OBJECTS & ARRAYS

Objects

What is an Object?

What is an Object?

- Objects are like nouns, people, places, things
  - Objects have methods which are like verbs
    - find, update, readFile, setDate
  - Objects have properties which are like adjectives
    - color = ‘green’, price = 5, startDate = ‘1/22/2016’

Javascript Built in Objects

- Boolean
- Number
- String
- Math
- Regex
- Date
- Array

Primitive Datatypes

- Primitive Datatypes:
  - Basic type that can be used as a building block
  - Built-in type that is supported by language

Javascript String Objects

- When we call String object methods on a string primitive, Javascript temporarily converts the primitive into a String object to perform the method call, then discards the temporary String object.

```
var stringPrimitive = 'hello';
var stringObject = new String('hello');
alert(stringPrimitive.length);
alert(stringObject.length);
```

- What are some issues with this?

Some String object methods:

- length()
- anchor()
- bold(), italics(), strike(), sub(), sup(), blink() (don't use these)
- charAt()
- indexOf()
- concat()
- split()
- slice()
- substring()
- toLowerCase(), toUpperCase()
- match(), replace(), search()

Javascript Strings are Immutable

- You can't change a string once it has been created. This is an interesting point to remember because when concatenating strings it requires Javascript to create entirely new objects.

Example:

```
var shoe = new String("Acme Cross Trainer - Men's");
alert(shoe.split(" ")[4]);
alert(shoe.substr(-5, 5));
alert(shoe.charAt(3));
alert(shoe.slice(3,4));
```

Exercise:

- Use the file '/materials/objects/exercises/string_objects.html'
- Use this string "Computers are useless. They can only give you answers." to alert the following:
  - Use split() to turn it into an array split by spaces.
  - Use substr() to set a variable to the value of the last 8 characters.
  - Use charAt() to find the 23rd character.
  - Use slice() to set a variable to the first word of the string.
- If you finish, replace your alerts with jQuery that inserts the results into the DOM.

Javascript Boolean Objects

- While Strings and Numbers have their own methods & properties, Boolean objects inherit all of their methods and properties from the Object object and do not have any unique methods or properties.
- Boolean instance methods:
  - toString()
  - valueOf()

Tell me the truth!

- Anyone remember what is true & false?

New Boolean Objects

- These evaluate to false:

```
alert(new Boolean());
alert(new Boolean('')); //empty string => false
alert(new Boolean(false));
alert(new Boolean(0));
```

- These evaluate to true:

```
alert(new Boolean(1));
alert(new Boolean('false')); //non-empty string => true
alert(new Boolean(true));
```

Exercise:

- Create a variable “bool” that is set to a true boolean object.
- Create a variable “num” that is set to 3
- Make a while loop that continues to loop until the variable you created is false.
- Make an if statement inside of your while loop that sets “bool” equal to false if num = 0
- After the if statement do console.log(num) and then be sure to decrement num so that it becomes 0 eventually.

Javascript Number Objects

- Methods:
  - toString()
  - valueOf()
  - toExponential()
    - returns a string representing the number in exponential notation.
  - toFixed()
    - returns a string representing the number in fixed-point notation.
  - toPrecision()
    - returns a string representing the number using a specific precision.

Try it!

```
three = new Number(3);
three.valueOf()
three.toString()
three.toExponential()
```

Arrays

Making Arrays

```
var eggCarton = new Array('egg', 'egg', 'egg', null, null, null)
```

Accessing Arrays

```
eggCarton[0] // ‘egg’
eggCarton[1] // ‘egg’
eggCarton[2] // ‘egg’
eggCarton[3] // null
eggCarton[4] // null
eggCarton[5] // null
```

Array.length

```
>>> eggCarton.length
6
```

Array.push

```
>>> eggCarton.push('egg')
>>> eggCarton
["egg", "egg", "egg", null, null, null, "egg"]
```

Array.pop

```
>>> eggCarton.pop()
>>> eggCarton
["egg", "egg", "egg", null, null]
```

Array.unshift

```
>>> eggCarton.unshift(null)
>>> eggCarton
[null, "egg", "egg", "egg", null, null, null]
```

Array.shift

```
>>> eggCarton.shift()
>>> eggCarton
["egg", "egg", null, null, null]
```

Multidimensional Arrays

```
var multiply = new Array()
multiply[0] = new Array(0,0,0,0)
multiply[1] = new Array(0,1,2,3)
multiply[2] = new Array(0,2,4,6)
multiply[3] = new Array(0,3,6,9)

console.log(multiply[3][1])
console.log(multiply[3][2])
console.log(multiply[2][3])
console.log(multiply[3][3])
```

Exercise

- About Arrays in Javascript koans
- git clone git://github.com/mrdavidlaing/javascript-koans.git

Homework Exercise: Bubble Gum Game

- Use the file materials/objects/bubble_gum_game.html
- Write a game that determines a random number representing how many breaths it is going to take to make a bubble gum bubble pop (all bubbles should pop after 20 breaths). It should prompt the user for how many breaths they want to blow over and over again until the bubble pops. If the bubble pops with the exact number that it would have taken, then they win, if they go over, they lose. Determine how many points they get by adding the number of breaths they went over to the number of turns they had and subtracting it from 20.
- Use jQuery to keep the user updated about how many breaths they have used and once they win, congratulate them! Get creative with jQuery and make it as visually interesting as you can.
- Once the bubble pops, ask the user if they want to play another game. Keep the score for each game they play in an array. Once they have played more than one game, start displaying their average score on the page.
- Feel free to add any other fun features or change the features listed above to make it more interesting!

Extra Credit Homework:

- Make a scheduling system.
  - Create an array called schedule
  - Each index of schedule represents a day of the week. 0 is Sunday, 1 is Monday, etc. Indexes should point to an array containing the names of employees scheduled for that day.
  - Employees:
    - "Sally"
    - "Todd"
    - "Kim"
    - "Joe"
  - Joe and Kim work on weekends
  - Sally and Todd work on Tuesday and Thursday
  - Sally and Kim work on Monday, Wednesday and Friday

Homework: Reading

- Read Chapters:
  - 4 (Objects)
  - 5 (functions)