React 4

CS571: Building User Interfaces

Cole Nelson

Announcements

- Today will be broken into 3 parts: React, Expert Evaluation, and Midterm Review.
- Midterm **next week** in class (details again later).
- Please contact me **today** if you will not be able to make the exam (Canvas/HonorLock alternative).
- HW5 was extended to Friday, 10/21 with no penalty (final late day of 10/28).

What will we learn today?

- Persistance
- Custom React Hooks
- Bigger Picture for React Apps
- Preparing for React Native...

How can we *persist* data?

```
fetch("https://example.com/create-content", {
    method: "POST",
    headers: {
        "Content-Type": "application/json"
    },
    body: JSON.stringify({
        content: "Hello World!"
    })
}).then(res => {
    if (res.status === 409) {
        alert("This content already exists!")
    }
    return res.json();
}).then(json => {
    if (json.msg) {
        alert(json.msg)
    }
});
```

Local Storage V/s Session Storage V/s Cookies

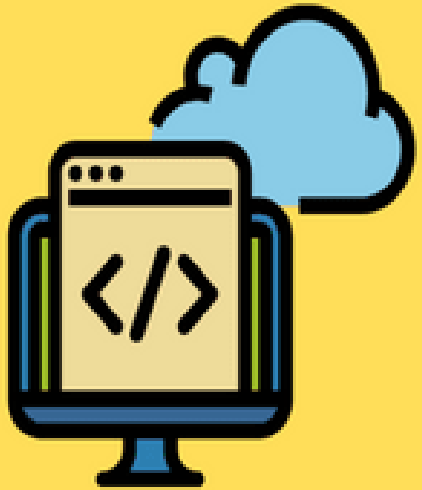


Image Source

Criteria	Local Storage	Session Storage	Cookies
Storage Capacity	5-10 mb	5-10 mb	4 kb
Auto Expiry	No	Yes	Yes
Server Side Accessibility	No	No	Yes
Data Transfer HTTP Request	No	No	Yes
Data Persistence	Till manually deleted	Till browser tab is closed	As per expiry TTL set

Image Source

Cookies vs. Session vs. Local

Type	Notes
Cookies	Can be set programmatically, but typically set by server through a `Set-Cookie` header
Session	Set programmatically via `sessionStorage`, typically used with form data.
Local	Set programmatically via `localStorage`, typically used with long-lasting data.

Cookies vs. Session vs. Local

These are all just key-value pairs of *strings*!

Type	Example
Cookies	`document.cookie = 'lang=en'`
Session	`sessionStorage.setItem('name', 'Cole')`
Local	`localStorage.getItem('lastLogin')`

Let's Persist Some Data!

Using `sessionStorage` or `localStorage`.

StackBlitz Solution | Inspitation from WDS

How Can We Reuse Logic?

Practicing **D**on't **R**epeat **Y**ourself (DRY)

Custom React Hooks

You can write your own custom hooks! These are just JavaScript functions that can use React's features!

- We use **custom components** to re-use **UI elements**.
- We use **custom hooks** to re-use **business logic**.

JSConf Talk

Let's Write a Custom Hook!

Writing reusable logic for persisting data.

StackBlitz Solution | Inspitation from WDS

Congrats!

