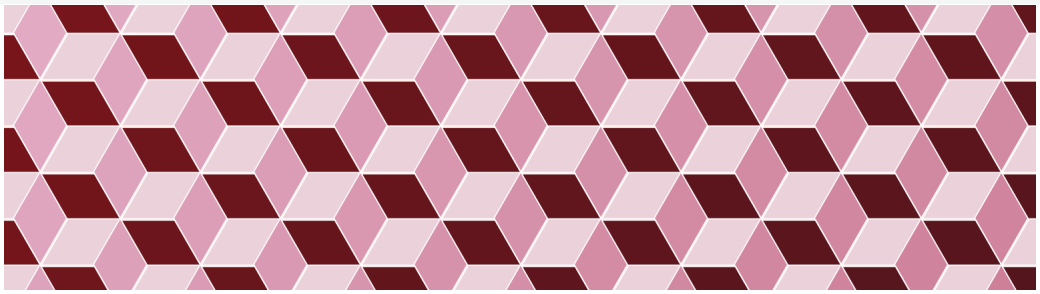

15-104 Introduction to Computing for Creative Practice

Fall 2020

37 Snake Game (from an example by Prashant Gupta, https://github.com/prashantgupta24)

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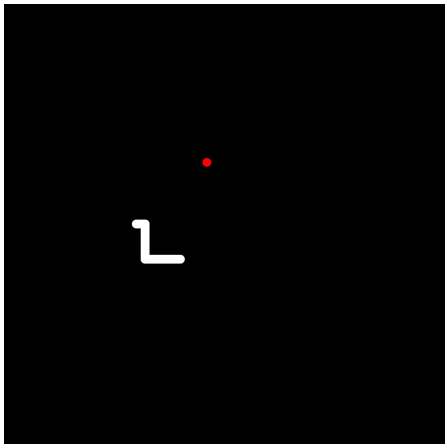
1

Classic Snake Game

- Control the movement of the snake with the arrow keys.
- If the snake eats the "fruit", the snake grows longer.
- Avoid the sides of the canvas! If the snake touches a side of the canvas, the game is over.



2

Fruit (as an object)

```
function makeFruit() {
    var fruit = { x: 0, y: 0, draw: drawFruit, move: moveFruit };
    return fruit;
}

function drawFruit() {
    stroke(255, 0, 0);
    point(this.x, this.y);
}

function moveFruit() {
    this.x = floor(random(10, (width - 100) / 10)) * 10;
    this.y = floor(random(10, (height - 100) / 10)) * 10;
}
```

Set the fruit point to lie in between 100 and width-100, and be rounded off to the nearest number divisible by 10, since the snake moves in multiples of 10.

3

Snake

```
var xTail = 0;
var yTail = 250;
var numSegments = 10;
var direction = 'right';
var xCor = [];
var yCor = [];

function initSnake() {
    for (var i = 0; i < numSegments; i++) {
        xCor.push(xTail + i * 10);
        yCor.push(yTail);
    }
}
```

The xCor and yCor arrays hold the x and y coordinates of each segment of the snake.
The tail is at (xCor[0], yCor[0]) and the head is at (xCor[numSegments-1], yCor[numSegments-1]).

4

Drawing the snake

```
function drawSnake() {
    stroke(0, 255, 0);
    for (var i = 0; i < numSegments - 1; i++) {
        line(xCor[i], yCor[i], xCor[i + 1], yCor[i + 1]);
    }
}
```

Connect each adjacent pair of coordinates to form the snake.
REMEMBER: if there are `numSegments` segments, then there is one less line to draw.
("the fence rail scenario").

5

Moving the snake

```
function moveSnake() {
    var x_diff = 0;
    var y_diff = 0;
    for (var i = 0; i < numSegments - 1; i++) {
        xCor[i] = xCor[i + 1];
        yCor[i] = yCor[i + 1];
    }
    switch (direction) {
        case 'right': x_diff = 10;  break;
        case 'left' : x_diff = -10; break;
        case 'down' : y_diff = 10;  break;
        case 'up'   : y_diff = -10; break;
    }
    xCor[numSegments - 1] = xCor[numSegments - 2] + x_diff;
    yCor[numSegments - 1] = yCor[numSegments - 2] + y_diff;
}
```

Copy each segment to the previous segment.
(so position 1 moves to position 0 and becomes the new tail)

Depending on the direction, add a positive or negative value to the previous head of the snake (which is now in position `numSegments-2` to create a new head of the snake in position `numSegments-1`.

6

Will the snake collide with itself?

```
function snakeCollision() {
    var snakeHeadX = xCor[numSegments - 1];
    var snakeHeadY = yCor[numSegments - 1];
    for (var i = 0; i < numSegments - 1; i++) {
        if (xCor[i] == snakeHeadX && yCor[i] == snakeHeadY) {
            return true;
        }
    }
    return false;
}
```

Check all segments of the snake (except the head) to see if any are in the same position with the head of the snake. If so, it collided with itself.

7

Putting the game together (uses DOM)

```
var scoreElem;      // score element for web page
var score = 0;
var fruit;
function setup() {
    scoreElem = createDiv('Score = 0');
    scoreElem.position(20, 20);
    scoreElem.id = 'score';
    scoreElem.style('color', 'white');
    createCanvas(500, 500);
    frameRate(15);
    strokeWeight(10);
    initSnake();
    fruit = makeFruit();
    fruit.move();
}
```

8

The main `draw` loop

```
function draw() {
  background(0);
  fruit.draw();
  drawSnake();
  moveSnake();
  checkForCollision();       // with wall or itself
  checkForFruit();           // if it eats fruit, move fruit
                             // and extend the snake
}
```

9

Check for collision

```
function checkForCollision() {
    var xHead = xCor[numSegments - 1];
    var yHead = yCor[numSegments - 1];
    if (xHead > width || xHead < 0 || yHead > height || yHead < 0 ||
            snakeCollision() ) {
        noLoop();   // stop the game by stopping the draw function
        scoreElem.html('Game ended! Your score was : ' + score);
    }
}
```

Update the div element on the webpage with the final score.

10

Check for fruit

```
function checkForFruit() {
    var xHead = xCor[numSegments - 1];
    var yHead = yCor[numSegments - 1];
    if (xHead == fruit.x && yHead == fruit.y) {
        score++;
        scoreElem.html('Score = ' + score);
        xCor.unshift(xCor[0]);
        yCor.unshift(yCor[0]);
        numSegments += 1;
        fruit.move();
    }
}
```

Update the div element on the webpage with the updated score.

Add a new tail to the beginning of the array by inserting the current tail using `unshift`.
THINK: Why will this work?

Move the fruit to a new location to be eaten.

11

Using the arrow keys to steer the snake

If you press the left arrow, your direction will be set to left but only if you're not going right. Why?

```
function keyPressed() {
    switch (keyCode) {
        case LEFT_ARROW:
        if (direction !== 'right') direction = 'left';  break;
        case RIGHT_ARROW:
        if (direction !== 'left')  direction = 'right'; break;
        case UP_ARROW:
        if (direction !== 'down')  direction = 'up';    break;
        case DOWN_ARROW:
        if (direction !== 'up')    direction = 'down';  break;
    }
}
```

WE NOW HAVE ALL THE COMPONENTS DONE! LET'S PLAY!

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