



Game Design Document

DH2650 - Computer Game Design

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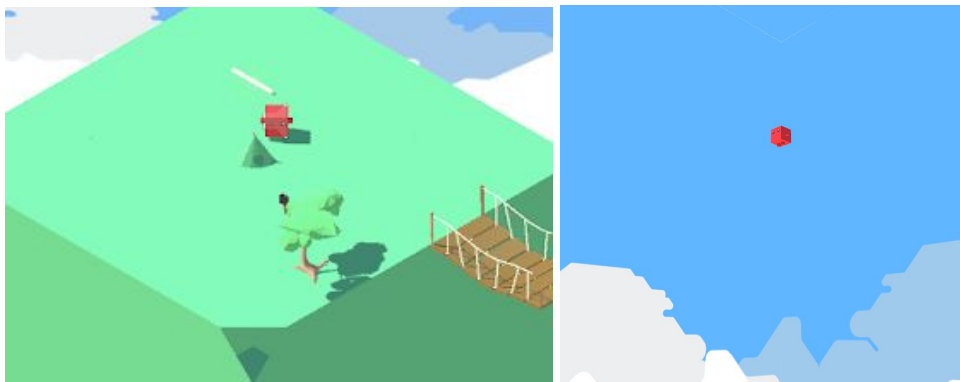
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1. Design History

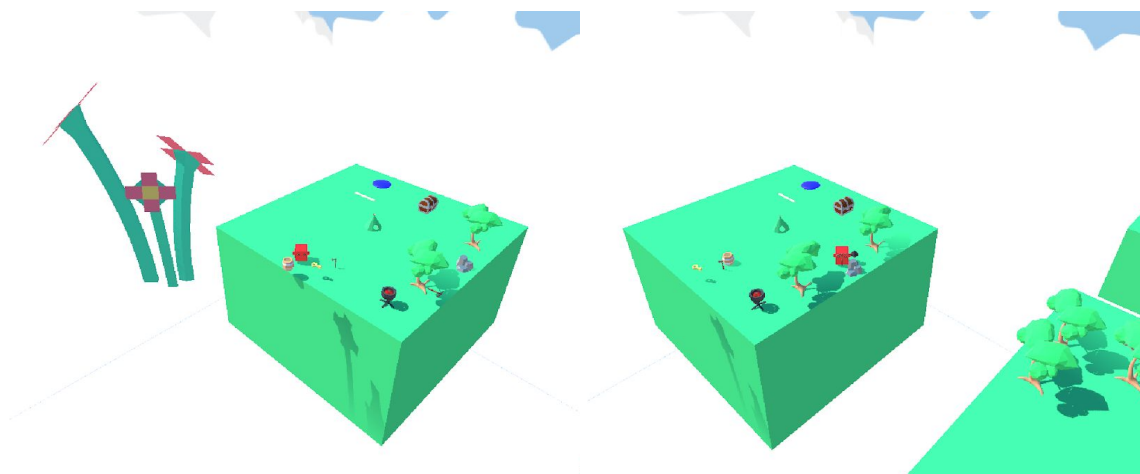
1.1 Version 1

In the first version of the game we designed an easy interaction just to get the touch and feel of the game. A tree, an axe and a rope were placed out on a biome (later, the home biome) in order for the player to build a bridge over to a second biome. However, due to a bug, the players of the first demo found out that by repetitive jumping, you could fly over to the surrounding biomes. Since our test players liked it, and it had the feel we were striving for in the game. We decided to keep the flying ability.



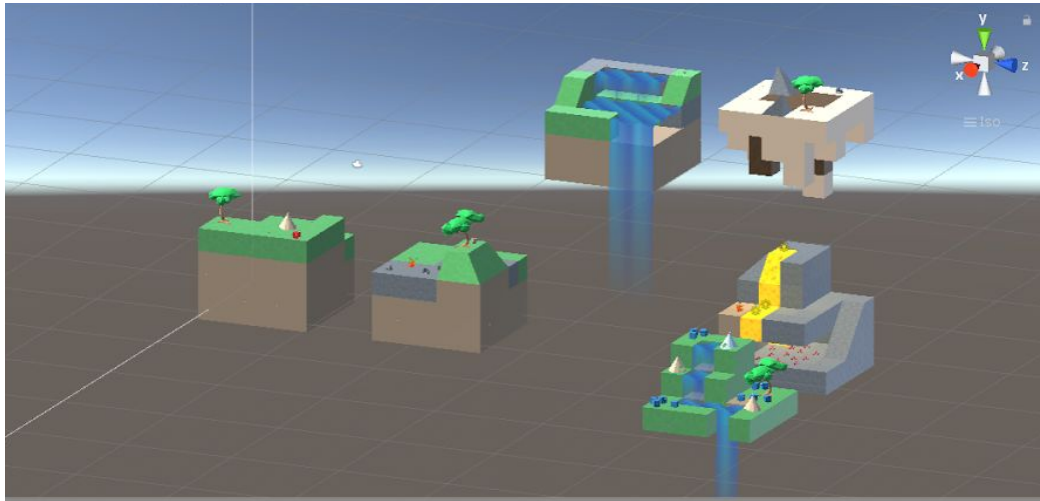
1.2 Version 2

For the second demo we added more types of interactions and crafting. Here the player had to solve one puzzle at each biome to spawn a “bridge” to the next one. Some of the “bridges” is the rope bridge from the last demo, a growing flower and a ladder. We also added a narrator who is mocking the player, and gives feedback on different interactions.



