Bootstrap and React for Web Development

L A Liggett 2019-08-07

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Introduction

HTML

2.1 HTML Properties

Commenting in HTML.

```
<!--
These are some comments.
-->
```

The head tag allows metadata to be labeled, the text of title for instance is typically listed in the tab or the status bar of the page in a browser.

The body specifies text for the page body.

Headings specifies header text of increasingly small sizes.

```
</body>
</html>
```

Unordered lists specify bullet points.

Ordered lists number lines in increasing order.

The image tag refers to and inserts an image as an html attribute. The alt gives alternative code if the image is missing. The height and width sets the image size in number of pixels. When the image size is set to 50% sets the image size dynamically to 50% of the browser width or height.

Tables display data in a table format that can be styled in various ways. The th tag specifies the headings of each of the columns. The td tag specifies the data in each of the columns.

```
George
       Washington
       1789-1797
     John
       Adams
       1797-1801
     Thomas
       Jefferson
       1801-1809
     </body>
</html>
```

Tables can be styled within the header of the html document. Both the th and the td styles are defined together. border-collapse combines the borders of cells together.

```
<!DOCTYPE html>
<html>
   <head>
      <title>Presidents</title>
      <style>
          table {
             border: 2px solid black;
             border-collapse: collapse;
             width: 50%;
          }
          th, td {
             border: 1px solid black;
             padding: 5px;
             text-align: center;
          }
          th {
             background-color: lightgray;
      </style>
   </head>
   <body>
      First Name
             Last Name
             Years in Office
          George
             Washington
             1789-1797
```

Forms can be created and labeled as such. The placeholder text is what is written within the form before anything is entered into it. The name is similar to a variable name and can be used to refer to the form and the data that is entered into it. The text within the button is the text that will appear on the button in the page.

Text can be aligned and colord by specifying styles within the respective tags of text.

Style elements can be separated from the actual body of the webpage. In this example every **h1** is styled within the style portion of the header.

Links to local pages or hyperlinks are included within the <a> tag.

```
<a href="about.html">About</a>
<a href="http://www.google.com">Google</a>
```

Links can also refer to locations on the same page.

```
<a href="section1">Section 1</a>
<h1 id="section1">Some stuff.</h1>
```

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A newline can be inserted within the body of text by using
.

```
<a href="about.html">About</a><br />
```

2.1.1 Forms

Generic text input fields can be created with the text type.

```
<div>
<input name="name" type="text" placeholder="Name">
</div>
```

A password field is pretty similar to a text field, but the characters are obscured.

```
<input name="password" type="password" placeholder="Password">
```

Dropdown lists of the possible valid choices for a field can be used with datalist.

2.2 CSS

Commenting in CSS.

```
/*
These are some comments.
*/
```

CSS properties can be found here.

Instead of putting the css styles within the header of the html file, they can be included in a separate css file and referenced. In this example, the type of file being referenced is classified as a stylesheet and the code is within styles.css.

The code that goes within the css file is here, and it is simply the same code that was put into the style headers in the above example.

```
h1 {
   color: blue;
   text-align: center;
}
```

Divisions define sections of the code that can be separated so it can be controlled in a particular manner. Font priorities are taken left to right if some fonts are not found.

```
<!DOCTYPE html>
<html>
    <head>
        <title>My Web Page!</title>
        <style>
            div {
                background-color: teal;
                width: 500px;
                height: 400px;
                margin: 30px;
                padding: 20px;
                font-family: Arial, sans-serif;
                font-size: 28px;
                font-weight: bold;
                border: 1px dotted black;
        </style>
    </head>
    <body>
        <div>
            Hello, world!
        </div>
    </body>
</html>
```

Divisions and spans can be named and used to refer to different parts of the html document specifically.

```
<!DOCTYPE html>
<html>
    <head>
        <title>My Web Page!</title>
        <style>
            #top {
                font-size: 36px;
                color: red;
            }
            .name {
                font-weight: bold;
                color: blue;
            }
        </style>
    </head>
    <body>
        <div id="top">
            This is the <span class="name">top</span> of my web page.
        </div>
    </body>
</html>
```

