Collisions

In this exercise, we will look at advanced collision detection on the canvas.

Exercises

1. Create a blank HTML file with a CSS section and a JavaScript section, and add a canvas element to it.

2. Create an init function, and have it resize the canvas to an appropriate size. Then call the function.

```
function init() {
  ...
}
init();
```

3. Create a ball "class" and create an object of that type (as described in lecture notes). Give the ball a position (both x and y), a radius, a mass and an x and y velocity. Choose some appropriate initial values for the properties, (e.g. (10, 10) for the centre position).

4. Add a draw function to the ball that will draw the ball on the canvas. Also add a setColour method.

5. As completed in Lab 3, add a move function to the ball that will step the position according to the velocity

6. Use requestAnimationFrame to move the ball, clear the canvas, and re-draw the ball.

```
function step() {
  ball.move();
  ...
  requestAnimationFrame(step);
}
```

7. As completed in Lab 3, add functionality to the ball's move function to detect a collision with the walls. Have the ball bounce off the wall in the case of a collision. Also incorporate mouse and keyboard event listeners (from Lab 4)

```
, move: function() {
    if (this.position.x + this.radius >= canvas.width) {
      this.velocity.x = -this.velocity.x;
    }
}
```

8. Create a second ball object. Give it appropriate properties, and have it move on the canvas, similar to the first ball

9. Write a function to detect collisions between the two balls. Print a message to the console every time a collision is detected. The method to achieve this is detailed in the lecture notes.

10. Once collisions can be successfully detected, implement ball reactions (as described in the lecture notes.)

Advanced exercises

1. Replace the two balls with pizzas (as completed in lab 3).
2. Add a y acceleration for gravity affect and apply it to one of the balls
3. Experiment with different sphere sizes/masses
4. Implement collision system for several balls (scalable code if possible)