1.3 Final version

The final version of the game consisted of six biomes, “bridges” between them and puzzles to be solved on all biomes. We added several block elements and sounds to the game to make it more immersive. With the help of a storyline we could extend the parts of narration and give the Cubanoid the task to find his friends and family on the last biome.



2. Game Overview

2.1 Game Concept

The game is built up of several biomes, i.e. cubic floating islands, where every biome has a puzzle. Each puzzle should include crafting of some sort, or creation of a path of some sort to progress onto the next biome. On the final biome the player will eventually find their friends and family, and the demo ends there.

2.2 Defining factors

1. Soothing and slow pace with tranquil scenes and sounds
2. Problem-solving, puzzle-oriented and limited resource management
3. Storyline
4. Catered towards player with little or no gaming experience

2.3 Genre

Explorative, adventure puzzle game for console.

2.4 Target Audience

The audience targeted for this game is not the typical gamer, but rather beginners or gamers looking for a different experience. People looking for a calm and soothing game to relax to is the targeted audience, to put it down into one sentence.

2.5 Game Flow Summary

The player need to solve a puzzle on every biome to get a route to the next biome, where he/she will find new puzzles to solve.

2.6 Look and feel

Open-air with low poly objects and soaring islands based on a cubical model. The idea is to give the feeling of a open-world where exploration is required to progress.

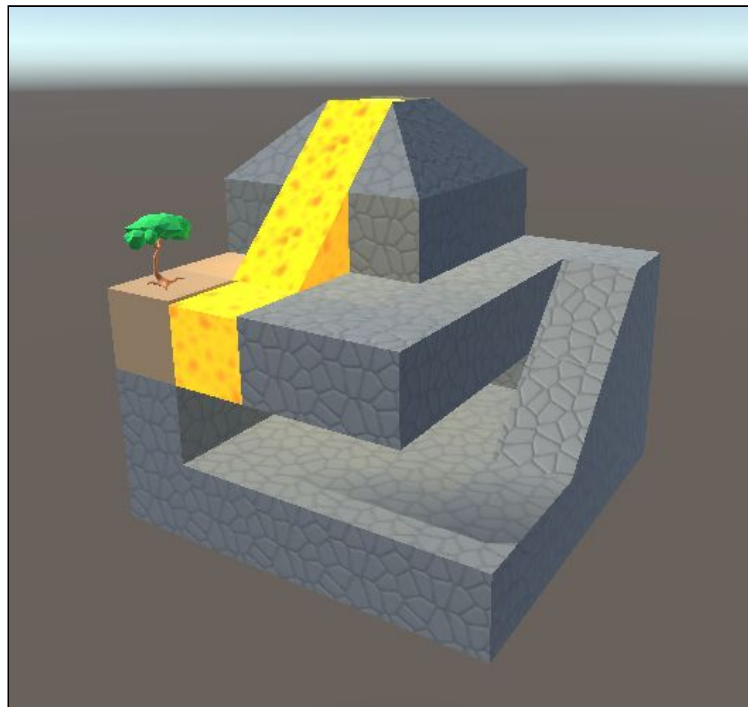
2.7 Project scope

2.7.1 Number of available biomes

There are six pre-made islands in the current game state with items to be interacted with. They are themed as follows:

- Plain, where the player spawns
- Hills
- River and waterfalls
- Desert and quicksand
- Volcano
- Village with river

Another one is used only as background content to fill up the world. There is also a randomly generated forest biome, but it hasn't been updated with the last updates and there isn't any items to interact with. However, the biomes in the background are real biomes. Therefore, the player could go there if he/she wanted to. This is also something that adds to our open-world feeling.



The volcano biome

2.7.2 Number of puzzles

Each biome contains one puzzle except for the final biome, making it 5 puzzles. Some puzzles are multi level so you have to combine and craft several objects before making the path to the next biome, while some you don't have to craft at all. For some of the biomes you need to retrieve objects from previous biomes to solve the current one.

2.7.3 Number of items

In total we have eighteen number of items that can be used for creating puzzles in the world. These consist of;

- axe
- fire
- flower
- friends
- key
- ladder
- metal
- mushrooms
- nails
- pickaxe
- plank
- plankbridge
- rope
- stone
- tent
- treasure chest
- tree
- watering pot.

