable" area for A Pathfinding*



The pathfinding system only uses this blue space to compute the shortest path to the destination (green line of the picture). The path is then updated at a certain interval we define in the code.

Display of the shortest path between the snake and the player



Technical Aspect

Target Hardware

We mainly target PCs (Windows, Mac, Linux) with a demo being provided on a web platform (our website). Due to how Unity works, it would be feasible to create a console version if that was to be desired.

Development hardware and software

Game developed with Unity 2020.1.13f1

Development procedures and standards

We used Unity Teams⁵ as version control instead of Git. The initial plan was to use Git but after receiving tips from the others in the class about using Unity Teams we decided on using that instead. Unity Teams was also made available to use via the Unity Student license. This was, in turn, made possible from the Github Student Developer Pack⁶.

Game Engine

Unity⁷

Scripting Language

The scripting language primarily used within Unity is C#. For the website we use HTML, Javascript and CSS.

Game Art

Concept Art

We initially just sketched what a potential character could look like. We took this sketch and translated it to pixel art and branched out from there.

⁵ Unity Teams, *Unity Technologies*, <https://unity.com/products/unity-teams>, retrieved 2020-12-08

⁶ GitHub Student Developer Pack, *Github* <https://education.github.com/pack>, retrieved 2020-12-08

⁷ Unity, *Unity Technologies*, <https://unity.com/>, retrieved 2020-12-08



Style Guides

The sprites were created with a [color palette](#) consisting of 32 colors, to ensure that they all matched and worked together to form a greater whole.



All of the sprites were drawn by hand.

Characters

For the enemies we wanted to create something which felt dark, yet adhered to the nature-theme that we had set for the world. We therefore kept the color scheme for the enemies to the darker shades of purple and blue from the palette and their shapes were inspired by nature - the final boss a skull with antlers and snakes.

Death Metal Mini-boss



Animation



Snakes And Their Nests

The snakes hibernate during winter, but we wanted their nests to be present no matter what season we were currently in. We opted to make the nests neutral, by simply sticking to the darker parts of the palette, so that they too were more readily associated with danger.



Animation



Bee

The bee is not an enemy in the sense that touching it would end in death, but more so an obstacle. To convey that it is less threatening, it was made to have a lighter color, with rounder shape.

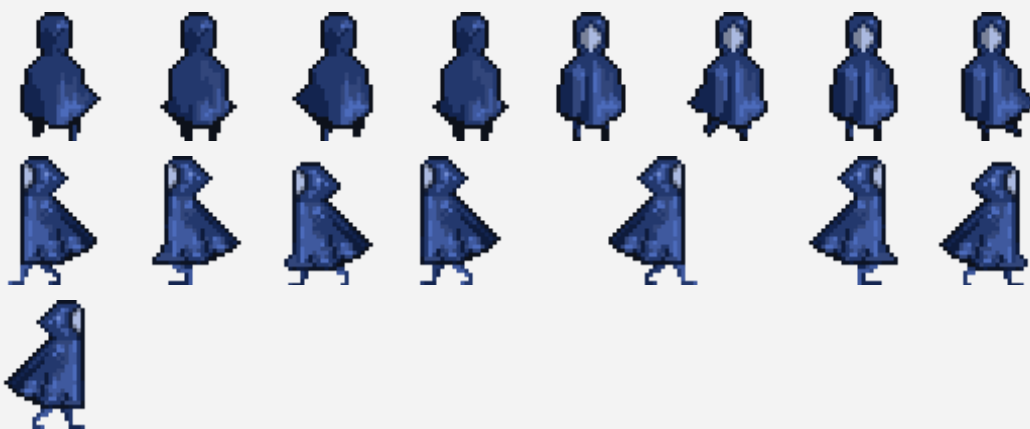


The Player

The player is embodied by a cloaked figure, with a triangular mask covering their face. The idea was to create a blank canvas for the person playing to project whatever they wanted onto this anonymous figure, inviting them to create their own idea of what this rather anonymous character could be.



