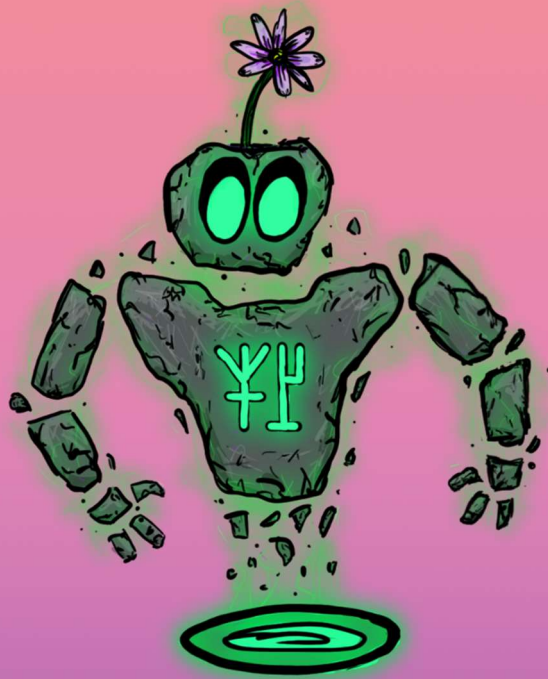# Glyf

Game Design Document

by Rewrite Games

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1.Introduction

Glyf is being created as part of our final year Major Project for our BA in Games Design. In this document, we will discuss the various aspects of our game in terms of design, narrative, art, audio and technical elements. We will also discuss the main elements of gameplay along with the intended marketing techniques.
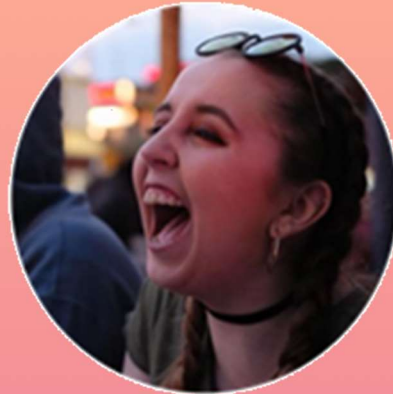
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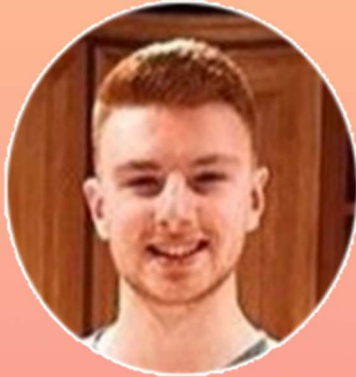Undergraduate Study

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2. Design

High Concept

Elevator Pitch: Glyf is a cinematic narrative game about discovering the harrowing past of a long-forgotten world. Overcome environmental puzzles as you ascend an ancient and mysterious mountain.

Player motivation: Discover the world's ancient past and solve puzzles that help you ascend the mysterious mountain.

Genre: Narrative game with an emphasis on cinematic storytelling with puzzle elements.

Target Audience: People that like narrative-driven games with puzzle elements such as *What Remains of Edith Finch*, *Journey* and *Inside.*

Unique Selling Point: Cinematic storytelling in a narrative puzzle game.

Summary Overview

In a quiet, abandoned world we meet our protagonist Glyf whose journey of discovery leads him toward the summit of a nearby looming mountain. Through a series of trials and tribulations, Glyf overcomes environmental challenges while escaping a mysterious force in search of his purpose and past.

Pillars

Discovery - Slowly revealing the world around you and your place in it as you progress through the game.

Interactive environment – The world around you reacts to your presence. Any interactive objects shouldn't feel out of place.

Cinematic experience –Every scene in the game will have carefully constructed framing, composition and lighting.

Key Features

Cinematic shots – As mentioned above, a key element of this game is putting careful thought into the framing and composition of every scene. The goals will be to tell the story through the environment, invoke emotions and convey information clearly to the player.

Environmental Storytelling – There will be no dialogue in the game. This means the history of the world and the motivation for ascending the mountain has to be conveyed entirely through the environment.

Interactive World – The world responds to the player's presence. As the player moves through the world, the environment will change and adapt to create an immersive experience.

Player Experience

There will be an emphasis on immersing the player in *Glyf*. All puzzles, challenges and their components will fit seamlessly into the world. As the game goes on, the motivation for climbing the mountain will increase as the player learns about its history and their place in it. This will also be enforced by the character of Abaddon who is trying to stop them, which will spur them on.

The player will feel like they influence this world. This will be done by the reactive environment e.g. grass parts and fireflies fly out as he moves through it. The game will evoke curiosity from the player as to how the world came to be like this. It will be slowly revealed to the player through indirect means which will fulfil players curiosity.

Design Inspirations

Figure 1 Journey

The way in which *Journey's* story unravels through the world and the pacing in which these clues are found by the player are both important design inspirations for our game. As there is no spoken dialogue in the game, *Journey* is a key inspiration on how to utilise environmental storytelling.
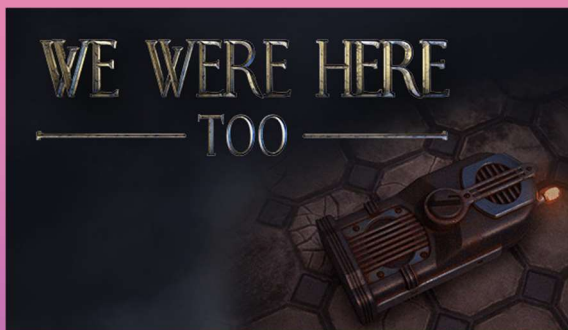

Figure 2 We Were Here Too

In *We Were Here Too*, the important parts of the puzzle are always relatively easy to find. The player is confused despite the number of objects in each room. It will be important to frame objects cleverly in the scene so that the player's goals are clear.