Link styling can be done by adjusting colors and text decorations of links.

```
<style>
    a:link {
    color: blue;
```

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```
background-color: transparent;
      text-decoration: none;
    a:visited {
      color: red;
      background-color: transparent;
      text-decoration: none;
    }
    a:hover {
      color: pink;
      background-color: transparent;
      text-decoration: underline;
    a:active {
      color: orange;
      background-color: transparent;
      text-decoration: underline;
    }
</style>
```

Fonts can be imported from locations like google's hosted fonts and used directly to avoid problems with a browser not supporting them. The link to the fonts goes within the header portion of the html code.

The imported font families can then be used within the CSS directly.

```
body {
    font-family: Proza Libre, Cormorant Garamond
}
```

Nested elements can be styled in a grouped manner.

A similar use is to style the immediately nested child elements and none other using the > operator.

Fields of particular types can be styled based on their type. These are examples of a text field that allows letters and numbers and a number field that only allows numbers.

The fields can then be styled based on the type of field that they are.

2.2.1 Selectors

CSS Selectors allow specific classes or elements to be selected and styled individually.

```
a, b /* Multiple element selector */
a b /* Descendant selector */
a > b /* Child selector */
a + b /* Adjacent sibling selector */
[a=b] /* Attribute selector */
a:b /* Pseudoclass selector */
a::b /* Pseudoelement selector */
```

Pseudo-classes allow for different styling effects depending on the state of the element.

Pseudo-elements are similar but select elements also allow things to be styled by placing information at the beginning of an item.

What is happening here is that there is a link amd before the link it says "Click here:", and to the left of that the \21d12 specifies a unicode arrow.

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```
    a::before {
        content: "\21d2 Click here: ";
        font-weight: bold;
    }

</style>
<body>
    <a href="#">A link</a>
</body>
```

Text highlighting can also be controlled with pseudo-elements. Here the text color turns red and the highlight is in yellow when the text is highlighted.

```
    p::selection {
        color: red;
        background-color: yellow;
    }

</style>
<body>
    This is some text
</body>
```

2.2.2 Responsive Design

Media queries are CSS rules that are only used if certain properties are true. A commonly used property is screen size to adjust page layouts fore mobile. It is generally a good idea to design for mobile first and adjust properties to fit desktop, as this will ensure mobile gets the fastest performace.

Here the width of a column is being altered if the browser window is at least 768px in size. Altering the design in this way illustrates how development can be done "mobile-first", as the property is altered if a desktop is used instead of mobile.

```
@media only screen and (min-width: 768px) {
  /* For desktop: */
  .col-1 {width: 8.33%;}
}
```

Media queries can also control content what content gets printed. Here both paragraphs get displayed on the page, but only the first paragraph appears when the page is printed.

The content of the page can also be changed using media queries.

2.2.3 Flexbox

Flexbox styling allows elements to be dynamically arranged to fit the screen. With a wide enough screen the div elements will all be in one row, but as the screen shrinks, they will move down into new rows.

```
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<style>
    .container {
        display: flex;
        flex-wrap: wrap;
    }
    .container > div {
        background-color: springgreen;
    }
</style>
<body>
    <div class="container">
        <div>Some stuff</div>
        <div>Some stuff</div>
        <div>Some stuff</div>
    </div>
</body>
```

2.2.4 Grid Styling

In the following example a grid system is being used for the items being displayed. the grid creates the first two column as 200px and the last column is automatically sized to fill the rest of the remaining screen.