You are now a React Devloper! 🥳🎏🎉

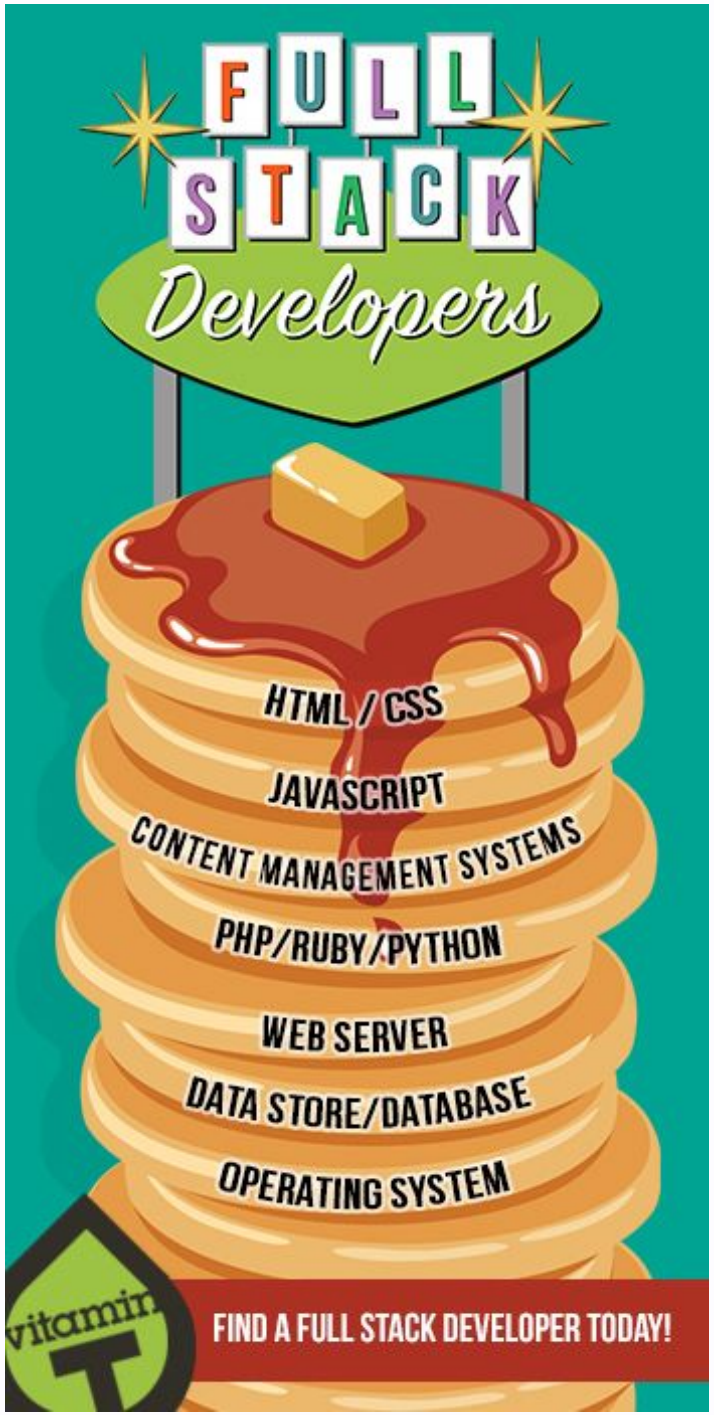
Questions You Should Ask Yourself...

- What even is "frontend development"?
- Where does this fit in to the software stack?
- How can I get my web app out in front of customers?
- What concerns should I have about my web app?
- What else can I do with these skills?
- How much of a raise should I ask for? 💰

Software Stack

Think of software like a stack of pancakes...

