Fotagogos

Level Layout Document

Table of Contents

Document History

The document is on its first version. No changes have been made yet.

Version Control History

Date	Version#	Author	Description of Change(s)
2009-10-16	1.00	Jerry Wong	Initial Document
2009-11-30	1.10	Jerry Wong	Updated for change in feature introduction and obstacle escalation

Objective

The objective of the level layout document is to ensure proper implementation of learning curve and escalation into the game. It will define when features are introduced, how they are introduced, and how often they are used. It will also have a guideline for level designing using the in-house level editor. The level layout document will outline the entire level design structure for the game.

Software Tools

Team of Two Level Editor – level development tool
Fotagogos Game – level testing tool
Toirtoise SVN – file sharing with version tracking

File Naming Conventions

The file name will represent the name in the game. Example.TO2 will be shown as Example during level selection. Always use the default .TO2 file extension used by the level editor.

Directory Structure

Fotagogos

- SharedData
    - Levels
        - Final Levels
        - InProgress
- Fotagogos.exe
- LevelEditor.exe

Final Levels – The levels that are finished and approved.
InProgress – The levels that are not finished but can still be used for future production.
Fotagogos.exe – The game engine used to test levels.
LevelEditor.exe – The level editor used to build levels.

Level Feature List

Toggling Blocks

The player has the ability to activate the toggle blocks collision and visibility. The toggle blocks are categorized into the three colours of red, green, and blue. Only one toggle block colour can be on at a time, and once the block has been toggled on, the player can walk on the block. Toggle blocks can also be used to block projectiles, boulders, and enemies.

Boulder Traps

Boulder traps are falling rocks that can damage the player. Once the player comes under the boulder that is attached to a ceiling, it will fall until it collides with the ground which will cause the boulder to break apart and disappear. If the boulder hits the player, it will cause X amount of damage.

Spike Traps

Spike traps are stationary objects that will damage the player if the player walks or falls into it. It will cause X amount of damage to the player. The spike trap can be attached to the wall, floor, or ceiling, but the spike trap should not floating.

Turrets and Projectiles

Turrets are objects that shoot damaging projectiles. If the player gets hit by the turret's projectile, it will cause X amount of damage to the player. Turrets can be attached to the wall, floor, or ceiling, and the turret's cannon head should always be outside of a block's collision so the projectile can properly fire. There are two types of turrets that shoot in different orientation. One type of turret shoots vertically, while the other turret shoots horizontally.

Enemy

The enemy walks along a linear path and can damage the player by walking into the player. The enemy can be killed by getting hit by traps, and the player can kill the enemy by jumping on it.

Lanterns and Switches

Lanterns and switches act as a lock mechanism for levels. They are categorized into the three colours of red, green, and blue. The lanterns will force the same colour toggle block to be on all the time until the lantern is turned off by going to a switch that has the same colour of the lantern and flipping the switch. The lantern's area of effect covers a radius of four grid space.

Checkpoints

The checkpoint allows the player to change the respawn location when the player dies. The checkpoint is a bronze statue that raises a flag when the player touches the checkpoint. Once the player activates a checkpoint, all other checkpoints will be reset.

Light Energy Crystal

Light energy crystals will regenerate the player's light bar. There are three sizes of crystals that will regenerate half of the player's light bar. The light energy crystal can be attached to the wall, floor, or ceiling.

Power Gem

Power gem are an achievement collectible, and it will also decrease the energy consumed when using the character powers. Power gem are placed within an art prop rock holder, and that art prop can be attached to the wall, floor, or ceiling. All three power gem must be present in every level. Power gem are retained in the player profile so that if a level is being replayed, the gem would already be collected and will already decrease energy consumption.

Fireflies

Fireflies are an achievement collectible, and it will also regenerate the light bar by a small amount. They can be used as a way to guide the player by being placed in a path or making arrows. A hundred fireflies must be present in every level.

