

JAVASCRIPT DEVELOPMENT

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JAVASCRIPT DEVELOPMENT

THE COMMAND LINE & DATA TYPES

WEEKLY OVERVIEW

WEEK 1

Installfest / The Command Line & Data Types

WEEK 2

Arrays & Loops / Conditionals & Functions

WEEK 3

Scope / Slack bot lab

LEARNING OBJECTIVES

At the end of this class, you will be able to

- Work with files/directories via the terminal window
- Create a Git repository and push/pull changes
- Run basic JavaScript code on the command line
- Describe the concept of a "data type" and how it relates to variables.

AGENDA

- JS and web technology
- The terminal
- Git and GitHub
- Command line JS
- Data types

EXIT TICKET QUESTIONS

- 1. the differences in translation between Pseudocode and different languages
- 2. I am curious about any potential links between modern day buzzwords like artificial intelligence, machine learning, or deep learning and their connections with web development.
- 3. For the underwater connections, is it one literal continuous cord??
- 4. can we cover node.js for at least one class?

THE COMMAND LINE 7

Think about last class:

- We installed software from the command line by typing commands
- We also installed software by downloading an installer, double-clicking it, and following the prompts

ACTIVITY



KEY OBJECTIVE

▶ Use the most common commands to navigate and modify files / directories via the terminal window.

TYPE OF EXERCISE

Turn and Talk

TIMING

2 min

- 1. List at least 2 advantages to using the command line.
- 2. List at least 2 disadvantages to using the command line.

JavaScript & Web Technology

WHAT CAN JAVASCRIPT DO?

Sign up	
First Name	
Last Name	
Email Address restriget viruse to or new punes.	nis accress to authenticate and notify you
Coarirm Email.	enail eddress.
Patsweed	
Confirm	
I am a developer If you would like to a	El spicad your own builds and invite your own

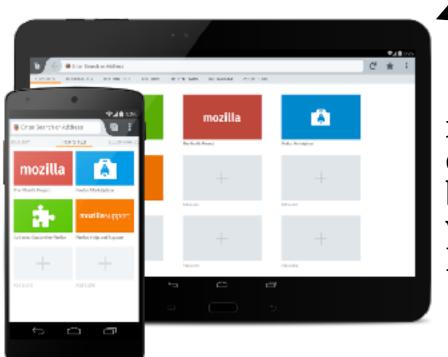
front end tasks (animations, buttons, forms)



APIs, databases, back end tasks



VERY FEW STEPS TO RUN



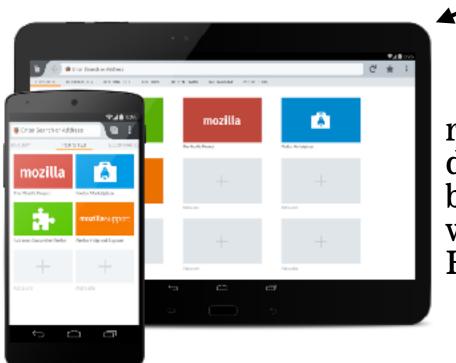


runs directly in browser within an HTML file





AND WORKS EVEN WHEN COMPUTERS ARE OFFLINE





runs directly in browser within an HTML file





HIGHLY RESPONSIVE INTERFACES



LOAD ADDITIONAL CONTENT WHEN USER NEEDS IT (AJAX)



WHAT ELSE CAN JAVASCRIPT DO?

