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 worldwide network of networks that uses the Internet protocol suite to communicate between networks and devices

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

It is an interconnected system of public 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?

Communication between a number of computers and devices

b) What are servers?

Servers are computers that store web pages, sites, and apps for clients to access

c) What are routers?

Basically a special computer that connects to a network of computers

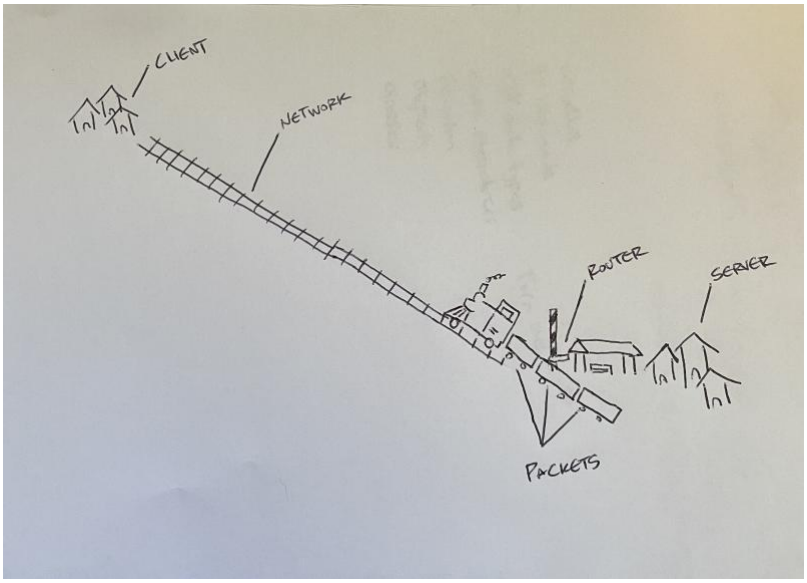
d) What are packets?

Small chunks of data that are sent from the server to the client

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 web is like a train route between two villages, one village is like the client and the other village on the other end of the railway is the server. The train tracks that connect the two villages to access each other is the network that allows you to send and receive data. The router is the singaler at a railway station, sending the trains to the right destination. The packets are the train made of small carts sending people from one village to another. Under this metaphor the internet would be a series of train routes going to different villages by railway.

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?

The IP address is a set of unique numbers that find where a website is stored on the server. A domain name is the web address spelt out like a company's name (.com) in the browser.

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

104.22.12.35

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?

For data security purposes, like blocking bots, spammers and hackers. It helps protect sensitive data.

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)

Special servers called Domain Name Servers/DNS allow a user to type in a web address and it helps match up the web address typed in the browser to the site's IP address.

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)	This is the first step with the user submits requested site to visit
HTML processing finishes	Request reaches app server	I put this down next as the web address is sent to the DNS to find the IP address
App code finishes execution	App code finishes execution	The next step is the DNS finds the IP address

Initial request (link clicked, URL visited)	Browser receives HTML, begins processing	Now that the right IP address is found the server starts to send packets of data.
Page rendered in browser	HTML processing finishes	I put this step after because the HTML processing and packets and all sent to the browser at this point
Browser receives HTML, begins processing	Page rendered in browser	This step is last because all the data has been sent from the server and the whole website is shown in the browser.

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:

I predict the body saying "Jurrni Journaling your journeys" based off the code provided

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

The content type will be html text

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

Yes, I was correct in my prediction. I based it off of what I saw in the code and what it was to return.

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?

Yeah, it was text and I based that off of the messages provided between the h1 and h2 in the function.

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:

The body of the response will be some IDs, dates, and content/message

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

The content type will be an array

- 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?

The body of the response was what I anticipated showing ids, dates, and strings.

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?

Yeah, what was returned was the entries array i expected that is in the code file.

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)

- **Arguments are passed in**
- **Those arguments are put into an object**
- **The data in the object is pushed/added to the entries array**
- **globalId is incremented by 1**

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)?

Id: number / date: string / content: string

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?

http://localhost:4500/entry

5) Predict what you'll see as the body of the response:

It will have the entries array with the new entry added to it.

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

It will still be an array of objects

- 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?

Yeah, it was the array with a new entry added to the end of it

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?

It was still an array of objects as expected

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)