LIGHT IT

How to Make Level

v1.0.0

HOW TO MAKE LEVEL

Introduction

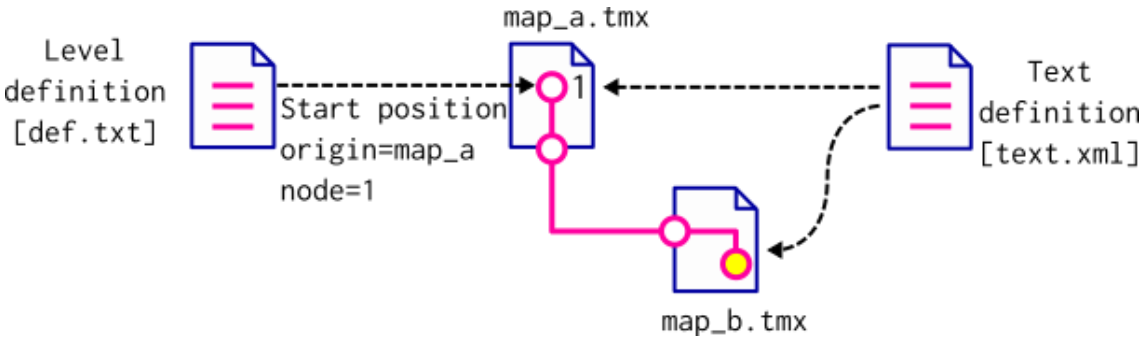
This document explains the format of data constructing a level and how to set it up. I recommend you to read this with checking sample data. You can download a sample data from a web site (http://torazoit.com/lit/level.html).

Files constructing a level

You have to make files under one directory.

```
Directory --+-- Level definition file [def.txt] (1 file / Necessary)
            +-- Text definition file [text.xml] (1 file / Necessary)
            +-- Map files [***.tmx] (More than 1 file )
            +-- Music files (Not necessary )
```

This figure is the relationship between files without music files.



Level definition defines general settings, like start position and back ground music.

Map file define field, enemies and so on. One level is made of several maps. Map file is tmx format. A map and another map is connected by nodes. Player can move between several maps through nodes.

Text definition defines texts used in the game. The title of level is defined in this file, too. A text is associated with a key used in map data.

You can play your music data as bgm by locating the music file in the same directory.

Level definition file

Level definition file defines general settings of a level, like start position, bgm and so on.

File name

```
def.txt
```

File name must be ‘def.txt’. The format is just a plain text file.

Format

```
origin=Tmx file name of start
node=Node name of start position
bgm=Music file name
items=Initial item list (described later)
```

Start position is defined by **origin** and **node**.

Back ground music for all maps is defined by **bgm**. However, you can also set a bgm for each maps in map (tmx) files.

Initial items are defined by **items**. The item section explains how to set it up.

Format of BGM

	Format
From default music	BGM identifier (described below)
Your music in the same directory	@file_name (including an extension)
Silent	!

The list of BGM identifier

This table is the listing of BGM identifiers. These are used in '**bgm**' of level definition file and '**bgm**' property in map file.

Identifier	Characteristic
core	Mysterious, Silent
triplex	Gentle
stealthy	Mysterious, Silent
tribe	Percussion
popo	Fantastical
myth	Mysterious, Silent
homeland	Noisy
fate	Noisy
chant	Like chant
steps	Noisy, Slow beat
env_silent	Silent, White noise
env_sea	Ocean
env_river	River

Text definition file

This file defines texts used in documents and pop-up messages.

File name

The file named ‘text.xml’ in the same directory.

Format

text.xml

```
<?xml version="1.0" encoding="UTF-8"?>

<root>

  <text key="@title">

    <en>Title</en>

    <ja>タイトル</ja>

  </text>

  <text key="key1">

    <en>Hello.</en>

    <ja>こんにちは。</ja>

  </text>

</root>
```

This file defines two texts. The keys are @tiele and key1.

@title is a specified key. It is used as the tile of the level.

You can define text for every languages. English is ‘en’; Japanese is ‘ja’.

About special unit

Frame

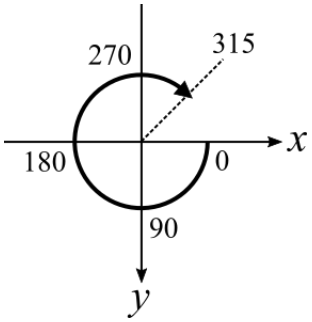
There are many setting items with unit named **frame**.

This game tries to make frame per second sixty. So, one frame is sixty part of one second. For example, half second is about 30 frames.

Degree

This figure is the coordinate system of this game. The angular degree increases clockwise from right direction.

The unit of angle must be degree (0 to 359) for settings.



Cell as length

If '**cell**' is used as length, it is the length of a side of a tile.

Map file

A map file is made with a free software named ‘Tield’. This game will load tmx format file. This is the default format type for this application.