- Determine your browser functional limitations and react accordingly (progressive enhancement)
- Power website backends and physical devices (node.js)

DRAWBACK: The environment in which JavaScript

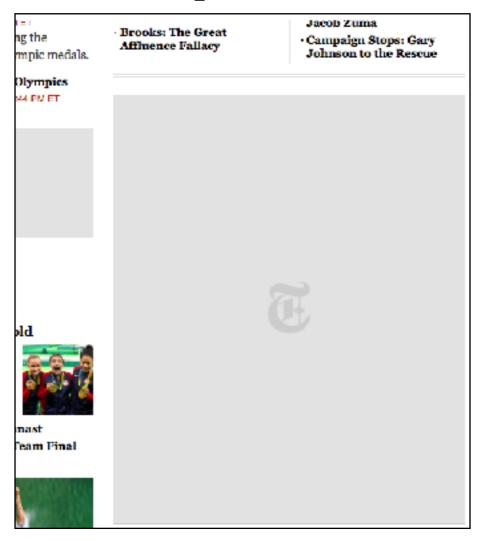
operates is unknown







DRAWBACK: JavaScript can be disabled



Node.js

Node.js

- A definition (from Wikipedia):
 - In software development, Node.js is an open-source, cross-platform runtime environment for developing server-side Web applications.
- Enables JavaScript on the server (the backend)
- Written in C, C++, and JS (so, not a JS framework)
- Interprets JS using Chrome's V8 engine
- Module driven; see Node Package Manager (npm)
- All about non-blocking, asychronous input/output

Node.js

- We will not be using Node.js as a web server (backend) see <u>Firebase</u>
- We will be taking advantage of Node's command line interface
- Allows us to run JavaScript from our terminal applications
- More at the end of class...

JavaScript Frameworks & Libraries

INTRODUCTION TO REACT

LIBRARIES VS FRAMEWORKS

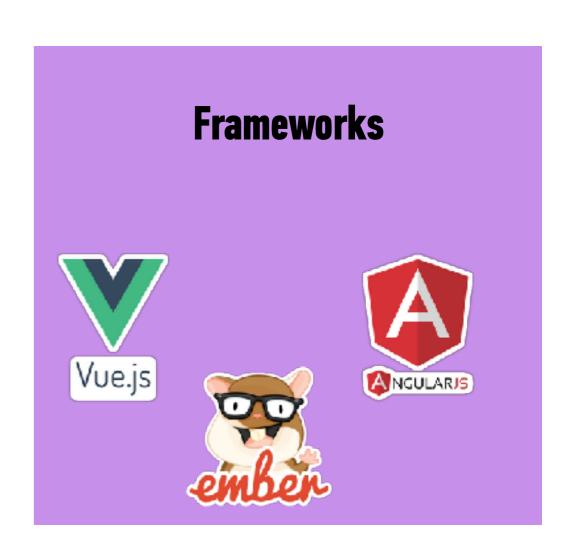
Libraries



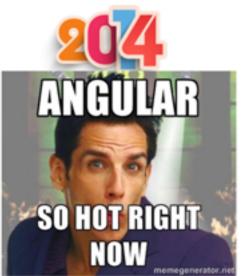
LIBRARIES VS FRAMEWORKS

Libraries





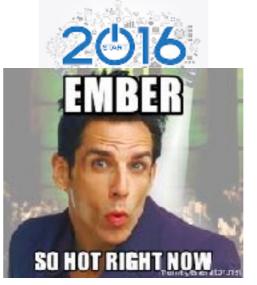


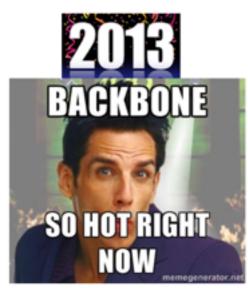


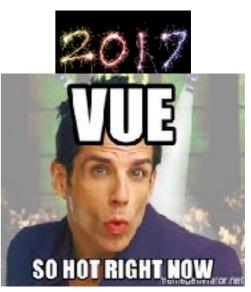






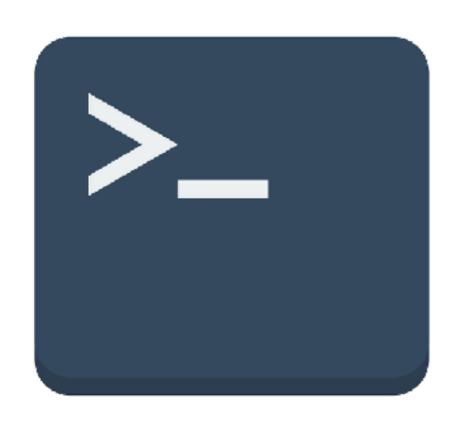






The Terminal

INTRODUCTION TO THE TERMINAL



- Terminal allows you to interact with your computer faster
- → Terminal === Command Line === Console

