

Deep Dark

DESIGN DOCUMENT

By Paul, Charlie & Areej for the 2024 Pirate Software Game Jam

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Introduction

Game Summary Pitch

Deep Dark is a top down, factory survival roguelite where you progress through a randomly generated cave, collecting resources whilst pushing back against the ensuing darkness. The main gameplay loop involves exploration, resource collecting and base building.

Inspiration

Creeper World 3

Creeper world 3 inspired the idea of fighting back against creeping darkness that the player must defend against. It will also serve as a good base for our major tower defence system.

Factorio

The market standard for factory and logistic games, this was a class choice to inspire one of the planned major systems, Runic Constructors.

Player Experience

In each cave, the player will go through a series of runs to delve deeper into the dark, attempting to retrieve as many useful materials as possible whilst keeping the area lit. When they return to the base, they can use these materials to craft new potions to aid them in their next run. They can also use them to craft automation to restock the potions whilst they are away on the run, which can range from refining raw materials to finishing the potions. The player must prioritise the materials they want to collect per run, how to use them and their tactics for defending from the darkness.

Platform

The game is developed to be released in the Browser

Development Software

- Unity 2022.3.38f1 for main game development
- Blender for modelling and texturing
- Material Maker -> SDF Generation and some texturing

Genre

Singleplayer survival, roguelite with a factory twist.

Target Audience

With a focus on survival and logistics, this game would be for fans of games such as Noita & Factorio. This wouldn't be as appealing to a casual market as it would to a more dedicated gamer market.

Concept

Gameplay overview

Player controls a character who delves into a cave with the shadows as the main antagonistic force. You can protect yourself with spells and potions, but you must lay down more permanent defences to get further and better resources. You need resources to craft more potions and spells, but you can also use them to automate this process so you can slowly build up a base that will be restocked when you return.

Theme Interpretation (Shadows and Alchemy)

The initial interpretation was that the player must fight against the shadows using the weapons provided by the alchemist practises. Finding the cipher hints around the world to unlock new modules, spells and potions also fit into the alchemy theme (thanks Thor for the idea on the livestream). As the project progressed, the alchemy theme was being developed upon by a system called the Runic Constructors. This system ultimately had too big of a scope to be included, but proof of the implementation is included below.

Design

Grid Simulation

Shadow Propagation:

One of the major aspects of the game was to simulate a fluid like shadow that would permeate the cave. This was done using a very basic cellular automaton simulating the pushing of shadow to nearby cells. This behaviour worked in 3 stages, Spread, Burn and Application.

Spread: push half of the cells current contents to the surrounding cells (while retaining a small percentage as propagation efficiency).

Burn: using the cell's current light value, the cell burns away fractions of the shadow destroying it.

Application: applies the current spread and burn values to the cell, but also caps its max value based on the depth of the cave.

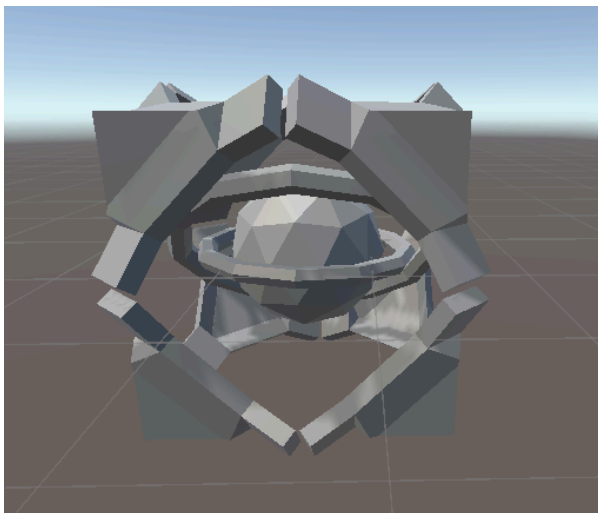
All effects are applied just before the game tick so that other systems can interact with the most updated version of the cave's cell grid.

Shadow would be used as a passive damage source for the player, and also as a means to spawn new enemies. The deeper into the cave the player would go the denser the shadow would become. This would form part of the game-loop focusing on tower defence and automation for building defences against the shadows using resources from within the cave. Whereas exploration inside the darkness would allow for a riskier method of exploring, but allow for the player to find ancient research notes and recipes early in which could allow them to build stronger defences.