Custom properties

Name	format	Descriptiln	
bgm	BGM identifier	The music is played in this map file.	O

N: Necessary, O: Optionally

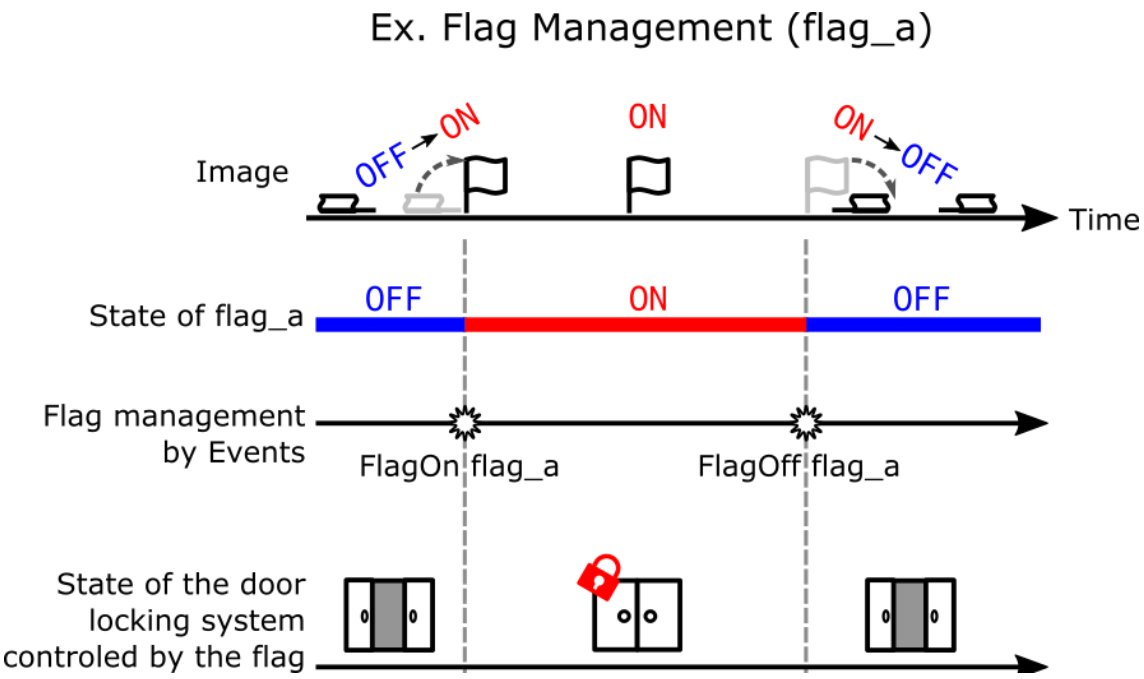
How to set up custom properties

This figure explains how to set up custom properties. You will do this operate many times.

1. Map->Map Properties to show window
2. Press ‘+’
3. Input ‘bgm’ in text box on pop-up window.
4. Input a value you want.

Flag Management

Flag is conditions for various events. For example, the typical use of flags is that, make flag A on when player go through a point, and a door is locked while flag A is on. This figure shows that situation.



How to make a flag on and off

- Generate ‘**FlagOn’** or ‘**FlagOff’** events by **EventGenerator**.
- Set flags for ‘die-event’ property of specified enemies (BlockerA, BlockerB, and Yama).

When to use flags

- For ‘lock’ property of **Door**. Set a flag to the property; the door is locked while the flag is on.
- As conditions of **EventGenerator** generating Events. **EventGenerator** generates Events when a flag is on.
- As conditions of showing **Message**. A message is shown while a flag is on.

Event

Events manage flags, open and close doors, flashes the screen, and show messages.

Events are generated by **EventGenerator**.

Event Format

Format	Description
FlagOn ␣ flag-id	Make the flag on.
FlagOff ␣ flag-id	Make the flag off.
OpenDoor ␣ door-id	Open the door.
CloseDoor ␣ door-id	Close the door.
GenEffect ␣ Flash ␣ Frames ␣ Red ␣ Green ␣ Blue	Flash the screen during the time of frames. Color is set by RGB. Each value must be 0 to 255.
Message ␣ Frames ␣ text-id	Show an instant message. Text-id is the key in Text Definition file (text.xml). Instant message is a white-colored message shown in the bottom of the window.

Layer kinds

A map file is made of several layers. Each layers have a specific objective.

Layer Name	Description
system	Start position, goal positions, and nodes.
item	Items player will pick up.
object	Door, block, and other objects.
enemy	Enemies.
light	Fixed lights.
zone	Zones of enemies' territory.
decor	The decoration of floor.
direction	The direction of floor tiles.
floor	Floor and wall.

