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Week 4

BEGINNING JAVASCRIPT

The Agenda

- Javascript: concept
- Javascript: syntax
- Javascript: history
- Javascript: demo
- (Extra points for identifying this week's theme)

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JAVASCRIPT

THE CONCEPT

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A PROGRAMMING LANGUAGE

But what does that mean?

Why do we program or write code?

To what end?

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WHAT IS PROGRAMMING?

PROGRAMMING IS THE PROCESS OF
WRITING *functions* THAT TELL COMPUTERS
TO DO WHAT WE TELL THEM TO DO

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FUNCTIONS

A FUNCTION IS A SET OF INSTRUCTIONS THAT TAKE SOME INPUTS AND PRODUCE A PREDICTABLE OUTPUT

EXACTLY LIKE IN ALGEBRA!

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CONCEPT

By defining and using functions, we can tell computers things we want to do. For example...

- Double a number
- Make all text on a web page double its current size
- Make an image change when a user clicks on it
- ...everything a computer does is implemented by a function

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VARIABLES

Sometimes, we want functions to have different outputs when we have different inputs.

- In algebra, you *solve* for a variable.
- But in programming, you get to assign variables values so that we can use those values later.

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VARIABLES AND FUNCTIONS

IF YOU UNDERSTAND THESE TWO CONCEPTS,
YOU'VE CLEARED A MAJOR HURDLE IN
UNDERSTANDING PROGRAMMING

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JAVASCRIPT SYNTAX

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FUNCTIONS

In algebra, we write $f(x) = \ldots$

- f is the name of the function
- x is the input
- … denotes the actual instruction of the function (ex. $x+1$)
- $f(x)$ is shorthand for the output (sometimes called y)

- I hope this sounds familiar.

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FUNCTIONS

In Javascript we write *f = function(x) { ... };*

- *f* is the name of the function
- *x* is the input
- ... denotes the instructions of the function (ex. **return *x+1;***)
- *f(x);* is still the output

- I hope this is still familiar!

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VARIABLES

Only kind of like algebra

- But instead of finding the values of variables, we use variables to **store values**.

- `a = 7;`
- **`a = a + 7;`**
- In algebra, the second statement is impossible. In programming, it *happens all the time*.

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JAVASCRIPT

A BRIEF HISTORY

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Are JavaScript and Java the same thing?

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“Are JavaScript and Java the same thing?”

NO

THE NAME

In 1995, Java was hot stuff, and the Netscape guys wanted their language to be also.

- So they named it JavaScript
- Supposedly this was in exchange for bundling Sun's Java runtime with their market-leading browser: Netscape Navigator.
- Java Applets (e.g. slimezone.com) later fell out of favor, but JavaScript kept kicking.

“Isn’t Javascript that crappy little toy language that was invented in like twenty minutes by some guy at Netscape?”

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“But isn’t Javascript that crappy little toy language that was invented in like twenty minutes by some guy at Netscape?”

Sort of...

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Sort of...

but not really anymore.

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BRIEF HISTORY

Javascript was hurriedly developed by Brendan Eich at Netscape in 1995

- “Mocha” > “LiveScript” > “JavaScript”
- Submitted to Ecma International for standardization in 1996 > “‘ECMAScript”
- Iterated, updated, and enhanced since then
- For more on Javascript’s colorful history, give this a read: http://ask.metafilter.com/195482/Lets-assume-that-I-am-the-stupidest-person-that-ever-lived-Explain-to-me-what-JavaScript-is-what-it-does-and-how-a-moron-would-go-about-learning-it#2813956

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JAVASCRIPT AIN'T PERFECT...

Given the rushed conditions of its development, JavaScript has some downsides

- Too permissive. Doesn't complain
- Type coercion (i.e. == vs. ===)
- Awkward typing
  - `if ( typeof x == 'undefined' ) {...}`

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BUT IT AIN'T BAD NEITHER!

JavaScript has its advantages

- Functions as first class objects
- Closures
- Event loop
- Prototype chain
- Tail recursion (in theory)
- Fast (thanks to Google's V8 engine)

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BUT IT AIN'T BAD NEITHER!

Appreciation for JavaScript has grown in recent years thanks to several key figures

- Douglas Crockford - YUI, Javascript: The Good Parts
- John Resig - jQuery
- Jeremy Ashkenas - Backbone.js
- Ryan Dahl / Joyent - Node.js