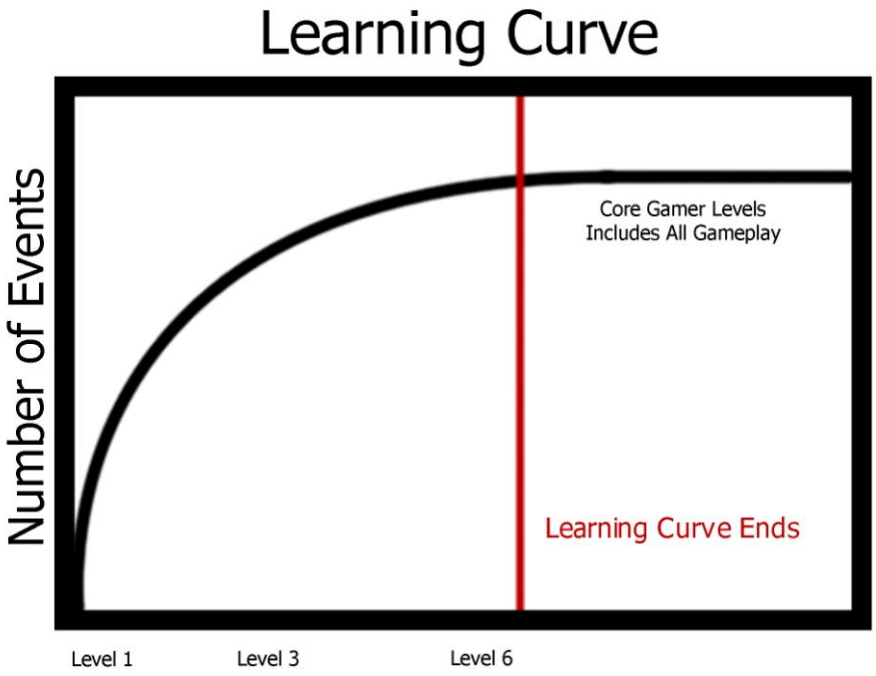
Unlock Crystal

The unlock crystal is a pickup that unlocks one of the character powers. There will be one of each colour, and each unlock crystal will only be present once in the game. Once the unlock crystal has been collected, the player can use that power in every level.

Learning Curve

Learning Curve Design Philosophy

The purpose of a learning curve is to slowly introduce game mechanics and features to the player and keeping the player's interest by having more things to learn in the later stages of the game. After the learning curve flattens, the game will continue with levels that utilize everything that has been learned for the core gamers.



The graph shows how the player will be learning the basic gameplay at the start of the game. The beginning will introduce enough mechanics to show the player that the rest of the game offers a lot more, and then the danger will be introduced with traps and reasons for collecting fireflies and picking up light bar crystals.

Character powers will be unlocked along the first half of the game. It is important that the player can retain being able to use the powers because the powers are an advanced gameplay feature that is built upon toggling and movement. There must be enough testing space in the level to ensure that the player is comfortable with the controls.

The learning curve must be taught through linear level design in order to force the player to practice playing the game. Exploration is featured after all of the gameplay has been introduced. When all of the events have been encountered, the level design shifts towards creating levels that incorporates every game feature.

Events

Events are the game mechanics and features the player will encounter and learn. Events will be used to define the learning curve and escalation. Here are five examples of events:

- Character Movement (walk and jump)
- Collecting Fireflies
- Toggling Blocks
- Speed Boost Power
- Turrets and Projectiles

These examples are listed in the order of encounter. The player will learn to walk around the level and jump on platforms, then learn about collecting fireflies to gain lives, and then learn about toggling blocks and using them to progress in the level. Using an event is how learning curve and level escalation will be explained.

Event Encounter Breakdown by Levels

Level 1
Reading Tutorial Signs
Character movement
Collecting fireflies for lives
Toggling red and green blocks
Collecting colour gems as collectibles
Toggling green and blue blocks
Mid air toggling
Toggling red and blue blocks
Collecting end crystal

Level 2
Using red power speed boost
Reading Warning Signs
Boulder Traps
Collecting light energy crystals
Collecting fireflies for light energy
Mid air toggling after using character power
Using Checkpoints
Collecting colour gems to reduce energy consumption

Level 3
Spike Traps
Using green power high jump
Toggling between powers
Reading Directional Signs

Level 4
Blue Power Slow Fall
Turrets and Projectiles

Level 5
Enemy
Lanterns and Switches

Escalation

Escalation Purpose

The purpose of designing Fotagogos with level escalation is to control the difficulty of the level so that the player will be eased into the game, and then the player will experience an increasing challenge until the end. Escalation correlates with the learning curve in order to create an easy experience at the beginning and ending off with difficult challenges at the end.