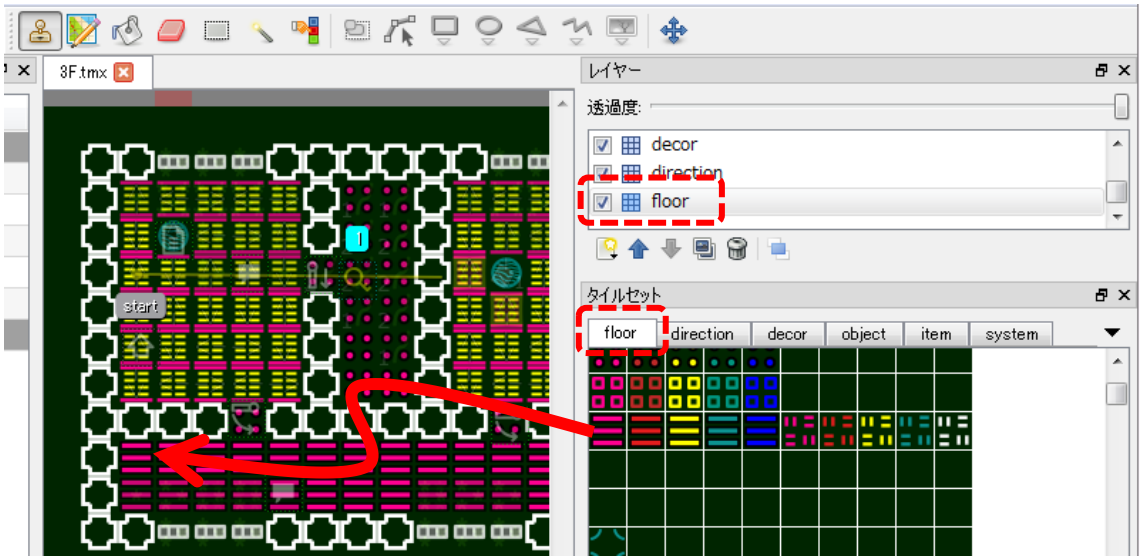
This documents explains from the bottom layer of the list.

Floor layer - floor

You can set the layout of wall, floor, and obstacles on this layer.

How to set up

Select the ‘floor’ tile from tile set, and set out tiles on ‘floor’ layer.



Note

You can’t set the direction of tiles. Set the direction on ‘direction’ layer.

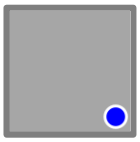
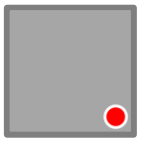
Characteristics of tiles

The difference of tiles are not only graphics. There are other difference; Loudness of footsteps; transparency; passable or not.

Loudness of footsteps

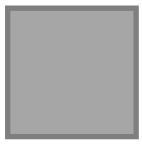
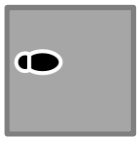
Loudness of footsteps has 3 levels.

Colored mark is on each tiles. This mark indicates loudness of footsteps.

Image			
Loudness	Silend	Normal	Noisy

Transparency and passable or not

Left-top mark indicates transparency and passable or not.

Image				
Transparent	×	○	○	×
Passable	×	○	×	○
ex.	Wall	Floor	Low obstacles	Bush

Direction layer - direction

You can set a direction of a tile by eight directions.

The default direction is right. That is, a tile is rendered as it is if its direction is right.

How to set

Select the ‘direction’ tile from tile set, and set out tiles on the ‘direction’ layer.

Decoration layer - decor

This layer decorates each tiles. This layer affects only graphics.

How to set

Select the ‘decor' from tile set, and set out a tile on ‘decor' layer.

Zone layer - zone

Some enemies have territories. A territory is defined by a Zone.

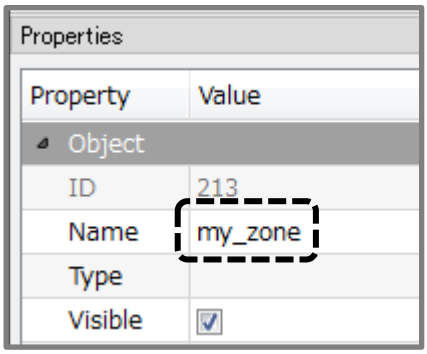
How to set

1. Click ‘zone’ layer to activate.

2. Select “Insert Polygon (P)” 

3. Make a polygon including center positions of tiles you want set as a zone.

4. Set identifier in ‘name’ property.

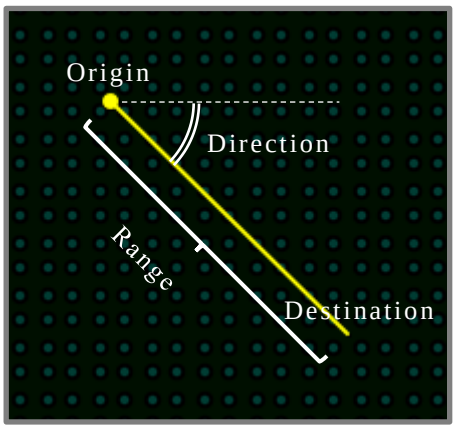


Light layer - light

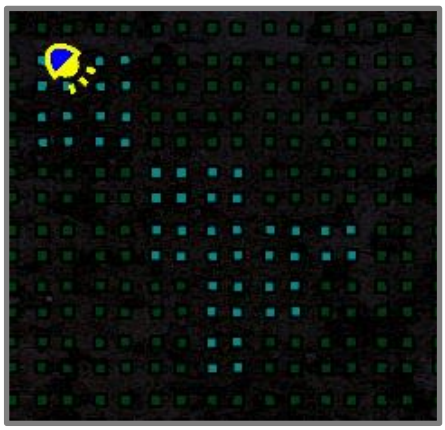
Place fixed lights.