Far Lone Sails uses simple mechanics very effectively. Stepping on buttons and picking up objects are the only inputs from the player. The story is told through an ever-changing environment, the constant feedback and the beautiful aesthetics keep the player fully immersed.

Figure 3 Far Lone Sails

Gameplay

The player will get to explore part of the world to familiarise them with the style and tone of the world. As they explore, important elements of the game will be introduced to the player.

Firstly, the character of the bird will be presented as a guiding ally to Glyf. This will be achieved through the bird's lack of fear towards Glyf as well as its important role of showing Glyf the main objective of the mountain.

Secondly, the mountain will be presented as a challenge to be conquered, a mixture of mystery and dominating presence will enforce the mountain as the main set-piece.

Finally, the antagonist will be introduced as a menacing character capable of killing members of Glyf's race. The player will have to use situated runes to their advantage in order to reach the cave where the antagonist will be introduced. They will be familiarised with the first rune and its ability to alter the size of objects.
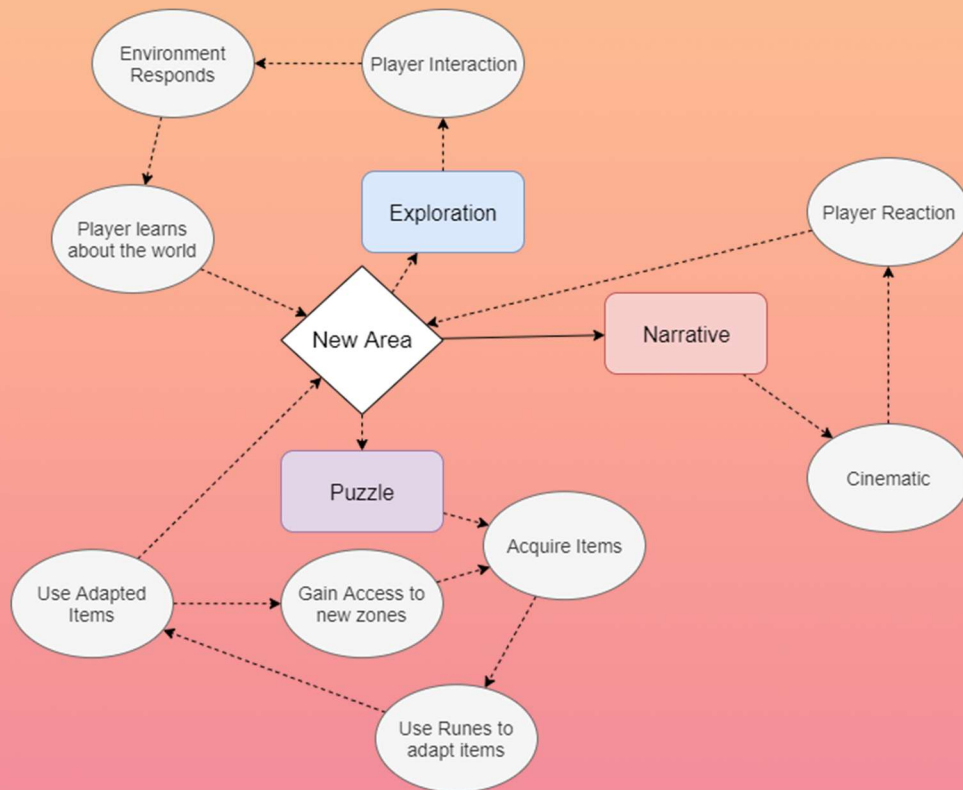
Game-flow

Figure 4 Game Flow Chart

The goal of the player is to reach the top of a mountain through a series of new areas. The game-flow chart highlights the three ways in which these new areas will be introduced to the character as well as the agency the player will have to discover new environments.

Short term goals: Solving puzzles, surviving danger, reaching the next area.

Long term goals: Summiting the mountain, discovering your place in the world, defeating the threat.

Controls

The game will use simple intuitive controls and will be playable on controller or keyboard and mouse. If the interaction is picking something up, a simple press of the button will suffice. However, if the interactable is a lever or heavy object that needs pushing, the player will be required to use the same interaction button and then decide in which direction the lever or heavy object should be pushed.

Movement

Interact

Jump

Pause Menu
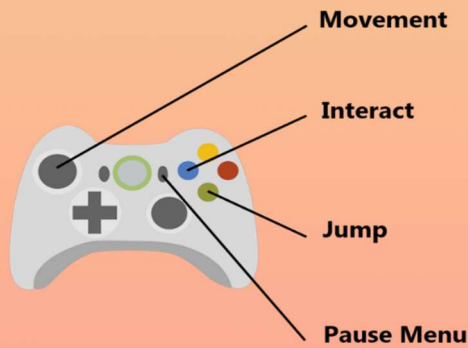
Using the controller, the player will move around the 3D world with the left analogue stick, jump using A, pick up / interact with items using X and pause using the start menu.

Using keyboard and mouse, the player will move around using the WASD keys, jump using the spacebar, pick up / interact with objects using left click and pause with the Esc key.

Figure 5 Example controller inputs

Mechanics

The main game mechanic will be bringing objects to runes to alter them. Bringing an object to a certain rune will have a determined effect and will result in the player acquiring a new object. The player will then be challenged to use these objects to overcome obstacles impeding them. The challenges presented to the player will be relevant to the environment the player is currently interacting with. As the player progresses, they will become familiar with the several different rune abilities throughout the game.

Runes will have different effects on items depending on which one the player interacts with. For example, one rune decorated with a symbol of two objects of varied sizes will allow the player to turn a small rock into a sizeable boulder and vice versa. Another rune will allow the player to combine two objects into a tool or object that will assist them in completing the puzzle. In later puzzles, the player will be given the ability to summon the bird to assist in more complicated puzzles. As the game progresses the player will have to utilise a combination of several runes in order to progress further in the game.

