```
<html>
    <head>
        <title>Canvas</title>

        <script language="javascript">
            //makes variables for each circle
            var invaderSpeedX = 5;
            var invaderSpeedY = 40;

            var invaderHealth = 10;

            var colorOne = "#0000FF";
            var colorTwo = "#FF0000";

            //defines the boundaries of the canvas as varaibles to make it easier to hot swap
            var canvasBoundX = 700;
            var canvasBoundY = 500;

            var speed = 6;

            //places circles in random locations
            var xCoordOne = Math.floor(Math.random() * (canvasBoundX - 100)) + 50;
            var yCoordOne = Math.floor(Math.random() * (canvasBoundY - 100)) + 50;

            var xCoordTwo = Math.floor(Math.random() * (canvasBoundX - 100)) + 50;
            var yCoordTwo = Math.floor(Math.random() * (canvasBoundY - 100)) + 50;

            var xDef = 350;
            var yDef = 450;

            var xInvaders = 350;
            var yInvaders = 50;

            var currentMovement = "none";

            var bulletShot = false;
            var initialPositionX = 0;
            var bulletY = 0;

            var isOn = false;
            //used for timer to determine if it is on or not

            window.addEventListener("keydown", function(event){


                switch(event.key){
                    case "a":
                        currentMovement = "left";
                        break;
                    case "d":
                        currentMovement = "right";
                        break;
                    default:
                        currentMovement = "none";
                        break;
                }

            }, true);

            window.addEventListener("keyup", function(event){
                currentMovement = "none";

            }, true);


            function initialize(){
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    var canvas = document.getElementById("myCanvas");
    var context = canvas.getContext("2d");

    context.fillStyle="#ADD8E6";
    context.fillRect(0, 0, canvasBoundX, canvasBoundY);

    turnOn();
}

function update(){
    resetBackground();
    writeText(invaderHealth);
    moveDef();
    moveBullet();
    moveInvaders();
    checkWinLoss();

}

function checkWinLoss(){
    if(invaderHealth <= 0){
            resetBackground();
            writeText("You Win!");
            toggleTimer();
        }

    if(yInvaders >= 400){
        resetBackground();
            writeText("You Lose!");
            toggleTimer();
    }
}

//for debugging
function writeText(text){
    var canvas = document.getElementById("myCanvas");
    var context = canvas.getContext("2d");

    context.font = "30px Arial";
    context.fillStyle = "#FF0000";
    context.fillText(text, 10, 50);
}

function moveBullet(){
    if(bulletShot == true){
        var canvas = document.getElementById("myCanvas");
        var context = canvas.getContext("2d");

        bulletY -= 10;

        context.lineWidth = 5;
        context.strokeStyle = "red";
        context.beginPath();
        context.moveTo(initialPositionX, bulletY);
        context.lineTo(initialPositionX, bulletY - 20);
        context.stroke();

        if(bulletY <= 10 || hitInvader()){
            context.strokeStyle = "#ADD8E6";
            context.stroke();
            bulletShot = false;
        }

        if(hitInvader())
            invaderHealth -= 1;
    }
}
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function fireBullet(){
    if(!bulletShot){
        initialPositionX = xDef;
        bulletY = yDef;
    }

    bulletShot = true;

}

function moveDef(){
    switch(currentMovement){
        case "left":
            if(xDef > 20)
                xDef -= speed;
            moveDefender(xDef, yDef, -1);
            break;
        case "right":
            if(xDef < canvasBoundX - 20)
                xDef += speed;
            moveDefender(xDef, yDef, 1);
            break;
        default:
            moveDefender(xDef, yDef, 0);
            break;

    }
}

function resetBackground(){
    var canvas = document.getElementById("myCanvas");
    var context = canvas.getContext("2d");
    //paint the background of the canvas
    context.fillStyle="#ADD8E6";
    context.fillRect(0, 0, canvasBoundX, canvasBoundY);
}

function moveDefender(x, y, direction){
    var canvas = document.getElementById("myCanvas");
    var context = canvas.getContext("2d");

    context.fillStyle = colorOne;
