Day 2-1

Assignment:

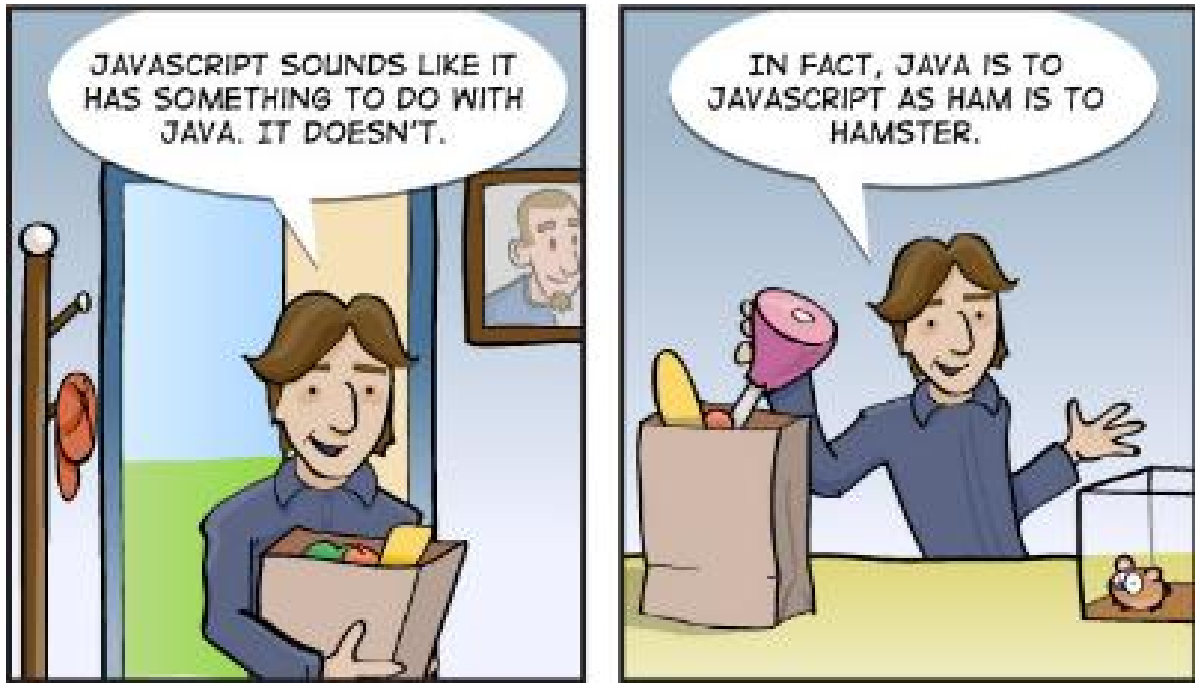
- Homework 01, Due Today
- Lab 02 is available now
- Homework and Labs have their own folders on Moodle

Today's Topics:

- Crash course in JavaScript
- BoneScript
- Blinking an LED
  - js
  - The hard way

JavaScript

- JavaScript is the programming language of HTML and the Web. (http://www.w3schools.com/js/)
- http://stackoverflow.com/questions/245062/whats-the-difference-between-javascript-and-java



node.js

- Platform built on Chrome's JavaScript runtime for easily building fast, scalable network applications.
- Uses an event-driven, non-blocking I/O model that makes it lightweight and efficient, perfect for data-intensive real-time applications that run across distributed devices.
- Programmed in JavaScript on both server and client.

http://nodejs.org/

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node.js

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Node.js® is a platform built on **Chrome's JavaScript runtime** for easily building fast, scalable network applications. Node.js uses an event-driven, non-blocking I/O model that makes it lightweight and efficient, perfect for data-intensive real-time applications that run across distributed devices.

Current Version: v0.12.7

INSTALL

DOWNLOADS | API DOCS

NODE.JS ON THE ROAD

PRODUCTION NODE HITS THE PAVEMENT
GET INSPIRED & INVOLVED LEARN MORE

AN EXAMPLE: WEBSERVER

This simple web server written in Node responds with "Hello World" for every request.

FEATURED

Installing node.js

- Already installed on Bone, but you can update it with:

```
bone$ apt-get install node
```

- You can also install it on your host, but watchout:

```
host$ sudo apt-get install nodejs
host$ cd /usr/bin
host$ sudo ln –s nodejs node
```

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https://packages.debian.org/search?keywords=node

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PACKAGES

debian

About Debian | Getting Debian | Support | Developers' Corner

/ packages / package search results

Exact hits

Package node

- squeeze (oldoldstable) (hamradio): Amateur Packet Radio Node program
  0.3.2-7.1: amd64 armel i386 ia64 mips mipsel powerpc s390 sparc
- wheezy (oldstable) (hamradio): Amateur Packet Radio Node program (transitional package)
  0.3.2-7.4: all
- jessie (stable) (hamradio): Amateur Packet Radio Node program (transitional package)
  0.3.2-7.4: all
- stretch (testing) (hamradio): Amateur Packet Radio Node program (transitional package)
  0.3.2-7.4: all
- sid (unstable) (hamradio): Amateur Packet Radio Node program (transitional package)
  0.3.2-7.4: all

node.js example: Webserver

- This simple web server written in Node responds with “Hello World” for every request.

```
var http = require('http');
http.createServer(function (req, res) {
  res.writeHead(200, {'Content-Type': 'text/plain'});
  res.end('Hello World\n');
}).listen(1337);
console.log('Server running on port 1337');
```