Puzzle Example

At the start of the game, the player enters a cave. Within the cave is a small room with a few objects in it including a large glowing rune [1] and one loose rock [2]. The player will quickly realise that they are unable to move across a gap [3]. Depicted on the wall is a drawing of a character interacting with the rune. When the player picks up the rock and brings it to the rune, it is transformed into a boulder. The player can then push the boulder to fill in the gap.

Further down there is a torch [4] on the floor that the player can pick up. In the centre of the room, there is a platform [5], when the player steps on the pressure plate the door lifts gently but not enough for the character to get through, when he steps off the door closes again. The player will have to use the torch to burn a string [6] in the room that releases a collection of rocks [7]. The player will then make another boulder and push it to the plate to open the door and exit the room.
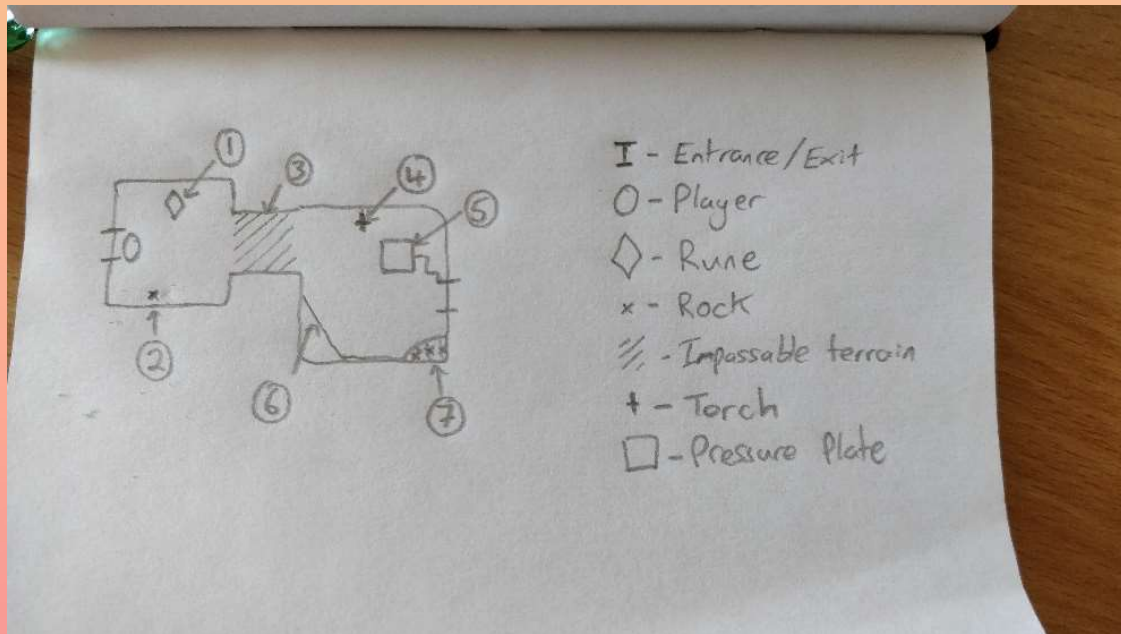
Figure 6 Puzzle example

3. Narrative

Character

Glyf is the protagonist, he is driven by curiosity and a sense of purpose.

Blu is the lone bird who revives Glyf and follows him on his journey.

Abaddon is a mysterious force which has drained the life from the land.

Plot

The world is slowly revealed to the player as the focus turns to an unassuming pile of rocks. A bird that was previously seen soaring through the trees perches atop the rocks, unsettling the precarious positioning of them. The rocks take shape as the main character Glyf, and the focus shifts to a mountain dominating the background of the scene. Glyf begins a journey of self-discovery towards the summit of the mountain, along the way he faces challenges presented by the harsh nature of the environment. In trying to discover his place in this world Glyf stumbles upon magical runes that possess ancient powers and a darkness that resides within the mountain.

Narrative techniques

The narrative of the game will loosely follow the model of the hero's journey.

The story will use lots of foreshadowing as the character climbs the mountain and moves toward the climax. Parts of the story will unfold through cave paintings and environmental storytelling as the player progresses.

The player will discover the background and setting of the world through ancient drawings inscribed on the walls of caves. The cave drawings will help guide the player on their purpose and lead towards how they decide to act later in the game.

The Hero's Journey

Figure 7 The Hero's Journey

Narrative Timeline

To help visualise the pacing of the story, a narrative timeline was created. This greatly helped with realising when to reveal various narrative elements to the player. Below are the first two acts of the story.

