Arrays

Ordered Collections

How To Make an Array?

How To Make an Array:

- rainbow = []

Adding Elements

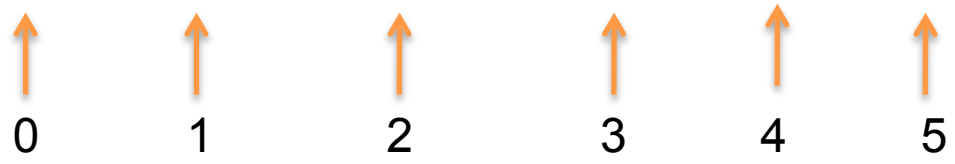
```
>> rainbow = []
=> []
>> rainbow << "red"
=> ["red"]
>> rainbow.push "orange"
=> ["red", "orange"]
>> rainbow + ['yellow']
=> ["red", "orange", "yellow"]
>> rainbow.concat ['green']
=> ["red", "orange", "green"]
```

Doesn't change rainbow

Changes rainbow

Accessing Array Values

```
a = [ "a", "b", "c", "d", "e" ]
```




```
a[2] #=> "c”

a[6] #=> nil

a[1, 2] #=> ["b", "c”]

a[1..3] #=> ["b", "c", "d”]

a[1…3] #=> ["b", "c"]
```

Accessing an Array

```
>> rainbow[0]
=> "red"
>> rainbow[1]
=> "orange"
>> rainbow[2]
=> "green"
```

Multidimsional Arrays

```
>> multiplication = []
=> []
>> multiplication[0] = [0,0,0,0,0]
=> [0, 0, 0, 0, 0]
>> multiplication[1] = [0,1,2,3,4]
=> [0, 1, 2, 3, 4]
>> multiplication[2] = [0,2,4,6,8]
=> [0, 2, 4, 6, 8]
>> multiplication[3] = [0,3,6,9,12]
=> [0, 3, 6, 9, 12]
>> multiplication[4] = [0,4,8,12,16]
=> [0, 4, 8, 12, 16]
>> multiplication[1][3]
=> 3
>> multiplication[4][4]
=> 16
>> multiplication
=> [[0, 0, 0, 0, 0], [0, 1, 2, 3, 4], [0, 2, 4, 6, 8], [0, 3, 6, 9, 12], [0, 4, 8, 12, 16]]
```

Exercise

- 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 ids of employees scheduled for that day.
  - Employees with their ids:
    - 1 => “Sally”
    - 2 => “Todd”
    - 3 => “Kim”
    - 4 => “Joe”
  - Joe and Kim work on weekends
  - Sally and Todd work on Tuesday and Thursday
  - Sally and Kim work on Monday, Wednesday and Friday

Methods

- In Ruby, strings, integers and arrays (objects) are like nouns.
- Methods are like verbs
- Other languages synonyms: ‘function’, ‘procedure’

How Methods Work

name = “sally”

name.upcase

‘upcase’ is a method on the string object we put into the name variable. It is an *action* that the string knows about and can do.

Making Our Own Methods

Syntax:

Parameters

```
def add(x, y)
  x + y
end
```

Now we can call the add method:

```
>> add(5, 6)
=> 11
```

Arguments

Arguments/Parameters

- Technical note: parameters appear in method definitions; arguments appear in method calls

A Word About Scope

- Scope means where a variable is available in a program.
- Ruby has different types of variables that are more or less limitted in access.
  - Local variables
  - Global variables
  - Instance variables
  - Class variables (we will talk about these later)

Local Variables

```
def add(x,y)
  number = x + y
end

def subtract(x,y)
  number = x - y
end
```

The variable `number` is only accessable within the *scope* of the method. The add method will not know about the `number` variable in the subtract method. If you try to access `number` outside of the method, you will get an error telling you that it is undefined.

Instance Variables

```
def add(x, y)
  @number = x + y
end

def subtract(x, y)
  @number = x – y
end
```

@number is an instance variable. It is accessable outside the methods, so when we call subtract, it assigns a new value to @number in ***both*** methods.

If Statements

```
if x == 54
   puts “x is 54”
elsif x == 63
   puts “x is 63”
else
   puts “x is some other number”
end
```

Exercise: Tic Tac Toe

Make a tic tac toe game. You'll probably want to use methods to accomplish it. I'd suggest using two methods, a `start_game` method and a `play` method. Remember that the two methods can share variables by using instance variables. Since tic tac toe is a two player game, you'll need to switch between players each turn...this brings *if statements* to mind. Oh, and just a hint, tic tac toe is a bit like a multidimensional array...

Introducing Test First Teaching

- Take it away Kai!

Exercise: Tic Tac Toe Using TFT

Homework

- Chapters 5, 7, 8
- Chapter 8.3 Building and sorting an array
- Extra Credit: Enter the Ruby Programming Challenge for Newbies!
  - This month's challenge is creating the Game of Life, which requires a multidimensional array to complete.
  - http://rubylearning.com/blog/2010/06/28/rpcfn-the-game-of-life-11/
  - Due August 2 (indian time)