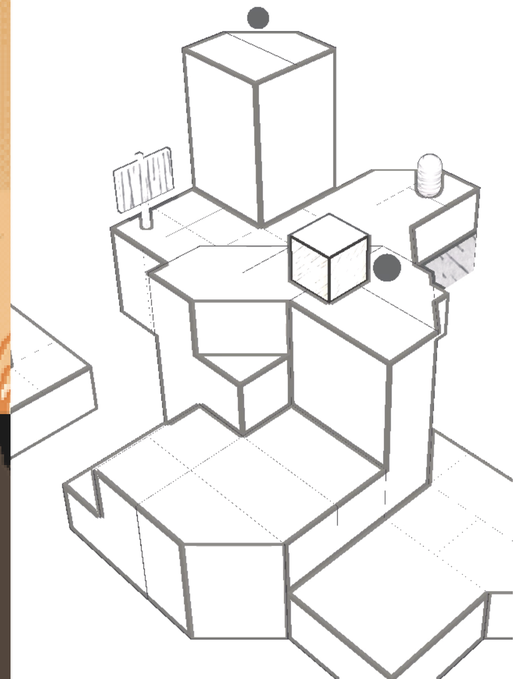
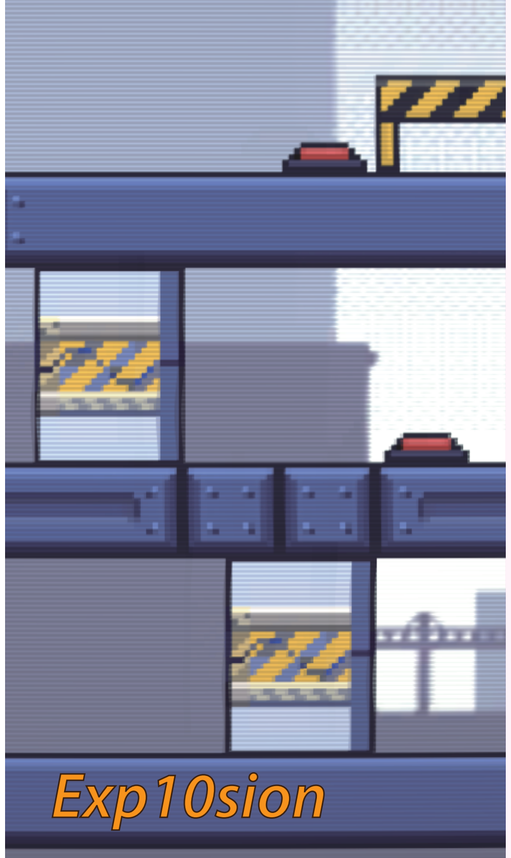
Portfolio of Zihan Liu

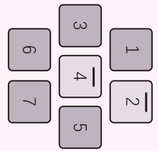
itch.io youtube github page

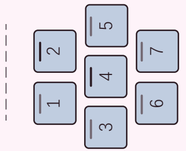
Shadiness





Rose and Poem





现代生活 死了
Modern life is dead.

不断旋转的 猩猩 想回到从前
A whirling gorilla wish to go back,

却看不见 欺骗
but can't see the deceit.

A Sokoban-like puzzle game with branching roots.

Global Game Jam 2023
Theme: Roots

Video: https://youtu.be/rX9GlioAAGY
Demo: https://psa1ms77.itch.io/bad-bad-roots

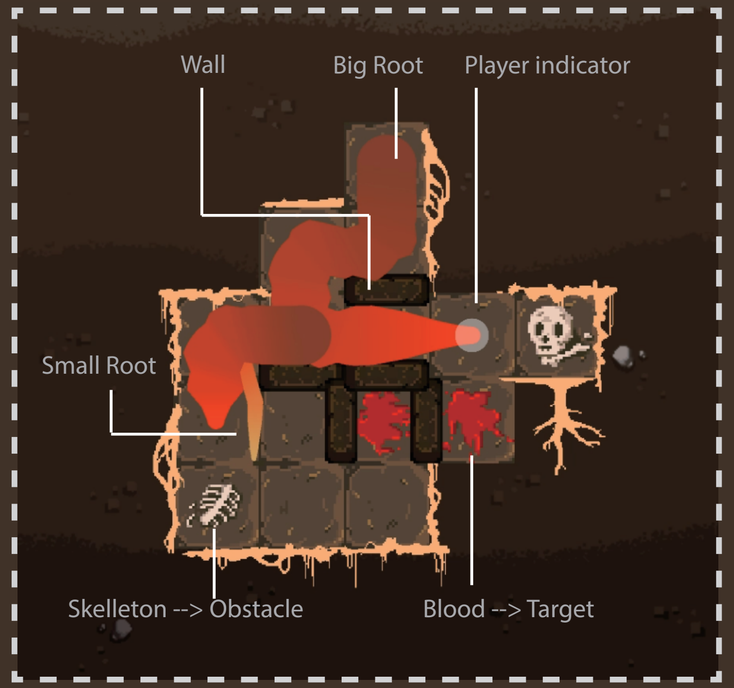
Introduction

In this sokoban-like puzzle game, player will control the ***Root*** of the "Bad Bad Tree", to move, branch and push away skelletons in order to forage for underground blood.

Though root ***could not go back*** or pass through itself, it could ***branch out new root*** body to approach more area.

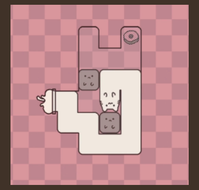
To further develope the idea, we introduce the "small root", **moving along tile sides**, as a new and challenging mechanism for out puzzle.

Game View



Inspirations

Sokoban-like / tile-based puzzles

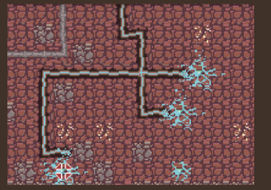


Elasticat

The Snake Cat

SNEKS

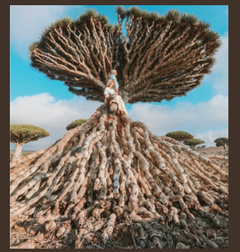
Game with Branching Root



Rooted

Dragon Blood Tree

We used the image of a dragon blood tree to be the outlook of our root, as it has unique structure and aesthetics. Thus came the idea of using blood and skelletons to be target and obstacles.



Dracaena cinnabari

Contributions in a team of five

Gameplay design
Level design
Programming
Art

I conceived the core idea and mechanisms and designed all the levels, while the details of gameplay and player input were designed collaboratively.

Idea Developing

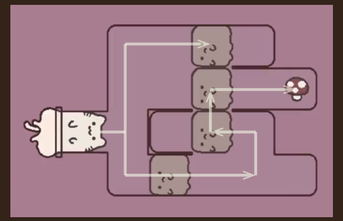
Root Can't Go Back !!!

Repeating Path is important in Sokoban like puzzles.
It will provide space for obstacles/targets to move.

Consider a simple and classic sokoban level as example.

Player will repeat its paths and box will be in same tiles in different steps.

Another example is ***Elasticat,*** by Zera.



The cat is elastic, it could strech out and shrink back. Player control the cat to push away hamsters and eat the mushroom

By shrinking back, cat could get to any tiles while leaving space for a path to target.

Compensation? Small Roots !

If roots could just normally branch but could not shrink, the levels will be too similar and limited.

What if there is a way that root could affect obstacles before it actually move there, like, using ***Small Roots***?

Small roots move along the side of the tile, thus not be blocked by obstacles but also can't push them.

When two small roots meet in same tile, they could converge into a ***Middle Root***. Middle roots act similar as big root despite they can't diverge or drink blood.

Big Root:

Block Obstacles ✓
Push Obstacles ✓
Pass Walls ✗
Drink Bloods ✓

Middle Root:

Block Obstacles ✓
Push Obstacles ✓
Pass Walls ✗
Drink Bloods ✗

Small Root:

Block Obstacles ✓
Push Obstacles ✗
Pass Walls ✓
Drink Bloods ✗

The *Go through* Matrix

Facing / Player	Big Root	Middle Root	Small Root
Big Root	✗	✓	✓
Middle Root	✗	✗	✓
Small Root	✗	✗	✗

Root can't go through itself, but can go through smaller roots.

Levels

14 levels in 2 divisions were designed during the jam.

Levels in 1st division could be solved by simple branching.

1-1	1-2	1-3	1-4	1-5	1-6	1-7
Introducing	*Introducing*	*Introducing*	*Practicing*	*Developing*	*Developing*	*Ending*
Move and Target	Branch	Obstacle	More Obstacles	Less Walls	More Wrong path	No walls More Targets

Levels

Levels in 2nd division are about the new mechanism of small roots.

2-1	2-2	2-3	2-4	2-5	2-6	2-7
Introducing	*Practicing*	*Practicing*	*Developing*	*Developing*	*Developing*	*Ending*
Branch Small Root Converge Middle Root	Small Root Middle Root	Small Root Middle Root	Middle Root move more	Less Walls	Saving Space	No walls More Targets

Levels

Illustration of some levels.

Level 1-6, choose side at the beginning.

Going left seems easy to reach one blood, but can't reach another one.

Going right seem difficult that one skelleton will stand before you multiple times.

Level 2-2, make way for skelleton.

Small root need to take a long way round.

Otherwise it would block the obstacle, and thus block the big root.