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```
grid-column-gap: 20px;
gird-row-gap: 10px;
grid-template-columns: 200px 200px auto;
}

.grid-item {
   background-color: white;
}
</style>
</body>
</div class="grid-item">1</div>
</div class="grid-item">2</div>
</div class="grid-item">2</div>
</div class="grid-item">3</div>
</div class="grid-item">3</div>
</div>
</div>
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```

Bootstrap

3.1 Setup

The bootstrap stylesheet can be used directly stackpath.com by including the following reference in the <head> before any other listed stylesheets.

```
<link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/bootstrap/4.3.1/css/bootstrap.min.css"</pre>
```

Here is an alternative link to the bootstrap CSS file.

```
<link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/4.0.0/css/bootstrap.min.css" int</pre>
```

The charset and viewport meta tags are often required for proper bootstrap responsive behaviors, and should be included when using the bootstrap css.

The viewport line is a responsive meta tag that ensures proper rendering and touch zooming for mobile devices.

```
<!-- Required meta tags -->
     <meta charset="utf-8">
     <meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">
```

3.2 Columns

Bootstrap styles a page as 12 columns. In the following code, columns that are 3/12 columns wide are used.

```
</div>
</div>
</div>
</body>
```

Bootstrap can also style elements to take different amounts of the 12 total columns depending on the screen size. What is happening in the following code is that the columns being listed take 3/12 columns if the screen is large, as defined by the bootstrap CSS, and they take 6/12 columns if the screen is small.

```
<style>
    .row > div{
        padding: 20px;
        background-color: teal;
        border: 2px solid black;
    }
</style>
<body>
    <div class="container">
        <div class="row">
            <div class="col-lg-3 col-sm-6">
                This is a section.
            </div>
            <div class="col-lg-3 col-sm-6">
                This is a section.
            </div>
            <div class="col-lg-3 col-sm-6">
                This is a section.
            </div>
        </div>
    </div>
</body>
```

Sass

4.1 Intro

Sass can be installed with npm.

```
npm install -g sass
```

Sass is an extension to CSS that adds functionality, including the addition of variables. Sass converts its code into CSS that can then be used by the browser. Below is an example of setting a Sass variable \$color.

```
$color: blue;

ul {
    font-size:14px;
    color: $color;
}
```

A Sass file is then converted to CSS by running Sass and specifying the output.

```
sass variables.scss variables.css
```

CSS files can be automatically recompiled if any changes are detected using Sass. Here the variables.scss file is being monitored for changes and recompiled to variables.css whenever changes are detected.

```
sass --watch variables.scss:variables.css
```

Github pages actually will automatically compile scss files into css files when a scss file is comitted to a github repository.

4.2 Nesting

Styles can be applied to divisions or items within other divisions when using sass. In the below example, the code within a sass file will style only those paragraphs that are nested within a div blue and only the ul wihin div as green. Anything outside of a div will not be styled by this scss code.

```
div {
   font-size: 18px;

p {
    color: blue;
```

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```
ul {
    color: green;
}
```

4.3 Inheritance

Sass uses inheritance to create generic governing rules that can then be extended by other elements. This can be useful for similar elements that share a number of properties but then have a couple of different properties.

In the following example, a %message group is created with a number of different styles, then .success extends %message and thereby inherits all of the included styles but then also has a green background.

```
%message {
    font-family: sans-serif;
    font-size: 18px;
    font-weight: bold;
    border: 1px solid black;
    padding: 20px;
    margin: 20px;
}

.success {
    @extend %message;
    background-color: green;
}
```

Flask

5.1 Intro

There seems to be a nice full flask tutorial here where a blog is created.

Installation can be done through anaconda.

```
conda install -c conda-forge flask
```

Flask code is generally stored within a file called application.py. Below is a general framework of the flask code that resides in this file.

Line 3 is creating a new flask web application.

Flask applications are designed around routes. On line 5, what is happening is that the code is referring to navigation to the / or home directory. The two lines below this route give the code of what to do when a user navigates to that home directory.

```
from flask import Flask
app = Flask(__name__)

@app.route("/")
def index():
    return "Hello, world!"
```

Flask then needs to be told how to import it, by setting the FLASK_APP environment variable. If the above code is put into a file called application.py, just export that filename. It may be useful if application.py is always going to be the main filename to just add this code to the bashrc.

