Animation Frames

In this exercise we will use requestAnimationFrame() to animate a ball/pizza moving around the canvas.

Exercises

1. In ball.html, resize the canvas and put a border around it so that we can see its edges.

2. Clear the canvas at each step of the animation, so that only one copy of the ball is visible at a time. You can use the clearRect method for this.

   ```
   ctx.clearRect(left, top, width, height);
   ```

3. Stop the ball moving when it hits the bottom of the canvas. You might use an if statement for this purpose.

```
// If the ball hits the bottom of the canvas.
if (...) {
  // Stop the ball.
  ...
  }
```

4. Represent the ball as an object, rather than by a global y value and hard-coded x and r values.

   ```
   var ball = {
     ...
   }
   ```

5. Change the code so that the ball starts moving up the way once it reaches the bottom of the screen.

   ```
   // If the ball hits the bottom of the canvas.
   if (...) {
     // Change ball's direction.
     ...
   }
   ```

6. Change the code so that the ball bounces from the bottom to the top of the screen, and back again, repeatedly.

   ```
   // If the ball hits the bottom of the canvas.
   if (...) {
     // Reverse the ball.
     ...
   }
   ```

```
// Otherwise, if the ball hits the top.
else if (...) {
  // Reverse the ball the other way.
}
```

7. Give the ball a horizontal velocity, as well as a vertical one, and have it bounce off the left and right sides of the canvas also.

8. Change the code so that the pizza from lab 2 rather than the ball bounces

Advanced exercises

1. Have the ball rotate in a realistic manner as it traverses the screen. Use the rotate function developed as part of Lab 2 to achieve this. Reverse the direction of the rotation when the ball/pizza strikes the wall

2. Give the ball/pizza a downwards acceleration, so that it gets faster as it falls, and slower as it ascends. Also add a kinetic energy loss on each bounce (i.e. the ball will only bounce to 90% of the height from which it has been dropped).

Notes

- See here for Mozilla's docs on Window.requestAnimationFrame().

- Mozilla Developer Network: WindowTimers.setInterval()

- Mozilla Developer Network: WindowTimers.setTimeout()