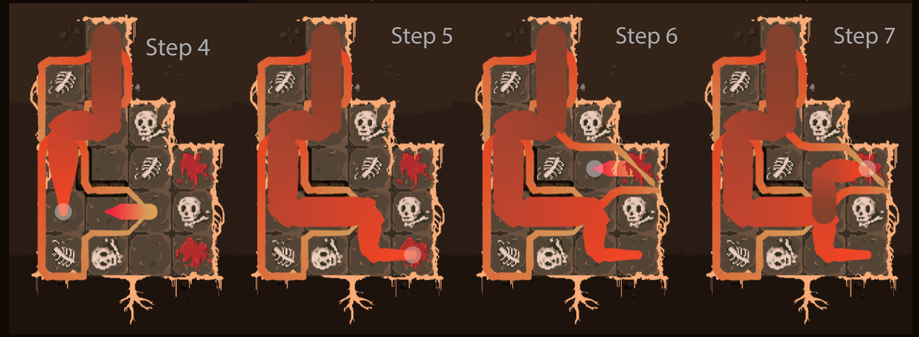
expected postion of Skelleton

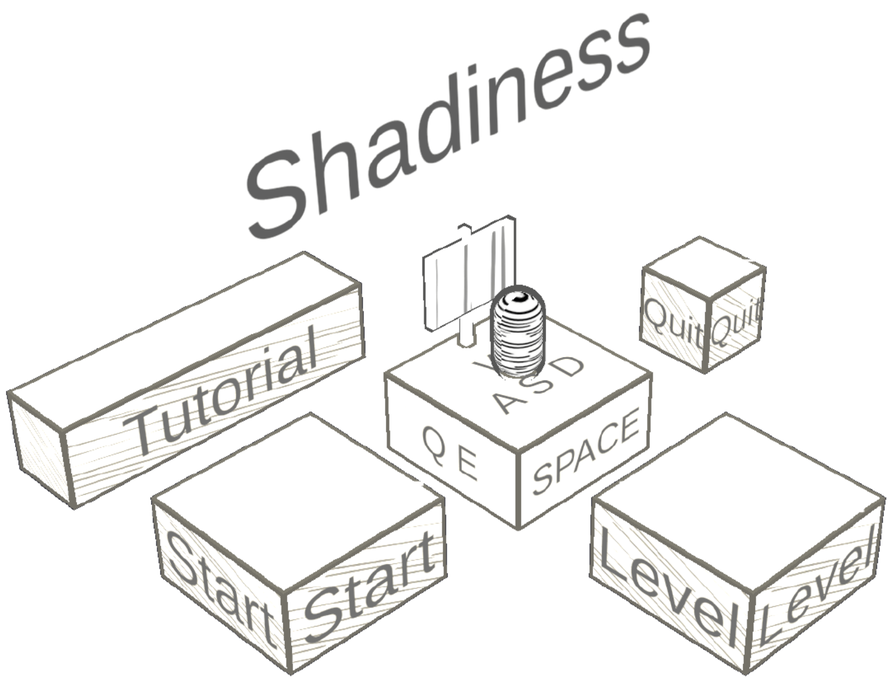
expected path of Big Root

Small root path 1

Small root path 2

Level 2-6, very strict about space.





Little Sandbox Game about Shade.
Solo-Developed with Unity,
2022.09 - 2022.12.

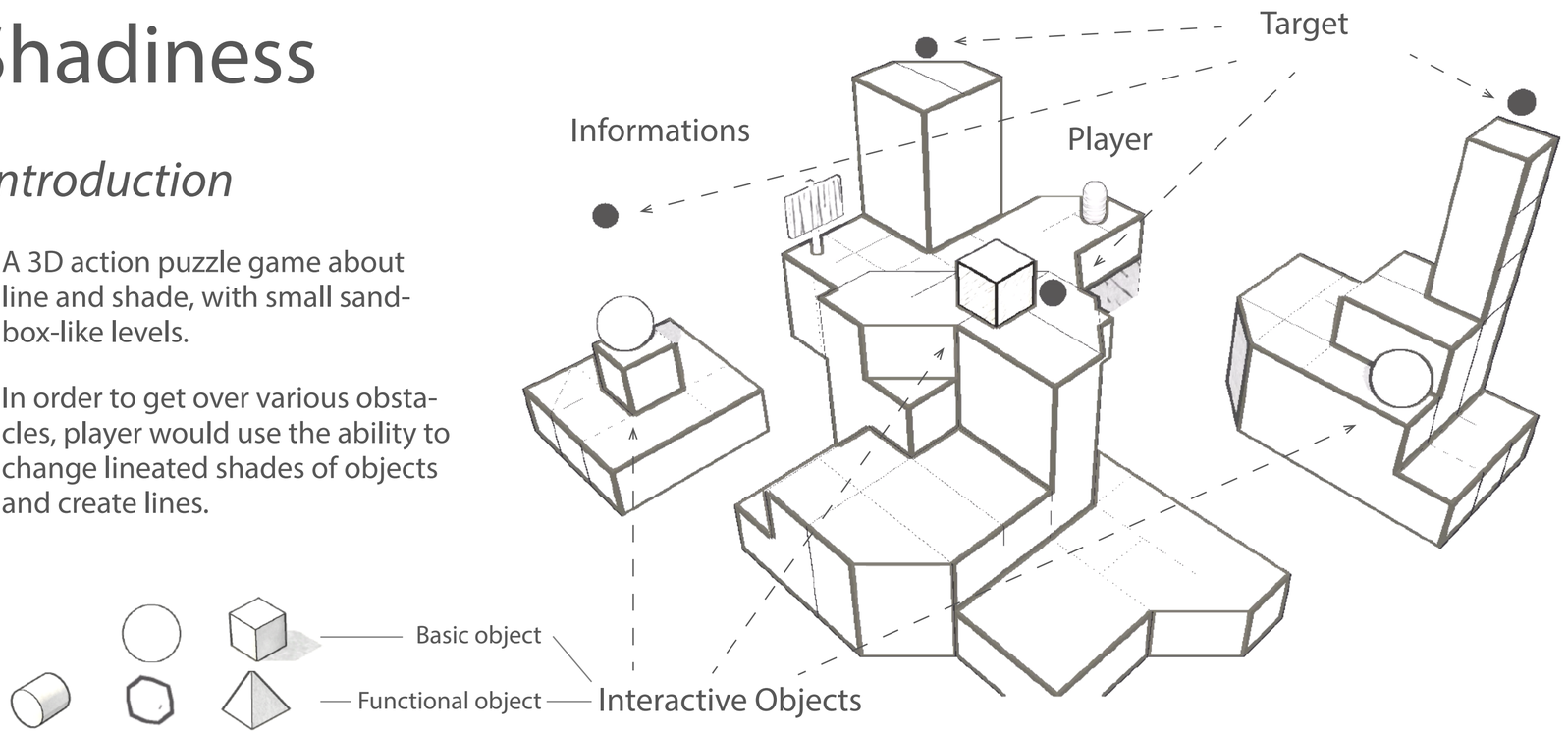
Demo: https://xiu0922koway.itch.io/shadlineee
Video: https://www.youtube.com/watch?v=vMuQf3GAeTs

Shadiness

Introduction

A 3D action puzzle game about line and shade, with small sand-box-like levels.

In order to get over various obstacles, player would use the ability to change lineated shades of objects and create lines.

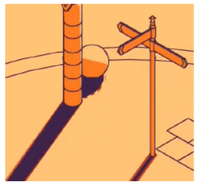


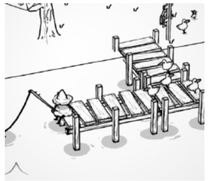
Inspiration

When learning sketch, I noticed shade would provide a sense of heaviness: the darker an object is, the heavier it felt to be.

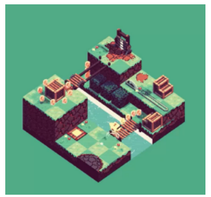
Basic Sketch Geometry

NPR





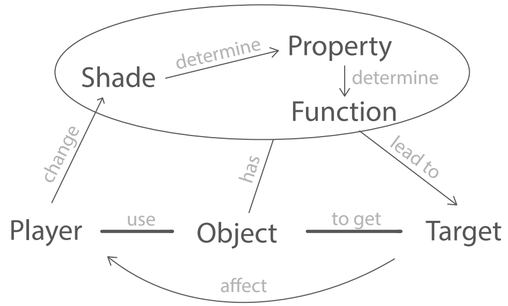
Sandbox Puzzle

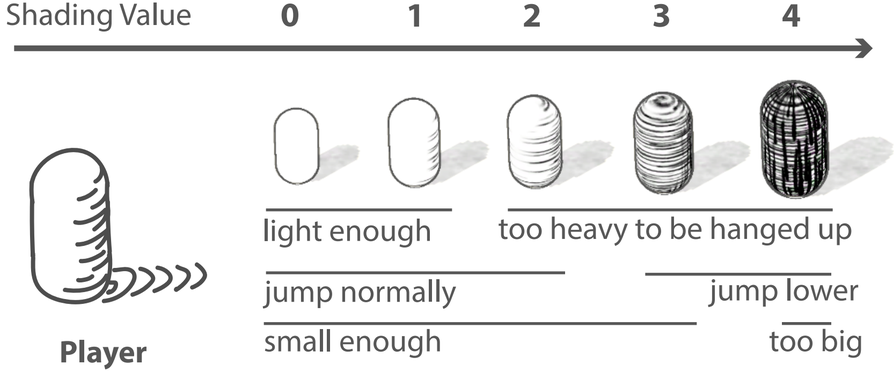


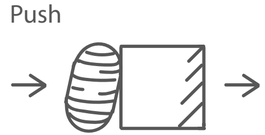
Gamplay

Shading Value

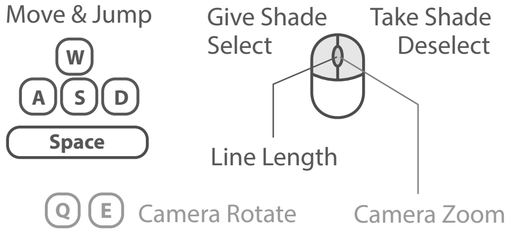
Shading Value is the basic unit in game. By taking and giving discrete shading value, player could change the shade of itself and other objects, and therefore change their **properties** and **functions**.

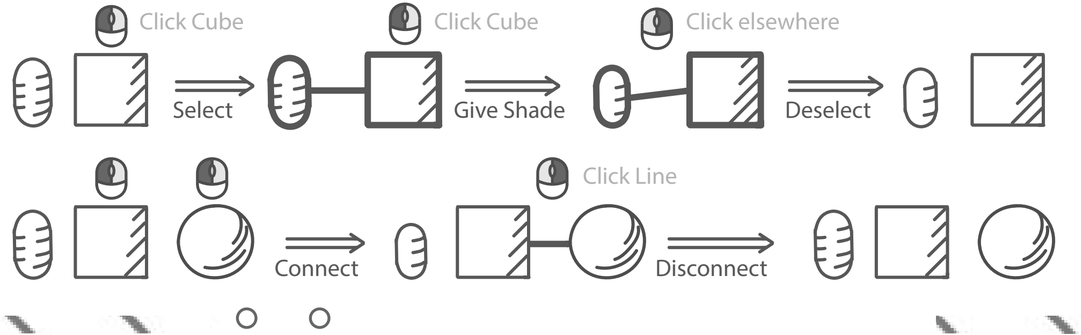




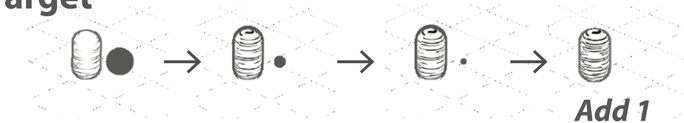


Player





Target

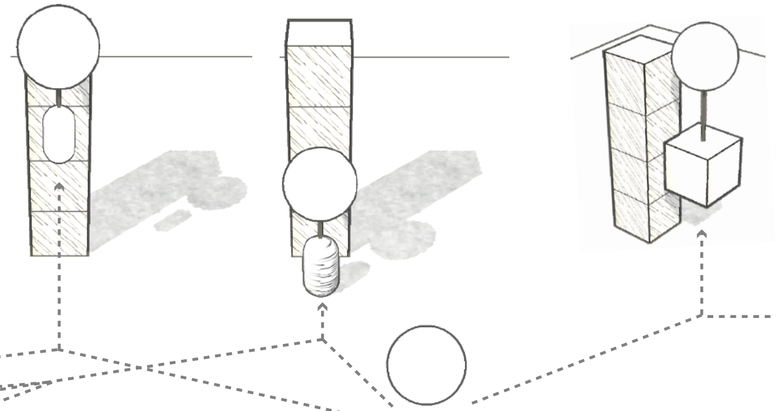


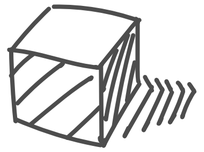
Player can only abosrb target when his shade value less than 3, hence the order of absorbing is need to be consider.