// Though this game loop unfortunately is not fully implemented. //

Runic Constructs

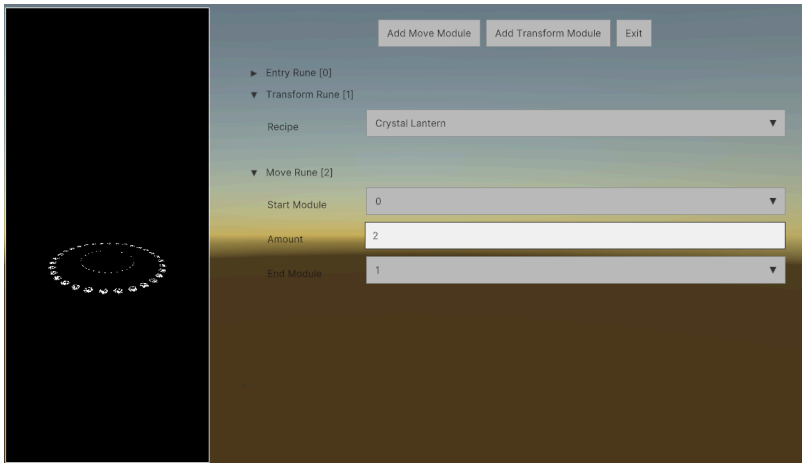
This system was how the automation and factory genre would be implemented into the project. It was designed to be able to support vastly complicated instructions that go



beyond a simple crafting system of A->B. A secondary aim was to be able to build up a network of these runes that could craft various different items with incredible efficiency.

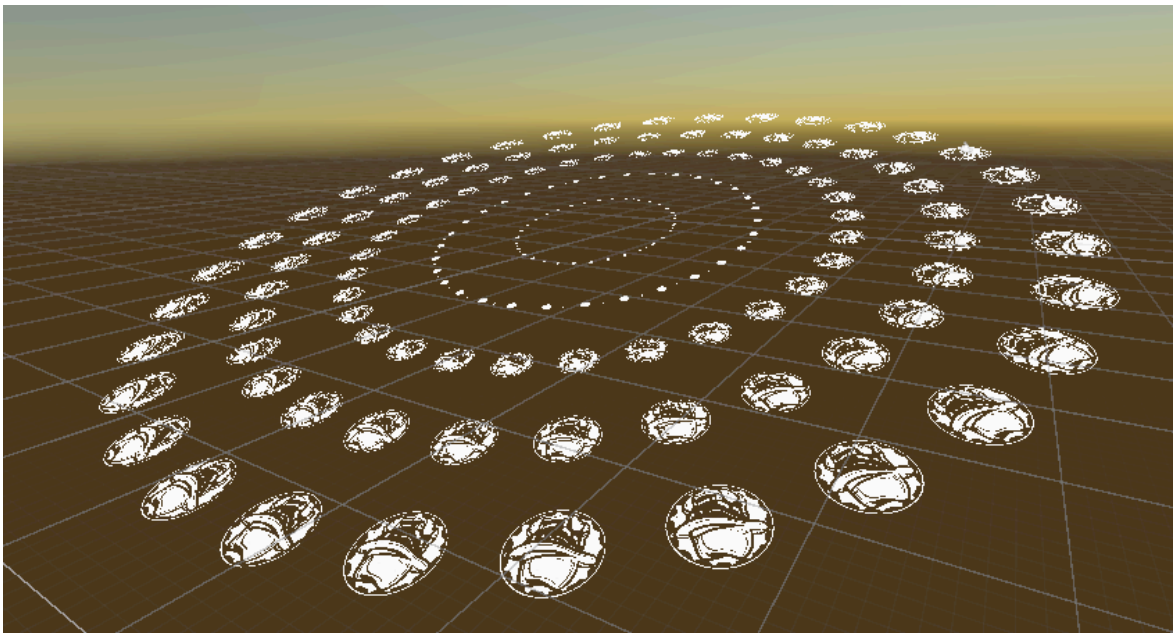
We are planning on adding a lot more types of runes that can perform a wider range of operations, such as extracting liquid mercury and constraining it within

the system or transmuting the base metals to be able to make higher level items.