How to place

1. Click ‘light’ layer to activate.
2. Select “Insert Polyline (L)” 
3. Make two points. The origin is the point where light is fixed. Range and direction is determined by the relationship of two points.
4. Set up a property



->



Properties (default)

Item	Format	Description	
Name	String	Identifier. It is used by ‘connect’ property of Switch object.	O

N: Necessary, O: Optionally

Custom Properties

Name	Format	Default	Description	
pow	True | False	True	Initial state of the power switch	O
switch	True | False	True	Has the power switch	O
deg	Real [degree]	30	Range of the light	O
rotatable	(Empty)		Rotatable or not	O
rot	Real [degree/sec/60]		Angular velocity of automatic rotation	O
btry	*Battery	inf	(*)Format is below	

N: Necessary, O: Optionally

Format of Battery

Kind	Format
One time 	`btry␣`*`electricity`*`[second]`
Rechargable 	`re␣`*`capacity`*`[second]␣`*`electricity`*`[second]`
Infinity 	`inf`

Enemy layer - enemy

Set enemies on this layer.

How to set

Select ‘enemy’ tab from ‘Tilesets’.

Select ‘Insert Tile (T)’.

Select an enemy and set it on ‘enemy’ layer.

(You can set a tile along the grid lines with CTRL key.)

Inser Tile (T)

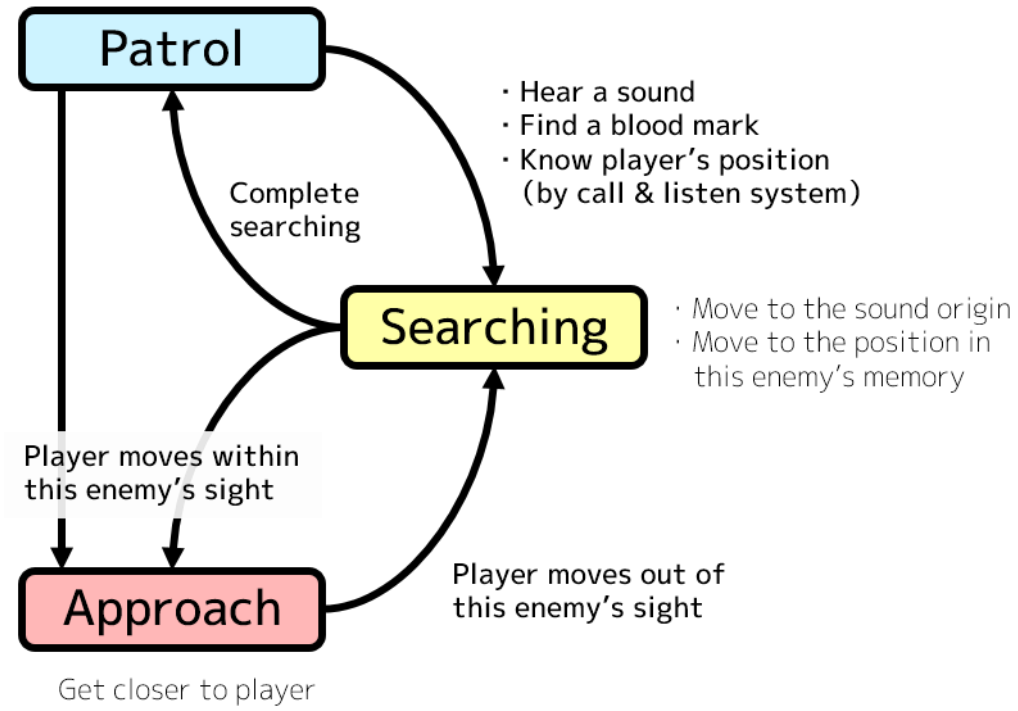
Tile Set of Enemies

The mode of behavior

An enemy has three behavior modes, patrol, searching, and approach. Every enemy moves with switching these modes.

The walking strategy can be set for each modes. You should understand these modes, if you want to set walking speed for each modes.

This figure explains how one mode changes over another mode.