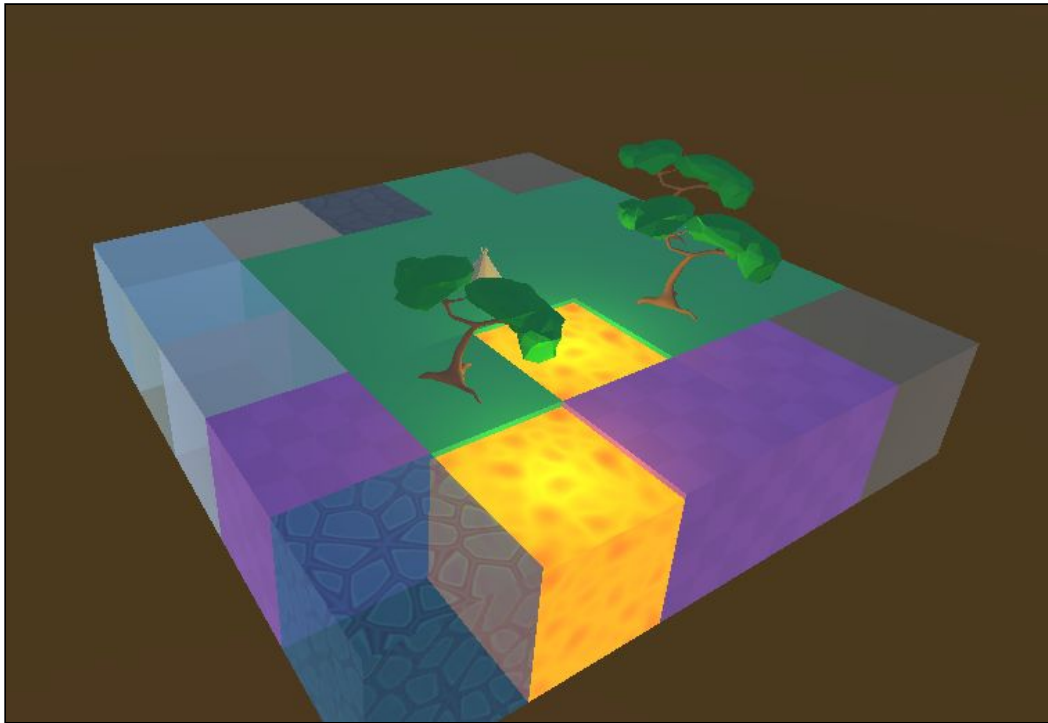
2.7.4 Number of blocks

The number of available blocks is based upon a combination of two factors: the number of available types, and the number of available shapes. Indeed, one block in the

world is either just a shape (a prefab in Unity's vocabulary) like water, lava or quicksand, or a shape combined with a type (a material in Unity) like a grass block, a stone block or a sand slope. This system avoid having to create one block for each possible combination, effectively reducing loading time and the number of assets. It also allows customisation of blocks like the tent to give it different styles depending on the biome it is found into, eg. a ice tent in toundra or a sandstone tent in the desert. Here is the current list:

Types	Shapes
Missing Dirt Grass Stone Sand Snow Ice Cloud Quicksand Water Lava	Cube Slope SlopeAngle Tree Tent Lava River Quicksand Waterfall

Some of them are listed twice, like lava. That way, there is one full shape for lava that produces light and one simple texture to apply on other shapes like the slopes. Same goes for quicksand, where the shape is a normal block that let the player goes through while being slowed down. Finally, this is a picture featuring most of the types listed and some shapes:



3. Gameplay and Mechanics

3.1 Gameplay

3.1.1 Game progressions

The player will start on, what we call the home biome, where it has its tent, and some tools to begin crafting. It will start with instructions from the narrator to find paths between the biomes, to connect to, and lastly find it's family. For every puzzle the player solves, it can build a "bridge" to get to the next biome.

3.1.2 Objectives

Solve the puzzles on every biome to get to the last biome and finish the demo.

3.2 Mechanics

3.2.2 Movement

3.2.2.1 General Movement

The main movement of the player is done by translating the transform component of the player in world space. The rigidbody component, used by Unity physics engine, is not properly used in that case because it leads to strange stuttering while moving. As such, the

velocity property of the player cannot be used and has led to some struggle, for example the player going down a slope cannot slow down easily. This should be fixed in future versions or at least a workaround should be found.

3.2.2.2 Other movement

Items are physically enabled and will keep moving or rolling by themselves if an initial push is given to them. This can be dangerous as the player could drop or push a mandatory item for the story into the void and won't be able to continue playing. At the same time, not letting objects move can feel like the world is too static - which is already the case if there's no water on screen.

