

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 the global system of interconnected computer networks that uses the Internet protocol suite (TCP/IP) to communicate between networks and devices. It is a *network of networks* that consists of private, public, academic, business, and government networks of local to global scope, linked by a broad array of electronic, wireless, and optical networking technologies.” - Wikipedia
- 2) What is the world wide web? (hint: [here](#)) “The world wide web is an information system where documents and other web resources are identified by uniform resource locators (URL). The resources of the web are transferred via the Hypertext Transfer Protocol (HTTP).” - Wikipedia
- 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 answer the following questions
 - a) What are networks? A set of devices communicating with each other over LAN, Wifi, or Bluetooth.
 - b) What are servers? Computers that store webpages, sites, or apps. When a client wants to access a page, a copy of the page is downloaded from the server onto the local client.
 - c) What are routers? A computer that makes sure a signal is sent to the proper receiver.
 - d) What are packets? The format in which data is sent from server to client, and client to server
- 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) I think of the internet and web in a similar way I think of USPS and package delivery.
- 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) 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? I think the major issue would be security concerns with having the direct IP access.
- 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)

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) | |
| HTML processing finishes | Request reaches app server | |
| App code finishes execution | Browser receives HTML, begins processing | |
| Initial request (link clicked, URL visited) | App code finishes execution | |
| Page rendered in browser | HTML processing finishes | |
| Browser receives HTML, begins processing | Page rendered in 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: **Based on the server.js code, I expect to see "Jurnni Journaling your journies" will be displayed.**
 - 2) Predict what the content-type of the response will be: **I expect to see a String or HTML response on the webpage.**
- 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? **I was correct about what would be displayed. Looking at the server.js code, the function triggered by "/" prints this out, and that is the flag used with this first curl command.**
 - 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? **I think so. If I understood this correctly, the reply from the server was a string (or a set of headers)**

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 command is /entries on the end of the previous curl command. This command will call the "entries" object and execute.**
- 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 **curl -i http://localhost:4500/entries**
- 3) Were you correct about the body? If yes, how/why did you make your prediction? If not, what was it and why? **Yes, assumed that the /entries would trigger the entries object.**
- 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? **No, it was JSON.**

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) **Accepts input for id, and date. Pushes newEntry to the site. Iterate the globalID variable. Send the info.**
- 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)? **We will need an ID, date, and content to send. The data types will be int, and 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? **curl -i http://localhost:4500/entry**
- 5) Predict what you'll see as the body of the response:
- 6) Predict what the content-type of the response will be: **JSON/HTML**
 - 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? **Yes, I read that 'post' would be an HTML/JSON related command**

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)