Custom Properties

Name	Format	Default	Description	
dir	Real [degree]	0	Initial derection	O
wear	String	-	An item it has	O
pos	Identifiers of pin Separated by ;	-	**Pin**s of Initial position. Choice one from pins arbitrary.	O
pins	Identifiers of pin Separated by ;	-	Round points for some kinds of enemy.	(N)
territory	Identifier of zone Separated by ;	-	Zones of territory for some kinds of enemy.	(N)
step	Real [side of cell]	Depend on enemy	Step length	O
wnd-step	ditto	ditto	Step length for patrol mode.	O
app-step	ditto	ditto	Step length for approach mode	O
src-step	ditto	ditto	Step length for searching mode	O
itval	Distribution Form (Described later)	Depend on enemy	The interval between a step and next step. It is calculated arbitrary.	O
wnd-itval	ditto	ditto	The interval for patrol mode	O
app-itval	ditto	ditto	The interval for approach mode	O
src-itval	ditto	ditto	The interval for searching mode	O

freeze	Freeze (Described later)	-	It stops if it is lighted during this setting time.	O
call	Channel Separated by ;	-	Described in the section about ‘call & listen system’	O
listen	Channel Separated by ;	-	Described in the section about ‘call & listen system’	O

N: Necessary, O: Optionally

(N): Necessary for some kinds of enemy

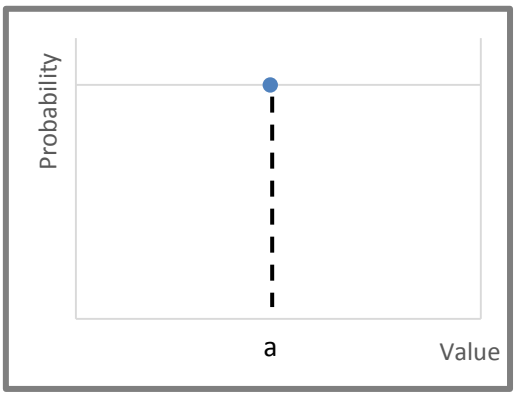
Distribution Form

Kind	Description	Format
Constant	Constant value	Constant ␣ *a*
Uniform	Uniform distribution	Uniform ␣ *a* ␣ *b*
NormDist	Normal distribution	NormDist ␣ *mu* ␣ *sigma* ␣ *min* ␣ *max*
Log	Log function	Log ␣ *a* ␣ *b* ␣ *min*

Constant (Constant value)

Format: Constant␣*a*

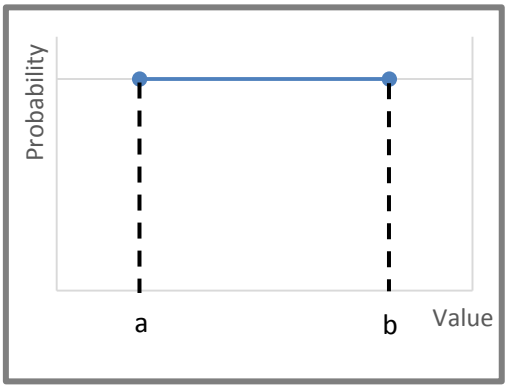
It always return *a*.



Uniform (Uniform distribution)

Format: Uniform␣*a*␣*b*

It returns arbitrary values between '*a*' to '*b*' generated by uniform distribution.

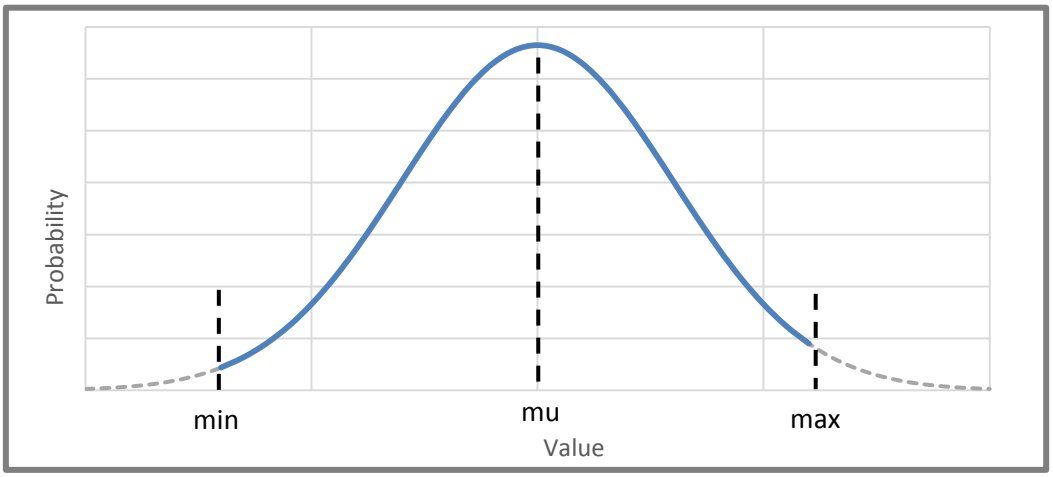


NormDist (Normal distribution)

Format: NormDist␣*mu*␣*sigma*␣*min*␣*max*

mu: Average　*sigma*: Standard Deviation (For variability)

min: Minimum　*max*: Maximum



Log (Log function)