Animation



Environments

The look of the environment is influenced to a big extent by the tiles that we created for each season (11 per season, 44 in total) , which also use the colors from the color palette:

Autumn:



Winter:



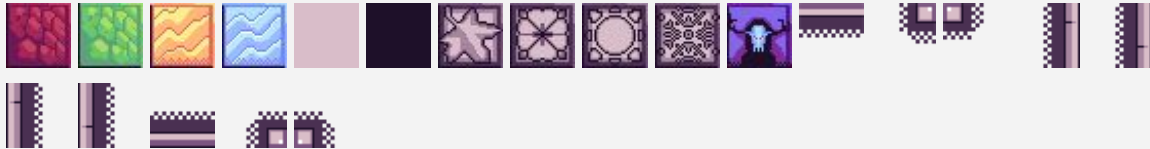
Spring:



Summer:



Challenge Room:

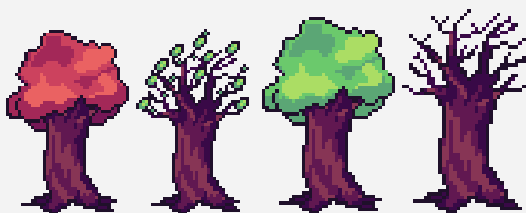


Miscellaneous

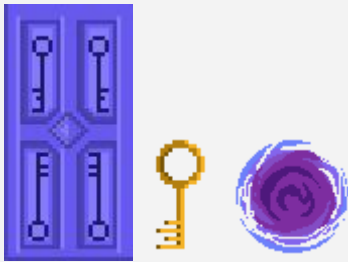
The Season Icons and Jump Counter



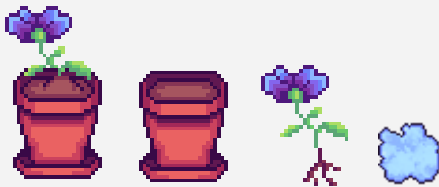
The Apple Tree



Door, Key and Portal

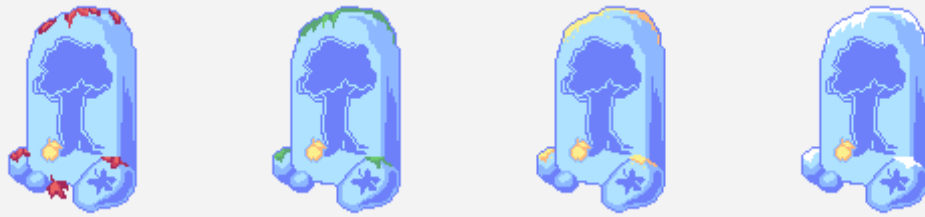


Flower, Flower Pot and Fog



Stones Describing Apple Tree Mechanic

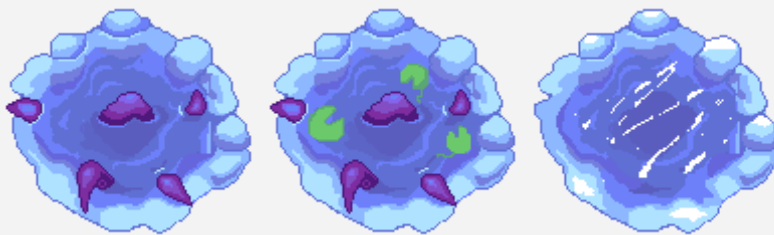




Ice wall



Lake



Libraries and dependencies

A* Pathfinding

This library provides all the scripts and support required to write your own pathfinding solution: <https://arongranberg.com/astar/>

We discovered it with this video: [2D PATHFINDING - Enemy AI in Unity - Brackeys](#)

Cinemachine

Cinemachine is a Unity built-in library that allows you to create a more sophisticated camera than the regular one. You can easily make it follow something, create some visual effects, create some cinematics etc. It can be found under Window > Package Manager in the Unity interface.

We discovered it with this video: [2D Camera in Unity \(Cinemachine Tutorial\) - Brackeys](#)

Secondary Software

Trello

We use Trello to organize the tasks for every week. We assign them to a specific label (Game Design, Programming, Website or GDD) and the person who has to fulfil the task. Usually, we define what needs to be done during the 3 to 5 meetings that we have every week.

Miro

Miro helps us to present, organize and combine our ideas online in an easy way. It played a very important role at a few stages during the Game Design process - during the ideation part but also when we were designing every level.

Photoshop

We used photoshop to create the pixel-art sprites for the characters, animations and items.

Pixilart

[Pixilart](#) is a very simple online software for creating pixel art. It was used for the creation of the tiles of every season.

Renoise

The background song was created with Renoise.

