**How the Web Works**

In this lab, you’ll be working with a partner to explore a little more about the internet, the web, requests, responses and more. You’ll be reading and writing about concepts as well as practicing some of the commands that we saw during the lecture earlier.

**Topic 1: The Internet and the World Wide Web**

1. What is the internet? (hint: [here](https://developer.mozilla.org/en-US/docs/Glossary/Internet))
2. What is the world wide web? (hint: [here](https://developer.mozilla.org/en-US/docs/Glossary/World_Wide_Web))
3. Partner One: read [this page](https://developer.mozilla.org/en-US/docs/Learn/Common_questions/How_does_the_Internet_work) on how the internet works, Partner Two: read [this page](https://developer.mozilla.org/en-US/docs/Learn/Getting_started_with_the_web/How_the_Web_works) on how the world wide web works. When you’re done reading, come back together and and answer the following questions
   1. What are networks?
   2. What are servers?
   3. What are routers?
   4. What are packets?
4. Come up with a metaphor for the internet and the web, you can do a single one if you think of one that puts them together or two separate ones (feel free to use one you’ve heard today or read about if you can’t think of a new one, but spend at least 10 minutes trying to think of something different before you resort to that)
5. Draw out a diagram of the infrastructure of the internet and how a request and response travel using your metaphor (like the map and letters we saw during the lecture). Insert the drawing into this document (can be a picture of a physical drawing, a Google Drawing, a Figma drawing, etc)

**Topic 2: IP Addresses and Domains**

1. What is the difference between an IP address and a domain name?
2. What’s devmountain.com’s IP address? (Hint: use ‘ping’ in the terminal)
3. Try to access devmountain.com by its IP address. It shouldn’t work because we have our sites protected by a service called CloudFlare. Why might it be important to not let users access your site directly at the IP address?
4. How do our browsers know the IP address of a website when we type in its domain name? (If you need a refresher, go read [this comic](https://howdns.works/) linked in the handout from this lecture)

**Topic 3: How a web page loads into a browser**

The steps of how a web page is requested and sent are in the table below. However, **they are out of order**. Unscramble them and explain your thinking/reasoning in the second two columns of the table.

| **Steps Scrambled** | **Steps in Correct Order** | **Why did you put this step in this position?** |
| --- | --- | --- |
| *Example: Here is an example step* | *Here is an example step* | *- I put this step first because \_\_\_\_*  *- I put this step before/after \_\_\_\_ because \_\_\_\_* |
| Request reaches app server | Initial request (link clicked, URL visited) | Computer will not start w/o request |
| HTML processing finishes | Browser receives HTML, begins processing | Browser takes input and starts to interpret |
| App code finishes execution | Request reaches app server | Request reaches server, send abc info. |
| Initial request (link clicked, URL visited) | App code finishes execution | Synchronous Top down process, app must finish before html |
| Page rendered in browser | HTML processing finishes | Html finish process and can render page. |
| Browser receives HTML, begins processing | Page rendered in browser | Process must finish before a page can render. |

**Topic 4: Requests and Responses**

*Setup*

* Download the folder for this exercise from Frodo.
* Make sure you unzip it.
* Open it in VS Code
* Run `npm i` in the terminal (make sure you’re in the web-works folder you just downloaded).
  + You’ll know it was successful if you see a node\_modules folder in the web-works folder.
* Run `node server.js` in the terminal (also in the web-works folder) and you should see a log to the terminal saying ‘serving up port 4500’
* You’ll be using this file to figure out what will happen when you make requests to this server, so read it over to see what’s going on. We’ll be getting into the two GET functions and the POST function.

*Part A: GET /*

* You’ll start by looking at the function that runs when we make a get request to /, which looks like this: <http://localhost:4500> or <http://localhost:4500/>
* You’ll use the curl command to make a request and read the response in your terminal

1. Predict what you’ll see as the body of the response:
2. Predict what the content-type of the response will be:

* Open a terminal window and run `curl -i http:localhost:4500`

1. Were you correct about the body? If yes, how/why did you make your prediction? If not, what was it and why
   1. Yes, I was correct, because Sam said so, and I trust him with my life. Also, the ‘/’ function was to send Jurrni and Journaling your journeys.
2. Were you correct about the content-type of the response? If yes, how/why did you make your prediction? If not, what was it and why?
   1. Yes, see above.