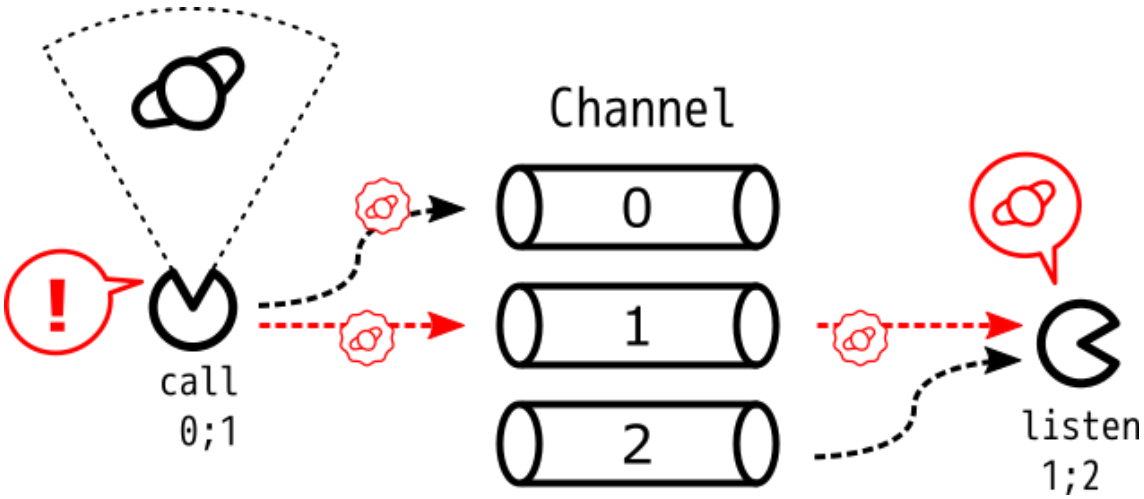
Log␣*a*␣*b*␣*min*

F(x) = *a* * log(1 + *b*x)

x(0 ≦ x ≦ 1)

Call & listen system

Some enemies can transfer the position of player. This is ‘call & listen’ system. This figure shows its concept.



An enemy has a ‘call’ setting will transfer the position of player to several channels listed in ‘call’ setting.

On the other hand, an enemy has a ‘listen’ setting will receive this information from channels listed in ‘listen’ setting. And, it will go to that position received.

Enemy List

	Name	Characteristics	Related Properties
	Crawler	- The most basic enemy - Stop for seconds and get closer	
	Closer	- Gets closer when it is not lighted	
	Invis	- Invisible enemy	
	RounderA RounderB	- Rounds pins - A: Arbitrary - B: In order	pins
	Patroller	- Wandering within territory	territory
	Shadow	- Gets closer when player is out of its sight.	
	Screamer	- Make lights within its sight disable for a while.	
	Killer	- Make player stops for a while. - Rounds pins arbitrary.	pins
	Rusher	- Move linearly	
	Bug	- Short distance of sight.	
	BlockerA	- Blocking a corridor - Disappears after specified seconds from the time lighted first.	die die-event
	BlockerB	- Blocking a corridor - Disappears if it is lighted for specified seconds.	die die-event

	Telepos	- It has ‘call’ setting by default. The channel is ‘0’	
	Hider	- Escape from player - It doesn’t attack	territory stay,freeze
	Tripper	- Wandering within territory - It doesn’t attack	territory stay,freeze
	Thief	- Take items from player	pins
	Yama	- Abilities of disable light and stopping player. - Wandering within territory	territory die die-event

Kind of Enemy

Crawler

The most basic enemy. It gets closer when found player.

CUSTOM PROPERTIES

Name	Format	Description	
territory	Identifier of zone Separated by ;	If it went out of this territory, it will come back to territory.	O

N: Necessary, O: Optionally

Closer

It gets closer while it is not lighted.

Invis

Invisible. Characteristics are the same with Crawler.

RounderA / RounderB

Rounds the positions of pins.

RounderA rounds arbitrary; RounderB rounds in order.

CUSTOM PROPERTIES

Name	Format	説明	
pins	Identifier of pin	Round points	N

	Separated by ;		

N: Necessary, O: Optionally

Patroller

Patroller wanders within zone of territory.

カスタムプロパティ

名前	フォーマット	説明	
territory	Identifier of zone Separated by ;	Moving range.	N

N: Necessary, O: Optionally

Shadow

Shadow moves quickly when player is out of its sight.

Screamer

Screamer screams when it is lighted; Lights within its sight is disabled for a while.

Killer

Killer screams when player is in its sight; Player can’t move for a while.

Bug

Bug has short distance of sight.

Rusher

Rusher has narrow sight, get closer lineally. It go back initial position when player is out of its sight.

You should set ‘dir’ property for Rusher, because enemy’s initial direction is determined randomly.

BlockerA / BlockerB

BlockerA and BlockerB blocks a corridor. They disappeared by lighting for required time. This time is set by ‘die’ property.

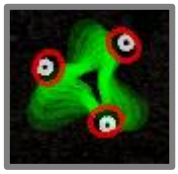
BlockerA disappears when the time went on, from the time it is lighted.

BlockerB disappears when the total time lighted went on.

Name	Format	Description	
die	[second]	Lighting time for the disappearance.	N
die-event	Event Separated by ‘;’	Events occur when it dies.	O

N: Necessary, O: Optionally

Telepos



Telepos doesn’t move and attack. However, it has wide sight; transfer the position of player to another enemies when found player. Zero is set for ‘call’ property by default.