3.2.3 Items

3.2.3.1 Picking up items

The player has a four-space inventory where he/she can place items and use them later. He/she can also hold one object in the character's hands. This is especially useful for tools such as the axe or the pickaxe, avoiding the need to put one in each biome where they are needed. Pressing the pick-up-item button with an object already in hand will make it drop instead. As said in the previous section 3.2.2.2 Other movement, the player should be careful not to drop items into the void as it could prevent any further progression. This obviously is an issue that should be solved before shipping the game, as it could lead to an unstable frustration and goes against our goal of having a relaxing game.

3.2.3.2 Moving items

The player can move items by picking them up at one place, and then releasing them in another place.

3.2.4 Biomes

3.2.4.1 Generation

The biomes were, for the purpose of this project, manually edited. However, we believe that it could be very engaging to have an auto-generated world. That obviously creates a whole new set of problematics regarding level (biome) complexity, reliability and how engaging it is.

3.2.4.2 Features

This is where the player has to solve riddles in order to progress.

3.2.4.3 Block element

Some blocks allow different levels of interaction. For example, the quicksand block let the player slowly go through it only if he doesn't move. Same goes for the water, at a different speed. Items like the watering pot can also interact with blocks like the water, filling

it up. Other interactions like these are planned such as giving incentives to avoid the lava, with particle effects and, character reaction or instructions from the narrator when discovering a new block.

3.2.5 Actions

3.2.5.1 Switches and buttons

Every item can have a customisable script that dictates it's behaviour when the player decides to interact with it. This way, creative and unique actions can happen between the player and the game objects, or even between object themselves. You could even imagine a cascading interaction chain that serves to make the player progress further.

3.2.5.2 Picking up, Carrying, Dropping and Building

The player can only carry four items in the inventory, and one in its hands. The player can pick up, and drop the items that it's holding in its hands. It also needs to hold the objects it wants to interact with in its hands, and standing close to the object the player want to combine with. There are two types of combinations, crafting and interacting. For example, chopping a tree with an axe is crafting, since you are using up the elements you are combining. While watering a flower is interacting, since all of the elements remains after a combination.

3.2.5.3 Moving and flying

The player can walk across the biomes and bridges, as well as jump up on higher levels. If jumping several times in a row, the player enables flying across the biomes. However there is a limit to jumping as means to flying. The player cannot fly to high, neither to low. When trying to fly to high, the player will stop progressing in the upwards direction when a hard limit is reached. And when flying to low (or falling) the player will respawn on it's home biome.

3.3 Game options

3.3.1 Saving

Each biome is already capable of being saved as it is a part of the biome editor detailed below. Thus, saving the whole world is easy and just a combination of multiple biomes. The game allows the player to have multiple saves to keep track of his progress in multiple worlds, trying out different possibilities with the randomness.

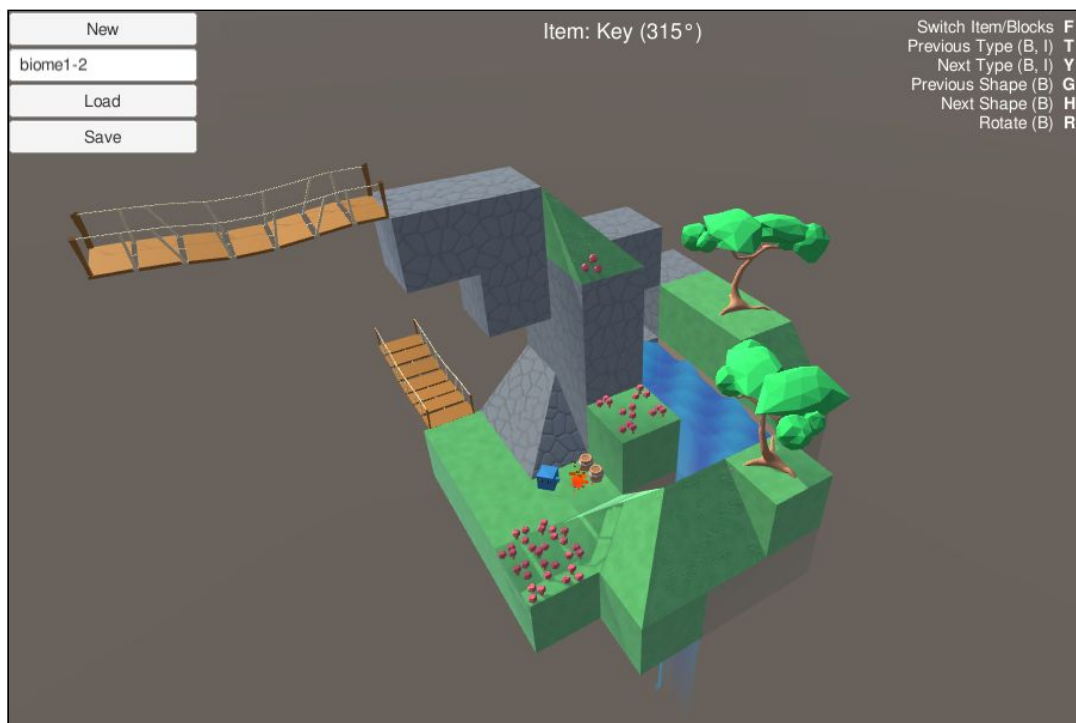
Technically, the saves are stored as binary files. They contains each biome, storing type, coordinates, blocks and items. Each block is saved using its type, its shape and its coordinates. Each item is saved using its type and its coordinates.

