

Introduction to Programming

Class 38, 15 May 2017



SYNC

Sit where you like.

Goals

Goal 1: You will understand how variables of a similar type are collected in to **arrays**.

Goal 2: You will know how to create and use an array.

Vocabulary

array
index

Code

```
array.push()  
array[i]
```

REVIEW

What is an object?

REVIEW

What is an object?

REVIEW

What is an object?

An OBJECT is a way to group
variables together.

REVIEW

What is a property?

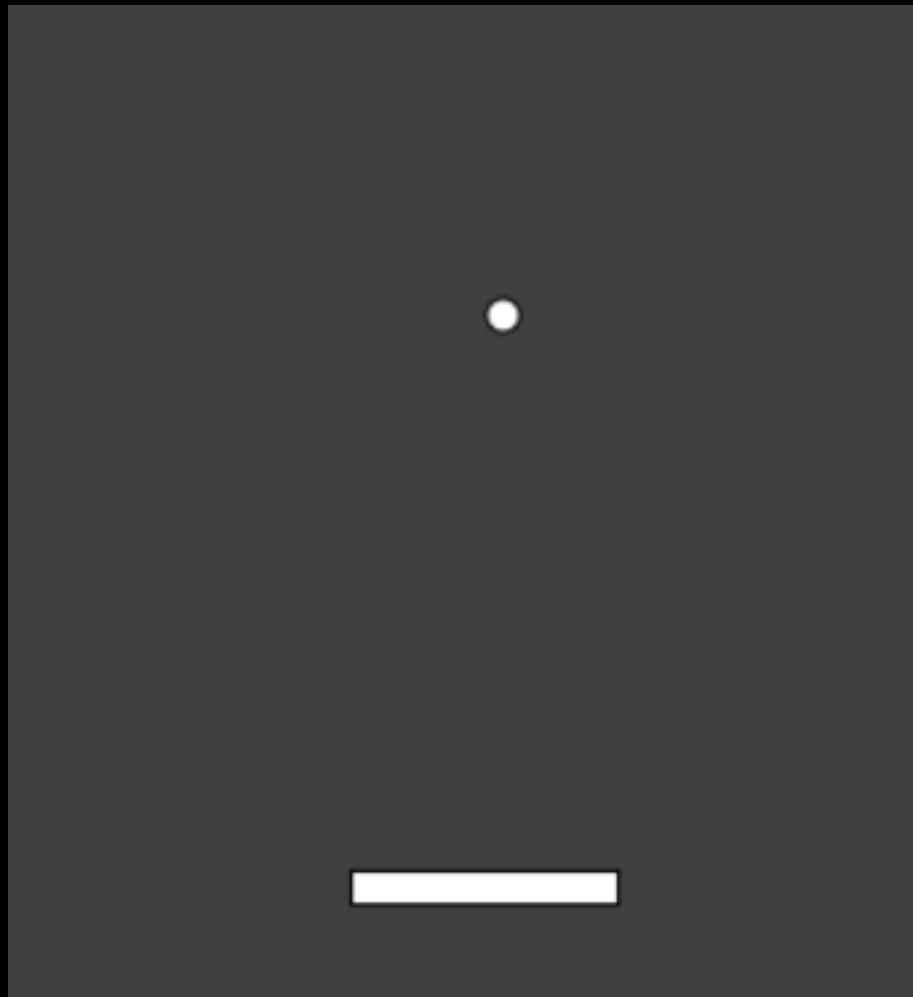
The variables in an object that store data (e.g., x, y)

What is a method?

The variables in an object that store functions (e.g., update())

REVIEW

Ball



Properties:

- x
- y
- dx (x-speed)
- dy (y-speed)

Methods:

- `draw()`
- `update()`

Ball

Properties:

- x
- y
- dx (x-speed)
- dy (y-speed)

Methods:

- draw()
- update()

```
var ball;
function setup() {
  ball = {
    x: width / 2,
    y: height / 2,
    w: 10,
    h: 10,
    dx: 2,
    dy: -3,
    update: function() {
      this.x += this.dx;
      if (this.x < 0) {
        this.x = 0;
        this.dx *= -1;
      } else if (this.x > width) {
        this.x = width;
        this.dx *= -1;
      }
      this.y += this.dy;
      if (this.y <= 0) {
        this.y = 0;
        this.dy *= -1;
      }
      else if (this.checkCollidePaddle()) {
        this.y = paddle.y - paddle.h / 2 - this.h /
2;

        this.dy *= -1;
        numHits++;
      }
      else if (this.y > height) {
        numLives--;
        this.y = height / 2;
        this.x = width / 2;
        this.dx = -2;
        this.dy = -3;
      }
    },
    draw: function() {
      fill(255);
      ellipse(this.x, this.y, this.w, this.h);
    }
  };
}
```


EXPLAIN

```
checkCollidePaddle: function() {  
    var verticalDifference = paddle.y - this.y;  
    var maxDifference = (paddle.h + this.h) / 2;  
    if (verticalDifference < maxDifference) {  
        if (this.x > paddle.x - paddle.w / 2 && this.x < paddle.x + paddle.w / 2) {  
            return true;  
        }  
    }  
    else return false;  
},
```

REVIEW

```
function draw() {  
  background(64) ;  
  paddle.update() ;  
  ball.update() ;  
  paddle.draw() ;  
  ball.draw() ;  
}
```

INTRODUCE

What is an array?

An ARRAY is a collection of data
of a similar type*.

*Although they don't have to be similar.

NEW CODE

Creating and populating an array

```
var lotteryNumbers = []; // an empty array
lotteryNumbers.push(54); // add a member
lotteryNumbers.push(12); // add another
lotteryNumbers.push(27); // add another
console.log(lotteryNumbers); // [54, 12, 27]
```

OR

```
var lotteryNumbers = [54, 12, 27];
```

NEW CODE

Accessing members of an array

```
var sum = lotteryNumbers[0] + lotteryNumbers[1] + lotteryNumbers[2];
```

OR

```
var sum = 0;  
for (var i=0; i<lotteryNumbers.length; i++) {  
    sum = sum + lotteryNumbers[i];  
}
```

PRACTICE

1. Open the JS Console.
2. Create an array of strings with the names of the days of the week.
3. Then alert the names one at a time using a for loop.

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APPLY

1. How could arrays be used to create a wall of bricks?
2. Open brickly2.js
3. Study the code and make sure you understand what each line is doing.
4. Add collision detection so that the ball bounces off the bricks.
5. Make the bricks disappear if they get hit.

HW

1. Finish Brickly.