Management

Detailed Schedule

Scope: Nov 5th - Dec 15th ~ 7 weeks

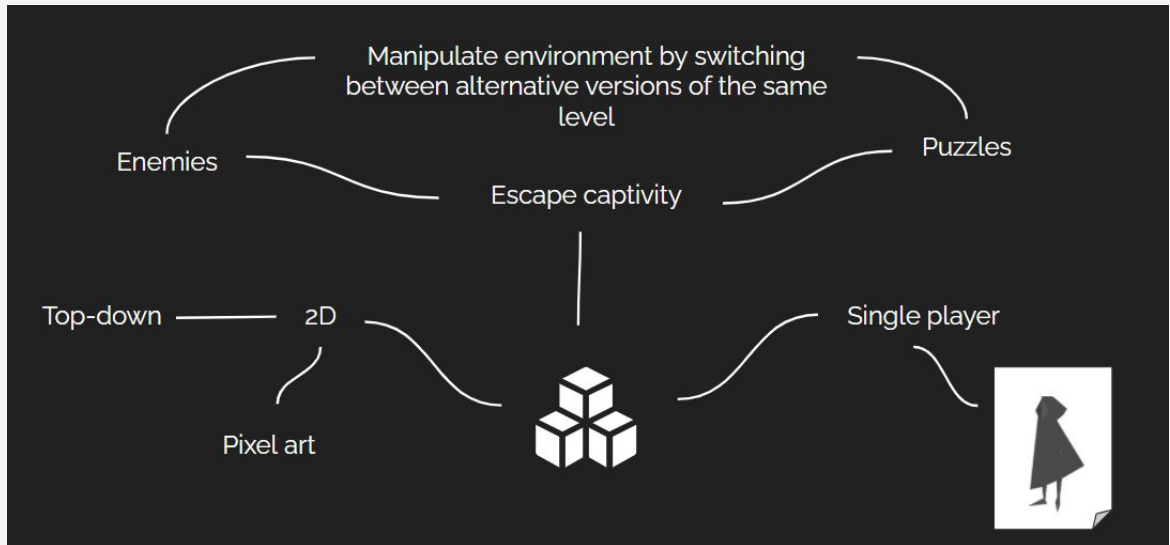
Our team meets between 3 to 5 times a week. During our meetings we discuss problems, take main design decisions together and plan what needs to be done next. Here is the approximate schedule we followed:

Week 1:

- Get to know each other
- Discuss the skills of each team member
- Share rough ideas about a possible game concept
- Draw inspiration from existing games

Week 2:

- Narrow down the game concept



- Combine different concept ideas to create our own unique game
- Find name for the game
- Concept design of 1st demo

Week 3:

- Split in two smaller teams (programming and design)
- Implementation of the demo

Week 4:

- Fix bugs of the demo
- Design and sketch the three levels that we want to present eventually

Week 5:

- Split work into smaller tasks for every team member:
 - Mechanics programming
 - AI programming
 - Pixel art creation (enemies, objects, tilemaps)

Week 6:

- Combining the work from Week 5 in order to build the two levels in Unity

Week 7:

- Fixing bugs

- Change the look of the UI
- Add sounds
- Polish the game
- Building final version
- Create website (<https://breachgame.github.io/#/>) and GDD

Business Plan

Applying the AARRR(Acquisition, Activation, Retention, Referral, Revenues) funnel as follow:

- Acquisition: publish the game in popular game communities
- Activation: Make great videos to introduce our game and encourage the users to make and share their own playing videos to attract other users
- Retention: Upgrade it with new levels to attract users come back
- Referral: Encourage the users to share the game to their friends to get a new level as DLC
- Revenues: Users pay when they want to buy this game to play (B2P)

There are several models to make profits in games: Buy to Play (B2P); Pay to Play (P2P); Free to Play (F2P) & Item mall (in-app purchase).

The F2P model is widely used in the mobile platform of puzzle games. However, considering the features of our game, the interaction ways, and the art style, we decided to focus on the PC platform and we chose the Buy-to-play as our business model.

Test Plan

We did not conduct any proper test sessions due to time constraints. However we still managed to make some of our relatives playtest our game during development. These playtesting sessions allowed us to spot some inconsistencies in the sprites and game logic.

Despite the few points to improve indicated by our testers, we did not have time to correct/change everything.

Some of the problems included confusing graphics, problems with the UI (for example having to use both the keyboard and the mouse when changing the season) as well as lack of implemented initial directions of the goal of the game.