Interactive Objects

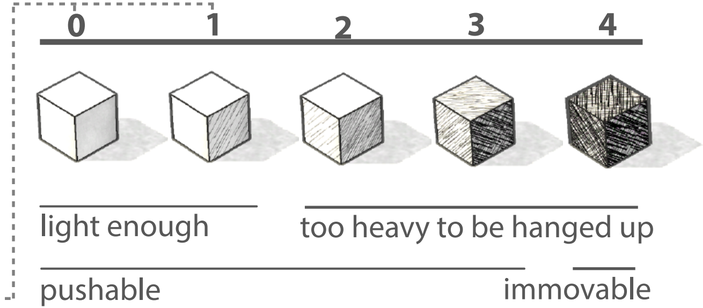
There are 5 iteractive objects in game.

Cube and ***Sphere*** are 2 basic objects, as the core puzzle solving elements through all levels.

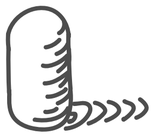




Cube

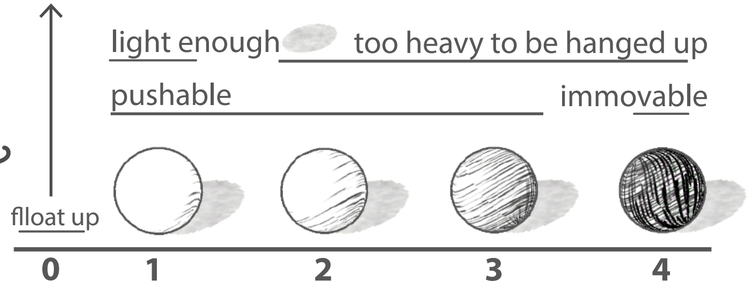


Shading Value 0 1 2 3 4



Player

Sphere

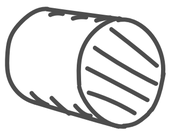


Cube could **be piled up and stood on** as an approach to **go higher**.

Sphere could **float up** to be a ballon and thus **carry** player and objects.

The size of these two object is slightly smaller than 1 unit in game.

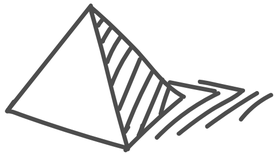
Shading Value 4 3 2 1 0 0 1 2 3 4



Cylinder

Cylinder: ***Wind Blower***
Blow wind accroding to its own shading value:
the darker, the farther.

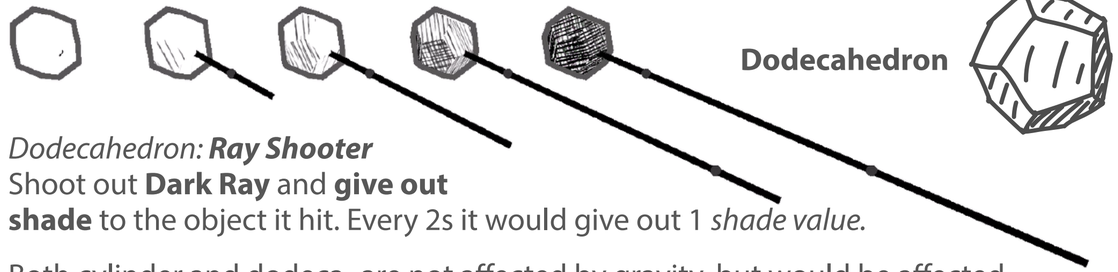
Cylinder and ***Dodecahedron*** and ***Pyramid*** are functional objects, for player to overcome more barriers.



Pyramid

Pyramid: ***Rotater***

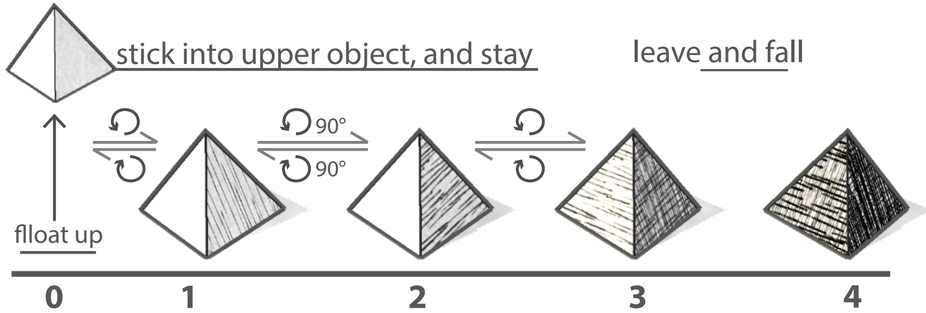
Rotate 90° when shade value changes. If shade value decrease, pyramid will rotate clockwise; if the shade value increase, it will rotate anti-clockwise. And Pyramid would **stick into** object its spike touches and **rotate along** with the object, when it is not too dark and heavy.



Dodecahedron

Dodecahedron: ***Ray Shooter***
Shoot out **Dark Ray** and **give out shade** to the object it hit. Every 2s it would give out 1 *shade value.*

Both cylinder and dodeca- are not affected by gravity, but would be affected by other cylinders or pyramids.

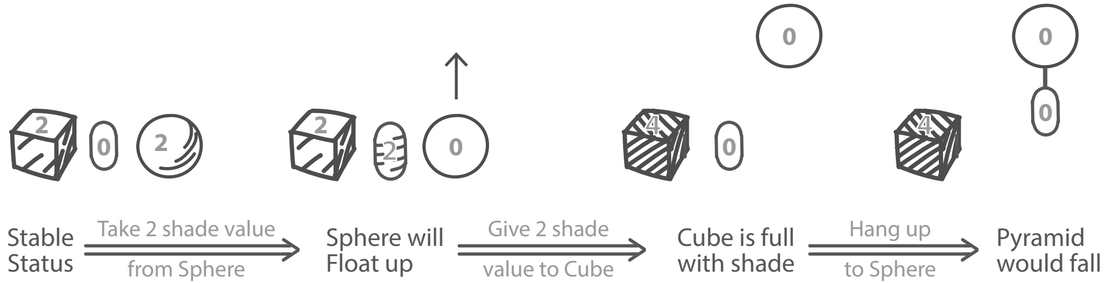


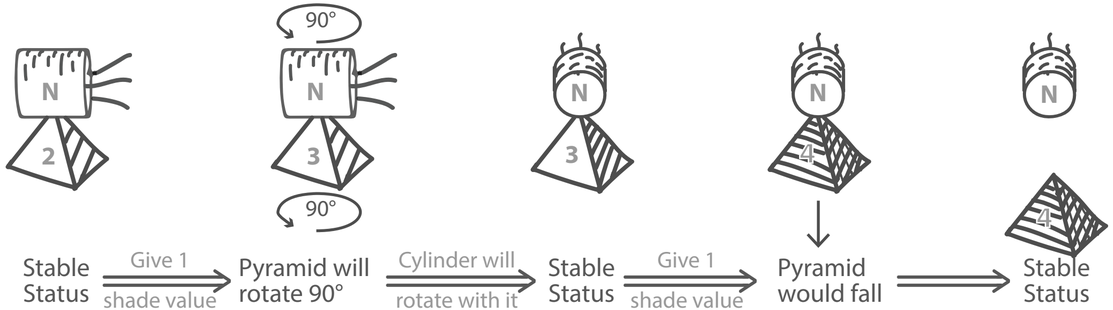
mass properties same as Sphere

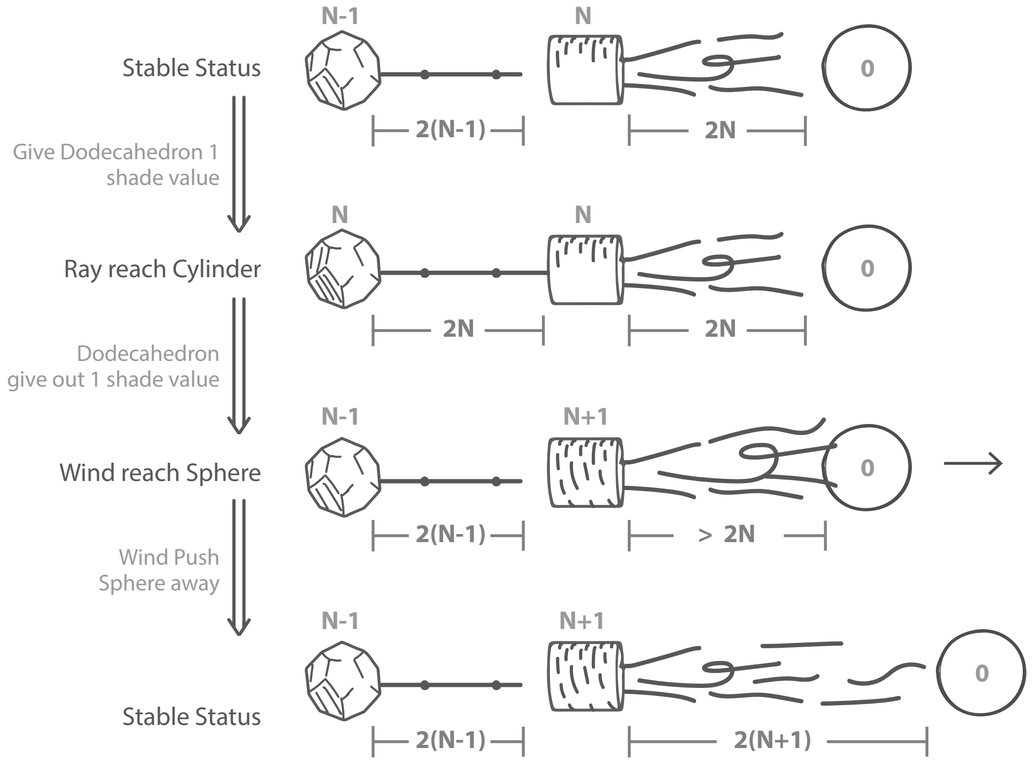
Object Functions

Illustration of functions and combination of objects.