UNIX



 Family of operating systems, including all Linux systems and OS X/macOS

SHELL



• A generic name for the primary program that runs inside a terminal

BASH



 Bourne-Again Shell: a specific shell program

```
Sashas-MacBook-Pro:JS-SF-15 sasha$
```

Host (computer) name

```
Sashas-MacBook-Pro:JS-SF-15 sasha$ ■
```

Working directory (current folder)

```
Sashas-MacBook-Pro: JS-SF-15 sasha$ ■
```

Username

```
Sashas-MacBook-Pro:JS-SF-15 sasha □
```

Bash prompt

```
Sashas-MacBook-Pro:JS-SF-15 sasha<mark>$ ■</mark>
```

Command (program)

```
Sashas-MacBook-Pro:JS-SF-15 sasha$ ls ■
```

Argument (input)

```
Sashas-MacBook-Pro:JS-SF-15 sasha$ ls 00-installfest ■
```

ANATOMY OF THE TERMINAL

Option

```
Sashas-MacBook-Pro:JS-SF-15 sasha$ ls <mark>-a</mark> 00-installfest ■
```

ANATOMY OF THE TERMINAL

Output

```
Sashas-MacBook-Pro:JS-SF-15 sasha$ ls -a 00-installfest
. .DS_Store index.html slides.md
.. img install.md
Sashas-MacBook-Pro:JS-SF-15 sasha$ ■
```



Command line codealong

For Mac

Open the Terminal app (Applications > Utilities > Terminal)

For Windows

Open the PowerShell application

LAB — COMMAND LINE



KEY OBJECTIVE

 Use the most common commands to navigate and modify files / directories via the terminal window.

TYPE OF EXERCISE

Individual/Pairs

TIMING

10 min

Follow the <u>instructions</u> posted on the class website to navigate and modify files and directories using the command line.

EXERCISE — **COMMAND** LINE



KEY OBJECTIVE

 Use the most common commands to navigate and modify files / directories via the terminal window.

TYPE OF EXERCISE

Whole class brainstorm

TIMING

2 min

1. Name a command line command and explain what it does. Let's hear from everyone at least once!

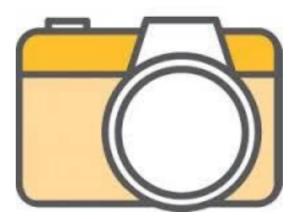
Introduction to Git/GitHub

GIT

- A version control program that saves the state of your project's files and folders
- Basically, it takes a "snapshot" of what all your files look like at a moment and stores a reference to that "snapshot"







GITHUB

- ▶ A web app/platform that makes it easy to manage git repositories.
- ▶ Similar to Dropbox or Google Drive, but for code.
- Stores a history of files and the changes that happen within each changed document.
- Hosts files on the cloud so you can share the finished product with other people.
- Git the technology that Github is based on top of was designed to allow for multiple engineers to work on the same project.



Why use GitHub?

HISTORY

Since GitHub stores a history of the code, it allows developers to go back in time if something breaks.