Even though the event breakdown in the learning curve forces an easy start at the beginning, the number of events, particularly the objects that deal damage, should be controlled. The more times the player is required to pass an obstacle, the more chances that player will fail to progress past the part of the level. Level design must keep player resources in mind.

Level Section

A level section is defined by a series of obstacles put together. Two pitfall jumps and two turrets shooting down between the pitfalls (see Player Resource section for an example picture) is a level section. The player must be able to pass those series of obstacles to get to the next part.

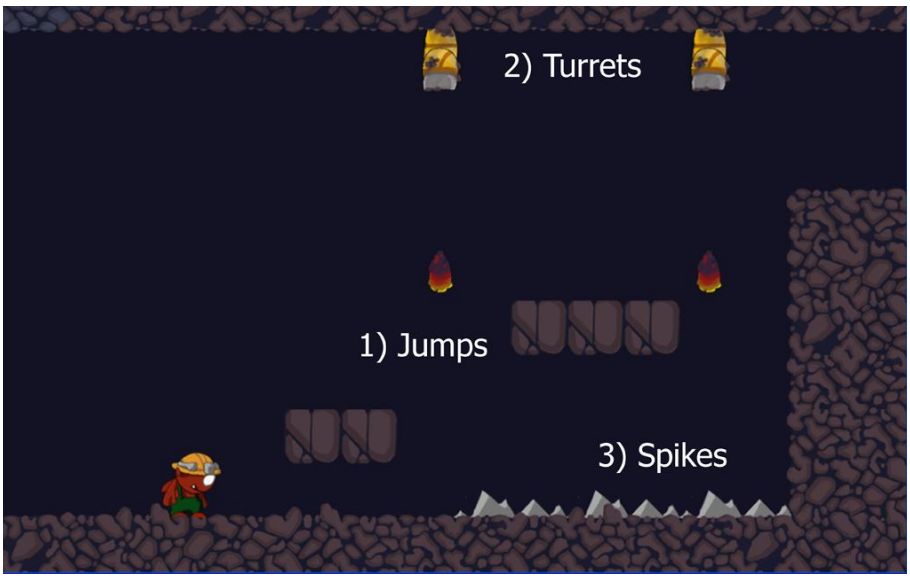
Level sections can be differentiated with the breaks in level section where there are no obstacles, but it should not be confused with areas where the player can idle and think about what to do next when it is within the level section.

Player Resources

In Fotagogos, the player has three resources:

1) Health
2) Energy
3) Time

The design of the game merges health and energy together into resource called light energy (or it could be referred to the light bar), so there are really only two resources. The design of a game is meant to take away the player's resources for every time the player fails at an obstacle. Fotagogos has many opportunities to consume the player's time, but it should not frustrate the player.



The picture above is an example of a level section. There are three ways that the player can have his or her resources taken away. All of the ways have a fifty percent chance of failure because they either make it or they don't.

1) Jumps – A jump is an obstacle because it takes effort and skill to complete a jump. The more jumps there are in a section of a level, the more chances that the player will not be able to progress. This will take away the player's resource of time.

2) Turrets – Adding turrets into the level section adds more difficulty because the player has to make the jump and time the jump. Turrets increase the chance of failure which has more chance to take away the player's resource of time. The turrets can also damage the player which takes away two player resources since health and energy are the same.

3) Spikes – Placing spikes into the level section do increases the chance of failure by taking away more of the player's resources. The spikes will damage the player and take away health and energy, so a failed jump will increase the amount of resources taken away.

Mathematical Analysis of Level Difficulty

This is a guideline for determining failure rate of an obstacle. The percentage of successful progression is governed by the chances of failure. If there are more chances of failure, the percentage to successfully pass the level section becomes lower. This simple equation calculates the percentage.

$$\frac{1}{2^{\text{Chance of Failure}}}$$

Chance(s) of Failure	Success Percentage
1	50.00%
2	25.00%
3	12.50%
4	6.25%
5	3.13%
6	1.56%
7	0.78%
8	0.39%
9	0.20%
10	0.10%

Escalation Design

The escalation in Fotagogos will follow a design based off the analysis of level difficulty. The design will escalate the overall game level design and with each individual level. Individual levels will be split up by segments.

