

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](#))

World wide network of networks that uses the Internet protocol suite

- 2) What is the world wide web? (hint: [here](#))

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 answer the following questions

What are networks?

- i) Groups of computers that use a common set of communication protocols over the internet.

What are servers?

- ii) Computers that can send messages intelligible to web browsers and process requests. Store web pages, sites, or other apps.

What are routers?

- iii) Routers connect our computer and devices to the internet and makes sure that a message sent from a given computer arrives at the right destination computer

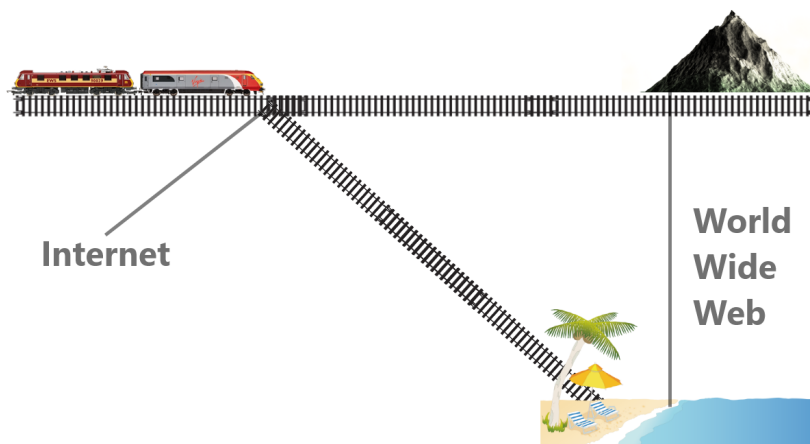
What are packets?

- iv) A series of small chunks called data packets or files that are sent to the clients web browser

- 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 is like a train taking you to where you need to go. The world wide web is like the destination, it's displayed when the train/internet makes it to the end.

- 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?
 - a) A label that is assigned to a specific computer connected a network. Hosts or network interface identification and location addressing. Domain is a human readable address that correlates to a specific ip address
- 2) What's devmountain.com's IP address? (Hint: use 'ping' in the terminal)
 - a) 2606:4700:10::ac43:93b:
- 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?
 - a) To protect against DDoS attacks on the website
- 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)
 - a) It is stored in the cache of our computer, router, ips, or internet.

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?
<i>Example: Here is an example step</i>	<i>Here is an example step</i>	- I put this step first because ____ - I put this step before/after ____ because ____
Request reaches app server	Initial request	You need to first send a request
HTML processing finishes	Request reaches app server	That request then reaches the server
App code finishes execution	App code finished execution	The server is done processing the request and is ready to send back the requested information
Initial request (link clicked, URL visited)	Browser receives HTML, begins processing	Once received, the browser will start to process the files received
Page rendered in browser	HTML processing finishes	Everything is finished processing in the DOM/HTML
Browser receives HTML, begins processing	Page rendered in browser	Page is finally displayed or an error happens

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:
 - a) HTML displayed with h1 and h2 tags
 - 2) Predict what the content-type of the response will be:
 - a) text/HTML
- 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?
 - a) Yes, I am familiar with node and express and know what was going to happen
 - 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?
 - a) Based on what was sent I just made a guess

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:
 - a) A list of entries that are hard coded into the server.js file
 - 2) Predict what the content-type of the response will be:
 - a) Text
- 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?
 - a) Yes, I am familiar with node and express and know what was going to happen
 - 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?
 - a) No, I forgot that for data/objects it would be sent as a JSON file as specified in the middleware at the top

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)
 - a) Setting the new entry based on the request from the client. It then adds the entry to the entries array and increases the global ID. Then sends the entries back to the client as a JSON object.
 - 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)?
 - a) Date and content. Strings

- 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?
 - a) localhost:4500/entry
- 5) Predict what you'll see as the body of the response:
 - a) {..., id: 3, date: "may 17th", content: "this is a test"
- 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?
 - a) Yes, based on the code, I figured out what was happening
- 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?
 - a) Yes, the content type was json, which is the info that was sent and recieved

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)