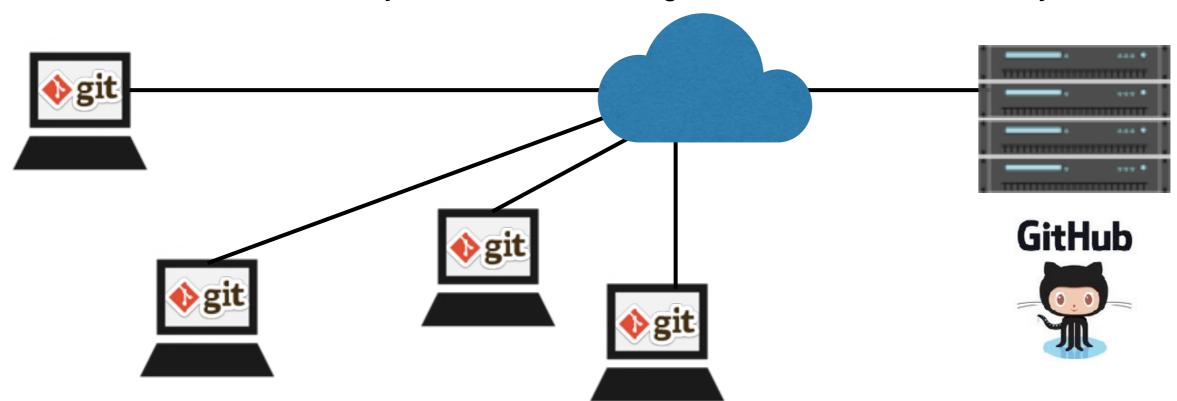
- Allows multiple developers to work on the same project. Much like Google Drive lets multiple people collaborate on the same document, GitHub allows this for code.
- You can see who worked on what.



 GitHub allows for feedback to be given on the code which, hopefully, increases code quality.

Git vs GitHub

- **▶ Git** is version control software
- GitHub is a website and platform for utilizing Git in a collaborative way



Git/GitHub Vocabulary

- Repository
- Clone
- **▶** Commit
- Push
- > Pull

What is a repository (repo)?



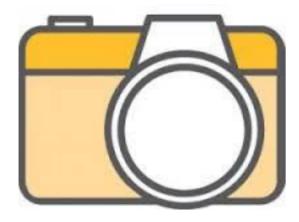
- ▶ Basic element of GitHub
- Contains all of a project's files (all the code)
- One or more users can contribute to a single repository
- Repositories are either public or private
- ▶ By the end of class today, you will create your own repo

clone



- Git command that copies/clones a remote repo to your machine
- ▶ This copy/clone is called a Iocal repo
- Changes to the Iocal repo will not affect the remote

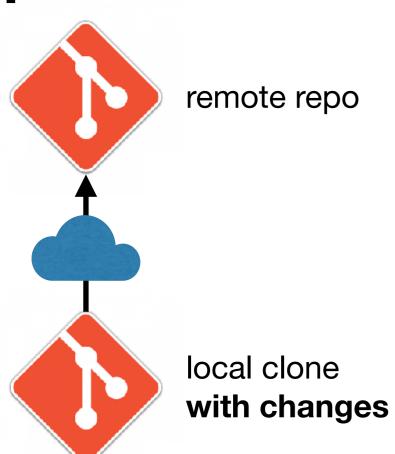
commit





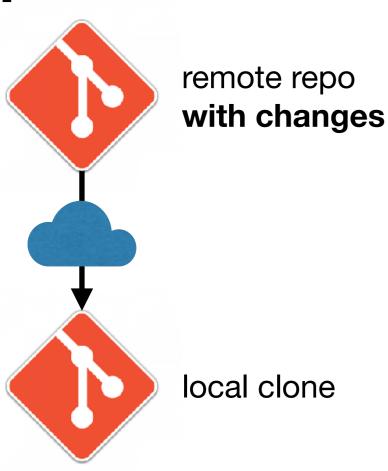
- Git command that creates a snapshot of changes to a repo
- Think of it as saving your changes with a timestamp
- Contains a message describing the changes made

push



- Git command that sends your commits (saved changes) to a remote repository
- Allows other developers to see your changes and copy ("pull") them to their own local repos

pull



- Git command that copies (pulls) changes by other developers from a remote repository to your local clone
- Allows you to see changes made by other developers and incorporate them into your local clone

How will we use GitHub in JSD15?