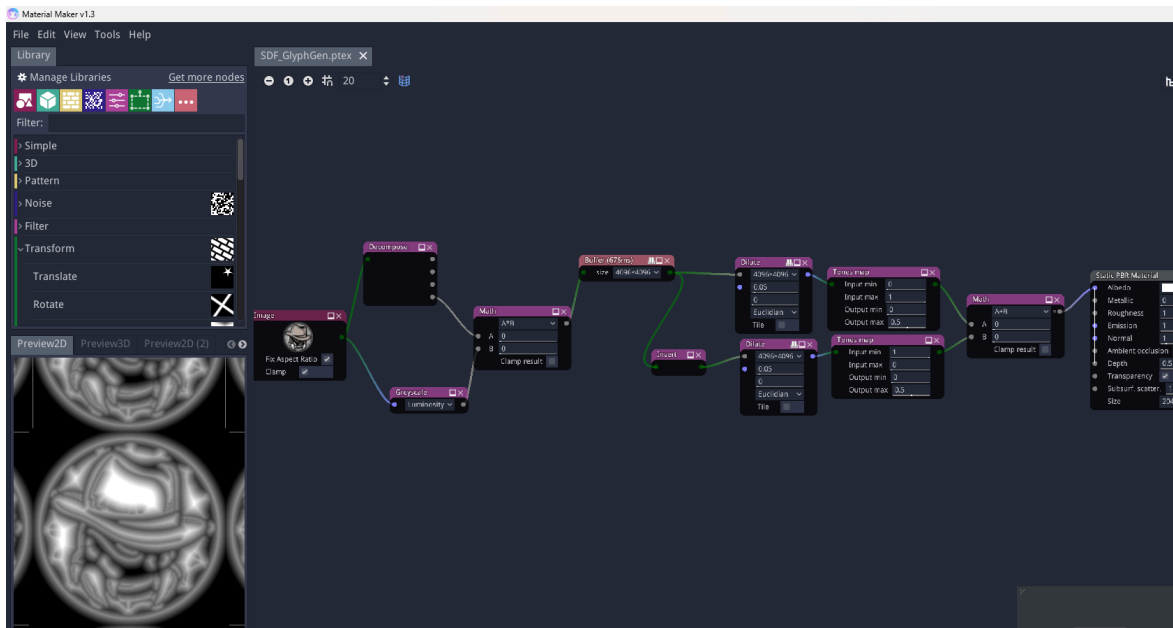


The base crafting ingredients were inspired by the main elements involved with alchemy; the minable ones being mercury (in the form of cinnabar for mining), iron and lead. These could then be used to craft recipes or be transmuted into the other 4 metals (Gold, Silver, Copper, Tin).

I never got as far as playtesting this system properly, but each rune module can be tweaked so the processing time can be altered which would have been the main method of balancing the system. This system was a joy to work on over the course of the last 2 weeks, but it was way over the scope of the project. There were additional plans to add a rail system to deliver mined metals to the machines and to be able to build a network but we will add these in over the course of the development in the next few months.



To ensure that the glyphs were maintaining as much detail as possible whilst still being performant enough to run in WebGL, an SDF was created of each glyph and used as an input for the shader. This was created in Material Maker, a free open source software similar to Substance Designer.



Item Design

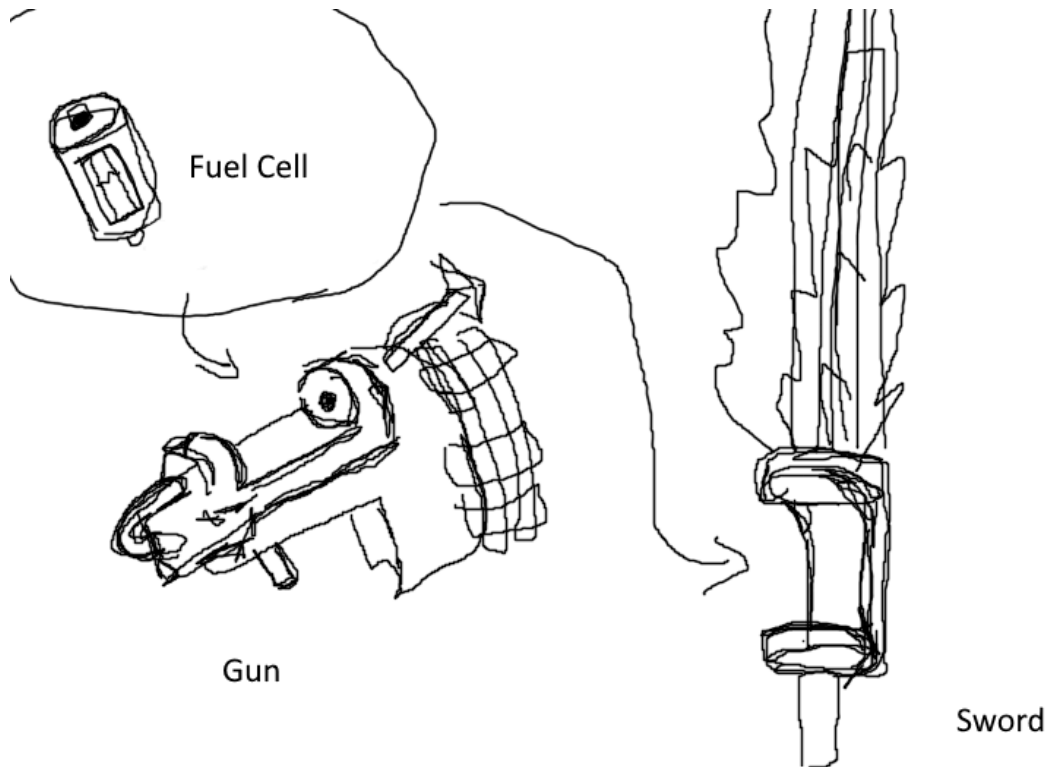
There was a quite considerable design space for the items, as there were many different mechanics to work within.