Intensity	0	1	1	2	3	2	-1	1	2	4
Moment	Forest		Foot of the Mountain	Mountain						
Act	Act 1: Set Up			Act 2: Confrontation with mini Crisis						
Heroes Stages	Call to adventure	Supernatural Aid	Crossing the First Threshold	Challenges & Tribulations					Revelation	Transformation
SP Moments	Moving through grass Witnessing fireflies	Bird is an ally Bird reveals the mountain to you Heading toward a clearing in the forest	Leaving for the mountain Sun is low in the sky Player discovers a cave Broken Rune	Player encounters rune for the first time. Player solves first puzzle Torches light up from Glyf Player encounters ancient contraption	Player meets small character similar to him Antagonist is introduced Small character is killed Player escapes	See-Saw puzzle	Player leaves the cave Player witnesses the sunset	Player encounters broken bridge Player repairs bridge Lightly snowing	Player discovers an ancient city in the distance Antagonist invades the scene Antagonist begins to actively follow the Player	Player climbs the face of a mountain Harsh snow falling Antagonist chases the player Bird assists the player
Cinematography	Panning shot finds the player. Camera tracks the player	Camera stays with the player	Camera pans to the mountain in the distance.	Close shot into revealing the scale of the room	Cutscene	Camera is closer to the player than the first puzzle	Camera is close to the player but focused on the beautiful background	Camera is closer than see-saw puzzle	Initially close shot to imply the player is in a small room, when lights come on the room is cavernous	Camera is tracking upward
Cave Paintings				Natural scenery in the background Small fire in the foreground Smoke emerging from the fire and being absorbed by the ancients Two ancients, one is changing the size of an object. The anicent is being powered by the fire		More ancients, less natural scenery. A few fires in the scene powering the ancients. Ancients are building machines. Light fog forming		Primitave Ancient Town, scarce natural scenery, larger fire causing smoke powering some ancients, taking the shape of Abbadon Some smoke is escaping	Abaddon large in the scene less smoke being produced Ancients are afraid Some houses are damaged	
Mood	Discovery, Mystery	Guidance, Direction	Encouragement, Excitement	Grandiose, Insignificance, Achievement	Curiosity, Warning, Threat		Calm, Peaceful		Wonder, Fear	Pressure, Perseverance
Player Conscious										
Spiritual Journey	Beautiful World				Something went wrong		A world worth saving	A monster is to blame		
Ancient Civ Plot				Ancients are much larger than Glyf Ancients technology works for Glyf Ancients were powered by fire	Glyf awakens another like him, but he is small Small Glyf is killed by smoke	Ancients built contraptions		Ancients built a town	Ancients used to live here.	
Bird Plot	Bird revived Glyf	Bird meant to save Glyf Bird knows something about the mountain								
Ruins Plot					Ruin Imprints onto Player Ruin is linked to life			Second Ruin imprints on player		Final Ruin imprints on player
Abaddon Plot	Abaddon awakens				Abaddon is perceived as evil Abaddon can kill Glyf			Abaddon is approaching Abdaddon was made by the ancients	Abaddon killed the Ancients	Abaddon is trying to kill you

Figure 8 Narrative Timeline

Cinematography

The game will use several cinematography techniques to help convey certain aspects of the story. Some examples of this are:

- Using an extreme long shot to establish and convey the vastness of the environment and the protagonist's place and relationship with it.
- Close up shots as the story progresses to shift towards a more intimate and impactful narrative.
- Tracking shots that follow the player closely to help build suspense.
- Full shots for quicker pace/action shots of the player.
- High Angle shots to frame the protagonist as vulnerable in some scenarios.
- Low Angle shots to frame the protagonist as heroic.
- Master Shots for establishing the beauty of the natural world surrounding Glyf, providing a break between faster paced and tense parts of the story.

For the entirety of the game, the camera's position will be determined to help design each scene of the game. Just like the art style and the audio cues, the cinematography and positioning of the camera will be an essential tool to convey the mood of each individual scene.

The game will draw inspirations from long shots to keep a continuous movement of the camera throughout and avoid any jarring cuts to enforce the cinematic feel. For example, if the player fails at any point, they will return to the last checkpoint but instead of cutting away, the camera will track back to the checkpoint to keep the longshot running throughout the game.

4. Art

Characters

Glyf:

Glyf is the game's protagonist and the only playable character in the game. Glyf is one of a sentient, intelligent race of rock people. He is made up of a rocky torso, head and two arms with hands. Glyf has no joints; his body parts are connected to each other by the glowing energy which emanates from the large rune engraved onto his torso. This rune is a green/blue colour and is similar to the runes that can be seen around the environment. Glyf's eyes are hollows in his head which glow like his chest rune. Glyf floats roughly a foot above the ground and, as he moves, he leaves a small trail of glowing energy behind him. Glyf's defining feature, which separates him from the other rock people, is the small, purple coloured wildflower which grows from the top of his head.
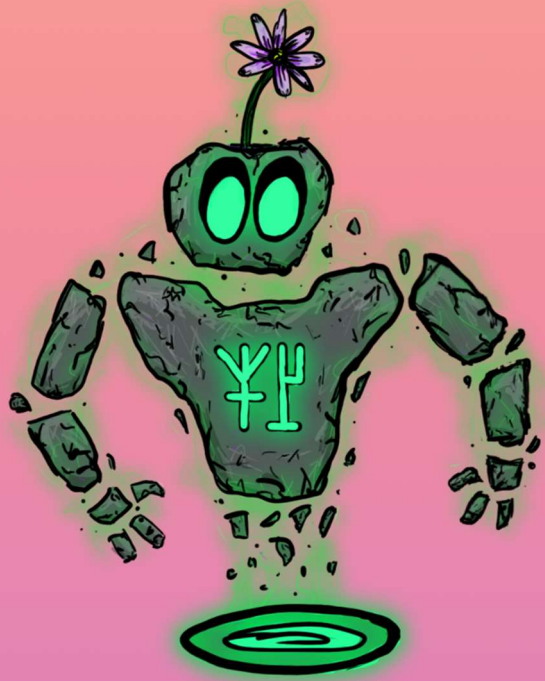

Figure 9 Glyf

Glyf is clearly smaller than the ancient race who inhabited the world before him, he is a younger version of his own people. Glyf is naturally curious and this will be reflected in his interactions with Blu and his reactions to his surroundings.

Glyf was inspired by the rock golem enemy that exists throughout popular fiction and works of fantasy. The idea was to flip that trope on its head. Instead of Glyf being huge and violent, he is curious and friendly and the game's protagonist.

Blu:

Blu is a companion character for the protagonist Glyf and acts as a guiding force throughout the course of the game.

It was decided early in the process that the bird will be distinctive and recognizable. Many different species of birds were brainstormed, and it was decided to create some concept art, focusing on a Robin and a Blue Jay Bird.