JS-SF-15-resources

- contains start and solution files
- you will pull changes at the start of each class



JS-SF-15-homework

- currently empty
- you will push your completed homework and receive feedback here



You will create your own additional repos for the 3 projects during this course.

GIT COMMANDS



EXERCISE — GIT/GITHUB



KEY OBJECTIVE

 Understand how to initialize a local Git repository and push/ pull changes to a remote Git repository.

TYPE OF EXERCISE

Pairs

TIMING

2 min

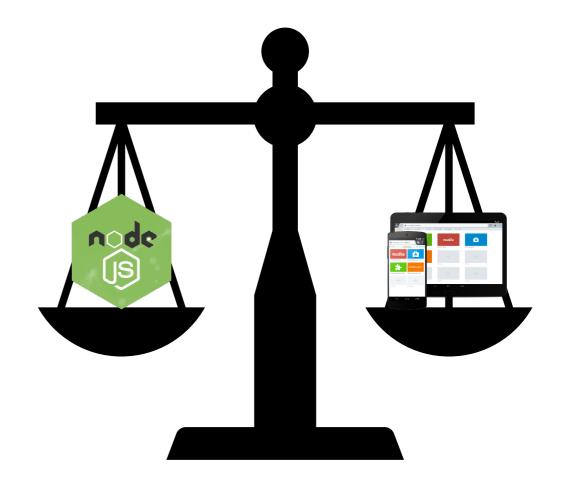
- 1. What command do you use to initialize a local Git repository? (Hint: Check the handout.) What does initializing do?
- 2. What command do you use to push changes to a remote Git repository? What does pushing do?
- 3. What command do you use to pull changes from a remote Git repository? What does pulling do?
- 4. BONUS: Draw a diagram illustrating all 3 commands

Intro to Node.js and command line JS



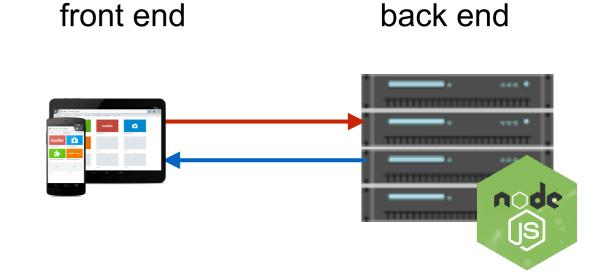
How is Node different from JS in the browser?

- No browser-specific functionality
- Same JS engine as Chrome



What is Node good for?

- Creating a backend server for a web application
- Running a script to do data analysis
- File management
- Making command line programs



Ways to run commands in Node

Interactive command line

Your command Node's response



Run a file

You > script.js

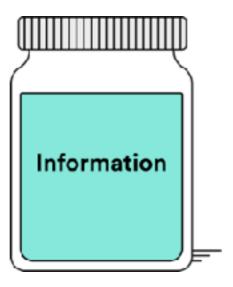
Node loads the file script.js and executes its contents

Node < 7

Executing JavaScript

Variables

- Containers that allow us to store values
- Let us tell our program to remember values for us to use later on
- ▶ The action of saving a value to a variable is called assignment



Declaring a variable

let age;

Assigning a value to a variable

```
age = 29;
```

Declaring and assigning in a single statement

```
let age = 29;
```

Printing things out for our own inspection

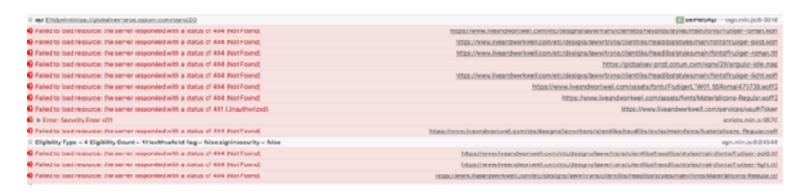
```
console.log("Hello!");
```

Printing a variable value out for our own inspection

console.log(age);

When do you use console.log?