N and numbers represent shade values or distance.



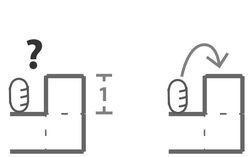




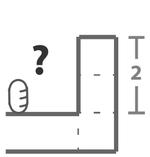
Level Design

Barriers and Approaches

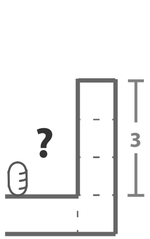
1. Height

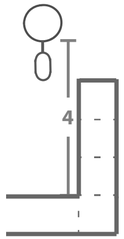


Jump

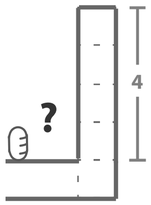


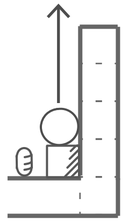
Find a Cube and Jump



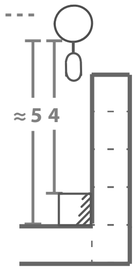


Float up a Sphere and Hang Up



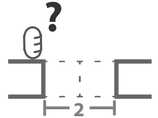


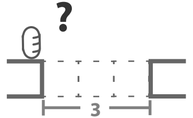
Float up a Sphere on the Box

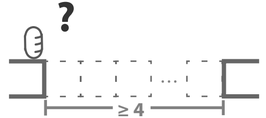


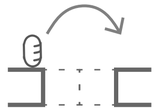
Hang Up

2. Distance

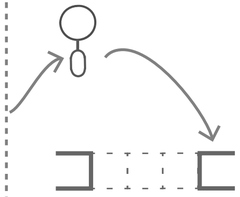




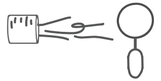




Jump to limitation



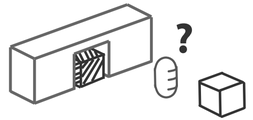
Run + Hang up

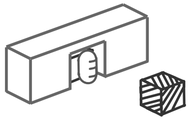


Wind, Floating Sphere

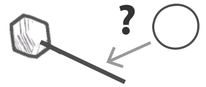
3. Shade Limit: (2) single obstacles

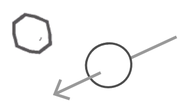
Small passage with a Heavy Box





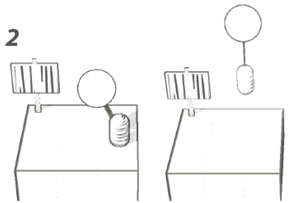
Ray affect Sphere path



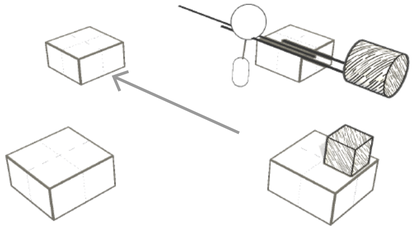


3. Shade Limit: (1) regional shade limit

Require ***at least 2*** Shade Value to control Sphere



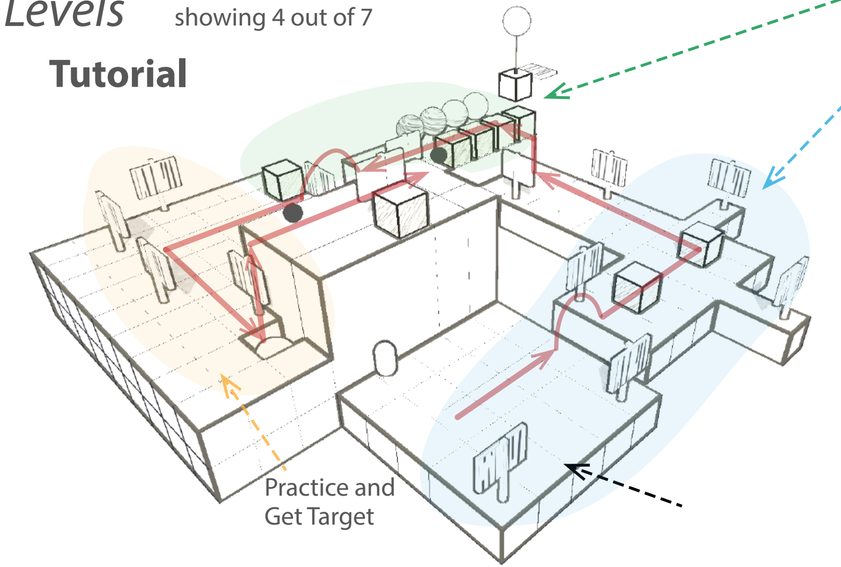
Wind could transport ***At most 1*** shade value



If target region require controlling of floating Sphere, Player would have to find more shade from other regions.

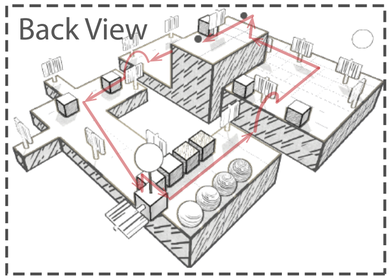
Levels showing 4 out of 7

Tutorial



Introduce objects' property

Introduce player control
and Shade Value interactions

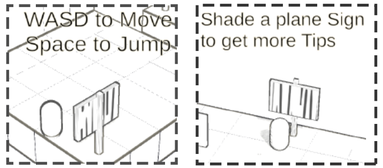


Player Path

Tutorail Region

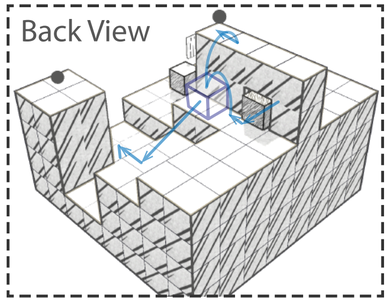
Tips Sign

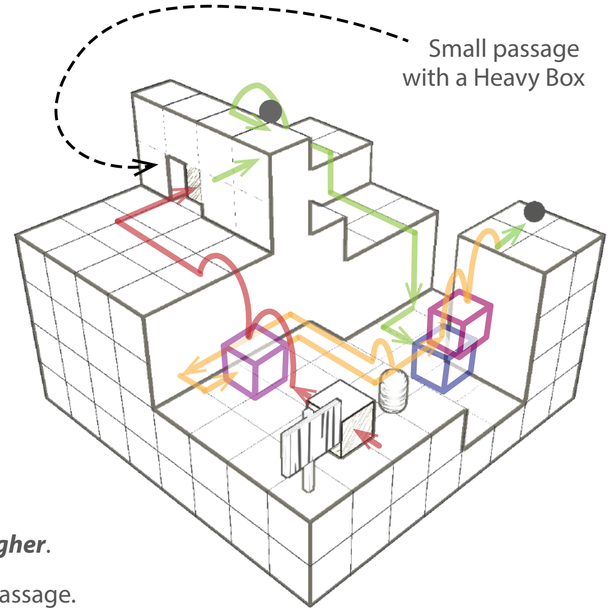
Show ***Text***
when player is near
if the Sign is ***shaded***



Level 1 Sokoban

Barriers: Height + Shade Limit





Push Cubes to right position to ***reach higher***.

Change shade of the cube in the small passage.

Take note of ***your own shade value***, to avoid:
can't jump normally high or push away cubes.

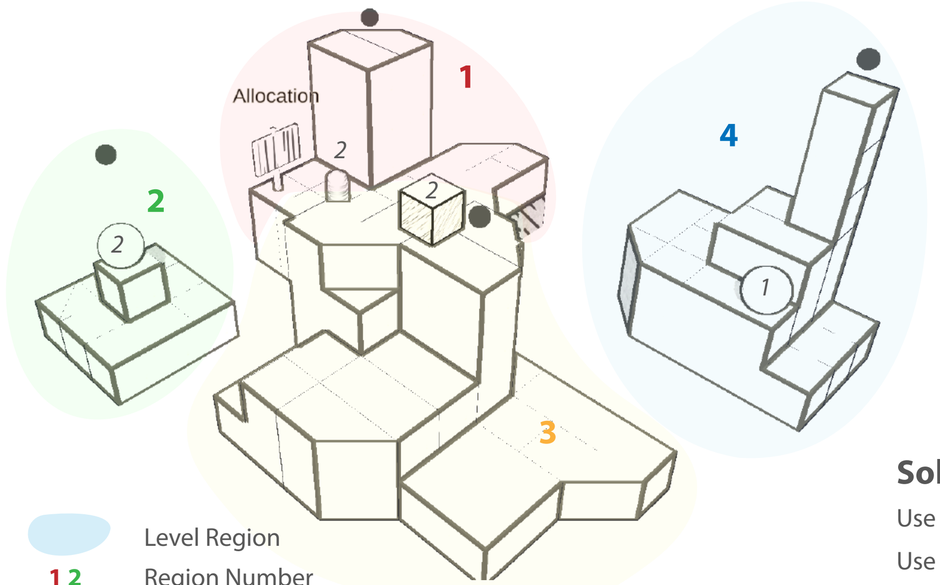
Take note of the ***Sequence*** of movement.

Player Paths of
different steps
(in sequence)

Positions of
Cubes after push

Level 4 Allocate

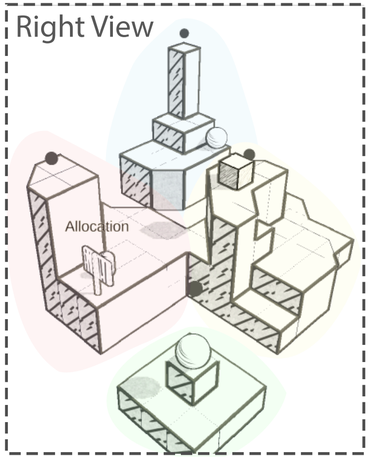
Barriers: ***Shade Limit*** + Height + Distance



Level Region

1 2 Region Number

1 2 Initial Shade Value



Solution:

Use sphere in 2 to reach targets in 1 and 2.

Use sphere in 4 to reach target in 4.

Directly reach targets in 3.

Shade Values Limit:

4 objects could contain shade value:

Player, Sphere, Cube and Sphere.

Their shade values at the beginning respectively:

2, *2*, *2*, *1* (a total of *7*) .

4 **targets** in the level, each provide *1* shade value.

So the ***shade values need to be contained*** is:

7+4 = 11.