- To run the server, put the code into a file *example.js* and execute it with the node program:

```
$ node example.js
Server running on port 1337
```

JavaScript – C-like

```
#include <stdio.h>
main() {
    int i;
    for(i=0; i<5; i++) {
       printf("i=%d\n", i);
    }
}
```

```
var i;
for(i=0; i<5; i++) {
    console.log("i=%d", i);
}
```

JavaScript in 10 minutes

- By Spencer Tipping
  - https://github.com/spencertipping/js-in-ten-minutes
  - 27 pages
- **OR**
- https://sites.google.com/site/solopurotutoriales/javascript-in-ten-minutes
  - **9 pages**
  - Here are the highlights…

JS - Types

- **Strings** – e.g. 'foo', "foo" (single vs. double quotation – no difference)
- **Numbers** – e.g. 5, 3e+10 (all numbers behave as floats)
- **Booleans** – true and false
- **Arrays** – e.g. **[**1, 2, "foo", [3, 4]**]**
- **Objects** – e.g. {foo**:** 'bar', bif**:** [1, 2]}, which are really just hashtables
- **Functions** – e.g. var example=function (x) {return x + 1}

JS - Functions

- Functions are first-class lexical closures

```
var f = function () { // f is toplevel, so global
    var x = 5;        // x is local to f
    y = 6;            // y is global
};
```

- Watch out

```
var f = function () { // f is toplevel, so global
    y = 6;            // y is global
    x = 42;
Do stuff…
    var x = 5;        // x is local to f
};
```

JS - Semicolon

- JavaScript doesn’t require a semicolon at the end of each line, but you should anyway.

```
var x = f
(y = x) (5)
```

- Is treated as:

```
var x = f(y = x) (5)
```

- You probably meant

```
var x = f;
(y = x) (5);
```

JS - Equality

- Never use **`==`** or **`!=`**
- Always use **`===`** or **`!==`**
- All these are **`true`**:

```
null  == undefined
null  == 0
false == ''
''    == 0
true  == 1
true  == '1'
```

JavaScript: The Good Parts

- Intended for programmers who, by happenstance or curiosity, are venturing into JavaScript.
- Also intended for programmers who have been working with JavaScript at a novice level and are now ready for a more sophisticated relationship with the language.
- Most programming languages contain **good parts and bad parts**. I discovered that I could be a better programmer by using only the good parts and avoiding the bad parts.
- JavaScript is a language with more than its share of bad parts.
- 172 pages

JavaScript Differences

- Performing physical computing tasks in JavaScript is a rather different than C on microcontrollers
- JavaScript and the Node.JS interpreter like to do everything *asynchronously* using *callbacks*
- An event loop runs waiting on whatever the next system-blocking event is,
  - such as waiting for a keypress or a file load to complete
- The callbacks are then executed to completion before other event handlers are run

BoneScript

- “BoneScript is a JavaScript library to simplify learning how to perform physical computing tasks using your embedded Linux”
- http://beagleboard.org/support/bone101
- “BoneScript is a Node.js library specifically optimized for the Beagle family and featuring familiar Arduino function calls, exported to the browser.”
- http://beagleboard.org/Support/BoneScript/

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beagleboard.org

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BeagleBoard.org › support › BoneScript

Your board is connected!
BeagleBone Black rev 000C S/N 3114BBBK1969 running BoneScript 0.2.4 at 192.168.7.2

BoneScript Library

BoneScript is a Node.js library specifically optimized for the Beagle family and featuring familiar Arduino function calls, exported to the browser. Get started exploring the BoneScript Library to discover the great simplicity that is made possible by utilizing Linux.

References

Web-based learning

- Node.JS API reference
- W3Schools JavaScript tutorial
- Khan Academy

Books

- **Programming the BeagleBone Black: Getting Started with JavaScript and BoneScript**
- Bad to the Bone: Crafting Electronics Systems with BeagleBone and BeagleBone Black (Amazon)
- Getting Started with BeagleBone
- Node: Up and Running

Functions

The BoneScript library provides several functions useful for interacting with your hardware. Browse the menu to the left for examples to get you started.

JavaScript

Performing physical computing tasks in JavaScript is a rather different than C on microcontrollers. JavaScript and the Node.JS interpreter like to do everything asynchronously using callbacks. An event loop runs waiting on whatever the next system-blocking event is, such as waiting for a keypress or a file load to complete. The callbacks are then executed to completion before other event handlers are run.