

Contemporary Data Processing Technology (CCOD) Lab 1 (September 08, 2016)

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Control two metro cars using Speed, Distance, and Brake

In this practice we made a model of 2 trains on plain loop with length of 1000 points. Every train at the beginning have the speed of 10 points and move in clockwise stream. On each iteration we change speed adding -1, 0, +1 at random. Speed should be ≥ 0 , ≤ 20 . When the distance between trains is 0 we stop the movement. The program can be run in every browser(it's an .html page)

Here is the source code:

Script.js

```
var blackTrain = document.querySelector(".blackTrain");
var redTrain = document.querySelector(".redTrain");
var redTrainSpeed = document.querySelector(".redTrainSpeed");
var redTrainDistance = document.querySelector(".redTrainDistance");
var blackTrainSpeed = document.querySelector(".blackTrainSpeed");
var blackTrainDistance = document.querySelector(".greentrainDistance");
var startSpeed = 0.01;
var x0 = 77;
var y0 = 74;
var r = 79;
var i = -1;
var j = 1;
var start = Date.now();
var redSpeed = 0.001,
    blackSpeed = 0.001;
var rand;
var redway = 0,
    blackway = 0;

var rightRed = redTrain.style.left + 20;
var leftRed = redTrain.style.left;

var rightBlack = blackTrain.style.left + 20;
var leftBlack = blackTrain.style.left;

var topRed = redTrain.style.top;
var bottomRed = redTrain.style.top - 10;

var topBlack = blackTrain.style.top - 10;
var bottomBlack = blackTrain.style.top;

var timer = setInterval(function () {
    var timePassed = Date.now() - start;
    redTrain.style.left = x0 + r * Math.cos(i) - 35 + 'px';
    redTrain.style.top = y0 + r * Math.sin(i) - 5 + 'px';

    blackTrain.style.left = x0 + r * Math.cos(j) - 10 + 'px';
    blackTrain.style.top = y0 + r * Math.sin(j) - 5 + 'px';

    i = i + redSpeed;
    j = j + blackSpeed;
```

```

    rand = randomValue(-1, 1) / 10000;
    if (redSpeed > 0 || rand > 0) {
        redSpeed += rand;
    }
    if (redSpeed > 0.002) redSpeed = 0.002;
    redway += redSpeed;

    redTrainSpeed.innerHTML = Math.round(redSpeed * 10000);

    redTrainDistance.innerHTML = 500 + Math.round(Math.abs(redway - greenway) / 6.0414 * 1000);

    rand = randomValue(-1, 1) / 10000;
    if (blackSpeed > 0 || rand > 0) {
        blackSpeed += rand;
    }
    if (blackSpeed > 0.002) greenSpeed = 0.002;
    blackway += blackSpeed;

    blackTrainSpeed.innerHTML = Math.round(blackSpeed * 10000);

    blackTrainDistance.innerHTML = 10000 - (500 + Math.round(Math.abs(redway - greenway) / 6.0414 * 1000));

    if (Math.abs(redway - blackway) > 3.02) {
        clearInterval(timer);
    }
}, 2);

function randomValue(min, max) {
    return Math.round(min - 0.5 + Math.random() * (max - min + 1));
}

```

Index.html

```

<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title></title>
    <link rel="stylesheet" href="css/style.css">
</head>
<body>
    <div class="subway_loop">
        
        
    </div>

    <div class="speed redTrainSpeed">red speed: <span class="redTrainSpeed"></span></div>
    <div class="speed blackTrainSpeed">black speed: <span class="blackTrainSpeed"></span></div>

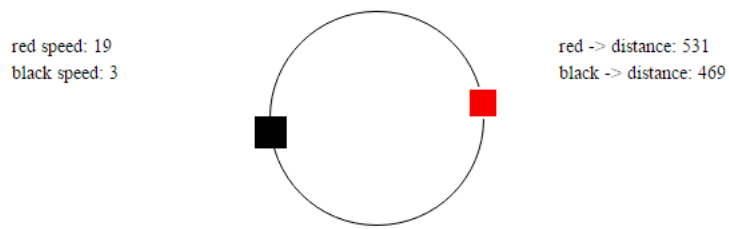
    <div class="distance redTrainDistance">red -> black distance: <span
class="redtrainDistance"></span></div>
    <div class="distance blackTrainDistance">black -> distance: <span
class="blackTrainDistance"></span></div>

    <script src="js/script.js"></script>

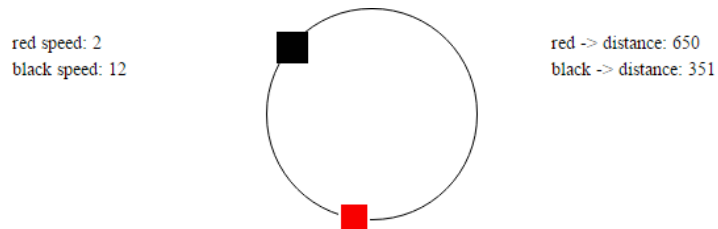
```

</body>
</html>

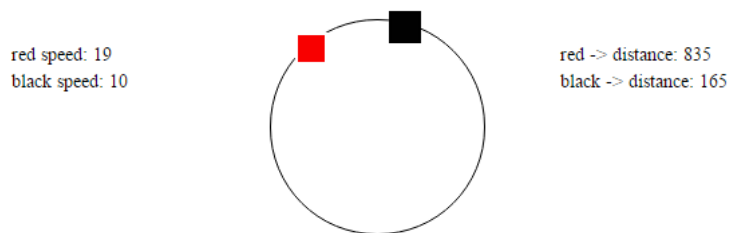
Results:



Red very fast : $\mu = 1$
Fast: $\mu = 0$
Black very slow: $\mu = 0.25$
Very slow: $\mu = 0.75$

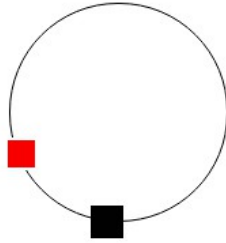


Red very slow : $\mu = 1$
Slow: $\mu = 0$
Black medium: $\mu = 0.5$
Fast: $\mu = 0.5$



Red very fast : $\mu = 1$
Fast: $\mu = 0$
Black medium: $\mu = 1$
slow: $\mu = 0$
fast: $\mu = 0$

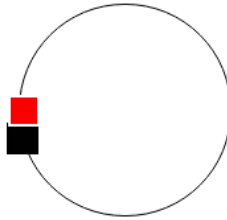
red speed: 15
black speed: 15



red -> distance: 862
black -> distance: 138

Red very fast : $\mu=0.25$
fast: $\mu=0.75$
Black very fast : $\mu=0.25$
fast: $\mu=0.75$

red speed: 3
black speed: 19



red -> distance: 1000
black -> distance: 0

Red very slow : $\mu=0.75$
slow: $\mu=0.25$
Black very fast : $\mu=1$
fast: $\mu=0$