Theoritically, the shade value capacity is:

4+4+4+4 = 16 > 11.

However, if targets in region 1,2 or 4 is the last to reach:

(1) the sphere's shade value need be 0 (to float),

(2) and player's shade value need less than 1 (to hang up).

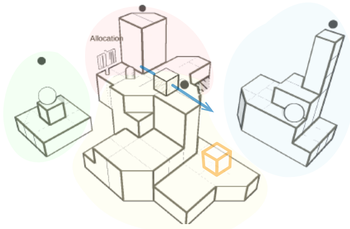
So the shade value capacity now is:

1+0+4+4 = 9 < 11.

The capacity is lower than the need.

Therefore target in 3 should be the last to reach.

Pass-ability between 4 regions at the beginning, dotted line with arrow for pass by spheres.



To reach region 4, Cube in 3 need to be pushed to specific position, in order to be:

(1) container of shade value;

(2) anchor of Sphere in 4

Level 6 Rotating

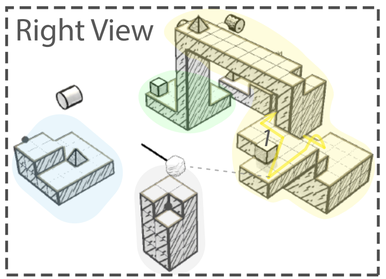
Barriers: Distance + Shade Limit

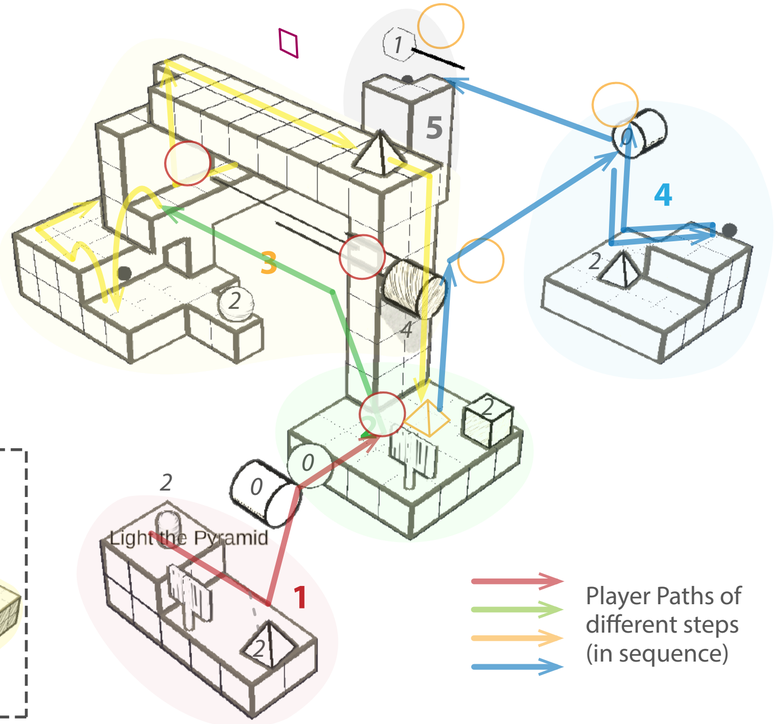
Level Region

1 2 Region Number

1 2 Initial Shade Value

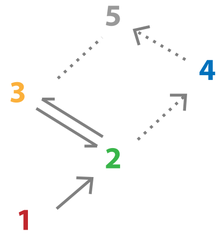
Positions of objects after move





Player Paths of different steps (in sequence)

Pass-ability between regions at the beginning. Dotted line with arrow for pass by spheres, dotted line without arrow for only selectable.



Introducing the pyramid in region 1, and practicing interactions in 2 & 4.

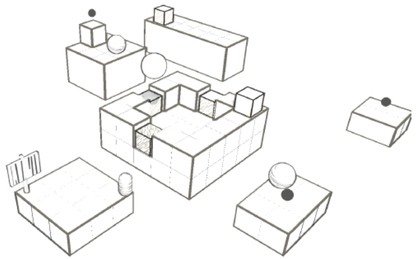
In region 3, player need to **remotely control** the dodecahedron in region 5, using ray to give cylinder shades.

Cube and Sphere in region 3 are used for contain shade values.

Other Levels

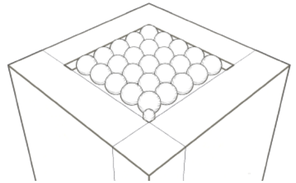
Level 2 Hang Up

Practicing Sphere interactions.



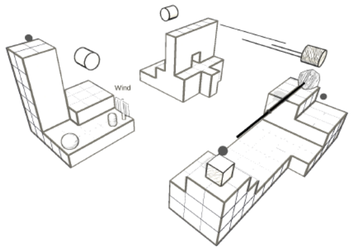
Level 3 Hide & Seek

Find the taget hidden in spheres.



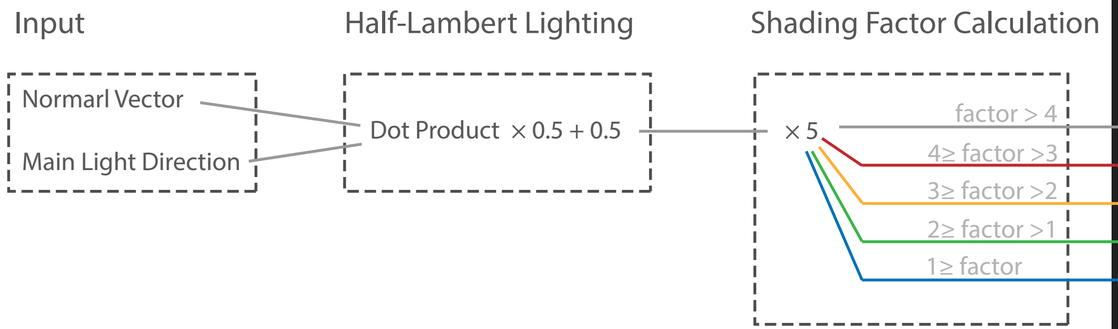
Level 6 Wind

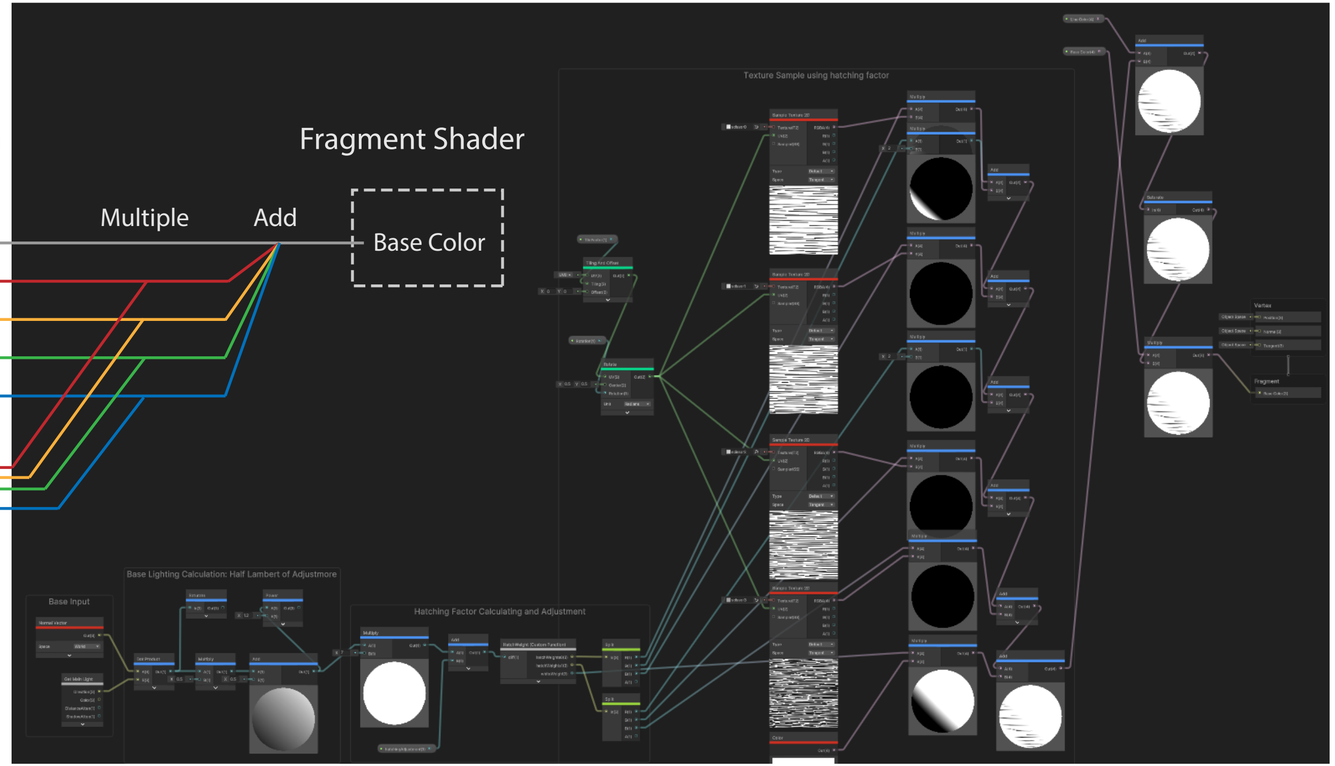
Introducing Wind and Ray, practicing shade value management.



Shader

Sketch Style Shader is referring the famous article
“Real-time hatching”, Praun et al. 2001 on SIGGRAPH.





A 2D platformer with
10 seconds limit

Ludum Dare 51
Every 10 Seconds

Jam version on *ldjam.com*

A puzzle game with
a Time Shadow

traveling back
Every 10 Seconds

Update version on *itch.io*

Introduction

In this multi-timeline game, player will control a ignited bomb to get to target before explosion.

Player would finish a level within several well-planned explosion with its helpful time shadow.

Each level is a challenge in both action and puzzle.

Rules

You have 10 seconds to reach the **Target** before you **explode**.

There are **doors** blocking your way.
Step on their buttons to keep them open.

You will reborn after explosion.
A ***shadow*** of you will repeat your last path.

Shadows clone your paths.
They won't be blocked by doors but could step buttons for you.

Game View

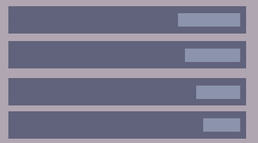
Inspirations

Braid

Retro Rift

Glich Loop

Contributions in a team of six.



Details of gameplay was discussed collabratively; I delivered an overall analysis of level structure and designed 2 levels.

I wrote the codes of game manage and UI event, and presented the particle and screen effect.