The original idea consisted of a Robin as they have iconic red chests and would be visible against the background of the forest, but it was felt that the red/orange chest could be considered a hazard as red and orange are generally associated with danger. It was also felt that though the chest would be distinctive, the brown colour and size of this bird would make it hard to see within the game.
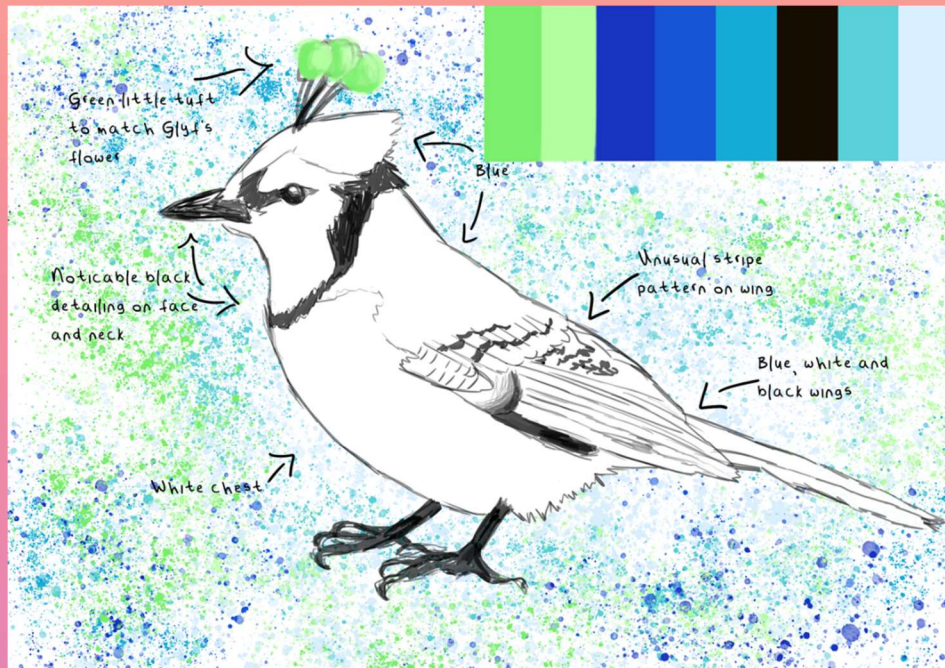

Figure 10 Blu

The second bird that was researched was a blue jay. Blue Jays are bright in colour and contrast nicely with the colours in the game's environment. From the original concept of the blue jay, different features were experimented with in order to make the bird unique. Drawing inspiration from the crest that is found on a peacock's head, a similar feature was added to the bird. The colour was then changed to green as a nod to Glyf's secondary colour. This connects both characters together as Glyf also has something on his head.

Abaddon:

The antagonist in the game isn't a person or creature, instead, Abaddon is more of a force or dark energy. It will be depicted in the game as a particle effect in the form of dark, black smoke.

Animations

Glyf:

Glyf will have multiple main gameplay animations and secondary animations which will convey emotion. There will be an emphasis on smooth transitions between all animations.

The main animations are tied directly to game mechanics and add to the feel of the game. The secondary animations will showcase Glyf's personality and create an emotional connection with the player. It will be important to show visually to the player how Glyf feels. As Glyf has no real facial expressions, this will all be communicated through body language, especially head and arm movement.

Glyf's main animations will be:

- Walk – Bobbing forward, arms swinging back and forth.
- Idle – Bobbing animation with slight arm and head movement.
- Jump – Small burst of energy to propel Glyf forward slightly.
- Push – Leaning forward, arms outstretched.
- Grab – Stretch one arm towards an object.
- Slide – Leaning back with one arm back as support.

Secondary animations will also be used to add detail and personality to Glyf. They will include:

- Initial Formation – Glyf will assemble himself from rocks on the ground at the beginning of the game.
- Looking Around – Use of head movement to signal interest/curiosity, bending to look at flowers, etc.
- Waving / Pointing – Unique animation for interaction with Blu.

Blu:

Blu will have simple, subtle animations. It was decided that Blu will have two models, one with his wings extended and another with him perched. It will be easier to use this technique then to animate a fluid animation of Blu taking flight. Animations will be created for each separate model.

- Flight: Simple up and down wing movements and head moving animations.
- Perched: A little hop and a twitch of Blu's head.

Environment

Landscapes:

The game is initially set outside in the dense brush area at the base of the mountain and throughout the ascent up to the summit. There will also be internal sections which take place on the inside of the mountain caves. Runes and glyphs can be discovered in puzzles and on cave drawings littered throughout the game.

Figure 11 Rough sketch of ancient tree (left), final image of ancient tree (right)

Figure 12 Rune rock in daylight (left), rune rock in nightfall (right)

Style

It was decided early in the conception of the game that highly detailed models wouldn't be feasible. Due to the number of objects which will be in scenes, in the form of trees, flowers, boulders etc., it was decided the game will have a lower polygon modelling style. Although models will have a lower polygon count, models won't be too simplistic.

Multiple different texturing techniques were researched, and it was decided the game will have a hand-painted texturing style. Using the website *Sketchfab* hand-painted environments were researched. It was discovered that using this technique, it will be possible to create low polygon models with a higher level of detail all while creating custom and unique textures. Below are some examples from *Sketchfab* of hand-painted environments.

Figure13 Examples from Sketchfab

Figure 14 An example of a model without texturing applied

Textures

As mentioned above, artists will be creating hand-painted textures for the models within the game. The textures will be simply detailed and have slightly lighter shades of colour at the top of each asset.

Glyphs and runes will play a large part in communicating the narrative of the game. Below is an alphabet created for the game which will be converted into alphas and then stamped on to different stones throughout the game. Emission maps will be used to make the runes glow.

Figure 15 Runic alphabet

Another important narrative tool will be the cave drawings carved into rocks in certain key points throughout the game. They will be textured in a very similar way to the runes. Certain parts of the drawings will be animated to communicate their message clearly.

Effects

Effects, whether it be lighting or particles, will benefit the game. They will be used primarily to add atmosphere and juice. Below are some examples.

Fireflies:

Glyf will be constantly interacting or affecting the environment he traverses. There will be sections of long grass, which when the character walks through, fireflies (in the form of a particle effect) will fly out.

Figure 16 Concept firefly art

Smoke / Fog:

Fog will be placed at strategic parts of the game to enhance the atmosphere for the player. Smoke will be used to form the antagonist, Abaddon, and will be created using particle effects.