- When you are developing a program and need help figuring out what's going on (aka debugging)
- When you want to print things to the command line





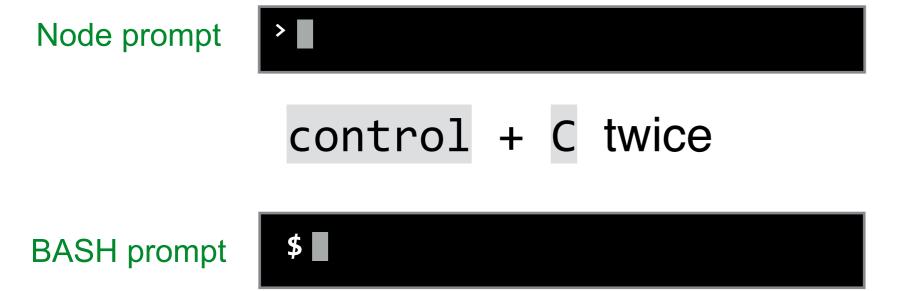
Let's write some JavaScript!





THE COMMAND LINE & DATA TYPES

Exit the Node console



EXERCISE — NODE



KEY OBJECTIVE

• Run basic JavaScript code on the command line using Node.

TYPE OF EXERCISE

Turn and talk

TIMING

2 min

- 1. What is Node?
- 2. What did we use it for today?
- 3. BONUS: How else can it be used?

DATA TYPES & LOOPS

DATA TYPES

THE DATA TYPE IDENTIFIES THE KIND OF DATA

"I just pushed my changes to the repo."

string

"red", "orange", "yellow", "green", "blue", "violet" array

42

number

DATA TYPES & LOOPS

STRINGS

"a"

"satisfied"

"none of the above"

"The only difference between me and a madman is that I'm not mad. - Salvador Dali"

DATA TYPES & LOOPS

NUMBERS

1.5

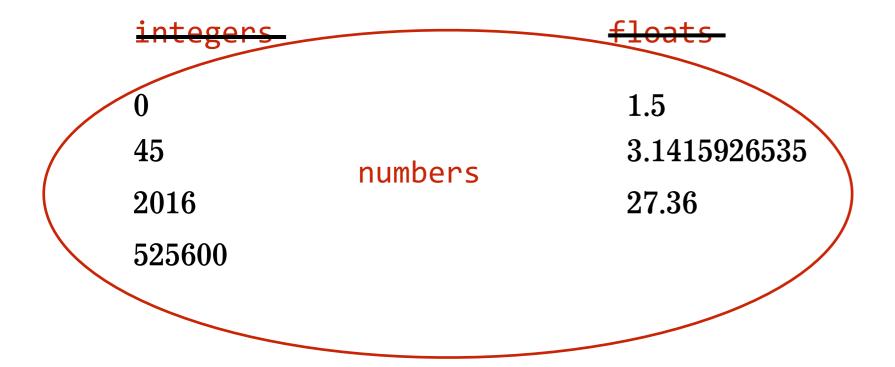
3.1415926535

27.36

45

525600

SOME LANGUAGES TREAT INTEGERS AND FLOATS AS SEPARATE TYPES, BUT NOT JAVASCRIPT



DATA TYPES & LOOPS

WORKING WITH DATA IN JAVASCRIPT

LIBRARY OF OBJECTS

Array()
Date()
Math()

LANGUAGE ELEMENTS

Operators (+ - * / % ...)