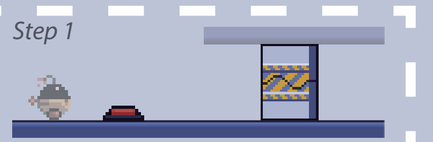
Illustration

Button & Door

Keep stepping to open

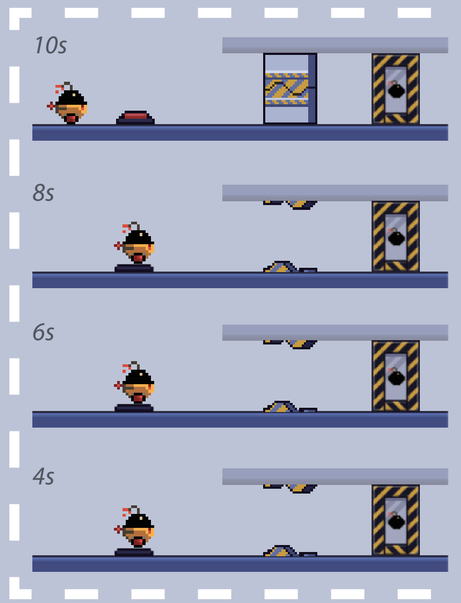
Player

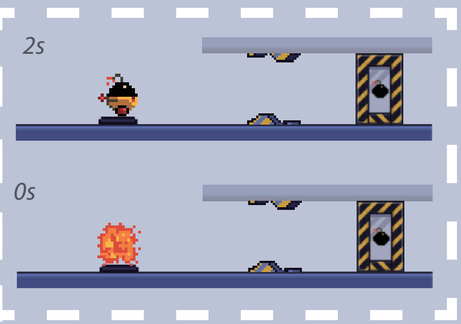
Shadow



How to pass a Door ? *The Basic Solution*

Round 1



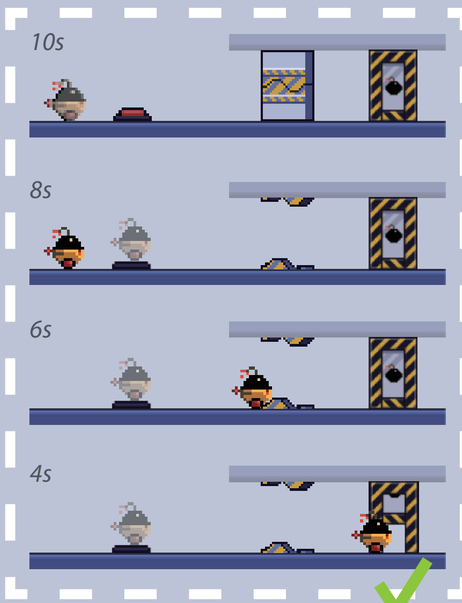


To finish a simple level with 1 door, it would take 2 rounds.

In round 1, player standing on the button until explosion.

In round 2, the shadow will step on the button, the door will be open and player could pass.

Round 2



Level Structure

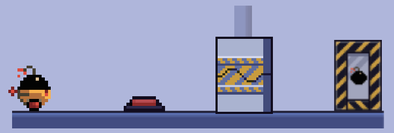
How many basic structures?

Essentials of a level: player  , target  (and barrier:  )

Case 0, No Button & Door

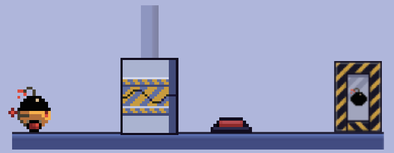
Structure 1

Case 1, One Button & Door



Structure 2

Door block the path.



No solution

Button have to be outside the door.

Case 2, Two Button & Door

Following out logic in *Case 2*, there are 2 questions we should consider:

Does a Door clock the path to Target? & *Is a Button outside a Door ?*

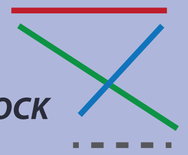
There are also some preconditions to make the door and level meaningful:

(1) The 2nd Door must block the path to Target.
(2) The 1st Button must be outside every Door;
the 2nd Button must be outside the 2nd Door.

Thus the situations for 2 questions are:

The 1st Door ***BLOCK*** the path to Target.
it must block 2nd Door

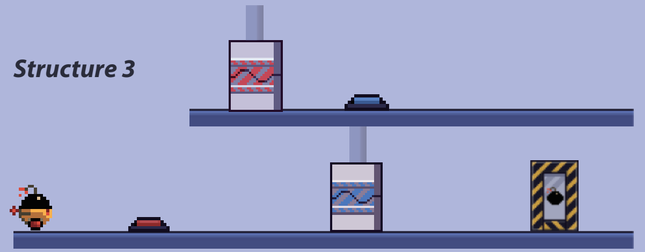
The 1st Door ***DON'T BLOCK*** the path to Target.
it must block something



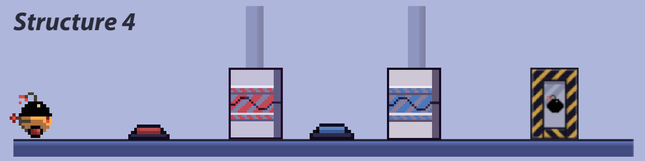
The 2nd Button ***Inside*** 1st Door.

The 2nd Button ***Outside*** 1st Door.

Structure 3



Structure 4



1st Door block nothing, not a new structure.

Structure 5

Level Structure Solutions

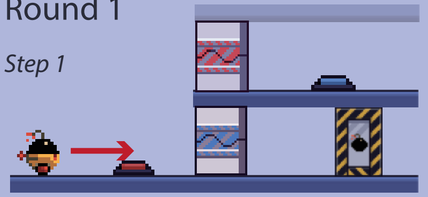
Solution for ***Structure 1*** is direct.
Solution for ***Structure 2*** was the *basic solution* illustrated above.
Structure 5 is similar to ***Structure 2*** and has same solutions.

Here we focusing on ***Structure 3*** and ***4***:

Structure 3

Round 1

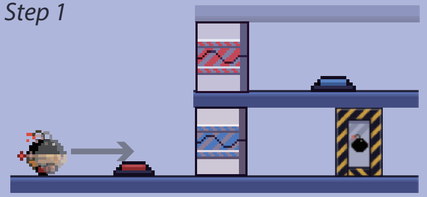
Step 1



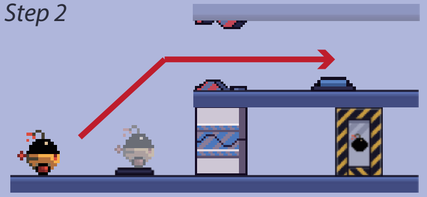
Step 2

Round 2

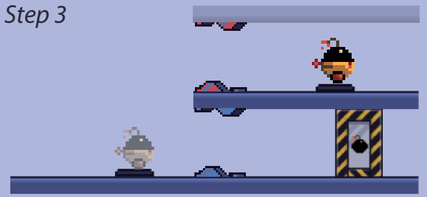
Step 1



Step 2

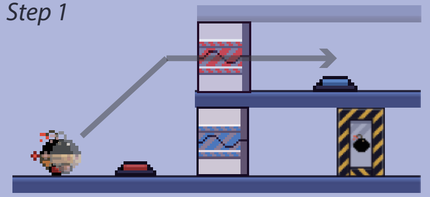


Step 3

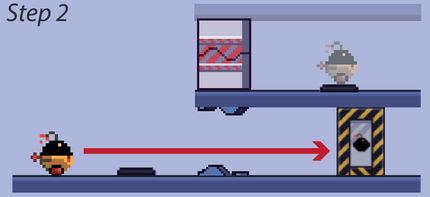


Round 3

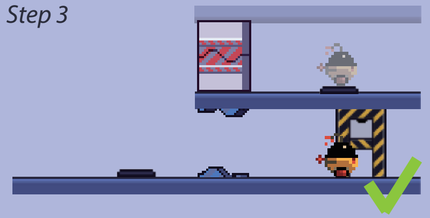
Step 1



Step 2



Step 3



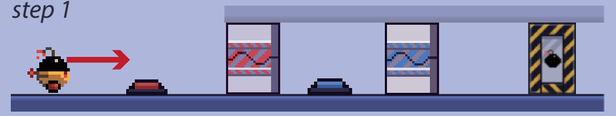
Solution of Structure 3 could be understand as two succesive "*basic solution*" processes.

Round 2 is the overlap of both process, when both shadow and player were steping on buttons.

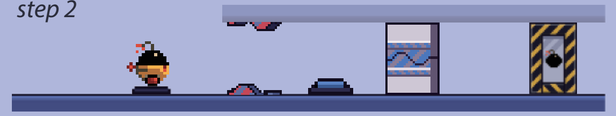
An example of Structure 2 in our game is level 5.

Structure 4 Round 1

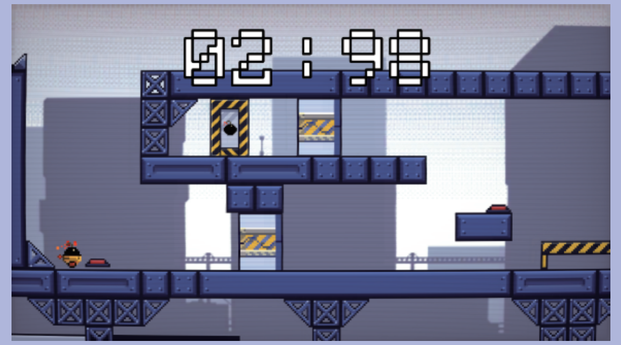
step 1



step 2

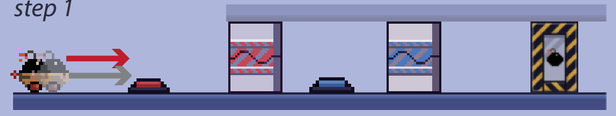


An example of Structure 2 in our game is level 6.

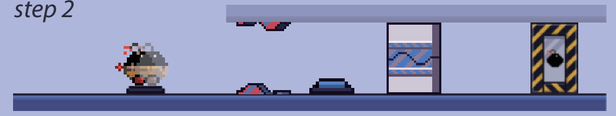


Round 2

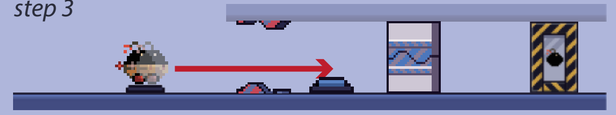
step 1



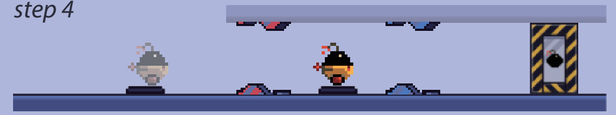
step 2



step 3



step 4

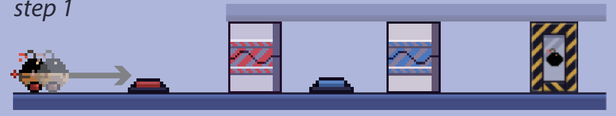


The Player's **waiting** in round 2 *step 2* is the key.