Saving the narrator state is still in the works but we obviously don't want to have all the story re-told to the player each time he loads the game.

3.3.2 Level editor

Currently, a biome editor is available inside Unity (not in the build game). It allows to pick blocks types and shapes, combine them and place them wherever wanted in the world, as long as it is respecting the biome coordinates system. The items can be placed more freely by clicking where wanted. A preview system allows you to see where the item or block you're placing is going to be.

In the future, we would like this editor to have more features to enable the editing of more parts of the game: crafting recipes, narrator triggers, etc... It would enable a really fast creation of stories and worlds while separating it from the creation of the game engine itself. It could also be given to the players for them to create their own stories and worlds.



The biome editor in its current version

4 Story, Setting and Character

4.1 Story and narrative

4.1.1 Backstory

The game is about a character who lives in a parallel dimension to ours. A world where gravity is working in different ways and things look different than our world. The main character is a Cubanoid (a creature made up of cubes), it lives in a tent on a peaceful flying island. Its island is fruitful with many different climates: water and rivers; sand and earth; trees and fruits, etc. Life in the world of flying islands is peaceful. One day, the Cubanoid

wakes up and realizes that its island have been split into many pieces. A voice talks to it in a sarcastic and mocking way, telling it that its former home has indeed been split into pieces. The voice tells it that its island is just a small part of what it once was. In the Cubanoid despair, it realizes that its friends, family and properties have been spread out on different parts of the once big island. Where are its properties? Where are its friends? The god-like voice tells him that they are alive on another flying island and that he can get there if he manages to build his way across the islands that are in between. The Cubanoid embarks upon a journey to find its friends and family, the only weapon it brings with it is its innovative curiosity.

The journey begins with the Cubanoid examining its island (biome) for materials that it can build something to get to another biome. It finds an axe and starts chopping wood from a nearby tree. It also finds some rope and in a short time, the Cubanoid have built a bridge to another biome.

On the second biome, it finds some of its best friends stuff. It recognizes the trees as well, this was its best friend's home. By chopping more wood, it realizes that it can combine some nails that are laying around into a ladder. In this way, the Cubanoid can climb up to another biome that is soaring just above it.

On this third biome, the climate is somewhat different. There are rivers and waterfalls that makes it harder to get around. There aren't any stuff laying around either - how is it going to make anything here that can take it further? After going back to the previous biome, the Cubanoid brings with it a bucket and fills it with the water from the new biome. It waters some flowers that are growing next to it, and all of a sudden, the flowers grows and grows, building a bridge over to a new biome! Lucky, the Cubanoid thinks to itself. The god-like voice laughs at it and says "Well aren't you lucky? Who could have thought that some flowers would take you to the next island - you sure are a clever little cube."

On the fourth island, the Cubanoid encounters new problems: there are quicksand that looks life-threatening. And there are no stuff laying around, what should the Cubanoid do? After a while, the Cubanoid accidentally gets stuck in the sand and is being drawn down by the force of the quicksand. In its panic it cannot move and is slowly being drawn down to meet the end. But then, something strange happens - the Cubanoid sinks through the island and falls down to another one. Now it realizes that this was the best that could happen - it managed to progress through the track of islands accidentally.

And now to the best part, it hears familiar voices from the island next to it. There they are, its friends and family are waving at it from the next island. The Cubanoid has almost made it. One last challenge left. The island it is standing on is made up of lava and underneath there is a cave with mushrooms. How should the Cubanoid manage to build something here? It picks up the mushrooms and takes them to the fire, at least it might be edible and might even taste good once it is grilled. But then all of a sudden the mushroom starts bubbling and slowly turning into a bridge over to the final island. It was a magic mushroom! The Cubanoid runs over the bridge and sees all of his friends and family gathered, where they all cheer on him and our game has finally reached its happy ending.

4.2 Game world

4.2.1 General Look and Feel

Very flat, the design is supposed to feel very simple with our use of 'Low-Poly' assets. The abstract and cartoonish design of the main character is conducive to create an affective link with the player.

4.2.2 Biomes

Simple, complex or chaotic, each biome type has its own vibe and purpose. Many different designs can be imagined, from the deepest dungeon types to a heavenly cloud platform.

4.2.3 Items

Several items are provided for crafting and solving puzzles. They are all low poly and with simple design and limited number of colors for the simplicity.

4.2.4 Animations

The game only have few animations. A water animation for the calming sense of the world, a flower animation making the flower grow, and blinking animations on the player character.