Statements for function return

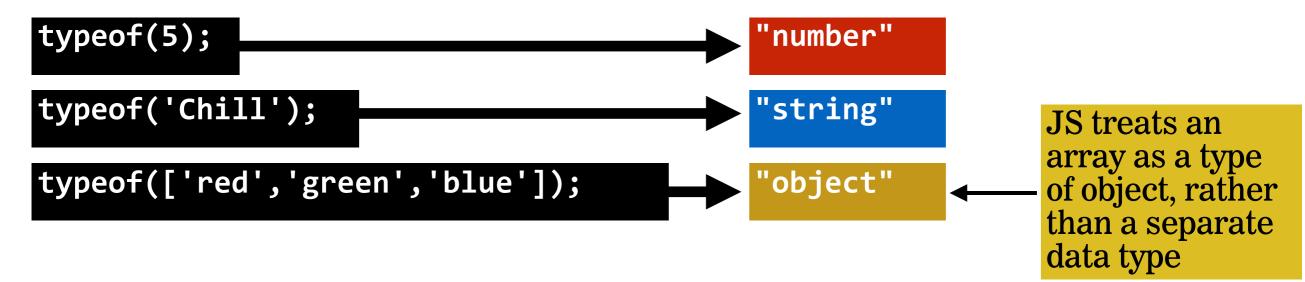
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- create elements
- place elements in the browser window
- change properties of elements in the browser window
- respond to user events

IDENTIFYING DATA TYPE

- typeof() function
- Returns a string naming the data type of the data you pass to it
- Syntax:
 - typeof(data), where data is a number, string, or other data

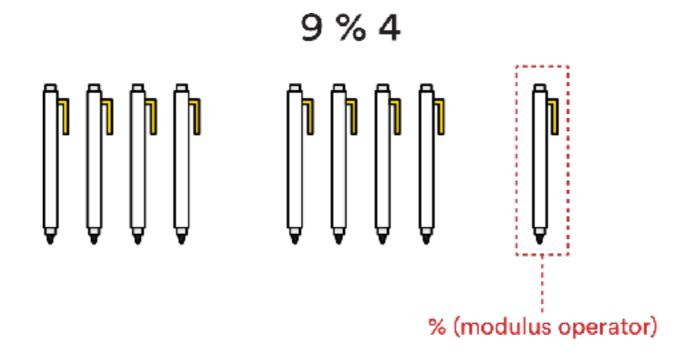


DATA TYPES & LOOPS

ARITHMETIC OPERATORS

- + add (also concatenates strings)
- subtract
- * multiply
- / divide
- % modulus (remainder)

DATA TYPES & LOOPS



THE COMMAND LINE & DATA TYPES



DATA TYPES & LOOPS

SPECIAL NUMBER OPERATORS

The Math object provides methods for additional operations

<pre>Math.pow(m,n)</pre>	Returns m to the power of n
<pre>Math.sqrt(n)</pre>	Returns the square root of n
<pre>Math.random()</pre>	Returns a random number between 0 (inclusive) and 1 (exclusive)
<pre>Math.floor(n)</pre>	Returns largest integer less than or equal to n
<pre>Math.ceil(n)</pre>	Returns smallest integer greater than or equal to n

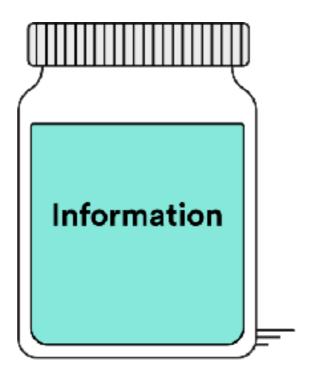
THE COMMAND LINE & DATA TYPES



WARIABLES

WHAT ARE VARIABLES?

- We can tell our program to remember (store) values for us to use later on.
- The 'container' we use to store the value is called a variable



DECLARING A VARIABLE

let age = 29;

VARIABLE CONVENTIONS

RULES:

- 1. Should be "camel case" First word starts with a lowercase letter and any following words start with an uppercase letter.
- 2. Names can only contain: letters, numbers, \$ and _
- 3. No dashes, no periods.
- 4. Cannot start with a number
- 5. Case sensitive number of students is not the same as number Of Students



Guideline: Names should be descriptive:



