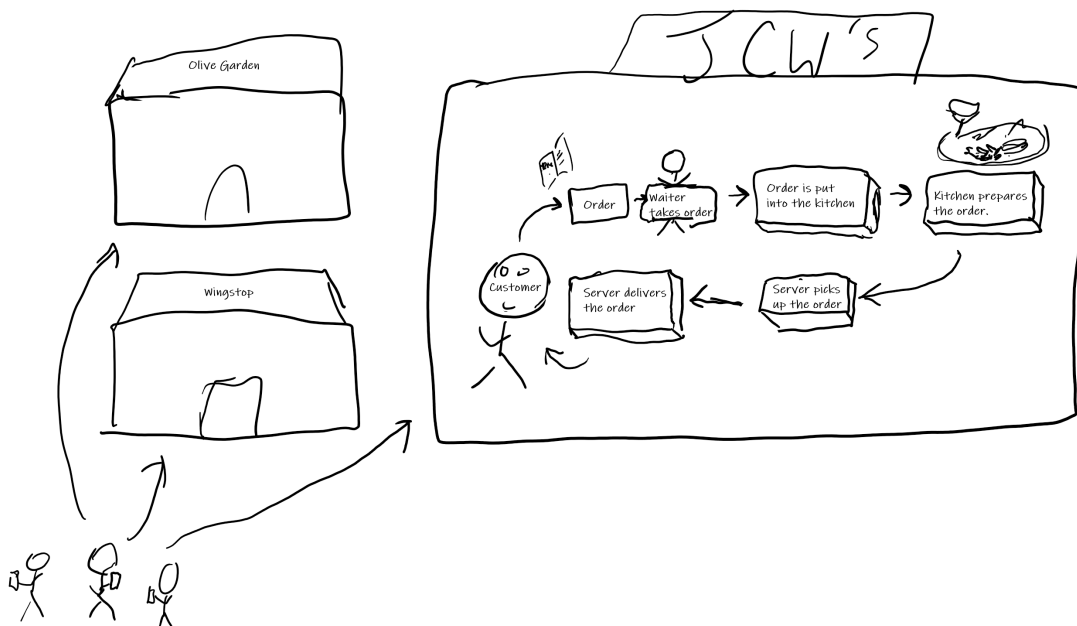


How the Web Works

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](#))
 - 2) What is the world wide web? (hint: [here](#))
 - 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?
-The physical or wireless connection of multiple computers.
 - b) What are servers?
-Servers are computers that store information such as webpages, sites, or apps.
 - c) What are routers?
-Routers connect the originating computer to the desired destination.
 - d) What are packets?
-Packets are a small chunks of a larger piece of data, that allow for faster exchanges.
 - 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 singular restaurant, while the internet is like the restaurant industry as a whole.
- While you have a slew of restaurants available to you, you can choose to eat at a particular restaurant where the food server takes your order and shortly thereafter comes back with what you asked for.
- 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 domain name is a nickname for an IP address
- 2) What's devmountain.com's IP address? (Hint: use 'ping' in the terminal)
 - 172.67.9.59
- 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?
 - To provide security/protect from malicious. For example, the DDoS attack on ClubPenguin that we talked about in lecture.
- 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)
 - Searches through your local DNS cache, router DNS cache, ISP DNS cache, then finally Root DNS servers as a last resort.

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 (link clicked, URL visited)	I put this step first because a user needs to submit a request, one way or another, to begin the process.
HTML processing finishes	Request reaches app server	This step next because the request needs to be received before it can start processing the request.
App code finishes execution	App code finishes execution	This step next because the app code needs to finish interacting with other things e.g., database servers before responding with the HTML.
Initial request (link clicked, URL visited)	Browser receives HTML, begins processing	App has finished executing, so it sends HTML to users browser.
Page rendered in browser	HTML processing finishes	HTML finished processing in users browser.
Browser receives HTML, begins processing	Page rendered in browser	Page rendered, window loads up.

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) had to get a reminder on what the body was, so i couldn't make a prediction
- 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) couldn't remember what the body was, so didn't make a prediction
- 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) i was correct. examined the send 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:
 - a) body should return the entries list
- 2) Predict what the content-type of the response will be:
 - a) application/json
- 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) i was correct. examined the send method.
- 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) correct. our object was requesting body info

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) building a new object
 - b) pushing the new object to the entries list
 - c) increments the global id
 - d) responds with the new entries
- 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) ID, date, content. the ID will be an integer, the remaining properties will be 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.
 - a) `{ "id" : "3", "date" : "March 4", "content" : "my birthday" }`
- 4) What URL will you be making this request to?
 - a) `http://localhost:4500/entry`
- 5) Predict what you'll see as the body of the response:
 - a) updated entry in list "entries"
- 6) Predict what the content-type of the response will be:
 - a) `application/json`
- 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)