Game Design Document

Title

Short Description

Parasites is a game in which you have to play through infinite procedurally generated levels accumulating points and avoiding being killed.

Game Type/Genre

Action/Maze

Scenario

The game happens on the insides of a living organism.

Long Description

In *Parasites* you impersonate a parasitic microorganism(probably some kind of flesh eating bacteria). In order for you to survive, you'll have to eat all organic tissue you find. But don't you think it'll be an easy trip! From time to time the organism that's hosting you will invoke his defense systemto try to eradicate you. So be quick, smart and cause as much inconvenience as possible!

Game System

Death/Shrinkage

There's no such conceptas “life” in*Parasites*. Instead, the bigger you are the more harm you can handle before you die, but if this happens - game over.When you get hurt you'll be shrunk to half of you current size. You can't get reduced past your starting size, otherwise you'll die.

Points/Growth

The main goal in *Parasites* (besides having fun) is accumulating points. At each 1000 points you'll double your size, and, as said before, greater will be the damage you'll be able to tolerate. The growth limit is getting 5 times bigger than your starting size.

In addition, each time you consume flesh (no matter how much you consume at a time), 10 points will be added to your score.

Levels/Level clearing

A level consists of a procedurally generated 2D cave-like environment. Its walls are made of organic tissue and therefore can (and must) be eaten. The size of the level (in tile units) is given by the following formula:

$$\text{width} = \min(37 + (([\text{current level}] - 1) * 2), 50)$$

$$\text{height} = \min(26 + (([\text{current level}] - 1) * 2), 35)$$

The minimum constants (26 and 37) were empirically found, whist the maximums (35 and 50) were foundbythe relationship between the resolution (1024x768) and the tile dimensions (32x32).

There's also an invisible limit that will prevent you from crossing the boundaries of alevel. This limit is said to be invisible because it looks like an ordinary wall, but you'll not be able to eat your way through it.

In the beginning of each level you'll appear at a random empty position. When you finish eating all eatable walls in this level, you'll reappear at a new level, your size will be reset back to the starting size, and the level counter will be incremented.

Move/Eating

You will use the arrow keys to move around the level.In order to eat, you'll just have to collide against a wall.

You'll always move faster than your enemies, but whenever you eat a wall, you'll get a few milliseconds behind. This might give your opponents a chance to reach you, so you must always manage the proximity from your adversaries before engaging a feast.

Antibodies

Antibodies are AI controlled NPCs that will chase and destroy you on contact. An Antibody is represented as a perfect white ball on screen. They might appear on a 33% chance inevery 5s. Their maximum number per level obeys the following formula:

maximum number of antibodies per level = min([current level] * 3, 20)

Their reaction time (the frequency with which they reevaluate their way to you) is also affected by the current level, as shownby theexpression bellow:

reaction delay = max(23 - [current level], 15)(milliseconds)

They will use a simple A* algorithm, weighted by the distance from the target, as means to find their path to you.

Antibiotics

Antibiotics substances are represented by rotating pills on screen. There's a 10% chance of a random number (>= 4 and <= 8) of pills to appearinevery 10s.

They'll generally appear around you, but never so close you could accidentally stumble on them. Their spawn locations respect a safety circular area of 5 tile unit’s radius.

Also, these substances will eventually get absorbed by the hosting organism, so they'll expire in 5s after they showed up on screen, disappearing immediately after that.

Game Play

"Since you started at a random position on screen, it took you a small fraction of time to realize where you were. But at the exact moment you acknowledged your position, you realized you were in danger. A white dot, more commonly known as antibody, was coming after you.

You started moving around using the arrow keys. Accidentally you stumbled upon a pink wall and it disappeared.The chewing noise that followed indicated you were probably eating though something. Having glanced at the border of the screen, out the corner of your eye,you noticed the score hadjust been updated.

Good!Now you knew just what to do.

You wildlypressed alternate keys,moving elusively to outwit the antibody. As you grew distant, you decided to eat through a thick wall of pink matter, knowing that even if it reduced your speed,your pursuer wouldn't be able to reach you. Unexpectedly and out of nothing, another white dot appeared right in front of you.Unable to go back or advance you started to think you were cornered, but then you remembered: I can eat my way out of here..."

Procedural Level Generation

The procedural level generation uses cellular automata algorithm (irony not intentional). Each generationof the automata refine theshape of the randomly scatteredcave-like rooms on the map. The values of the input parameters that control the algorithm(fill probability, the number of neighbors of opposing type - known as 4/5 rules - and generation repetition) were empirically found, based on the perception of how they affect the final aspect of the map.

As a result of this experimental approach, the occurrence of non-connected rooms (undesired effect) could not be completely eliminated.

The most satisfactory parameters empirically found were:

Walloccurrence probability:
45%

1st automata generation:
Each wall must have 5 (out of 9) neighborsas walls (rule 1)
Each non-wall must have less than 2 walls as neighbors (rule 2)
Repeat 4x

2nd automata generation:
Each wall must have 5 out of 9 neighbors as walls (rule 1)
Repeat 3x

Title and Information Screens

Menu

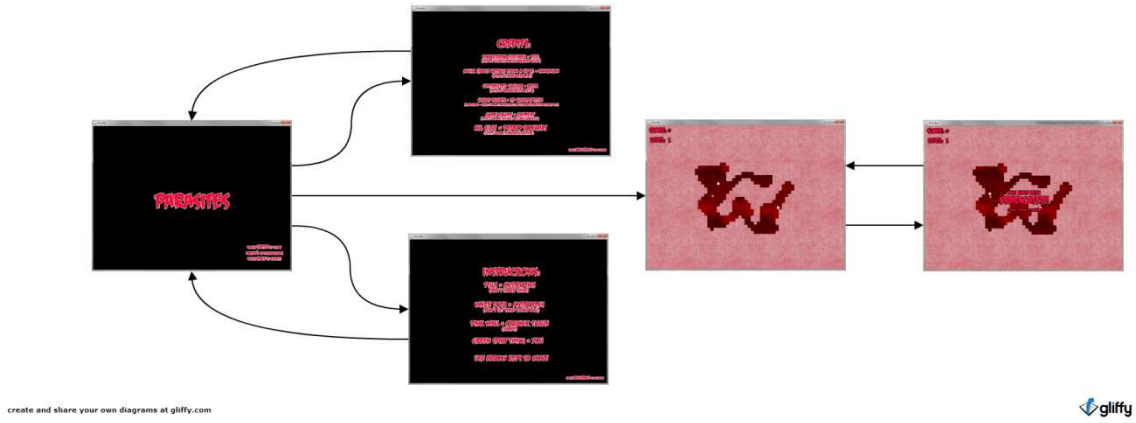
It will be the first screen of the game. From there you'll be able to see the instructions, watch the credits and start the game.

Instructions

This screenwillinstruct the playeron how to get started in the game. It will contain information such as "who you are", "who your enemies are", "what the objectives of the gameare"and "what you should do to achieve them".

Credits

There will be listed all meaningful tools (and respective authors) that were used during the development of the game.



Screens navigation flow

Audio Requirements

Most sounds will be synthesized by computer. Sound effects must be played during growth, harm and eating. The background music should be eerie and mysterious and must be played continuously in an infinite loop.