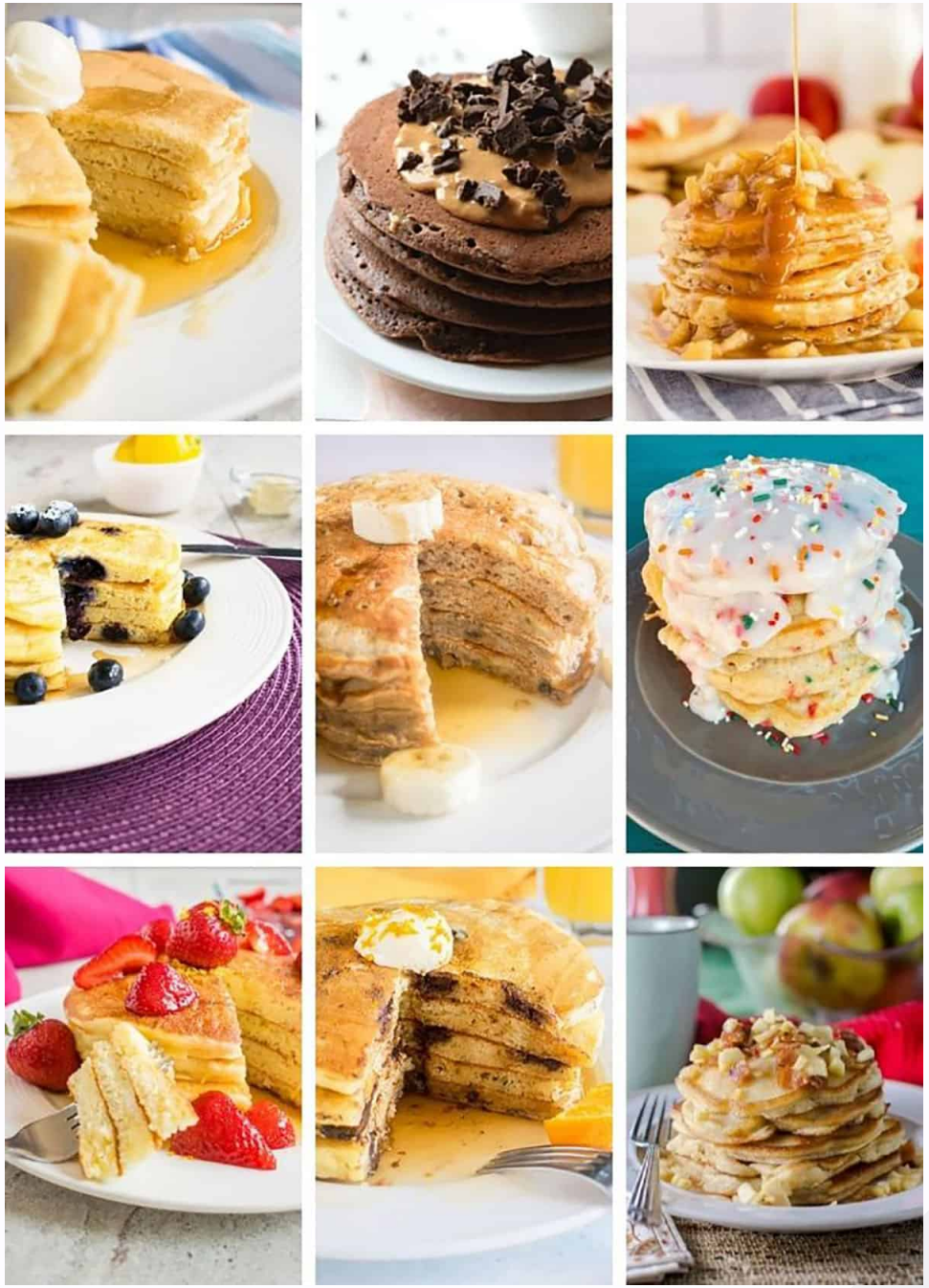
Image Source



Software Stack

... where each pancake can be its own flavor...

Image Source



Software Stack

... and can be cooked its own way...

Image Source

Software Stack

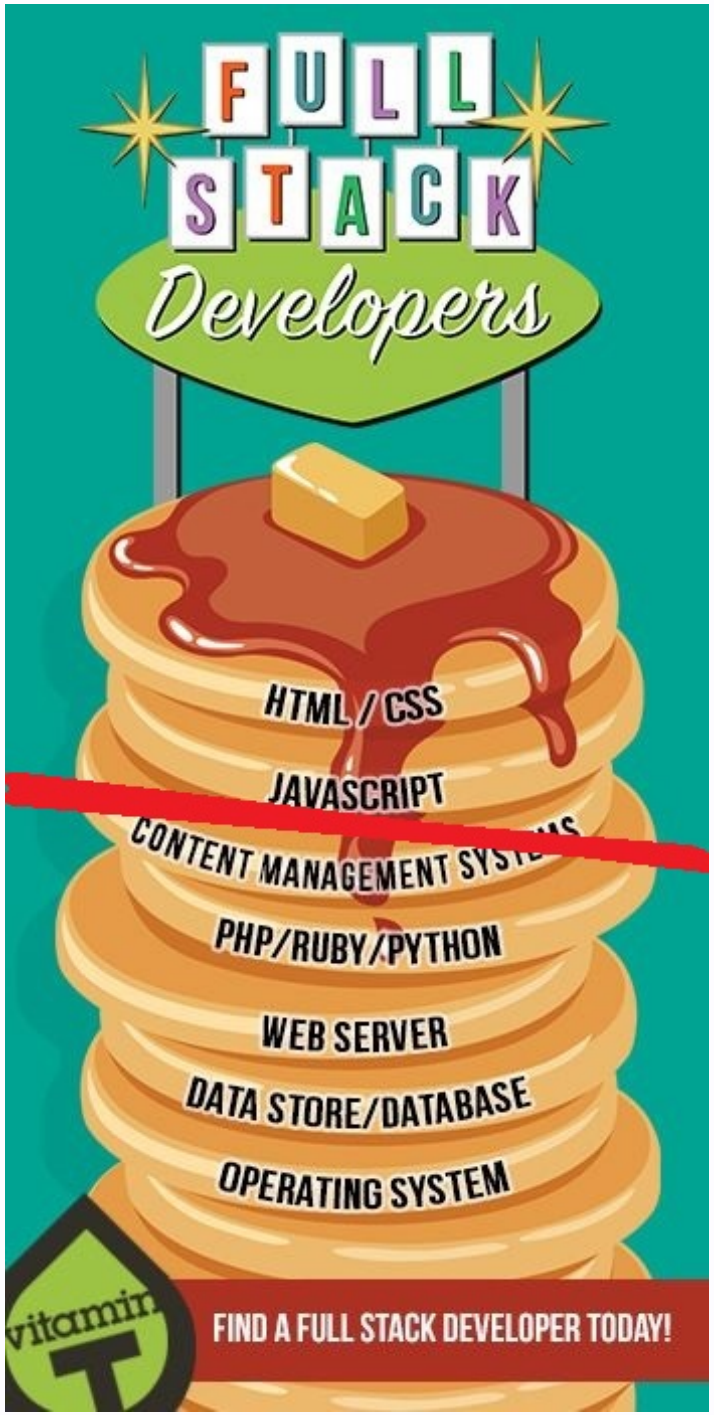
... with as many or as few as we want!