    context.beginPath();
    context.arc(x, y, 15, 0, 2 * Math.PI, true);
    context.closePath();
    context.fill();

    context.fillStyle = colorOne;
    context.beginPath();
    context.arc(x + (15 * direction), y, 7.5, 0, 2 * Math.PI, true);
    context.closePath();
    context.fill();
}

function moveInvaders(){
    var canvas = document.getElementById("myCanvas");
    var context = canvas.getContext("2d");

    context.fillStyle = "#FFFFFF";
    context.beginPath();
    context.arc(xInvaders, yInvaders, 40, 0, 2 * Math.PI, true);
    context.closePath();
    context.fill();

    if(xInvaders >= canvasBoundX - 40 || xInvaders <= 40){
        invaderSpeedX *= -1;
        yInvaders += invaderSpeedY;
    }
    xInvaders += invaderSpeedX;
}

function hitInvader(){
     return (Math.abs(xInvaders - initialPositionX) <= 40 && Math.abs(yInvaders - bulletY) <= 40)
}

//paints a circle on the canvas
function drawCircle(){
    var canvas = document.getElementById("myCanvas");
    var context = canvas.getContext("2d");
    //paint the background of the canvas
    context.fillStyle="#ADD8E6";
    context.fillRect(0, 0, canvasBoundX, canvasBoundY);

    //draw the circle one
    context.fillStyle = colorOne;
    context.beginPath();
    context.arc(xCoordOne, yCoordOne, 15, 0, 2 * Math.PI, true);
    context.closePath();
    context.fill();

    //draw circle two
    context.fillStyle = colorTwo;
    context.beginPath();
    context.arc(xCoordTwo, yCoordTwo, 15, 0, 2 * Math.PI, true);
    context.closePath();
    context.fill();
}


function move(){
    //momves circle ~10px

    //if circle hits horizontal edge then change x direction
    if(xCoordOne > (canvasBoundX - 15) || xCoordOne < 15){
        //moveXOne = -Math.sign(moveXOne) * Math.floor(Math.random() * 10);
        moveXOne *= -1;
    }

    //if circle hits vertical edge then change y direction
    if(yCoordOne > (canvasBoundY - 15) || yCoordOne < 15){
        //moveYOne = -Math.sign(moveYOne) * Math.floor(Math.random() * 10);
        moveYOne *= -1;
    }

    if(xCoordTwo > (canvasBoundX - 15) || xCoordTwo < 15){
        //moveXOne = -Math.sign(moveXOne) * Math.floor(Math.random() * 10);
        moveXTwo *= -1;
    }

    if(yCoordTwo > (canvasBoundY - 15) || yCoordTwo < 15){
        //moveYOne = -Math.sign(moveYOne) * Math.floor(Math.random() * 10);
        moveYTwo *= -1;
    }

    //if the circle contact then change direction for both circles and toggle the color
    if(contact()){
        moveXOne *= -1;
        moveYOne *= -1;
        moveXTwo *= -1;
        moveYTwo *= -1;

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                    toggleColor();
                }

                //change the coordinates of the circles
                xCoordOne += moveXOne;
                yCoordOne += moveYOne;

                xCoordTwo += moveXTwo;
                yCoordTwo += moveYTwo;

                //moves cirlces to new coordinates
                drawCircle();
            }

            function contact(){
                //if the circles are within a circle threshold then return true
                return Math.abs(xCoordOne - xCoordTwo) <= 20 && Math.abs(yCoordOne - yCoordTwo) <= 20;
            }

            function toggleColor(){
                //if the color is blue then make it green, if no then make it blue
                (colorOne == "#0000FF") ? colorOne = "#008000" : colorOne = "#0000FF";

                //if the color is red then make it purple, if not then make it red
                (colorTwo == "#FF0000") ? colorTwo = "#800080" : colorTwo = "#FF0000";
            }

            function toggleTimer(){
                //if the timer is on the turn it off, if its not then turn it on
                isOn ? turnOff() : turnOn();
            }

            function turnOn(){
                //turns the timer on
                timer = setInterval("update()", 20);
                isOn = true;
            }

            function turnOff(){
                //turns the timer off
                clearInterval(timer);
                isOn = false;
            }
        </script>
    </head>

    <body onload="initialize()" onclick="fireBullet()">
        <center>
            <h1>Basic Animations</h1>

    </br>
    </br>

        <canvas id="myCanvas" width="700" height="500"
            style="border:2px solid rgb(195, 195, 195);">
            Your browser does not suppport the canvas element
        </canvas>

    </br>
    </br>
        </center>
    </body>
</html>
```