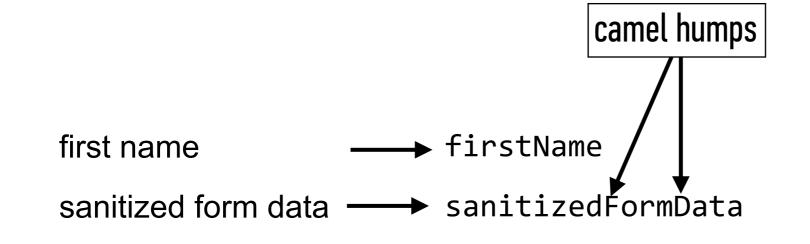
let lastName = "Vodnik";

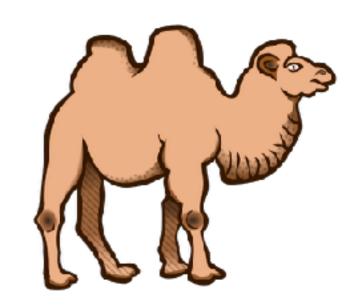


let x = "Vodnik";

CAMEL CASE

- Use when creating a name based on multiple words
- Remove spaces, then capitalize the first letter of the second and subsequent words





JAVASCRIPT — UPDATING THE VALUE OF A VARIABLE

Declaring a variable:

Update the value of the variable:

KEYWORDS FOR DECLARING VARIABLES

keyword	when will we learn it?
let	We will use let today
var	We will learn about var
const	and const next week

Printing text out for our own inspection

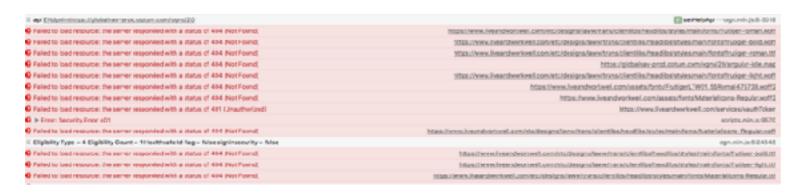
```
console.log("Hello!");
```

Printing a variable value out for our own inspection

```
console.log(age);
```

When do you use console.log?

- When you are developing a program and need help figuring out what's going on (aka debugging)
- When you want to print things to the command line





browser developer tools

KNOW YOUR EQUAL SIGNS

```
assigns value on right to object on leftevaluates whether values on left and right are the same
```

```
let minutes = 17;
```

```
> minutes === 10
< false</pre>
```

COMPOUND OPERATORS

+=	adds a number to a variable and assigns the new value to the same variable
-=	subtracts a number from a variable and assigns the new value to the same variable
++	adds 1 to a value
	subtracts 1 from a value

TRANSFORMING A VALUE INTO A STRING

- String() function
- Returns the original value as a string
- Syntax:
 - String(data), where data is the name of a variable

QUIZ

```
"Bill" = let name;
```

```
let name = "Bill";
```

let total score = 20;

let totalScore = 20;

let fullName = Suzie Smith;

```
let fullName = "Suzie Smith";
```

Let fullName = "Bill Smith";

```
let fullName = "Bill Smith";
```

```
let score = "5";
score += "6";
```

ACTIVITY — VARIABLES & DATA TYPES



KEY OBJECTIVE

• Describe the concept of a "data type" and how it relates to variables.

TYPE OF EXERCISE

Turn & Talk

EXECUTION

2 min

- 1. Describe variables. Explain why we would want to use variables in our programs.
- 2. What are the three data types in JS? Can you think of an example of each?

Exit Tickets!

(Class #1)

LEARNING OBJECTIVES - REVIEW

- Work with files/directories via the terminal window
- Create a Git repository and push/pull changes
- Run basic JavaScript code on the command line
- Describe the concept of a "data type" and how it relates to variables.

Next class preview: Arrays & Loops

- Declare, assign to, and manipulate data stored in a variable.
- Create arrays and access values in them.
- Iterate over and manipulate values in an array.
- Build iterative loops using for statements.

Q&A