Name	Format	Default	Description	
call	Chanel (Non negative integer) Separated by ;	0		O

N: Necessary, O: Optionally

Hider

Hider escape from player when player approaches it or it is lighted. It escape within zone of territory. It doesn’t stop even if it is lighted.

Name	Format	Default	Description	
territory	Identifier of zone Separated by ;	-	Moving range.	N
stay	Distribution Form	Constant ⎵ 60		

N: Necessary, O: Optionally

Tripper

Tripper always move. Wandering boundary are set by ‘territory’. It doesn’t attack. It doesn’t stop even if it is lighted.

Name	Format	Default	Description	
territory	Identifier of zone Separated by ;	-	Moving range.	N
stay	Distribution Form	Constant _ 300		

N: Necessary, O: Optionally

Yama

Unknown.

Name	Format	Default	Description	
territory	Identifier of zone Separated by ;	-	Moving range.	N
die	Seconds	600	Lighting time for the death.	O

die-event	Identifier of Event Separated by ;		Events occur when it dies.	O

N: Necessary, O: Optionally

Object layer - object

Doors, blocks and switches are on ‘object’ layer.

How to set

Select ‘object’ tab from ‘Tilesets’.

Select ‘Insert Tile (T)’.

Select an object and set it on ‘object’ layer.

(You can set a tile along the grid lines with CTRL key.)

Insert Tile (T)

Door

Hinged Sliding

Each doors have four directional tiles. The difference of direction affects only graphics.

Properties

Name	Format	Default	Description	
name	Identifier (String)	-	This identifier is used by OpenDoor and CloseDoor events. Refer to the section “Event Generator” about these events.	O

N: Necessary, O: Optionally

Custom Properties

Name	Format	Default	Description	
open	(Empty)	-	If this item exists, this door is opened by default.	O
key	Identifier Separated by ;	-	Key holes.	O

kickable	Natural number		If this item exists, this door will open after player kicks.	O
breakable	Natural number		If this item exists, enemies can breaks this door. After enemies knock this number, this door will break.	O
dummy	(Empty)		If this item exists, this door won't open. However, enemies can break this door, if it has 'breakable' property.	O
lock	Identifier of flag		The door won't open if this flag is on. (Refer to the section of "Event Generator")	

N: Necessary, O: Optionally

Curtain Rail

The kinds of curtain rail

With cloth
Closed

With cloth
Open

Without cloth

Each curtain rails have four directional tiles. Difference of direction affects only graphics.

Custom Properties

Name	Format	Default	Description	
removable	True/False	True	Removable for cloth	O

N: Necessary, O: Optionally

Socket

For charging portable lights, or charge normal light silently.

Water supply

Water supply for a bottle.

Switch of Light

Switch power of fixed lights on light layer in the distance.

Custom Properties

Name	Format	Default	Description	
connect	Identifier of light Separated by ;	-		N

N: Necessary, O: Optionally

Pool

This pool doesn’t disappear. Enemies make footprints for a while after go through on this pool

Draggable Block

Player can drag this block.

名前	フォーマット	規定値	説明	
count	Frame	60	Required frames to drag one cell length.	O
breakable	Natural number	-	If this item exists, the block will be broken by enemies.	O

N: Necessary, O: Optionally

Breakable Block

Player can break this block.

カスタムプロパティ

Name	Format	Default	Description	
count	Natural number	10	The number player have to knock to break the block.	O

N: Necessary, O: Optionally

Document

Show text on a special screen.

Custom Properties

Name	Format	Default	Description	
key	Identifier of text	-	The key of text in Text definition file (text.xml).	N

N: Necessary, O: Optionally

Event Generator

It generates various events. Open and close door; Sounds; Manage flags.

Properties are generating conditions and details of an event.

Custom Properties

	Name	Format	Default	Description	
Event	@while	Event Separated by ;		Events generated while requirements are satisfied.	
	@once	ditto		Events generated once.	
	@in	ditto		Events generated when just requirements are satisfied.	
	@out	ditto		Events generated when just requirements are not satisfied.	
Require-ments	distance	Real [cell]		Distance between this object and player.	O
	lighted	(Empty)		When this object is lighted	O
	sight	(Empty)		When this object is in sight from player	O
	time	[second]		When the time went on for each maps.	O
	flag	Identifier of Flag Separated by ;		When all flags are on	O

N: Necessary, O: Optionally

A requirement without setting is treated as satisfied (TRUE).

Message

Show a green text on the screen. This is used to tell player some messages like tutorial.

Properties have several conditions. A message shows while all conditions are matched.

Custom Properties

	Name	Format	Description	N/O
	key	Identifier of text	The key in Text Definition file (text.xml).	N
Requirements	distance	Real [cell]	Distance between this object and player.	O
	lighted	(Empty)	When this object is lighted	O
	sight	(Empty)	When this object is in sight from player.	O
	time	[second]	When the time went on for each maps.	O
	flag	Identifier of flag Separated by ;	When all flags are on	O

N: Necessary, O: Optionally

Item layer - item

Player can pick up items on this layer.