- Light Levels
- Shadow Levels
- Player Health, Movement & Inventory
- Automation Speed, Efficiency, Mana Cost
- Tower Defense (which could just be placing lanterns or something at this stage)

The only item that was successfully implemented in time was the light crystal lantern, which can be placed down to illuminate areas to prevent the shadows from propagating further.

Combat

The aim was to have combat consist of 1- Unique weapons that have different properties e.g. shooting pattern, attack speed and weight. And 2- Energy Cells or Ammo types that alter the way damage is dealt by those weapons including adding special status effects. These energy cells would be filled with magic, following the game's modern magical world theme.



Weapons

You can equip 2 weapons at a time. Using LMB and RMB to swap between them. Further weapon swapping was gonna be introduced through a weapons menu.

To make each weapon unique, we considered adding different properties that vary based on the weapon. Some of those properties are:

- Damage: Weapon or augment related? Could use have a base dmg for augment and a multiplier on the weapons
- Reload/ammo count
- Weight
- Range
- Crit Chance
- Accuracy

Below are design ideas for different weapons to be added.

Gun/ Weapon	Range	Pattern/ Description	Attack Speed (bullet and swing speed for melee)	Attack rate (CD)	Weight (speed of player while carrying it)	Damag e Multipli er
Magic (basic) Gun	Mid ▾	Single shot	Mid ▾	Low ▾	Low ▾	1 ▾
Homing	High ▾	Marks target and follows them.	Mid ▾	High ▾	Mid ▾	1.2 ▾
Shotgun	Low ▾	Low range burst	High ▾	High ▾	High ▾	1.4 ▾
Splatter	Mid ▾	Shoot multiple parallel shots. Or in 3 directions in a cone	Mid ▾	Mid ▾	Low ▾	0.6 ▾
Machine gun	Low ▾	Fire multiple shots front multiple fire points in rapid succession before reload.	High ▾	Mid ▾	High ▾	0.8 ▾
Flame thrower (shape wise not actual fire)	Melee ▾	Hold fire button to shoot constantly in a small cone.	NA ▾	NA ▾	Mid ▾	0.6 ▾
Long Sword	Melee ▾		Mid ▾	Mid ▾	Mid ▾	1.2 ▾
Dagger	Melee ▾		Melee ▾	Low ▾	Low ▾	1 ▾

For lack of time, for the demo, we reduced these to 2 weapons. A basic sword and a magic gun. Each using the basic energy cell, which only deals a set amount of damage

Energy Cells / Ammo

Depending on whether the weapon is melee or ranged these Energy Cells (or ammo) could act differently. Below are examples of Energy Cell designs we considered.

