Graphics Animation Of The Random Walk Assignment

#### **Learning Outcome Addressed**

  5. Implement web animations using JavaScript

## Random Walk Assignment

So far, you've been able to use HTML, JavaScript and CSS to create a UI element representing a ball on the web page. You were also able to add animation to this element and make it move on the page.

In step 1 of this activity, you will add JavaScript code that will create three balls within a defined area of the screen. Then, in step two, you will make the three balls move randomly within that area.

The starter code for this activity includes the following:

* Index.html: This is the Html file where all elements are created. You will not need to update this file to solve this activity.
* styles.css: This is the CSS file containing all the styles needed for this activity. You will not need to update this file to solve this activity.
* walk.js: This is the JavaScript file containing all the functions needed for this activity. **You will need to update this file to solve this activity.**

The walk.js file contains code and comments that will help you through this activity. Here are some more details:

* The area variable is an object that defines the area of the screen in which the ball elements will be displayed. It has a set width and height, and a reference to the Html element called area. This reference is stored in the property element.
* The initialize function creates the area div on the Html page.
* The moveTo function takes a "ball" and "x,y" coordinates as parameters, then it sets the coordinates of that given ball to the given x,y coordinates.
* The changeDirectionIfNecessary function takes a "ball" and "x,y" coordinates as parameters, then it determines whether the ball trajectory should be reversed if the ball hits the area bounds.
* The create function has the following parameters as input:
  + color: This is a string representing the color of the ball (ex. red)
  + dx: The starting position of the ball on the x-axis
  + dy: The starting position of the ball on the y-axis
* The update function has the following parameters as input:
  + ball: This is a reference to the ball
  + x: The new desired position of the ball on the x-axis
  + y: The new desired position of the ball on the y-axis

**Your task in this activity is to complete the implementation of the function create in Step 1, and the function update in step 2**

After you're done, uncomment the following block of code. You should see three balls: blue, red and green on the screen.

initialize();  
const ball1 = create('blue', 4, 3);  
const ball2 = create('red', 1, 5);  
const ball3 = create('green', 2, 2);  
moveTo(ball1, 1, 1);  
moveTo(ball2, 10, 10);  
moveTo(ball3, 20, 20);

Task

Complete the implementation of the function create

**Track movement of the Ball**

Now that you've created three balls on the screen, it is time to make them move.

**Your task is to edit the update() function to add movement to the balls.**

The update function should use the input ball, x and y to move the ball on the screen using the moveTo function. Then, it needs to check the direction the ball should move in using the changeDirectionIfNecessary function every sixteen milliseconds. It should also keep calling itself every sixteen milliseconds to keep the balls moving.

After you're done, uncomment the following block of code. You should see three balls: blue, red and green moving on the screen:

update(ball1, 70, 0);  
update(ball2, 20, 200);  
update(ball3, 300, 330);

Task

Implement the update() function to add movement to the balls

<!DOCTYPE html>

<html>

<head>

  <title>Random walk</title>

  <link rel="stylesheet" href="./styles.css" />

</head>

<body>

  <div id="area"></div>

</body>

<script src="./walk.js"></script>

</html>

#area {

  position: relative;

  background-color: #f0f0f0;

  margin: 1em auto;

}

.ball {

  background-color: black;

  position: absolute;

  display: inline-block;

  border-radius: 50%;

}

// No need to change the following code

// The area object defines the div in which the balls will be created

const area = {

  element: document.getElementById('area'),

  width: 600,

  height: 400,

};

// No need to change the following code

// The initialize function creates the area div on the Html page

function initialize() {

  area.element.style.width = area.width + 'px';

  area.element.style.height = area.height + 'px';

  document.body.appendChild(area.element);

}

// No need to change the following code

// The moveTo function moves a given ball to a set x and y coordinates on the page

function moveTo(ball, x, y) {

  ball.element.style.left = x + 'px';

  ball.element.style.top = y + 'px';

}

// No need to change the following code

// The changeDirectionIfNecessary function reverses the ball direction when it hits the area borders

function changeDirectionIfNecessary(ball, x, y) {

  if (x < 0 || x > area.width - ball.width) {

    ball.dx = -ball.dx;

  }

  if (y < 0 || y > area.height - ball.height) {

    ball.dy = -ball.dy;

  }

}

// TODO: implement the create function

function create(color, dx, dy) {

  const newBall = Object.create(this);

  // TODO: Set newBall properties: dx, dy, width, height

  // TODO: set the newBall.element property and initialize it to a Html element "div"

  // TODO: set the backgroundColor, width and height style properties for newBall.element

  // This line set the CSS class for newBall.element. No need to change this line

  // TODO: set the width and height of newBall based on newBall.element

  // Hint: use the Javascript parseInt() function to convert a string value to integer

  // TODO: use the Javascript appendChild() function to add newBall.element to the area element

  return newBall;

}

// TODO: implement the update function

function update(ball, x, y) {

  // TODO: use the moveTo() function to move the ball

  // TODO: use the Javascript setTimeout() method to call changeDirectionIfNecessary() and update() every 16ms

//setTimeout(changeDirectionIfNecessary(ball, x, y),16);

//setTimeout(update(ball, x + ball.dx, y + ball.dy),16);

// Uncomment these lines for step 1 of the activity

// This is expected to create 3 balls within the area div

 initialize();

 const ball1 = create('blue', 4, 3);

 const ball2 = create('red', 1, 5);

 const ball3 = create('green', 2, 2);

 moveTo(ball1, 1, 1);

 moveTo(ball2, 10, 10);

 moveTo(ball3, 20, 20);

// Uncomment these lines for step 2 of the activity

// This is expected to make the 3 balls move around the area div

 update(ball1, 70, 0);

 update(ball2, 20, 200);

 update(ball3, 300, 330);

// Do not change code past this point

if (typeof module !== 'undefined') {

  module.exports = { update, create, changeDirectionIfNecessary, moveTo, area };

}