Image Source

Software Stack

We typically refer to the "frontend" as the content that gets delivered to the user...

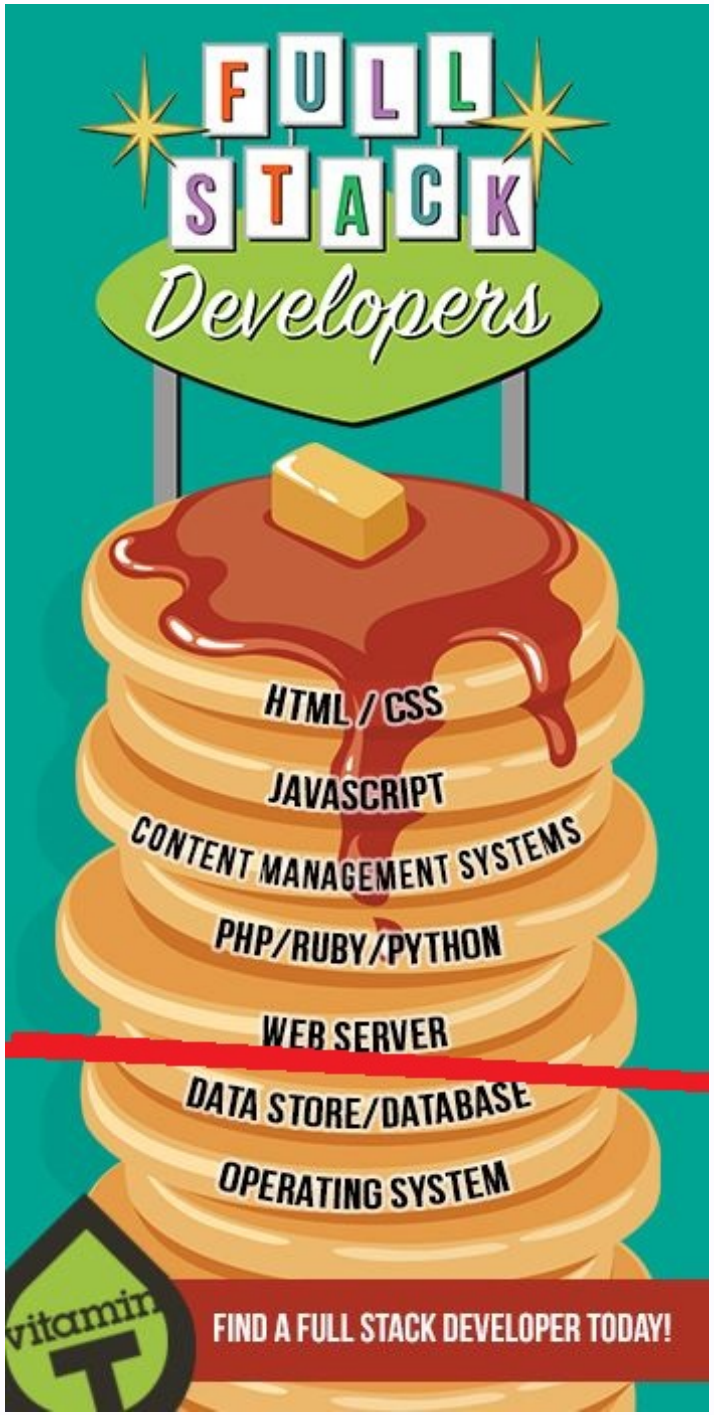
Image Source



Software Stack

...but this can change based on your perspective!