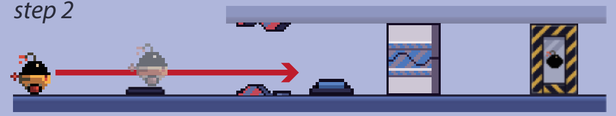
Player could pass through the first door in round 3 only when he did this waiting in round 2.

Round 3

step 1

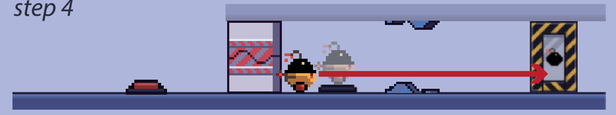


step 2



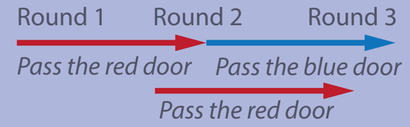
step 3

step 4



step 5

Solution of Structure 3 could be understand as three "*basic solution*" processes.



There is still a succesive relationship as above. And the 3rd process started early in round 2.

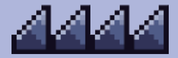
In round 2, player have to step on both buttons susscessively. The time of stepping on each button will be depended on level specifics.

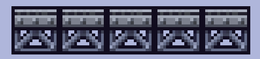
Levels

We delivered 10 levels during LD51. We only used at 2 two Button & Doors in our levels. Reasons are:

(1) Player could only affect 2 buttons at the same time with only 1 shadow. Because of this, structures with more button & doors are basically combination of and nesting of structure 3 & 4, and their solutions will be cumbersome and repetitive.
(2) Only 10 seconds of one round. Too many operations would be difficult in a round.

(3) Don't take too many rounds. More rounds means more mistake oppotunities and more repeat to finish level.





By bringing in small mechanisms like *spike*, *crumbling platform* and *moving platform*, we presented levels with more challenges on acting and timing.

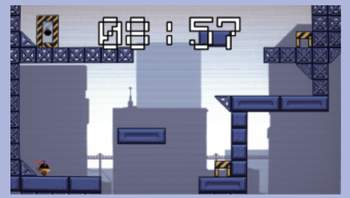
Level 1

Structure 1

Introducing

Move and Target

Level 2



Structure 1

Practicing

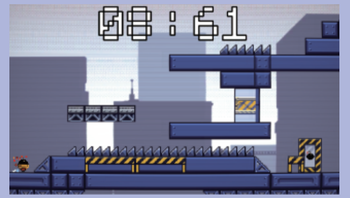
Level 3

Structure 2

Introducing

Shadow, Button & Doors

Level 4



Structure 2

Practicing

Level 5

Structure 3

Introducing

Two Button & Doors

Level 6

Structure 4

Developing

Level 7

Structure 3

Practicing

Level 8

Structure 3

Developing

1 Button, More Doors

Level 9

Developing

Challenge in Jump

Level 10

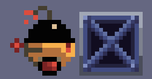
Ending

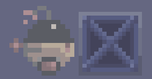
Challenge in Timing

After Jam

After LD51, we adjust levels' arrangement and reduced previous levels to 8 as the first division.

We introduced a new mechanisms, ***Shadow Box***, and bring 4 new levels as the second division.





The Box could also generate a shadow repeating its path in last round. Bth box and its shadow could affect button.

Now player could affect at most 4 buttons at the same time, which brings us more possibilities of level design.

Level 2-1

Level 2-2

Level 2-3

Level 2-4

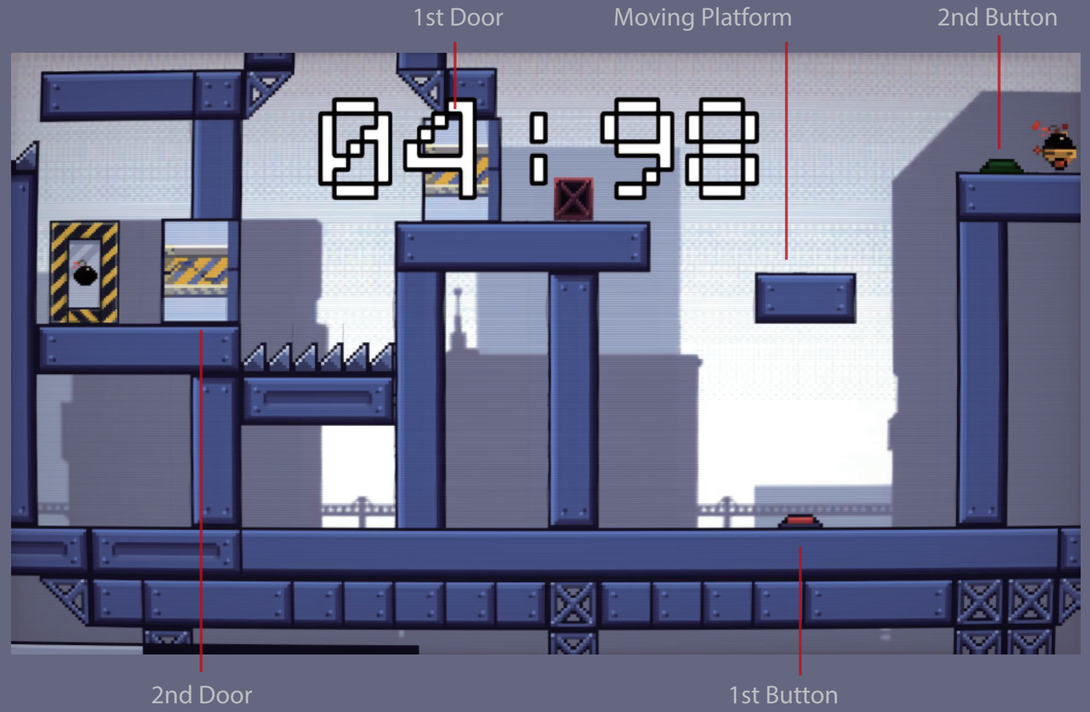
Besides generating time shadows, box also have other functions:

as a stepping stone:
(1) for player jump higher: level 2-2
(2) blocking Spikes: level 2-1, level 2-2

or go to places player can't go or can't get back:
(3) Passing through Spikes: level 2-2, level 2-3
(4) Going deep down: level 2-1, level 2-4

I designed level 2-1 and level 2-4.

Illustration of level 2-1: challenge in timing and jumping.



Round 1

Step 1
Push Box to 1st Button.

Step 2
Jump back to step 2nd Button.

Step 1

Step 2

Step 1

Step 2

Step 3

Step 4

Round 2

Step 1
Box shadow press 1st Button.

Step 2
Push Box through 1st Door;
Box land on the Spikes;
Jump on Box.

Step 3
Player Shadow step on 2nd Button.

Step 4
Reach the Target.

Illustration of level 2-4: challenge in puzzle solving

Buttons and doors are arranged in order from left to right.

Round 1

Step 1
Push Box to 1st Button;
Pass through 1st Door.

Step 2
Step 2nd Button.

Round 2

Step 1
Box shadow press 1st Button.

Step 2
Push Box through 1st Door;
Box Land on 2nd Button

Step 3
Pass through 2nd Door.
Step on 3rd Button.

Step 1

Step 2

Step 1

Step 2

Step 3

Player could step 1st Button in Round 1.

The purpose of first 2 rounds is to let player reach 3rd Button.

Round 3

Step 1

Push Box to land on 1st Button.

Step 2

Box Shadow land on 2nd Button;
Pass 1st and 2nd Doors.

Step 3

Step on 3rd Button, and wait;
Shadow Step on 3rd Button.

Step 4

Pass through 3rd Door;
Step on 4th Button.

In round 3, all four objects (player, player's shadow, box and box's shadow) are stepping on a button.

The movements in round 3 and 4 are basically certain, because the 1st and 2nd buttons have to be pressed by box and the 3rd and 4th buttons can only be stepped by player.

The waiting in step 3 of round 3 is similar as the waiting in *structure 4*. After solving previous levels, this obstacle won't be too complex for players.

Round 4

Step 1

Shadow Box land on 1st Button.

Step 2

Pass through 1st Door;
Push Box to land on 2nd Button;
Pass through 2nd Door.

Step 3

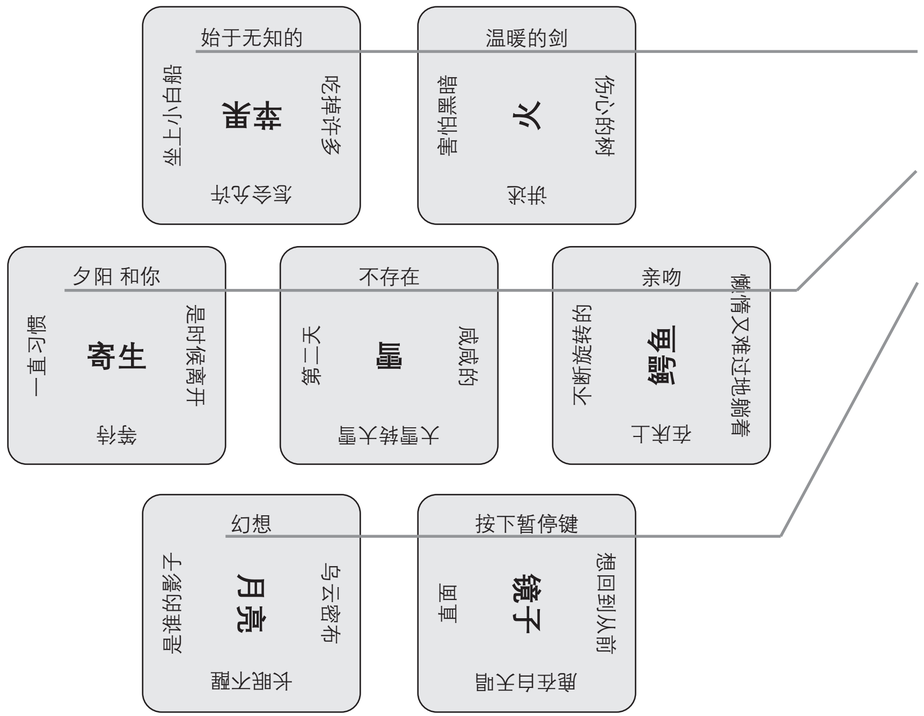
Shadow Step on 3rd Button;
Pass through 3rd Door.