*Part B: GET /entries*

* Now look at the next function, the one that runs on get requests to /entries.
* You’ll use the curl command again. This time, you’ll need to figure out how to modify it to get the response that you need.

1. Predict what you’ll see as the body of the response:
   1. Looks like the date options
2. Predict what the content-type of the response will be:
   1. Html I suppose

* In your terminal, run a curl command to get request this server for /entries

1. Were you correct about the body? If yes, how/why did you make your prediction? If not, what was it and why?
   1. It is a bunch of dates, very basic array.
2. Were you correct about the content-type of the response? If yes, how/why did you make your prediction? If not, what was it and why?
   1. Nope, because I did not listen to sam. Smeagol got me, and now I feel suckerd for going the html route.

*Part C: POST /entry*

* Last, read over the function that runs a post request.

1. At a base level, what is this function doing? (There are four parts to this)
   1. Push new entry, and send resulting entries, read in date and content, increments global id.
2. To get this function to work, we need to send a body object with our request. Looking at the function in server.js, what properties do you know you’ll need to include on that body object? And what data types will they be (hint: look at the objects in the entries array)?
   1. Body with date and content attributes
3. Plan the object that you’ll send with your request. Remember that it needs to be written as a JSON object inside strings. JSON objects properties/keys and values need to be in **double quotes** and separated by commas.
   1. ‘{“date”:”August 2”,”content”:”It is up to date”}
4. What URL will you be making this request to?
   1. http://localhost:4500/entry
5. Predict what you’ll see as the body of the response:
   1. August 2 it is up to date
6. Predict what the content-type of the response will be:
   1. Sam says Json, he is almost sure, I agree due to the Json syntax

* In your terminal, enter the curl command to make this request. It should look something like the example below, with the information you decided on in steps 3 and 4 instead of the ALL CAPS WORDS.
  + curl -i -X POST -H ‘Content-type: application/json’ -d JSONOBJECT URL

1. Were you correct about the body? If yes, how/why did you make your prediction? If not, what was it and why? Yes
2. Were you correct about the content-type of the response? If yes, how/why did you make your prediction? If not, what was it and why? Yes, because I looked into the abyss, and I found one dash screwing everything up that again, took 10 minutes to find.

**Submission**

1. Save this document as a PDF
2. Go to Github and create a new repository. (Click the little + in the upper right hand corner.)
3. Name your repository “web-works” (or something like that).
4. Click “uploading an existing file” under the “Quick setup heading”.
5. Choose your web works PDF document to upload.
6. Add “commit message” under the heading “Commit changes”. A good commit message would be something like “Adding web works problems.”
7. Click commit changes.

**Further Study: More curl**

Visit [this link](https://jvns.ca/blog/2019/08/27/curl-exercises/) and do the exercises using the website provided. Keep track of the commands you used in this document. (Don’t forget to resubmit to GitHub when you complete this section)

**Topic 1:**

1. A Small box. A Global network of connected computers.
2. A communication system/network for devices to communicate and share files.
3. 3
   1. A group of devices communicating with each other
   2. Large computers that store information along with hosting websites and other information
   3. A device for forwarding packets to individual devices
   4. Small parcels of data
4. The internet is like a bunch of people scattered around a warehouse, they really want to talk to each other so they start yelling. Devices and such help to take all the conflicting sound and sort it to the recipient in a clear and understandable manner. Packet loss is when someone yells so loud your shout is drowned out for a moment (because people can’t yell loud for very long).
5. 

**Topic 2.**

1. An IP address is the device's unique address or network locator. A Domain name is an identifier, usually some phrase instead of a string of numbers.
2. 172.67.9.59
3. So people don’t access private information, networks, or your back end.
4. DNS providers have a crack team consisting of like four guys that look at the request and try to figure out where you actually wanted to go. There used to be more, but with google, a lot of the work was already done. The browser communicates using a network with specific providers and resolvers that give you the specific address using the information you put in, like an interpreter for a foreign language.