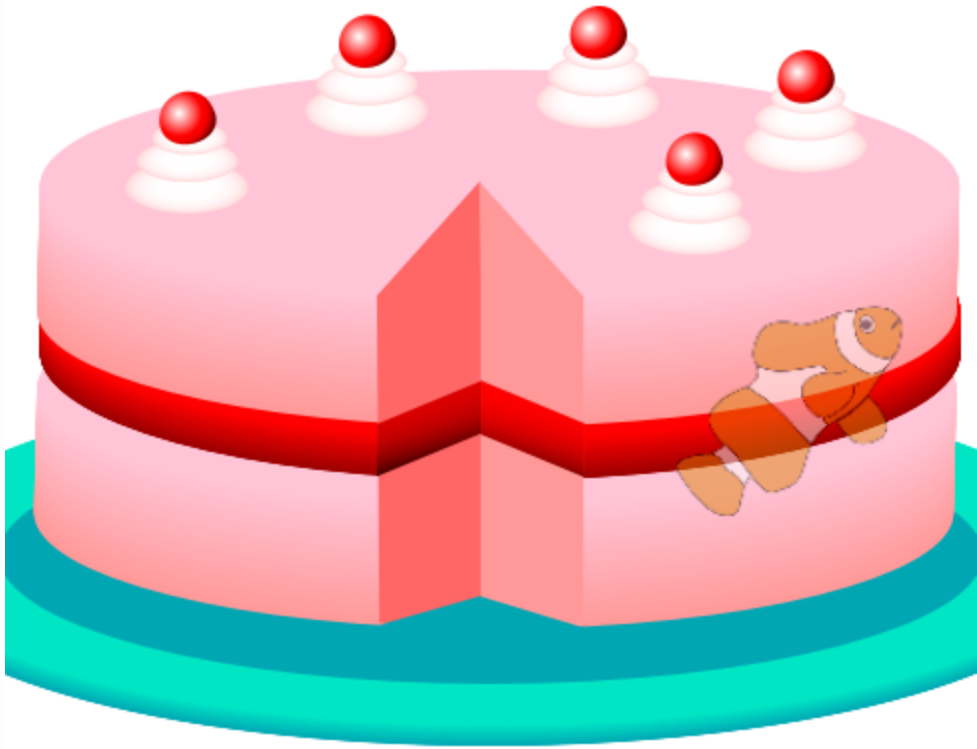
Image Source



The Browser

However, we are constrained to what the browser can interpret...

- HTML
- CSS
- JS



So... is React an Exception?

Facebook is influential, but not *that* influential!

Reminder: JSX

This React component displays Hello World on the webpage using JSX.

```
function Welcome() {
  return <h1>Hello World!</h1>;
}
```

Babel transpiles JSX into JS, CSS, and HTML.