	Ranged Effect	Melee Effect
Basic	basic shot/attack	
Bouncing	Bouncing bullet	knockback for melee?
Fire	Spread, dps	Same from first enemy hit each swing
Explosion	Aoe explosion that deals moderate damage.	an aoe circle for melee on hitting a target
Piercing	Go through enemies till it hits a wall or the bullet range ends	To implement this we would have to add a limit to the sword swing and maybe increase it here.
Poison	single target dps	same
Weakening	Lowers enemy defence	same
Frost/ electric	Stun. Maybe a silence instead preventing magic/ranged enemies from casting.	same
Sticky	Slow (maybe lower attack for melee enemies since animations would be slower)	same
Life Steal	On-hit heal. Could be changed to a mark that lasts N seconds. Allowing u to swap to different weapons and deal more dmg and heal more. Could also be swapped to be a weapon type for easier balancing e.g a dagger or something idk.	same

Black hole/ gravity	dps and gravity pull	Unsure. Could do the same thing as the gun, from the first enemy hit as well. Or the sword itself could pull enemies towards the player while equipped)
Death Mark	Marks enemy to take more dmg from u (on next attack), grants move speed towards them?	
Light	Like a flare shot thingie	Increases the range of a circle around the player.

Enemies / Monsters

For the demo, we decided to add two basic enemies. A trap and a melee enemy.

- Crawler**
 A shadow creature that lives underground. When the player walks into its active radius, it digs up, revealing itself and allowing the player to attack it from afar. When the player walks closer, it chases them till it's in melee attack range.
- FloorTrap**
 A simple floor trap that activates when the player steps on it after a delay. The delay is high; giving the player the chance to dash out of it.

Art

Our lead programmer is also our best artist, so a lot of the artwork will be done via code with shaders and then supplemented with Blender models. Since we don't have the expertise required, we will be going for a low poly art direction with minimalist features. The colours will need to have some decent contrast whilst still maintaining a sense of coherence and supporting the main feelings of dread and exploration.

Audio

Music

To add to the feeling of exploration and dread, a combination of drone sounds and light guitar will be a great addition. None of the team members are particularly gifted with music, so freesounds.org will be the most valuable resource here.

Game Experience

UI

Since we are using Unity, the UI will be made using UI Toolkit and animated in-engine. This will be quite simple and

Controls

The game is split between two control modes, combat and building.

Combat Mode:

Keyboard

Arrow keys / WASD -> Move

Tab-> Build Mode

Spacebar -> Dash

Mouse

LMB -> Attack with Right weapon

RMB -> Attack with Right weapon

Build Mode:

Keyboard

Arrow keys / WASD -> Move

Tab-> Combat Mode

Mouse

LMB -> Place selected build

RMB -> Remove selected build

Development Timeline

MINIMUM VIABLE PRODUCT

#	Assignment	Type	Status	Finish By	Notes
1	Design Document	Other ▾	Finished ▾	Jul 31,...	
2	Grid System	Coding ▾	Finished ▾	25 Jul ...	
3	Shadow Propagation	Coding ▾	Finished ▾	22 Jul ...	Shadows spread over the map
4	Basic Inventory	Coding ▾	Finished ▾	18 Jul ...	
5	Basic Crafting	Coding ▾	Finished ▾	19 Jul ...	
6	Runic Graph System	Coding ▾	Finished ▾	26 Jul ...	Being able to represent the Runic Constructors process as a graph to traverse
7	Player Controller	Coding ▾	Finished ▾	26 Jul ...	

#	Assignment	Type	Status	Finish By	Notes
8	Player Attacks	Coding ▾	Finished ▾	28 Jul ...	
9	AI Spawning	Coding ▾	In progress ▾	📅 Date	
10	AI Movement	Coding ▾	In progress ▾	📅 Date	
11	Player Animations	Art ▾	Finished ▾	26 Jul ...	
12	Background Music	Art ▾	Finished ▾	30 Jul ...	Sourcing and mixing the music in Unity
18	SUBMIT	Other ▾	Finished ▾	Jul 31,...	Create Itch Page and upload

BEYOND (if ahead of schedule / extra time)

Expand the Level	Other ▾	In progr... ▾	
Properly implement the Runic Constructor System	Coding ▾	In progr... ▾	Volume slider, fullscreen toggle
Add more Items to fill the design space	Art ▾	Not sta... ▾	
Minable items	Coding ▾	Not sta... ▾	
Rail Network System to enhance the automation aspect	Coding ▾	Not sta... ▾	
Better models	Art ▾	Not sta... ▾	
More Sound effects	Audio ▾	Not sta... ▾	
Implement the additional energy cells/ammo	Coding ▾	Not sta... ▾	
Add in the alchemy recipes as a collectable item	Art ▾	Not sta... ▾	This would be to encourage exploration, plus an extra challenge in following the recipe with the Runic Constructors