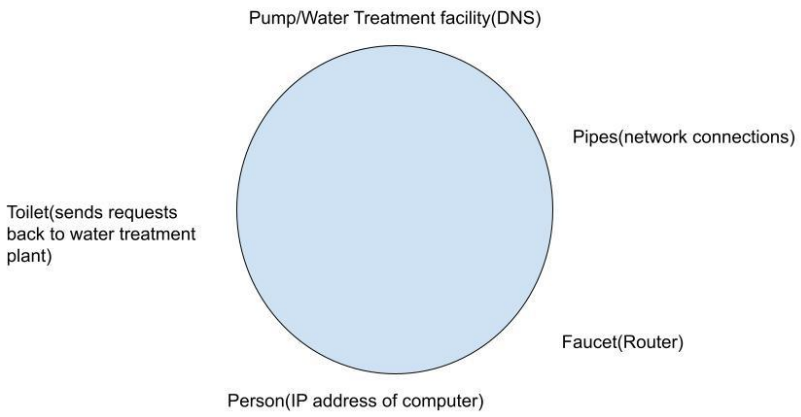
How the Web Works

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

- What is the internet? (hint: here) A giant network of smaller local networks
- What is the world wide web? (hint: here) an information system on the internet which allows documents to be connected to other documents by hypertext links, enabling the user to search for information by moving from one document to another
- 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
    - What are networks? A group or system of interconnected computers
    - What are servers? Refers to specific program or process; computers that store webpages, sites, apps
    - What are routers? A device which connects two or more networks
    - What are packets? A formatted unit of data which is stored and sent from server to client
- 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)
    - Imagine plumbing. A pump is like a server, the pipes are the method by which data is carried (could be wifi or hardwire), the faucet is the IP address etc etc
- 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

- What is the difference between an IP address and a domain name? IP address is the specific set of characters that identify a computers location according to internet protocol. Domain name specifies the domain of which a website is a part
- What's devmountain.com's IP address? (Hint: use 'ping' in the terminal) 172.67.9.59
- 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? Allowing direct access to your server might allow someone to make undesirable changes to your server
- 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) They seek it out in its own cache, in the router/modem's cache, in the ISP's cache, or by contacting the DNS directly.

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.

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	First step is a request made
HTML processing finishes	Request reaches app server	Request reaches server after request is made
App code finishes execution	Browser receives HTML, begins processing	Request response reaches browser and processing begins
Initial request (link clicked, URL visited)	HTML Processing finishes	Html processing finishes after it begins
Page rendered in browser	Page rendered in browser	Page is visible after html is processed
Browser receives HTML, begins processing	App code finishes execution	App code finishes after website is closed

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

- Predict what the content-type of the response will be:
- Open a terminal window and run `curl -i http:localhost:4500`
- 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 html and i made that prediction because most of the internet is on html
- 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 that was what the server that we had operating had going for it

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.
- Predict what you'll see as the body of the response:
- Predict what the content-type of the response will be:
- In your terminal, run a curl command to get request this server for /entries
- Were you correct about the body? If yes, how/why did you make your prediction? If not, what was it and why? Yes it looks like json stuff as we discussed the other day
- 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 we did it the other day

Part C: POST /entry

- Last, read over the function that runs a post request.
- At a base level, what is this function doing? (There are four parts to this)
- 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)? Date and content, strings
- 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.
- What URL will you be making this request to? http://localhost:4500/entry
- Predict what you'll see as the body of the response:
- 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
- Were you correct about the body? If yes, how/why did you make your prediction? If not, what was it and why?Nope, my json info was all wrong and i googled it to figure it
- 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, same as before

Submission

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

- 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)