```
export FLASK_APP=application.py
```

If flask is run in debug mode, an app will update anytime a change is made to the underlying code.

```
export FLASK_ENV=development
```

The web application can then be run by running a flask webserver.

```
flask run
```

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5.2 Routes

Instead of just using the main route, new routes can be created that when navigated to can have different functionality. In the following example, the route can be accessed at this address: http://127.0.0.1:5000/david

```
@app.route("/david")
def david():
    return "Hello, David"
```

The route can take the URL addess information dynamically and use it as a variable. In the following example, the text in the URL is being read in as a string, and the value is being assigned to the name variable.

```
@app.route("/<string:name>")
def hello(name):
   name = name.capitalize()
   return "Hello, {}!".format(name)
```

HTML code can also be included in the python code and can be returned and interpreted as HTML. In the following example the text that is getting returned and displayed is being styled as header text on the webpage.

```
@app.route("/<string:name>")
def hello(name):
   name = name.capitalize()
   return "<h1>Hello, {}!</h1>".format(name)
```

5.3 Templates

Instead of embedding HTML within values that get returned by python code, HTML files themselves can be served by the python code. Flask can look for HTML files and it will look in a subdirectory of the main directory called templates. So in the following example if there is an HTML file called index.html within a subdirectory called templates, that html file gets served up by the following code.

```
@app.route("/")
def index():
    return render_template("index.html")
```

Variables can also be passed from python to the html files that exist within the templates directory in order to dynamically alter the HTML content.

In the following code, the headline variable is defined in python and then getting passed to HTML, and it is common that the varible names are just kept the same, though in the return function the second headline refers to the python variable and the first to the html variable just as is python methods.

```
@app.route("/")
def index():
    headline = "Hello thar"
    return render_template("index.html", headline=headline)
```

Now this headline variable can be used in HTML like so. The language being used is Jinja code. This functionality can be helpful in using the very same HTML code but allow it to perform differently.

```
<body>
<h1>{{ headline }}</h1>
</body>
```

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5.4 Jinja

Jinja brings programming logic gates to HTML. The code must be put into an html file within the templates directory and used by flask as shown in the above templates section.

For loops work pretty similar to python as well. In the following code names is a python list getting passed from application.py, and the list items are rendered as a ul in HTML.

Routes can be referred to by the name of a method within them from HTML. If the following code exists within the application.py file:

```
@app.route("/more")
def more():
    return render_template("more.html")
```

The above method more() just refers to another html file, and this html file can be used from html like so, where the jinja function url_for finds the route that contains the more() method, and then uses that URL as the link in the href.

```
<a href="{{ url_for('more') }}">See more...</a>
```

5.4.1 Inheritance

Inheritance is useful when html code is being repetitively used, as it allows a general layout to be defined and they reused and slightly modified.

The first part of the example below is how the general layout html can be setup in a file called layout.html. In the following code a block is being defined, and the content it uses is whatever is being passed under the variable name heading.

```
<h1>{% block heading %}{% endblock %}</h1>
```

A separate html file can then inherit all of the html content within layout.html, but then add something unique to the black defined above.

```
{%extends "layout.html" %}

{% block heading %}
   This is the header
{% endblock %}
```

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5.4.2 Forms

Forms or fields allow input to be captures from the user and then used to perform other functions. In the below example, the action is being set as the route that contains teh hello method, and the manner in which the information is sent is post. The post method is different from other methods like the get method where information is submitted and a result is returned; may need to read more on this. The get method will place the text from the form into the URL. The information being input into the <input> field is named "name" and this varible can be then passed to Application.py.

Within Application.py the text that was input into the form is then used to send to hello.html. here the name variable gets set by using the form.get method to retrieve the information, and then the hello.html template is rendered by passing the name variable tot by using the form.get method to retrieve the information, and then the hello.html template is rendered by passing the name variable to it.