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DEMO

FIRE UP THE CONSOLE

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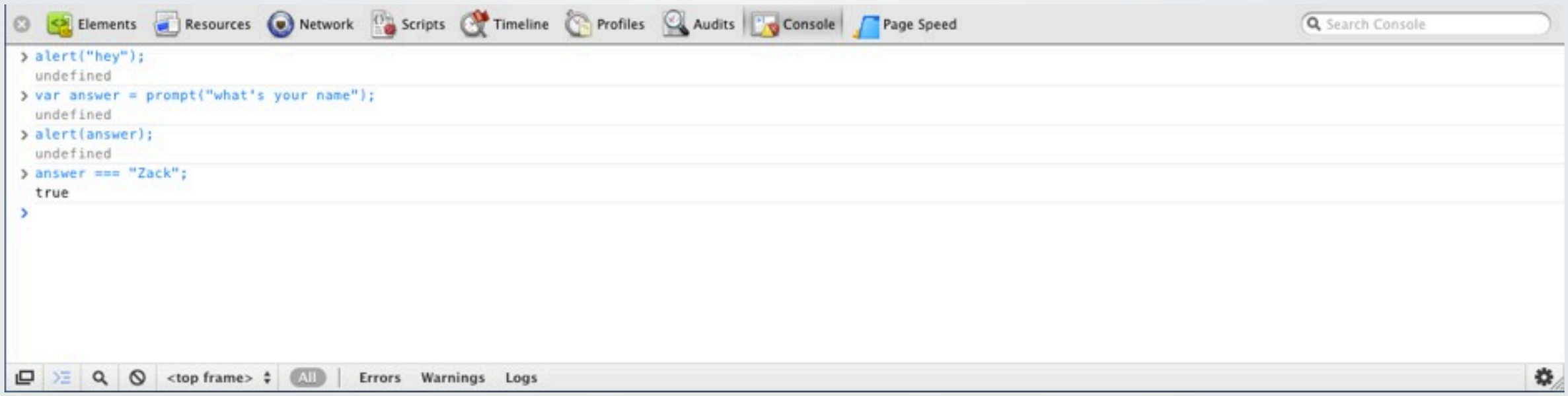
CHROME CONSOLE

command + option + j
or
view -> developer -> javascript console



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VARIABLE SYNTAX

```
var a = 7;
```

- var tells the computer that a is variable
- = means to **store**. In this case, the number 7
- All Javascript statements end in a semicolon.

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VARIABLE SYNTAX

```
a = a + 7;
```

- Don't need to resay that a is a variable.
- = means to **store**. In this case, the number 7
- All Javascript statements end in a semicolon.

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OTHER EXAMPLES

We covered a lot of examples in class, that I'll list here.

- `var f = function(x) { return 2 * x };`
- `var numCatz = 7;` vs just `numCatz = 7;`
- `var numDogz = "7";` and `numDogz + numCatz;`
- `typeof numCatz;` and `typeof f;`
- `var g = function(func) { return func(2); };`
- `var ps = document.getElementsByTagName("p");`

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THE CONCEPTS

The concepts covered in the examples (respectively)

- Defining functions
- The use of the keyword ‘var’
- The difference in addition between string and numbers
- Types in Javascript (‘var’ is not a type. A variable only gets a type when it is assigned a value). Functions are a type!
- Functions can be inputs to other functions
- Getting elements on your HTML page (in this case, all paragraphs)

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UNDERSTANDING THE CONCEPTS

It is *incredibly* important that you understand all of the previous concepts, even if you have programmed before. Javascript does things a bit differently than C or Java, and when we start talking about more advanced things (like callbacks and the Event Loop), we're going to take these things as a given. Use Google or come to office hours...it's just 6 concepts!

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INCLUDING JAVASCRIPT

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SIMILAR TO CSS

```
<!DOCTYPE html>
<html>
<head>
   <!-- some HTML -->
</head>
<body>
    <!-- some more HTML -->
    <script src="main.js"></script>
</body>
</html>
```

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WHAT ARE THE DIFFERENCES?

```
<!DOCTYPE html>
<html>
<head>
   <!-- some HTML -->
</head>
<body>
    <!-- some more HTML -->
    <script src="main.js"></script>
</body>
</html>
```

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CSS

```
<html>
<head>
    <!-- some HTML -->
    <link rel="stylesheet" href="/style.css">
    <!-- some more HTML -->
</head>
<body>
    <!-- even more HTML -->
</body>
</html>
```

JAVASCRIPT

```
<!DOCTYPE html>
<html>
<head>
   <!-- some HTML -->
</head>
<body>
    <!-- some more HTML -->
    <script src="main.js"></script>
</body>
</html>
```

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HOMEWORK

A TODO LIST

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THE LEPRECHAUN LIST

For homework, you're going to examine a Javascript file and annotate it; that is, say what each line of code means.

- The file is http://cloudchill.in/s/leprechaun_list_2/main.js
- Copy the text into a new file and add annotations as such:
  - ```
    // Assigns something to the variable todoList
    var todoList = document.getElementsByTagName("ol")[0];
    ```
  - Remember, two slashes (//) starts a comment
- In reality, you'll be much more specific.
- In particular know what `document` and `window` are

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    ```

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QUESTIONS EVEN GOOGLE CANT ANSWER?

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