	No. of Obstacles in Level Segments		
Levels	Beginning	Middle	End
Level 1-2	3	4	5
Level 2-4	4	5	7
Level 5-Onwards	5	6	7

The left column represents the level number in the game. The level segments define how far the player has gone through the level. Each number represents the maximum of obstacles that should be in the level segment. The chart shows that level 3 would have four obstacles built in the middle segment of the level, while level 8 would have six obstacles built in its middle segment.

Level Design Guidelines

Level design for Fotagogos should always keep every player type in mind, and these guidelines are to prevent creating levels that disregard certain player types. Here are the guidelines:

1) Must be able to travel to another level section within five seconds.
2) Health pickups should be available before every level section.
3) Any pickup should be reachable without taking damage.
4) All firefly and power gem collectibles should reachable from any point of the level.
5) Always have breaks in long vertical drops. There should be a break where the player could land on every two vertical screens.
6) Jump distances should be from a middle of one block to the middle of the landing block. There should be no jumps that require jumping from the edge or landing on an edge.
7) Drops that go into or near spike traps should have clear indication of the danger.
8) Open ended levels should have the end crystal visible early in the level.
9) Never have art props that blend in with other objects. (Truss_1 + Firefly or Projectile)

Level Editor Guidelines

Layers

This is a guideline that states which props go into which layer.

Background 2 – Background black silhouette props
Background 1 – Background rock props
Object 4 – Emitters, Light Ray
Object 3 – Art prop fixtures (gem holder, switch stand, sign chain)
Pickups – Light energy crystals, fireflies, power gems, unlock crystals, end crystal
Object 2 – Bones, Switches
Enemies/Traps – Spike traps, turrets, boulder traps, enemy
Object 1 – Signs, Lanterns, Checkpoint
MainChar – Character
Foreground 2 – Tiles, tile trim, colour blocks, platform blocks
Foreground 1 – Art props that go in front of tiles

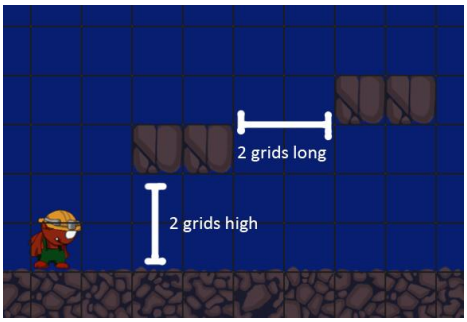
Object Placement

All of the platforms and traps need to be placed exactly within the 64 x 64 pixel grid based off of the level editor standards. There should be no platforms or traps that are 32 or 16 pixel between two grid spaces. Object placement guidelines rely on exact grid measurements.

Jump Distances

This is a guideline that state the distances of objects for platform jumping. Height is measured to how many grids the character can make it up to from his current position. Length is measured to how many grids the character will jump to from his current position on the middle of a block, so a guaranteed distance from the middle of the starting block to the middle of the landing block (see level design guideline 6).

Jump height – 2 grids high
Super jump height – 4 grids high



Jump length – 3 grids long, 2 grids high
Super jump length – 4 grids long, 4 grids high
Speed boost jump length – 6 grids long, 2 grids high
Slow fall jump length – 8 grids long, 2 grids high

Super jump the speed boost length – 7 grids long, 4 grids high*
Super jump then slow fall length – 12 grids long, 4 grids high*

*Requires higher skill level due to timing of the power change. Distance tested with jump at the highest.

Object Spacing

This is a guideline to determine the amount of room required to make jumps over traps, trap placements, and other things.

1) Horizontal platform jumping should have a second block after the landing block to ensure the player won't fall off. Vertical platform jumping does not need to have a second block.
2) Jumps with platforms above the character require two extra grid spaces, so if the jump height is 2 grids high, then the room for the jump should be 4 grids high.
3) Level sections with enemies should have a room height of 4 grids to be able to safely kill the enemies.
4) Spike traps on walls need to be one grid away from the top left or right corner of platform walls.
5) Small boulder traps need to be placed four grids away from the floor block. Large boulder traps need to be placed five grids away from the floor block.