```
from flask import Flask, render_template, request

@app.route("/hello", methods=["POST"])
def hello():
    name = request.form.get("name")
    return render_template("hello.html", name=name)
```

hello.html can then use the name variable to display the text entered into the form.

```
Hello, {{ name }}!
```

5.4.3 Sessions

Sessions allow data to be stored, and as long as the webserver is still running (or the data can be saved), and furthermore allows each user to have data that is specific to their individual session. First flask_session needs to be installed.

```
pip install flask-session
```

Here in application.py a notes list is being created to store data that is being input. The route uses both the get and post methods to get data from the user. And the form sends the note variable.

The notes list is created using session["notes"] as this will create a list that is stored in a cookie and is specific to the user.

```
from flask import Flask, render_template, request, session
from flask_session import Session

app = Flask(__name__)

app.config["SESSION_PERMANENT"] = False
app.config["SESSION_TYPE"] = "filesystem"
Session(app)

@app.route("/", methods=["GET", "POST"])
def index():
    if session.get("notes") is None:
        session["notes"] = []
```

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```
if request.method == "POST":
   note = request.form.get("note")
   notes.append(note)

return render_template("index.html", notes=notes)
```

Then in index.html the form is created to send the data to the application.py file. And since notes is an ever growing list, the list is rendered in the html.

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Hackernews

6.1 Setup

First make sure create react app is installed. The project here follows this tutorial. There are lots of other good looking tutorials like The React Handbook, and others at gitconnected.

npm i -g create-react-app

Then create a new directory for the app.

create-react-app hacker-news-clone

Change into the newly created directory and then create a file to handle environmental variables.

cd hacker-news-clone
touch .env

Within the .env file refer to the src folder. This will allow dependencies to be more easily imported. Add the following to the .env file.

NODE_PATH=src

Make a components directory within src to hold all of the components for the project.

mkdir -p src/components/App

Make a services directory within **src** to add additional functionality to the app and reference other site APIs.

mkdir src/services

Make a styles directory within src to add styles that can be used across the app.

mkdir -p src/styles

Make a store directory within src to add styles that will add Redux function.

mkdir -p src/store

Make a utils directory within src for shared functions across the app.

mkdir -p src/utils

Now move App.js to components just to keep the components bundled together. Rename App.js to index so that it can be imported from the mycomponents app.

```
mv src/App*js src/components/App/
mv src/components/App/App.js src/components/App/index.js
mv src/logo.svg src/components/App/
```

Delete the css files because style components will be used instead.

```
rm src/*css
```

Remove the imports of the css files in src/components/App/index.js.

```
import './App.css';
```

And remove the import within src/index.js.

```
import './index.css';
```

Now create some styles to be used throughout the app.

```
mkdir src/styles
touch src/styles/globals.js
touch src/styles/palette.js
```

The js files above contain routine code that can be copied from the author's github page. Alternatively, here is the code for global.js.

```
import { injectGlobal } from 'styled-components';
import { colorsDark } from './palette';
const setGlobalStyles = () =>
  injectGlobal`
    * {
      box-sizing: border-box;
    }
    html, body {
      font-family: Lato, Helvetica-Neue, Helvetica, Arial, sans-serif;
     width: 100vw;
      overflow-x: hidden;
      margin: 0;
      padding: 0;
      min-height: 100vh;
      background-color: ${colorsDark.background};
    }
    ul {
      list-style: none;
      padding: 0;
    }
    a {
      text-decoration: none;
      &:visited {
        color: inherit;
    }
export default setGlobalStyles;
```

And here is the code for palette.js.

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```
export const colorsDark = {
  background: '#272727',
  backgroundSecondary: '#393C3E',
  text: '#bfbebe',
  textSecondary: '#848886',
  border: '#272727',
};

export const colorsLight = {
  background: '#EAEAEA',
  backgroundSecondary: '#F8F8F8',
  text: '#848886',
  textSecondary: '#aaaaaa',
  border: '#EAEAEA',
};
```