

Technical Documentation

Night Mission Pinball

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Game Engine

Phaser

Phaser is a Desktop and Mobile HTML5 game framework.

We chose this engine as it is fast, free and fun open source framework for Canvas and WebGL powered browser games.

Phaser Features

- Preloader
- Physics
- Sprites
- Groups
- Animation
- Particles
- Camera
- WebGL and canvas
- Input
- Mobile Browser





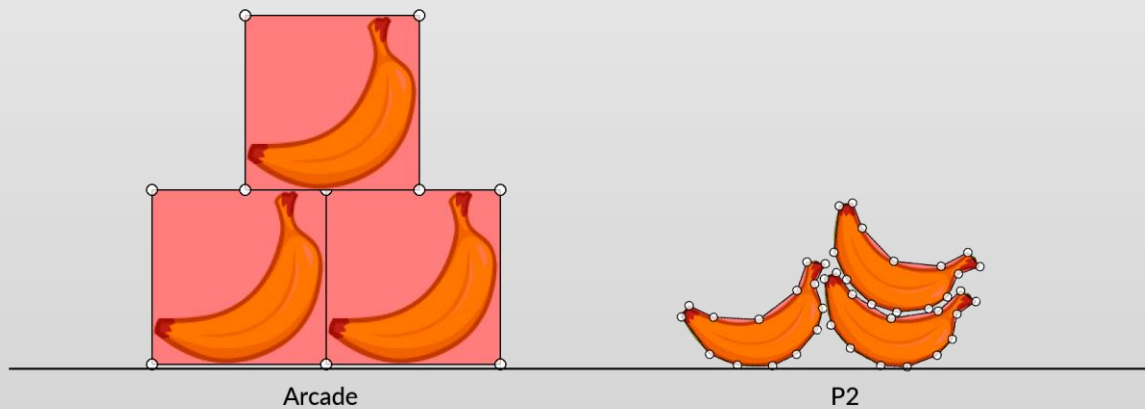
Graphic Engine

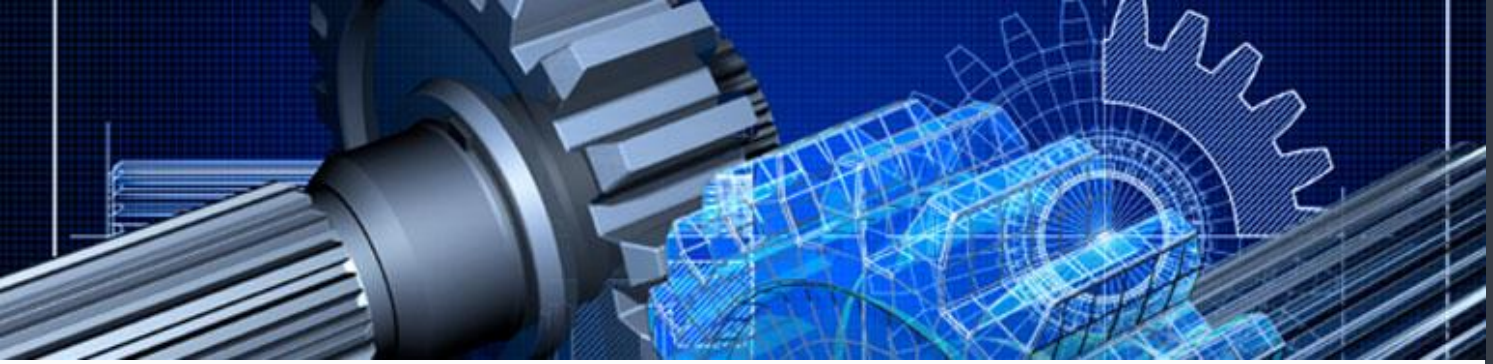
It is very easy to implement good graphics and animation using Phaser. We just need to load images and declare them as different sprites each with its own specifications. We can also draw objects in Phaser.

Furthermore, as its on HTML5, we are free to use CSS to design our page together with lots of libraries such as Bootstrap.

Physics Engine

First of all, Phaser has a lot of built-in physics type, (for example: Arcade physics, Box2d physics, P2 physics and Ninja physics). We chose P2 Physics as it is best suited for a pinball game. Arcade physics is easier to use but in P2 we can set an object with custom polygons for impact events as shown below:





Physics of the ball

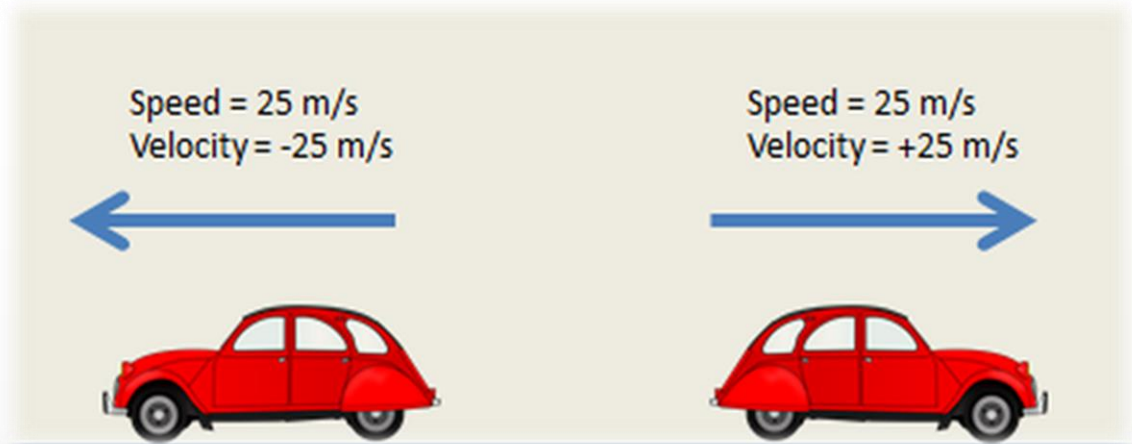
Gravity

In Phaser it is easy to declare the gravity of the ball. We did the game in such a way that the gravity affects the level of the game. That is, if the gravity is high, most of the time the ball will be near the flippers and its hard as the player won't have time to rest. On the other hand, if gravity is low, the ball will roam a bit freely and therefore the player will get a lot of bonuses.

Furthermore, with high gravity, the ball will perform more parabolic paths.

Elasticity/Restitution

When the ball collides with obstacles, a fraction of its energy is lost to the other bodies. We implemented the restitution to 0.9 which means that 10% of the ball energy is lost whenever it has collided with an obstacle.



Bumpers

There are 2 big bumpers and 5 small ones. The velocity of the ball is increased when collided with them. As velocity is not linear, we need to know in which direction the ball is heading and increases the velocity to this direction.

A negative velocity y means the ball is heading to the top, a positive y means the latter is heading down.

A negative x velocity means the direction is to the left and positive means to the right.

Flippers

The left flipper's anchor is set to 0,0 means that the pivot is top-left corner when rotating and the right flipper's anchor is set to 1,0, that is, the pivot is top-right corner when rotating. They are rotated to a maximum of 65 degrees.

A function is called when the ball collides with the flippers to help make the ball directed upwards with a high velocity.



Bumping table

The game is simulated so well that we can bump the table same as the real pinball.

The physics we used to implement this feature is that if we bump the table to the right, the ball gains positive x velocity (speed to the right). On the other hand, if we bump the table to the left, the ball gains negative x velocity (speed to the left).

Spring

When the player holds spacebar, a variable named "speed" is increased continuously to a maximum value. When spacebar is released, the ball is launched with an initially negative velocity y of same value as "speed".