4.3 Characters

4.3.1 Player character

The playable character is a Cubanoid whose world has been split into pieces. His mission is to build bridges between all of the biomes that are split over the world to find his friends and family.

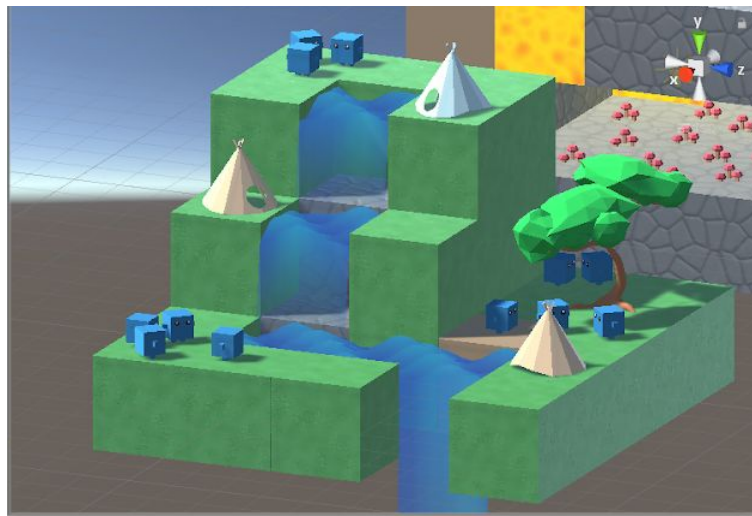


4.3.2 Narrator

In the world there is a god-like character guiding the player. Maybe he is the reason that the world has been split up. He gives the Cubanoid hints, but also mocks him on his journey.

4.3.3 Friends and family

On the last biome in the demo there are several Cubanoids, friends and family, gathered. They look exactly as the player but instead of a red color, they are blue.



5 Interface

5.1 Visual System

5.1.1 HUD

For the purpose of the aesthetics, we have chosen to decrease the amount of HUD so that the player only sees the world and the player with as little information as possible. It is, however, possible to press a button to see what items the player is currently carrying. The reason for this is that the player needs to interact with the items it is carrying so therefore it was necessary.

5.1.2 Menu

Regarding the menus, we have two different menus in the game. One is the start menu and the other is the pause menu that is displayed when the player presses the start-button. The start menu, or main menu, is the first thing the player sees when he/she starts the game. It is composed out of three main UI-buttons: new game, load game and settings (see Figure 1).



Figure 1. Main menu



Figure 2. Pause menu

5.2 Control System

The player has control over the game, which means the game won't be doing anything without any player input, as least as it is now. It's not excluded that, in the future, an artificial intelligence could be triggering events such as other entities moving by themselves around biomes or blocks interacting with each other naturally - for example water and lava touching each other and forming stones.

The number of different inputs is intentionally kept low to improve the relaxing aspect: no complex combos to learn, no time spent on configuring the inputs, just playing. These are the controls currently available on a standard Xbox controller:

- A : Jump
- X : Grab or release an object
- Y : Interact with another item, like using an axe on a tree
- B : Craft
- Left and Right bumpers : Rotate the camera by 90 degrees
- Start : Open inventory / Pause menu
- Left joystick : Move

5.3 Audio

5.3.1 Music

To provide an immersive game experience, we decided to have both ambient sounds and music that goes well together with the overall game. The importance of background music in video games is very importance, as described in "The Influence of Background Music of Video Games on Immersion", where the authors describe it as "[i]t can not only provide an audio complement to action on the screen but also help create a sense of a real physical space" (Xiaoqing Fu, J.Z. 2015). This was something that we tried to implement to

provide this sense of immersion. By looking into different sounds that fitted the aesthetics of the game, we could find a few elements that helped us in our decision. First of all, the graphics is low poly and its set in a world that is not exactly like our real world: the main character is a cube and the world is made up of flying islands, therefore we could take some creative decisions of how the overall feeling should be. When it comes to the ambient sounds, we decided on having it somewhat real however: the sound of water, wind, trees, fire cracking, chopping down a tree, etc. where all made up of real sounds. The music, however, was made up of one synthesizer that played a loop of X seconds. The sounds were made with a OP-1 synthesizer from Teenage Engineering, which is known for its bank of “fun” sounds, meaning that the sounds are to a large extent made from FM synthesis and provide sounds that are largely similar to historic games with fewer bits. This music loop was, according to the people that answered a survey during one of our game tests, a good fit for the game (see Figure 2).

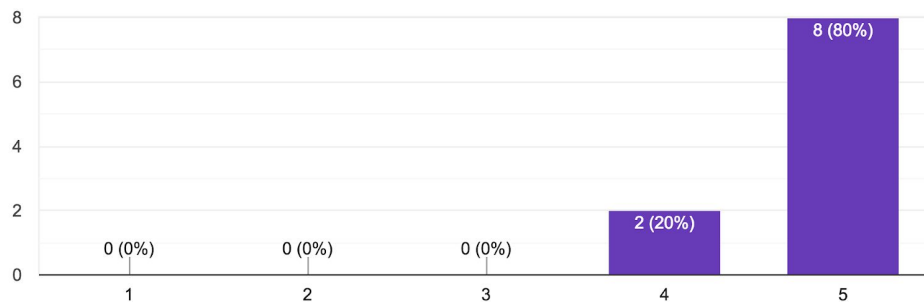


Figure 2. Survey responses, “Does the music fit the game?”