Delivery of React App

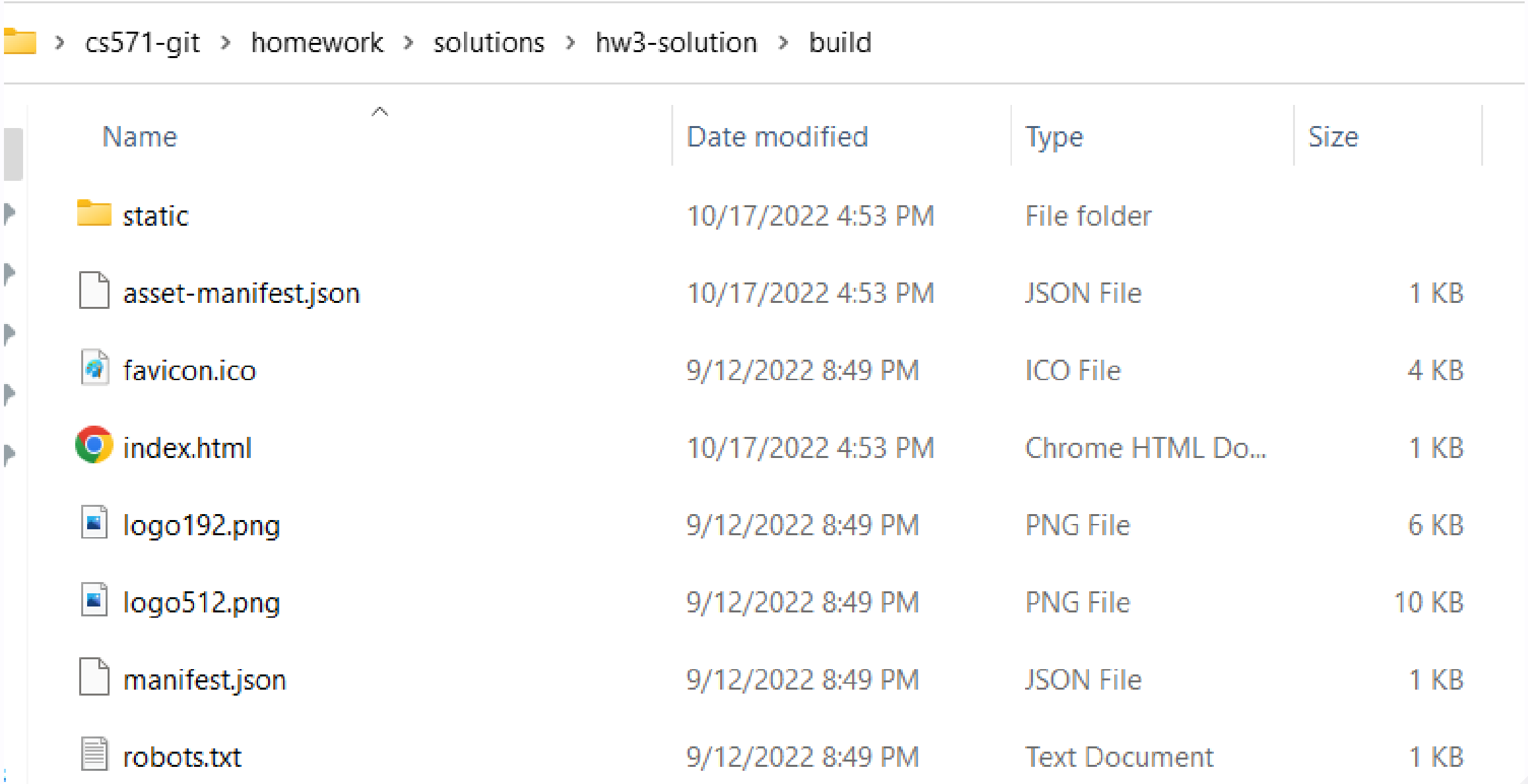
We don't deliver our JSX code, we deliver HTML, CSS, and JS generated via `npm run build`!

Also, specify a home page (absolute or relative)...

```
{
  "name": "hw3",
  "version": "0.1.0",
  "private": true,
  "homepage": "https://coletnelson.us/mycoolapp/",
  "dependencies": {
    ...
  }
}
```

What does this do?

Creates our "build bundle"...


