Pulsus

A Game of Particles

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ASTRACT

Pulsus is a flash game in which players must solve puzzles by arranging objects in order to move particles from an emitter into goal points. The game is in part about solving puzzles, but also about exploring and understanding a dynamic, engaging, system.

1. OVERIEW

The goal of the project was to create a game that was aesthetically compelling, fun, and logically engaging. Players enter the game with little explanation and, through initially simple levels, explore how to manipulate the system to accomplish goals. While it is essentially a puzzle game, the system being solved is constantly in flux.

Within the game, each level consists of a few objects on the stage and others that can be placed onto it. Using these objects players must move particles into goal objects on the stage. The particles and objects are each one of three colors. Particles are effected differently by objects of their own color. Force objects attract their own color and repel others. Goal objects are filled with their own color but are drained by others. Objects can also be a fourth, neutral, color, which accepts, pushes, or otherwise manipulates all particles the equally. Most objects on the stage at the start of each puzzle are locked in place.

2. PROTOTYPES

2.1 Dirty Prototype

The first prototype was a set of paper analogs for the objects within the game. The prototype laid out the general game mechanic. Players could move objects and the particles would be moved to show the effects of their actions.

Having players test this very simple rendition of the game, gave some feedback on how intuitive the system was, both in terms of the relevance of the icons and the feedback from the system.

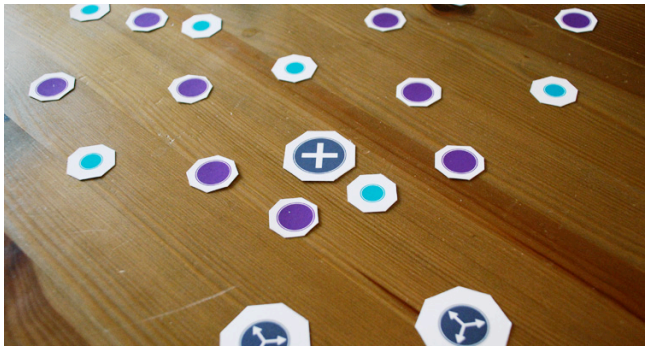

Figure 1. Dirty Prototype

2.2 Second Prototype

The first digital prototype laid out the basics of the particle system, which is the central component of the game. In this prototype the game, without goals or levels, could not yet be played, but objects could be added to the system to explore their functions.

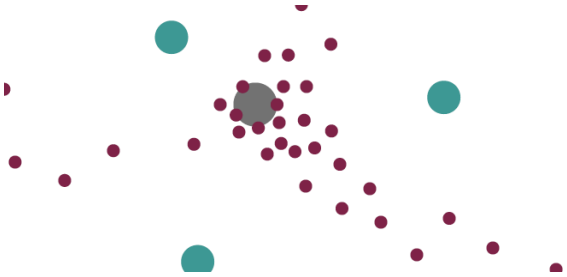

Figure 2. Basic Game Mechanics

Building from this prototype, goal objects were added so that players could complete simple levels and see how manipulating objects could complete goals.

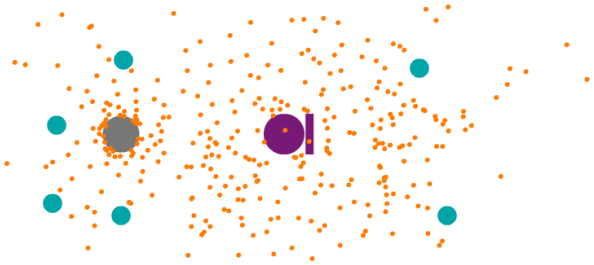

Figure 3. Elements of Gameplay

2.3 Third Prototype

In the third prototype, the game was given an aesthetic

style and the game mechanics were further fleshed out, with multi-colored particles and objects and the basics of the game interface. This prototype also included five playable puzzles and a simple menu to navigate through them.

The puzzles were stored in an external set of xml files so that they could be easily changed and added to.