How to set

Select ‘item’ tab from ‘Tilesets’.

Select ‘Insert Tile (T)’.

Select an object and set it on ‘item’ layer.

(You can set a tile along the grid lines with CTRL key.)

Insert Tile (T)

		Property (Put in ‘name’ field)	Description
	**Key**	Key number	Integer (0 to 4)
	**Portable Light**	Distance[cell]␣ Range[degree]␣(*)Battery	*) Refer to the section of light layer about Battery.
	**Cloth**	(Empty)	
	**Network Camera**	(Empty)	
	**GPS**	(Empty)	

	**Whistle**	(Empty)	
	**Bell**	(Empty)	
	**Kitchen Timer**	(Empty)	
	**Bottle**	Number	Integer (0 to 3) Default is 3
	**Scanner**	(Empty)	

Custom Properties

All items have common properties.

Name	Format	Description	N/O
pos	Identifiers of pin Separated by ;	**Pin**s of Initial position. Choice one from pins arbitrary.	O
setup	(Empty)	If it exists, this item will be the same with that player set on the floor in game. For example, if you set a Bell on 'object' layer, it sounds when enemies go through on it by default. Caution: This property is valid for the following items. Portable Light, Network Camera, GPS, Bell, Kitchen Timer, Scanner	O

N: Necessary, O: Optionally

How to describe in Level Definition file

In Level Definition file, you can set initial items player has. This table shows format of each items.

		Format
	**Key**	key␣*KeyNumber*
	**Protable Light**	light␣*Distance*[cell]␣*Range*[degree]␣*Battery*
	**Cloth**	cloth
	**Camera**	cam
	**GPS**	gps
	**Whistle**	whistle
	**Bell**	bell
	**Kitchen Timer**	timer
	**Bottle**	bottle
	**Scanner**	scanner

Kinds of system items

Node

For the start position and the connection between levels.

Properties (default)

Item	Format	Description	
name	String	Identifier of Node. It is necessary if it is used as the start position or a destination of a connection between levels.	O

N: Necessary, O: Optionally

Custom Properties

Name	Format	説明	
to	TmxName;NodeName	Move to another node from this node. Set tmx name and name of another destination node.	O
type	NodeType	A kind of screen transition. Described below. 'Flat' is the default.	O

N: Necessary, O: Optionally

NodeType

Identifier	Flat	Fall	Stair
Effect	Walking sounds	Falling sounds Zoom in	Sounds walking stairs

Goal

Clear a level when player reaches Goal. You can set several Goals.

Check Point

Player can retry from this point.

Pin

For enemies.

Item	Format	説明	
name	String	Identifier of Pin. It is used by ‘pins’ and ‘start’ properties of Enemy and Item.	N

N: Necessary, O: Optionally

Play your levels

Location of the level data

One level is in one directory. Locate that directory in the directory below.

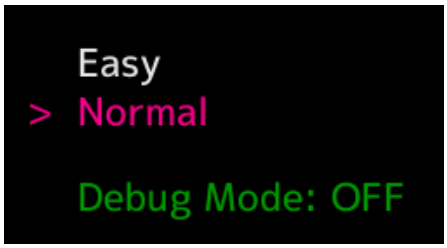
The name of directory is the identifier of the level. The identifier must be a combination of alphanumeric and half-size characters.

```
{Local Directory of This Game}/user/{Identifier of the level}/(Various data)
```

Selecting levels in the game

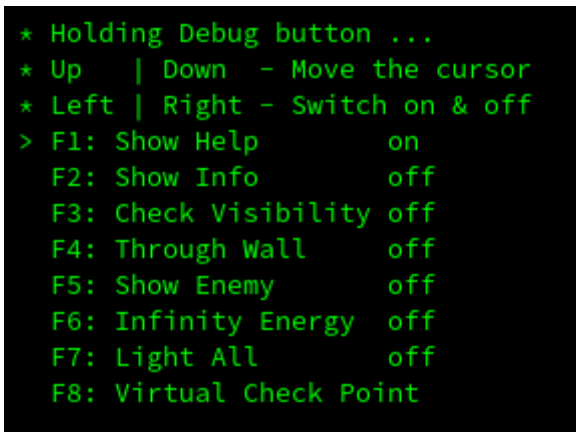
Start the game; select “User’s Level” in the title. The list of levels in ‘user’ directory; select a level you want to play.

And then, the difficulties and on & off state of debug mode will show. Select a difficulty to start the level. If you put the debug mode on, you can use various debugging options while you are playing. A score will be not recorded when you clear the level with debug mode.



Control of debug mode

Debugging information will be shown on the top-left of the window with debug mode. Each items have the on & off state and it is switchable. Holding debug button; move the cursor by up and down buttons, switch the state by left or right buttons.



This table explains roles of these items.

Item	Description
Show Help	Show this information.
Show Info	Show additional information. For example, flags information.
Check Visibility	Visible player's sight.
Through Wall	Let player goes through a wall.
Show Enemy	Show enemies always.
Infinity Energy	Electricity of player's light will not decrease.
Light All	Light all objects up. Make all visible.