5.3.2 Sound Effects

In regards to the sound effects, we decided to have a loop of ambient nature sounds in the background that always plays. This sound loop was made up of birds singing, wind and miscellaneous nature sounds from trees and animals. The rest of the sound effects was mostly made up of interactions from the character. The different effects we had was when the player interacted with:

1. Picking up items (Axe, pickaxe, nails, water bucket, mushrooms, metal)
2. Combining items or elements (Chopping wood, mining metal)
3. Crafting new items (Bridge, ladder, nails, flower)
4. In the proximity of certain items or elements (pouring water, crackling fire)

The sounds was important in our game because of the overall experience of getting feedback from actions. As described in “Heuristics and Usability Guidelines for the Creation and Evaluation of Fun in Video Games”, one of the main heuristics is to “use visual and audio effects to arouse interest”, which is something that we took seriously throughout the process (Federoff, M. a 2002).

The next sound was the footsteps, which we made with just a voice, tapping the sound, basically. What makes the footsteps sounds interesting was when we added randomized volume and pitch, so that they become more organic within the overall game experience.

6 Technical

6.1 Target Hardware

We are aiming to release the game primarily on Nintendo Switch. As we're using Unity, the game could and should be easily portable to other console systems as well. Because the game is tested on PC during the first phases of production, the game will naturally also be available on this platform.

6.2 Development Hardware and Software

The development of the game is made on computers equipped with graphical capabilities, whether using integrated chipsets or dedicated graphics card. Both Windows and MacOSX are used by members of the team.

The following software is being used:

- Unity
- Illustrator
- Blender

6.3 Development Procedures and Standards

We are following a agile-style kind of process. Approximately every week we meet to decide on the goals of the next sprint and report the task that weren't done. This is done by using different organizational tools such as Trello for task tracking, Slack for team communication and GitHub for code sharing and issue tracking.

We are also following C# and Unity's coding practices: classes, enums, methods and properties should be in PascalCase while attributes and variables should be in camelCase.

6.4 Game Engine

Unity is used as the game engine platform. With it comes a tremendous amount of features and many more can be added through the official package manager or the asset store. We're notably using the TextMeshPro official package.

6.5 Scripting Language

C# is Unity's default and only officially available language. We're using C# 4.

7 Game Art

7.1 Concept Art

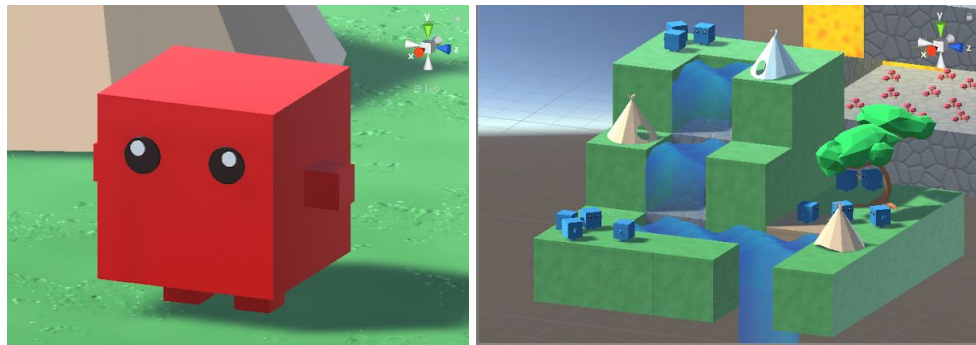
The concept of art style used in this project is simple, yet earthy. We have used only a limited number of colors and sets of textures on all objects and biomes.

7.2 Style Guides

The font used in the logo, as well as in the manus in the game is Dutch & Harley. Furthermore, the overall style is made up of low-poly graphics. This is because we wanted to build a polished world where colors and shapes are “simple” and easy to understand. This was important for us to realize the soothing and meditative part of our game.

7.3 Characters

The characters are the player and the friends and family that he seeks.



What we tried to focus on with the character is to make it look “cute” and somewhat likeable. We therefore made animations for making our character blink its eyes and wag its arms. Sometime during the process, we decided that our character would be a Cube, and not a humanoid. This provided us with more artistic freedom as the entire world could be set in a different universe, basically.