Lighting:

Lighting effects will also be used to enhance the atmosphere and the visuals in the game to reflect the different sections of the narrative and to change the time of day throughout the game.

The game will begin in the evening with the lighting quickly transitioning to dusk, including a shot of the sunset, before moving to twilight and finally night. Light sources at night will come from the character Glyf, torches and the runes carved into the environment.

One important lighting effect will be to create the illusion of a thunderstorm. This effect will be used later in the game in a specific section to create tension. The player's vision will be limited during this time to increase suspense.

Flowers:

At certain points in the game flowers will bloom in response to Glyf's interactions with his environment. This will occur when Glyf interacts with runes, causing a burst of energy that makes the flowers grow in a circle around him.

<u>Art Bible</u>

This section gives a general overview of the style guidelines for the game's art. A separate style guide document will include specifics regarding modelling, texturing, environment assets and character designs.

General Style Rules:

- All assets will look stylised and not have realistic proportions.
- All textures have simple details with small amounts of shading to create depth. Lighting effects will be used to create most of the shading.
- All environment assets will use darker shades towards the base and lighter shades towards the top of the asset.
- Glyf's flower is unique to him, as is Blu's signature colouring. Each has a unique colour palette.
- Interactive objects such as puzzle elements and runestones will be lighter in colour and have more well-defined silhouettes and shapes than background assets. Puzzle assets and runestones have separate colour palettes to background assets.
- Assets closer and in direct view of the camera will have more detail than assets further away.
- Smoothing groups will be used to remove sharp edges on assets.
- Edges of smoothing groups on assets will be highlighted with a lighter / darker strip of colour.
- All interactive objects (runes, puzzle assets, etc.) do not use red. Light oranges can be used for some assets/effects.
- Remains of ancient civilisation (gears, chains, stone walls, etc.) look old, disused and overgrown.

Colour Palette:

The colour palettes for the rocky terrain of the environment will be made of muted greys and browns. Organic environment assets will be slightly brighter in colour but more muted than the characters or puzzle objects.
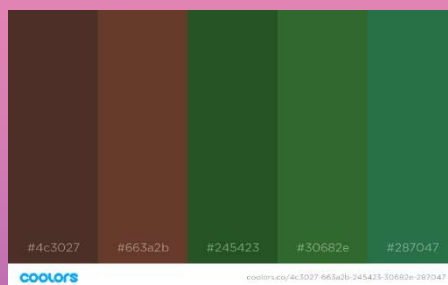
Figure 17 Tree colour palette   Figure 18 Rock and terrain colour palette

Glyf and Blu will have brighter versions of some of the colours used in the environment. Light purples and greens (Glyf) and blues (Blu), will draw the players eye to the characters, so they are not lost in the background. Glyf will have similar greys to the stones carved with runes.
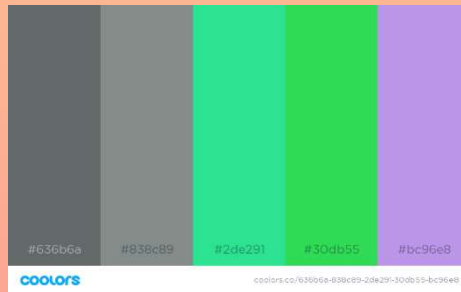

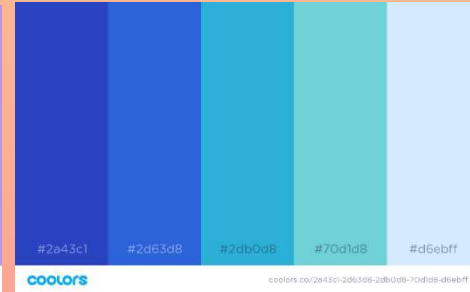*Figure 19 Glyf colour palette*

Figure 20 Blu colour palette

Runestones will have a different colour to background rocks and will glow. The rune's glow will be green or blue in colour.
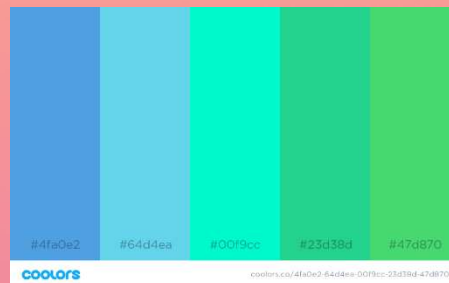

Figure 21 Runic colour palette

Puzzle objects will also have a particular colour palette with lighter greys and greens, so they stand out against the background assets.

Figure 22 & 23 Puzzle elements colour palettes

Below is the colour palette that will be used for the skybox. A bright colour palette, with purples, pinks and oranges, will be used to represent the sunset.

Figure 24 Skybox colour palette
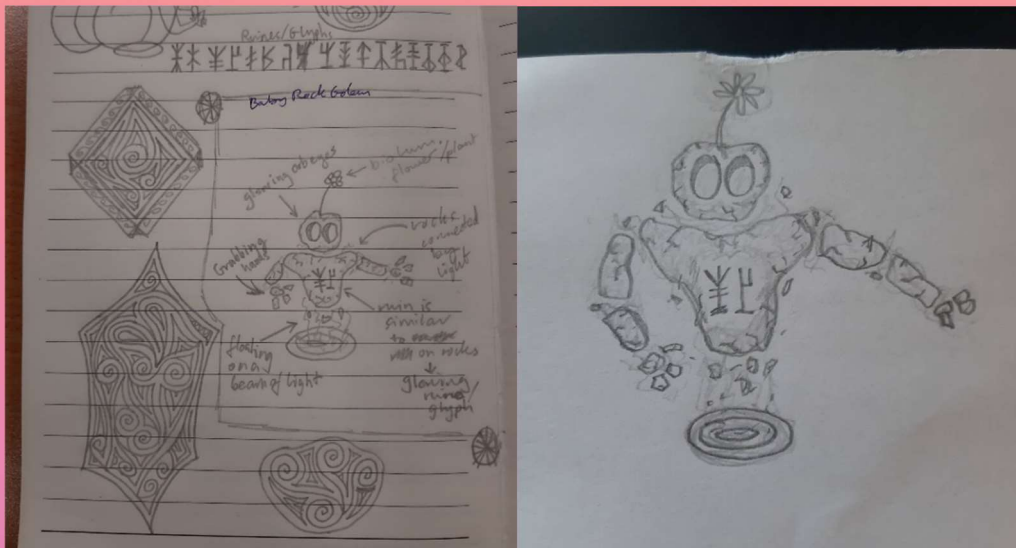
Concept Sketches