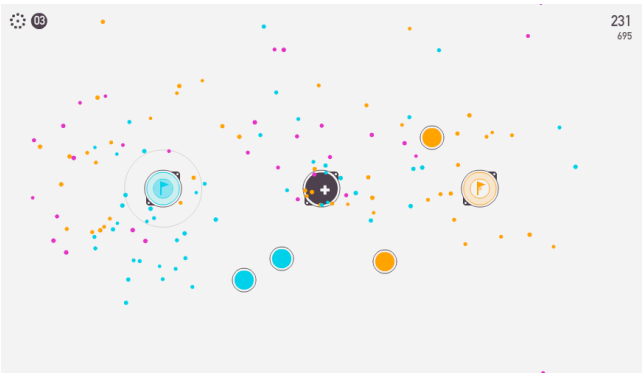

Figure 4. Third Prototype

The level menu was designed to lead into the aesthetics of the game and to be a creative solution to an often dull interface. The menu consists of a wheel of circles each of which represents a level. On the right side is the next level, which has not been completed, and the entire dial rotates every time a level is cleared.

2.4 Final Game

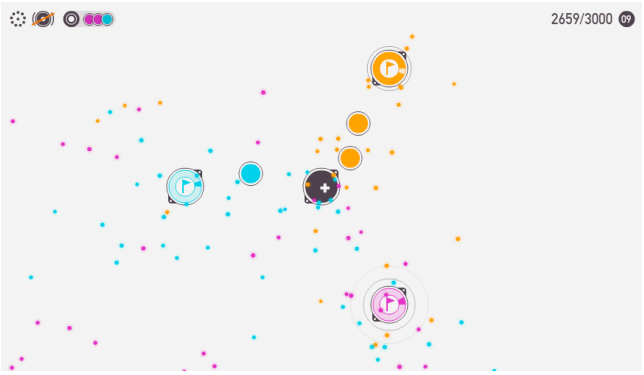

Figure 5. Final Game

The final game looks similar to the third prototype but is generally more polished. The interface is more intuitive and designed and objects that can be used to complete each puzzle are stored in a bar at the top left of the screen. The other screens within the game, including the screens that appear when the level is won or lost were redesigned to be more clear and interesting.

Sounds were created using Pure Data to enhance the game experience. Sounds occur for various actions within the game and the menus and there is a background track of ambient tones.

With the final version a website was built for the game which is hosted on http://www.pulsusgame.com.

3. PRECEDENTS

The Incredible Machine is one of the primary influences for Pulsus. The core mechanic is similar in the players use a set of objects in order to solve puzzles. The Incredible Machine establishes precedents construction, which echo through many other games. Pulsus is a far more abstracted game and the motion of the particles and objects and the general design aesthetic will give a very different feel to the game and appeal to a different audience.

The Soda Constructor was always one of my favorite things to play with when I was first introduced to the web and quite possible planted the seed for my interest in particle systems. Pulsus borrows again from the interface of a constructible canvas where objects can be placed and manipulated. The interface of a panel of adjustments, seen in many games, will be similar in Particle.

Laser Logic is a simple puzzle game that is quite similar to Pulsus. In it players can place mirrors and prisms, in order to direct different colored lasers into goal points. Although the experience of Pulsus will be much more dynamic and engaging the basic mode of gameplay is quite similar.

Manipulating crowds of objects through larger forces is a common aspect of video games. It is the mechanic behind the game Ants in which players had to control one ant to leave scent trails and other messages to guide the colony. In other games like Pharaoh and Roller-coaster Tycoon players also had a similar method. In these cases they had to build cities and theme parks to get their populations to accomplish certain tasks, however the interaction has certain similarities.

Spaced Penguin is a simple flash game. Players shoot their penguin, sending him orbiting around planets in order to hit certain goals. Within Pulsus objects that attract particles can be used in the same way as planets within this game to pull particles to goal points.

Many precedents have long been established for the functionality of particle systems outside of their function within gameplay. Particle systems are used in movies, animations, and games to create special effects such as explosions and fluids. Dan Shiffman lays out an excellent framework for basic functionality of particle systems and forces. More specific tools, like Perlin Noise, created for the movie Tron, are used constantly with particle systems to create fluid effects.

In more artistic realms, Particle systems are employed by artists like Casey Reas, Robert Hodgin, Jared Tarbell and many others who have expanded their use and pushed their aesthetic into new directions.

4. REFERENCES

[1] Soda Constructor - http://sodaplay.com/creators/soda/items/constructor / http://www.manetas.com/eo/biennale/works/soda/sodaconstructor/index.html

[2] Laser Logic - http://www.gamingdelight.com/games/laserlogic.php

[3] Spaced Penguin - http://www.bigideafun.com/penguins/arcade/spaced_penguin/info.htm

[4] Pure Data - http://puredata.info/

[5] Dan Shiffman - http://www.shiffman.net

[6] Robert Hodgin - http://www.flight404.com

[7] Jared Tarbell - http://complexification.ne