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)

   The internet is a large network but also contains smaller, local networks.

2) What is the world wide web? (hint: here)

   The world wide web is an application that makes web pages accessible through the internet.

3) Partner One: read this page on how the internet works, Partner Two: read this page on how the world wide web works. When you're done reading, come back together and and answer the following questions

   a) What are networks? A network is a connection for computers to communicate to each other through wired or wireless.

   b) What are servers? Servers are computers that store webpages, sites or apps. A client accesses the webpage by downloading the webpage from the server to the device.

   c) What are routers? A router is a smaller computer to help communication be a bit easier for the computer. It is streamlined. Do not need cords.

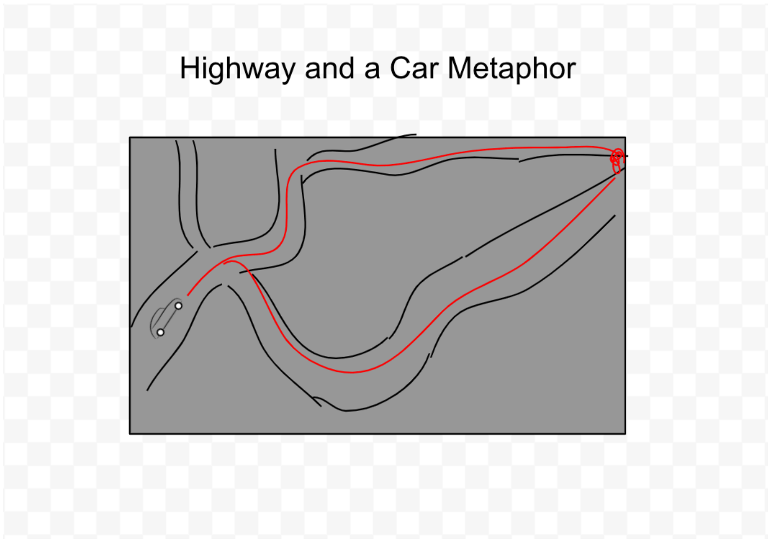
   d) What are packets? Data being sent across the web in small chunks. That way it can all show up or mostly show up if there is a block in the way. Also sending it in packets allows it to show up faster and allows many different users to download it at the same time. If it was one big packet, then only one person could use it at a time!

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)

   The internet and web are like the nervous system and the brain. The brain is the internet and the nervous system is the web. You have to have the signal of the brain to be able to access and use the nervous system.

   The internet and web are like the car on a highway. The highway is the web that holds all of the information and the web is the car which is the means by which you can access the web. You can also re-route if something is jamming up your initial route.

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?

   IP is the exact numerical address and the domain name is more of a nickname that is easier for us to remember and access. It links to the IP address.

2) What's devmountain.com's IP address? (Hint: use 'ping' in the terminal)

   172.66.40.149

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?

   Letting your IP address be accessed publicly can easily find out your approximate location, internet information, and browsing history. Other people might steal information and sell it without authorization. With Devmountain holding a lot of information about people, it should be protected.

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 linked in the handout from this lecture)

   The DNS links the host name to the IP address. So, when we input the host name, the computer checks the systems to find the IP address.

   It checks multiple DNS systems. It checks the closest one, Local DNS Cache. If it can't find it there, it moves to the Local Router DNS. Then it moves to your ISP DNS and finally, if it is nowhere to be found on those three, it looks at the Root DNS Server.

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)	I put this step first because you must make the initial request to begin the process.
HTML processing finishes	Request reaches app server	I put this step after because once we put in the request it communicated to the server that we would like to access that information.
App code finishes execution	Browser receives HTML, begins processing	I put this step after because the server has sent out the packets and now the browser can download the information it needs. It begins with HTML.
Initial request (link clicked, URL visited)	HTML processing finishes	I put this step after because This is the next logical step since it was working on HTML
Page rendered in browser	Page rendered in browser	I put this step after because once the code is finished processing the page will be displayed in the browser.
Browser receives HTML, begins processing	App code finishes execution	I put this last because it signals that the request that was made has been completed.

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`

3) Were you correct about the body? If yes, how/why did you make your prediction? If not, what was it and why?
4) 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?

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:
2) Predict what the content-type of the response will be:

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

3) Were you correct about the body? If yes, how/why did you make your prediction? If not, what was it and why?
4) 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?

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)
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)?
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.
4) What URL will you be making this request to?
5) Predict what you'll see as the body of the response:
6) Predict what the content-type of the response will be:

- 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

7) Were you correct about the body? If yes, how/why did you make your prediction? If not, what was it and why?
8) 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?

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 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)