Step 4

Shadow Step on 4th Button;
Pass through 4th Door.

Reach the Target.

Level 2-4 is our only level requiring 4 rounds to finish. Thus we kept other elements in level 2-4 to be simple.



始于无知的　温暖的剑

夕阳 和你　不存在　亲吻

幻想　按下暂停键

A warm sword from innocence.

There is no sunset no you. Kiss,

imagine, hit the pause button.

Rose and Poem the Zoo

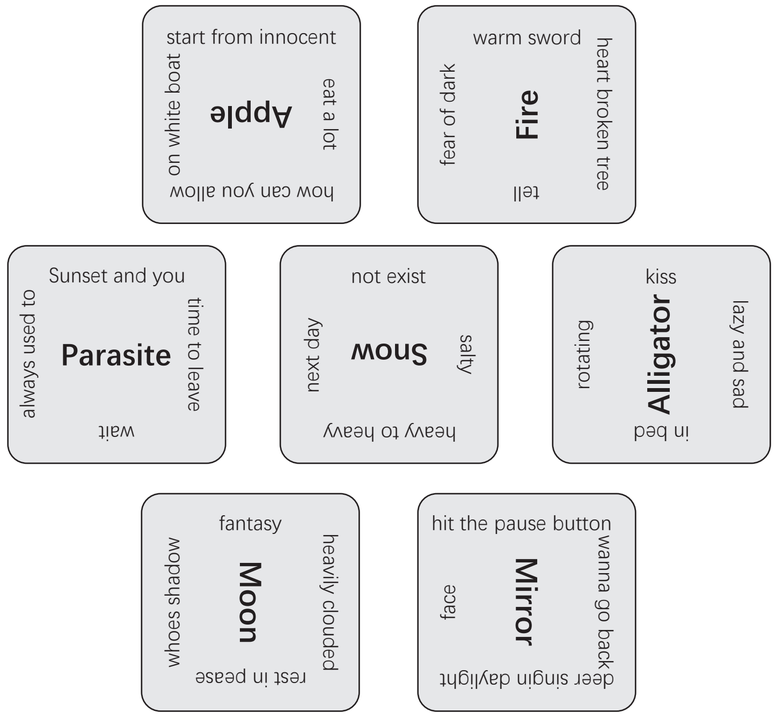
玫瑰与诗：动物园

A print & play card game

To wirte and guess a poem

https://xiu0922koway.itch.io/rose-and-poem

Translation of cards above



Introduction

This game is about writing and interpreting poems with a certain corpus.

Play time: 10 ~15 min Player: 2

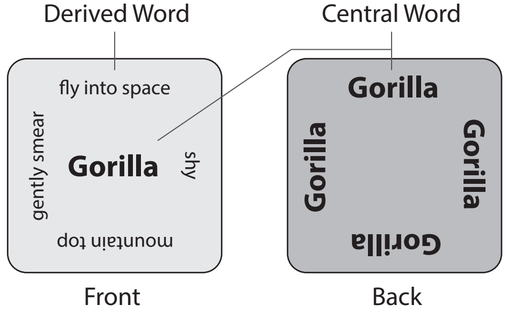
One player will use these square cards to write a poem, the other player will guess the specific words and phrases.

Pepare 2 sets of cards to play. The 2nd set will be the reference for guessing.

Word Cards

Each card has a ***Central Word***, representing a core image, and four ***Derived Words*** relating to its central image.

There are 30 cards in the game. 15 cards are about animals, like gorilla, rhino and cat.

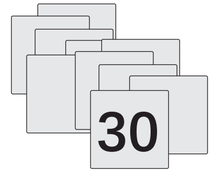


Usage

To use a central word in poem, please place the card with the back face up.

To use a derived word (or phrase), please place the card with the front face up, and rotate the card until the derived word is facing forward.

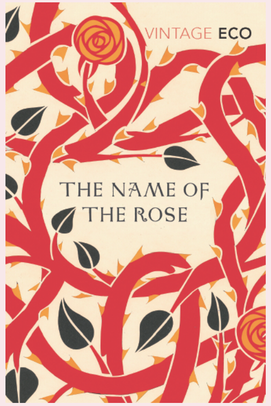
A set of cards



Use *Gorilla*

Use *Mountain Top*

Inspiration



From Saussure's "*arbitrariness of sign*" to Derrida's "*instability of meaning*", the uncertainty of interpretation has been widely dsicussed.

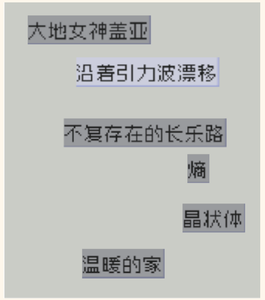
In *Interpretation and Overinterpretation*, Umberto Eco limited this uncertainty by proposing the idea of *intentio operis*, the intention of the text.

In this game, I tried to represent the intention of the Central Word with four Derived Words, as a simulation to both creating and interpreting.

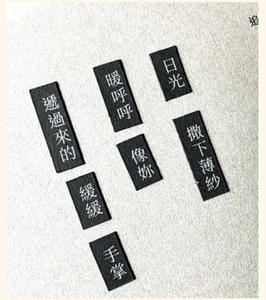
Interpretation from a much wider semantic field is now transformed into guessing from four (weakly or strongly) related words or phrases, which could have more potential interpretations. This transformation gives guessing more fun.

The name of the game is also inspired by Eco's work, *The Name of the Rose*.

Games about poem writing:



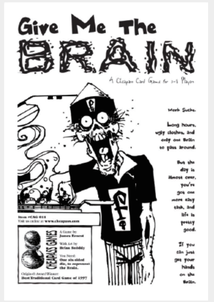
Make a Poem



詩心引力

Print & Play games:

Idea of present a print & play board game was inspired by the work of ***James Ernest*** and his ***Cheapass Games.***



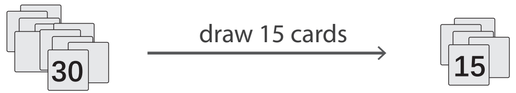
The game was prepared to publish on the 2023 annual of an art community, 水朝夕, at Zhejiang University.

Friends here also helped me to do game test and provided some word cards.

Illustration

0.Prepare

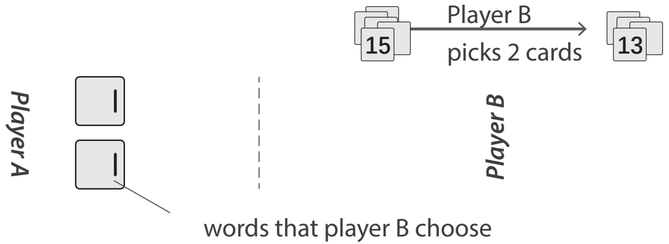
Draw 15 cards from library.



1st set of cards

1.Specify

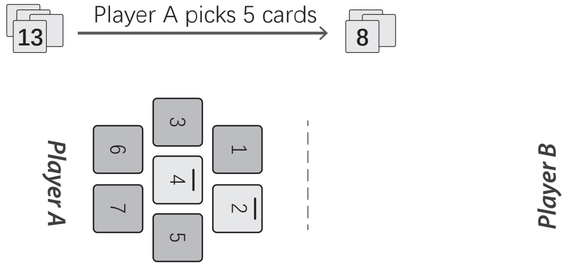
Player B specify 2 words for Player A to use in the poem.



words that player B choose

3.Write a poem

Player A picks another 5 words, use this 7 words to write a poem.



The 5 cards that player A picked should face down.

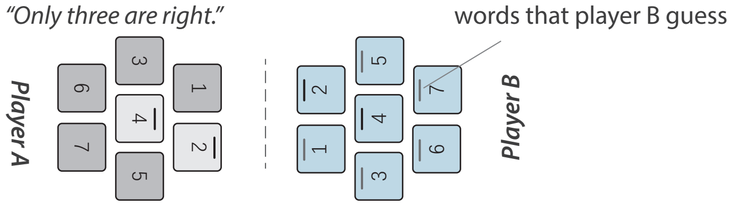
Player A could use a central word or a derived word.

The poem should have a 2-3-2 structure:
The 1st line and the 3rd line each has 2 cards, and the 2nd line has 3 cards.

4. Guess

Player B will show the guess and player A will answer how many cards were guessed right.

2nd set of cards

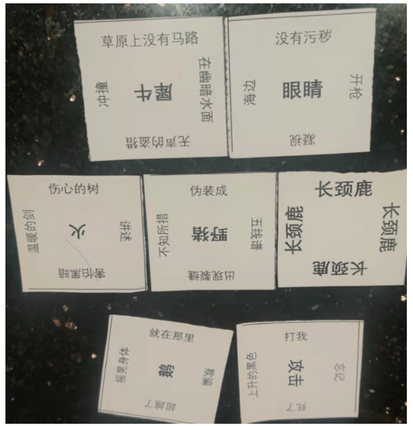


5. End

If player B guessed the whole poem within 4 tries, player B would success.

Or player B would fail.

Poems



草原上没有马路 没有污秽
No roads in savanna, no squalor.

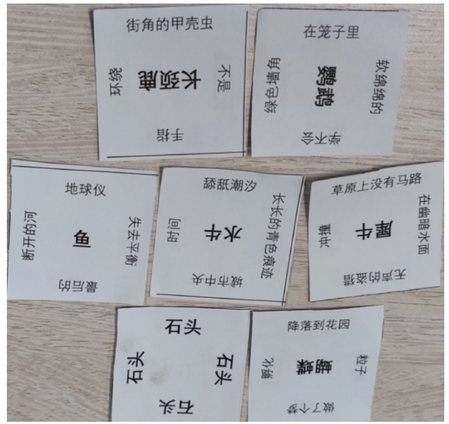
伤心的树 伪装成 长颈鹿
A heartbroken tree disguised as giraffe,

就在那里 打我
punched me right there.

现代生活 死了
Modern life is dead.

不断旋转的 猩猩 想回到从前
A whirling gorilla wish to go back,

却看不见 欺骗
but can't see the deceit.



街角的甲壳虫 在笼子里
Beetle on the street corner, locked in the cage.

地球仪 舔舐潮汐 草原上没有马路
Globe lick the tide, no roads on the grassland.

石头 降落到花园
A rock lands on the garden.

Poetry is difficult to translate, and so are the words and phrase that compose it.

Because of the differences of grammar and semantics between Chinese and English, literally translating of the corpus in cards and combining them would be probably unreadable.

Thus, I translated poems listed here by meaning.

I'm looking forward to make a English version with the help of native speakers.

The core machanism of this game is integrated in the form of the word card.

It is encouraged for player to add their own corpus or define their own rules like the structure of poem or the guess methods.