cs571-git › homework › solutions › hw3-solution › build
Name
Date modified
Type
Size
static
10/17/2022 4:53 PM
File folder
asset-manifest.json
10/17/2022 4:53 PM
JSON File
1 KB
favicon.ico
9/12/2022 8:49 PM
ICO File
4 KB
index.html
10/17/2022 4:53 PM
Chrome HTML Do...
1 KB
logo192.png
9/12/2022 8:49 PM
PNG File
6 KB
logo512.png
9/12/2022 8:49 PM
PNG File
10 KB
manifest.json
9/12/2022 8:49 PM
JSON File
1 KB
robots.txt
9/12/2022 8:49 PM
Text Document
1 KB

```
<html lang="en">
  <head>
    <meta charset="utf-8" />
    <link rel="icon" href="./favicon.ico" />
    <meta name="viewport" content="width=device-width,initial-scale=1" />
    <meta name="theme-color" content="#000000" />
    <meta name="description" content="Web site created using create-react-app'
    <link rel="apple-touch-icon" href="./logo192.png" />
    <link rel="manifest" href="./manifest.json" />
    <title>React App</title>
    <script defer="defer" src="./static/js/main.aae268c3.js"></script>
    <link href="./static/css/main.ace4cd11.css" rel="stylesheet">
  </head>
  <body><noscript>You need to enable JavaScript to run this app.</noscript>
    <div id="root"></div>
  </body>
</html>
```

```
/*! For license information please see main.aae268c3.js.LICENSE.txt */
!function(){var e={694:function(e,t){var n;!function(){"use strict";var r={}.
hasOwnProperty;function l(){for(var e=[],t=0;t<arguments.length;t++){var n=arguments[t];
if(n){var a=typeof n;if("string"===a||"number"===a)e.push(n);else if(Array.isArray(n)){
if(n.length){var o=l.apply(null,n);o&&e.push(o)}}else if("object"===a)if(n.toString===
Object.prototype.toString)for(var u in n)r.call(n,u)&&n[u]&&e.push(u);else e.push(n.
toString())}}return e.join(" ")}e.exports?(l.default=l,e.exports=l):void 0===(n=function
(){return l}.apply(t,[]))||(e.exports=n)}()},618:function(e,t,n){var r;!function(){"use
strict";var l=!("undefined"===typeof window||!window.document||!window.document.
createElement),a={canUseDOM:l,canUseWorkers:"undefined"!==typeof Worker,
canUseEventListeners:l&&!(!window.addEventListener&&!window.attachEvent),canUseViewport:
l&&!!window.screen};void 0===(r=function(){return a}.call(t,n,t,e))||(e.exports=r)}()},
888:function(e,t,n){"use strict";var r=n(47);function l(){}function a(){}a.
resetWarningCache=l,e.exports=function(){function e(e,t,n,l,a,o){if(o!==r){var u=new
Error("Calling PropTypes validators directly is not supported by the `prop-types`
package. Use PropTypes.checkPropTypes() to call them. Read more at
http://fb.me/use-check-prop-types");throw u.name="Invariant Violation",u}}function t(){
return e}e.isRequired=e;var n={array:e,bigint:e,bool:e,func:e,number:e,object:e,string:e
,symbol:e,any:e,arrayOf:t,element:e,elementType:e,instanceOf:t,node:e,objectOf:t,oneOf:t
,oneOfType:t,shape:t,exact:t,checkPropTypes:a,resetWarningCache:l};return n.PropTypes=n,
n}},7:function(e,t,n){e.exports=n(888)()},47:function(e){"use strict";e.exports=
"SECRET_DO_NOT_PASS_THIS_OR_YOU_WILL_BE_FIRED"},463:function(e,t,n){"use strict";var r=n
(791),l=n(296);function a(e){for(var t=
```

Build Bundle Deployment

Concerns in Production...

- Reliability
- Performance
- Monitoring
- Business Value of Delivery
- Search Engine Optimization (SEO)

Reliability

Does our code work?

- Manual testing
- Automated testing
  - Jest
  - React Testing Library
- Static analysis
  - TypeScript: Used for type-checking
  - ESLint: Used for following best practice

Performance

Does our code work *well*?

- Be aware of the "bundle size"!
- Our code specifically...
  - Perf
  - Profiler
- Our code broadly...
  - Google Lighthouse
  - Chrome User Experience Report (CrUX)

Monitoring

Does our code *continue to* work well?

- Logging
  - *Not* `console.log`
  - Sentry
  - DataDog
- Cloud Tools
  - Cloud Monitoring Tools
  - DownDetector

Business Value of Delivery

- Core Questions
  - Are we making money? 💸
  - Are users making use of new features?
- Analysis Methods
  - A/B Testing
  - Customer Surveys
- Commercial Tools
  - Pendo

Search Engine Optimization (SEO)

The generated HTML simply says...

```
You need to enable JavaScript to run this app.
```

What is a search engine crawler supposed to do?

Option: Server Side Rendering next.js

Up Next: React Native

React Native in 100 seconds

What did we learn today?

- Persistance
- Custom React Hooks
- Bigger Picture for React Apps
- Preparing for React Native...

Quick Reminder

During the "JavaScript", "React", or "React Native" weekly assignments, students must incorporate at least one additional, meaningful third-party library into at least one of their submissions and provide a short description about its use.

Please submit the seperate Canvas assignment.

You may go *back* and use a library, just let me know!

Quick Reminder

Please complete the AEFIS Mid-Semester Survey by Saturday, October 22nd! 🙂

This is optional and not required but encouraged!

Please submit the Canvas assignment acknowledging that you *can* (but don't have to) complete it.

I will leave the room so you have time.

On to Expert Evaluation!