Figure 25 Mountain concept art

Figure 26 Example rock paintings and glyphs

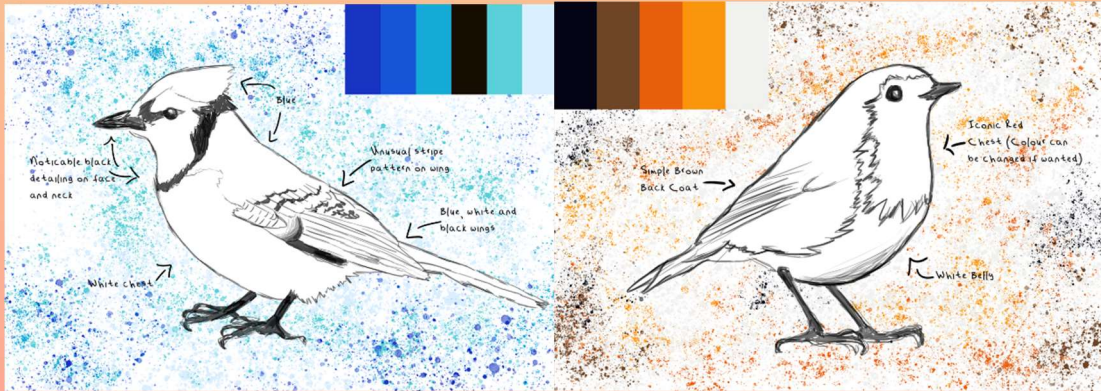*Figure 27 Original concept of Glyf*

Figure 28 Blue Jay concept art   *Figure 29 Robin concept art*

5. Audio

Overview

The goal of the audio design is to add elements of fantasy as well as realism to the game. It should not distract the player or break their immersion. The game features a fantastical world full of locations, creatures and objects that have no base in the real world. The audio aims to aid the visuals in giving life to a fictional world and allow the player to suspend their disbelieve.

Soundtrack

The soundtrack will be minimalistic. The focus should be on the visuals and the soundtrack should give the visuals room to be impactful on their own. This means that the game will rely on environmental sounds to carry the brunt of the workload rather than a soundtrack. Since the game features no dialogue and solely relies on visual and environmental storytelling, it will be necessary to reinforce emotional moments and guide the players in a certain direction. The game will make use of sparse but effective leitmotifs and short musical pieces. They shouldn't overstay their welcome and will be faded in and out as needed. An example of this is a short piece of music swelling as the player sees the mountain for the first time.

Sound Effects

As with the soundtrack, the SFX will be unobtrusive and add to the visuals of the game. The SFX will be comprised of mostly background environment sounds with the sounds themselves muted and low in volume. These effects will be used to add gravitas and weight to certain objects in the environment without seeming out of place with the style of the visuals.

The SFX will also serve the purpose of adding to the game feel. They will inform the player of the impact their actions have on the environment. This will be particularly of use for the puzzle-solving mechanics. Feedback for the player will be important and the SFX will be designed to give as much positive reinforcement to the player as possible.

Tools

The audio development process will require the use of multiple different applications. These applications and their uses are outlined below.

Cakewalk by Bandlab:
Cakewalk is a free to use DAW (Digital Audio Workstation) which will allow for easy recording of musical sections. It allows for easy MIDI (Musical Instrument Digital Interface) and microphone recording. It also allows for horizontal resequencing and vertical remixing which will be a necessity when recording a piece of music. Most music recording will be done here.

Adobe Audition:
Adobe Audition will also be used for music editing. However, access to this software will be limited, so only a few premium features will be used on tracks imported from Cakewalk, as well as some sound effects.

FMOD:
FMOD is a sound effects engine and authoring tool with integration in Unity. This will be used to create and alter sound effects. It also will allow for easy integration with Unity. It improves on and extends Unity's limited audio tools. FMOD makes it easy to load and unload audio, create audio event triggers and add more audio functionality.

Inspirations

Inside:

A great example of creating an unsettling, ambient soundscape as well as disturbing and lifelike sound effects. Even though the game is stylised, the audio creates a great atmosphere and turns unbelievable visuals into real and disturbing moments.

Figure 30 In game image from Inside

Blade Runner 2049:

Blade Runner 2049's soundtrack is effective at making the consumer feel small and insignificant. It heavily utilises low-frequency sounds and percussion that resemble mechanical engines. This gives the environment scale and mass.

Figure 31 In film image from Blade Runner 2049

Lord of the Rings (The Shire leitmotif):

The Lord of the Rings soundtrack is a great example of effective use of motifs and leitmotifs. More specifically, the motif of the Shire is utilized throughout the trilogy in many ways. To begin with, it conveys a sense of home and happiness. This then transitions into creating a sense of longing and reinforcing the horrible nature of the places the characters have travelled and traversed.

Figure 32 The Shire from The Lord of the Rings

The Dark Knight:

The Dark Knight has one of the most memorable villains in all of cinema. The Joker's leitmotif is a case study in simplicity working. Even though Hans Zimmer's Joker leitmotif only consists of a single note, it creates a sense of dread and a disconcerting atmosphere whenever the motif starts fading into a scene.