8 Business Plan

8.1 Target Group

The audience targeted for this game is the typical player of the Nintendo Switch. Since we want to release our game to the Nintendo Switch for starters, we consider our main target group to be the classic Nintendo player. Nintendo have gone through many changes during its lifetime and different consoles. It has all ended up with Nintendo having a rather varied playing group where different ages, different lifestyles, etc. are not deciding factors. Thus, we think that our game can reach out to a big audience as well. The main idea is to provide a game for beginner players, and not the average triple-A-player. Because of this, we think that the game could partly be suitable for kids, or for players who are not accustomed to any specific type of game.

8.2 Market Analysis

Since the target group of this game is beginner gamers, people of a wide age variance and people looking for a calm and soothing game, the marketing will be done almost entirely on delivering a calm and soothing feeling with promises of beautiful scenery. This can be done via many different kinds of channels: through video commercials on TV or Instagram to posters in the subway etc. This would, however only be possible if we do not consider the money-factor. If we consider this, and the fact that this is an indie-game with the lowest budget, we would have to rely on word-of-mouth and try to spread the news of the game ourselves. This is easier today than before the use of social media, however, it comes with some risks as well. For example, we could write about it on social media channels such as facebook, instagram, twitter, etc. and hope that the spreadability of the material would be sufficient.

8.2.1 SWOT Analysis

Table 1. SWOT-Analysis.

Strengths:	Weaknesses:
<hr/> Soothing feel/vibe in the game Multi-dimensional (working with dimensions in an original way) Scalable (new context and smart ways of including items, etc. will make it scalable very easily)	<hr/> Unclear objectives in the game Too repetitive Budget-game (developed by students - there will be bugs)

Opportunities:	Threats:
Scalable Could be online and a community could arise from it Easy interactions could provide multi-platform accessibility Could reach non-traditional target groups by looking into exploration game play and easy interactions	Low-poly trend (could be obsolete soon)? Too conceptual, players might get annoyed Lack of understanding - our target group might not be reached due to their unwillingness to play Might feel pointless

8.2.2 Market size

As of september 2018 there are 22.9 million Nintendo switches sold on the global market (Statista, 2018). This is, however, not *our* market size, just because it belongs to Nintendo, but there are the potential of these players getting the news about our game, which in turn grants the potential for customers.

8.3 Risk Analysis

Here is a risk analysis that was conducted in the beginning of the project;

- Not enough time to finish
 - Limit the things we need to have, and leave room to extend the game.
- One or more group members don't contribute what they have promised to
 - Make sure that everyone knows what is expected from them in terms of time and deliverables.
 - Allow people to freely ask for help when needed and encourage to ask for it.
 - Have clear goals and deadlines within the group.
- Different opinions within the project
 - Always try to have a discussion of what is the best.
 - Then have vootings.
 - And if nothing else works, turn to the project leader or the course leader.
- Access of controllers for the console
 - Make sure to make the game playable with mouse and keyboard as well.

8.4 Development Team



Julien Rouault



Axel Soll



Dui Ardal



Kasper
Karlgrén



Petra Olsson

8.5 Financial Plan

Our financial plan will be based upon number of sales. Our idea is that the game will be a one-purchase-get-all kind of game. Therefore, we will be somewhat vulnerable due to the fact that revenues will come from other sources. Other options for us, would be to consider microtransactions where the player can purchase items, power-ups, etc. to scale the gaming experience; we could put up payment walls where the player only can do *so* much before he/she hits a wall; we could divide our game into tracks and the player can purchase new tracks. There are many options for financing the game and ourselves, but we all concluded that it would be somewhat hypocritical if we were to use any of these methods. The explanation as to why is because one of our main goals with this game is to provide the player with a somewhat meditative, soothing gaming experience, where the player can immerse him-/herself in the game completely with the graphics, gameplay and music. This package that we want to provide is not something that would be suited for microtransactions or payment walls, but rather a on-time payment.

8.5.1 Budget

This budget is calculated in consideration of taking the game to the market. The budget will then be used to make an estimation of how much income the game must have for the justification of the development team deciding to proceed with it.

Description	Cost Calculation	Total Cost (\$)	Motivation
Salary	$2800 * 3 * 0,5 * 5$	21 000	The salary for the development team working part time for 6 months
Nintendo Developer Kit (Nintendo Today, 2017)	450	450	The fee for retrieving and Nintendo developer kit for publishing on switch
Total		21 450	

8.5.1.1 Revenue forecast

The revenue forecast below will be over a 3-year period with three different assumptions to showcase on different possible outcomes depending on how successful the game will be. The different forecast are Optimistic, Realistic and Conservative assumptions. The result is a wide range of possible revenues, this due to the uncertainty of the market and whether the game could go viral or not.

We decided to price the game at 20.0\$ per unit after looking up on successful indie games on the switch platform (Business Insider Nordic, 2018).

Assumptions	Year 1 Sales	Year 2 Sales	Year 3 sales	Total Revenue (20.0\$ per unit)
Optimistic	5 000	3 000	2 000	200 000
Realistic	3 000	1 000	1 000	100 000
Conservative	1 000	500	500	40 000

9. References

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