Figure 33 The Joker from The Dark Knight

Journey:

The soundtrack for the game *Journey* is a masterpiece of atmospheric game audio. It varies between different emotions while still maintaining a sense of mystery and awe. Swells of volume add emotional weight to the whimsical visuals of the game. String instruments are used throughout the soundtrack, creating an uplifting atmosphere which builds a sense of adventure.

Figure 34 In game image from Journey

6. Technical Aspects

Character

The character movement will be basic third-person movement, by controller but with keyboard control support. The direction of movement will be relative to the camera position. The movement will be physics-based, using Unity's Rigidbody component.

Mechanim will be used to animate the character. Its root motion and humanoid rigging features will not be compatible, due to the design of the character. This eliminates the use of the built-in Inverse Kinematics (IK) which is reliant on the animated character having a humanoid rig. To circumvent this, the game will make use of the animation rigging package. This allows for the rigging of a character, independent of their avatar.

This package also allows for IK runtime animation. IK will be used to create more believable animations. The game will utilize this primarily with interactions between the player character and interactive objects. Examples being, picking up a torch or rock.

Camera

The camera in the game will be on rails. The player will have no control over its position or rotations. The camera will position itself based on locations and movement. This will be achieved using Cinemachine and Timeline. This allows for easy switching between virtual cameras and procedurally blending between them. The initial timeline will be set up by a programmer but since Cinemachine is easy to use, designers will be able to manipulate the camera afterwards.

Challenges

The main challenges of the game will be Multi-scene editing and the loading system. These problems stem from the cinematic nature of the project. The goal is to have the game be a seamless experience without loading screens. The camera will be on rails for the whole game to give the player the feeling of controlling a character in a movie. These goals brought up the following challenges:

Multi-scene editing

There are two options for achieving a game without loading screens in Unity. The first and infeasible approach would be to have only one unity scene with all assets required for the game. This would be inefficient in terms of performance and collaborative work since merging scenes via source controls, even though it is possible, causes its own problems. Instead, multi-scene editing will be used. This will allow for easy collaboration and better performance which will be discussed in the Loading System section.

The multi-scene implementation in our game will be set up in the following way. The first scene will be the logic scene. Within the logic-scene will be all managers and systems that will be required throughout the game. Examples of which will be a scene manager, audio manager, a save system etc.

The second scene will be the base scene. This will contain any objects that are in all scenes i.e. the player, the camera and UI. In some situations, having a player-specific scene will be useful to avoid merge conflicts. However, the player will be quite straight forward and will not require their own scene.

The remaining scenes will be section-scenes. The game will be split into smaller chunks. These section-scenes will include section specific art assets, scene-specific logic and enemies.

Figure 35 Example of multi-scene editing

There are some problems with multi-scene editing. The first of which will be introducing the team to a new workflow, which will be addressed with a live demo. Another problem will be cross scene referencing. To get around this, the game will make use of Singletons. Since Unity's lighting settings are scene-specific, it will be a problem if scenes have drastically different lighting. To change between lighting fluidly, a custom system will be required. Complex Nav-Mesh workflow will not affect this project. Since merge conflicts are still possible in smaller scenes, prefabs will be used as much as possible.

Loading System

To get the performance benefit of multi-scene editing, the game will implement a scene loading system. The system will asynchronously load the next chunk of the game when the player hits a certain trigger point. It will also unload old scenes that are redundant. It is crucial that the scene loading is done in a way that the player is wholly unaware of it. This means that no art assets in the background disappear, sounds cut off unexpectedly, the game stutters or there is a loading icon or bar visible.

Ideally, this system will work with the audio system to check if all sounds have finished and have faded out before unloading them. To avoid the player seeing art assets unload, clever level design and camera position will need to be used. To avoid stutter when loading new scenes, the game will be coded with performance in mind. No intensive calculations should be done in the Awake() or Start() functions. If it is necessary, they should be done over multiple frames using coroutines.

Architecture

The game's code will be elegant, concise and performant. To achieve this, the game code will follow S.O.L.I.D. principals. Scripts should have a singular purpose and should only be aware of the bare minimum in terms of cross script communication and references. For example, the player object does not need to be aware of the scene loading manager, even though the two will inevitably communicate. This will be achieved using delegates, events and funcs. Member variables will be private and have getters and setters only if needed. The goal is to limit tight coupling between classes, which will keep the project clean and easier to work in the long term.

Coding Policies and Git Use

The tech team has agreed on the following policies to keep the code legible, scalable and uniform as well as agreeing on how version control should be implemented:

1. Work in the develop branch.
2. Master branch should always be playable.
3. Develop systems in external branches in test scenes.
4. Once a system works in a test branch merge it into the develop branch.
5. Once a test branch is merged, implement the system into the game.
6. If everything works without a problem, commit it and tag the commit.
7. Commits should be frequent.
8. Commits should have detailed comments.
9. Classes should have an overview comment at the top explaining its purpose.
10. Functions should have an overview comment at the top explaining its purpose.
11. Classes should have a single purpose.
12. Classes member variable should be private.
13. Only set up getters and setters if needed.
14. Use interfaces when possible.
15. Avoid using unity tags or searching objects by name.
16. Use delegates and events over referencing when possible.
17. No taxing calculations should be made in Awake() or Start().
18. If calculations are needed on Awake() or Start() spread them out over multiple frames using coroutines.

Rendering

The game will be rendered using the Unity scriptable render pipeline or SRP. More specifically the preset High-Definition Render Pipeline (HRDP). This will work well with our target platform and will give the game realistic volumetric lighting. The HDRP also allows for local volumes with their own settings, which will make it easier to create small sections of the world with specific visuals. The use of shadergraph will also be prevalent in the game. Shadergraph is only available with the SRP and it will allow for easy shader creation through a visual interface.

Figure 36 Example unity rendering

7. Social Media

Twitter

@RewriteGamesStu

Facebook

https://www.facebook.com/RewriteGamesStu/

Instagram

rewritegamesstudios

Email

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