Lecture 10: SQL, HTML, and CSS

Intro to Data Science for Public Policy
Spring 2017

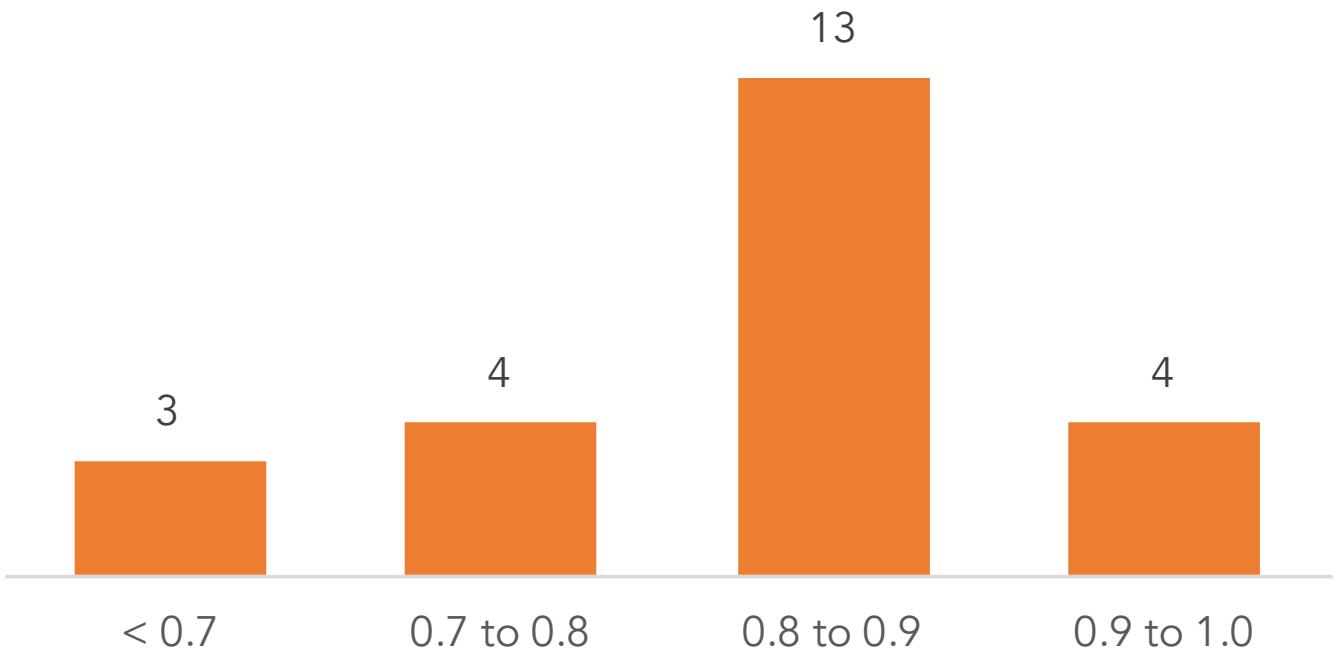
Jeff Chen + Dan Hammer

Roadmap

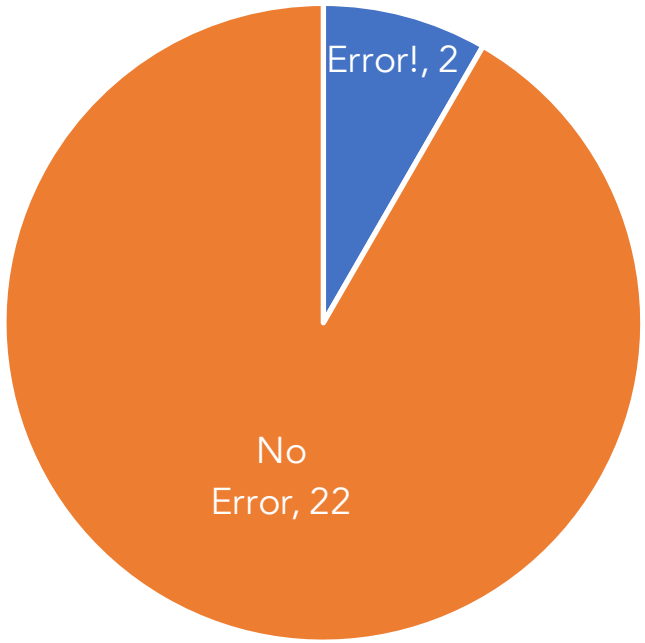
- Homeworks #3 + #4
- SQL + how data is really stored
- <break/>
- HTML, CSS + web pages

Homework #3

Mean F1s



Smoothness of code



Homework #3

What made for a good model?

y(f1) = f(terms in optimal equations)

Coef	Value
(Intercept) – Base perf	0.758
randomForest	0.057
accel	0.053
avg50	0.029
type	0.011
user_acc_y.G.	0.010
avg100	0.009
k	0.000
min50	-0.041
knn	-0.254

- Explicitly including accel and avg100 variables
- Random Forests did better
- Decision trees (“type”) were about average
- KNNs yielded less accurate results

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In most data courses, we assume that data is available in CSVs, which then can be manipulated in R/Python using data frames

CSV

```
id,id2,Field 1,Field 2,Field 3,Field 4,Field 5,Field 6
1,1,0.21,0.89,0.04,0.75,0.85,0.66
2,1,0.5,0.56,0.52,0.21,0.89,0.45
3,1,0.43,0.56,0.48,0.36,0.33,0.59
4,2,0.52,0.43,0.3,0.1,0.43,0.22
5,2,0.23,0.37,0.15,0.87,0.6
6,2,0.96,1,0.67,0.93,0.26,
7,2,0.32,0.21,0.82,0.15,0.
8,2,0.9,0.76,0.24,0.65,0.61,0.81
9,2,0.37,0.83,0.28,0.7,0.43,0.21
10,2,0.65,0.87,0.03,0.88,0.01,0.07
11,3,0.26,0.44,0.47,0.53,0.01,0.83
12,3,0.5,0.47,0.77,0.48,0.58,0.52
```

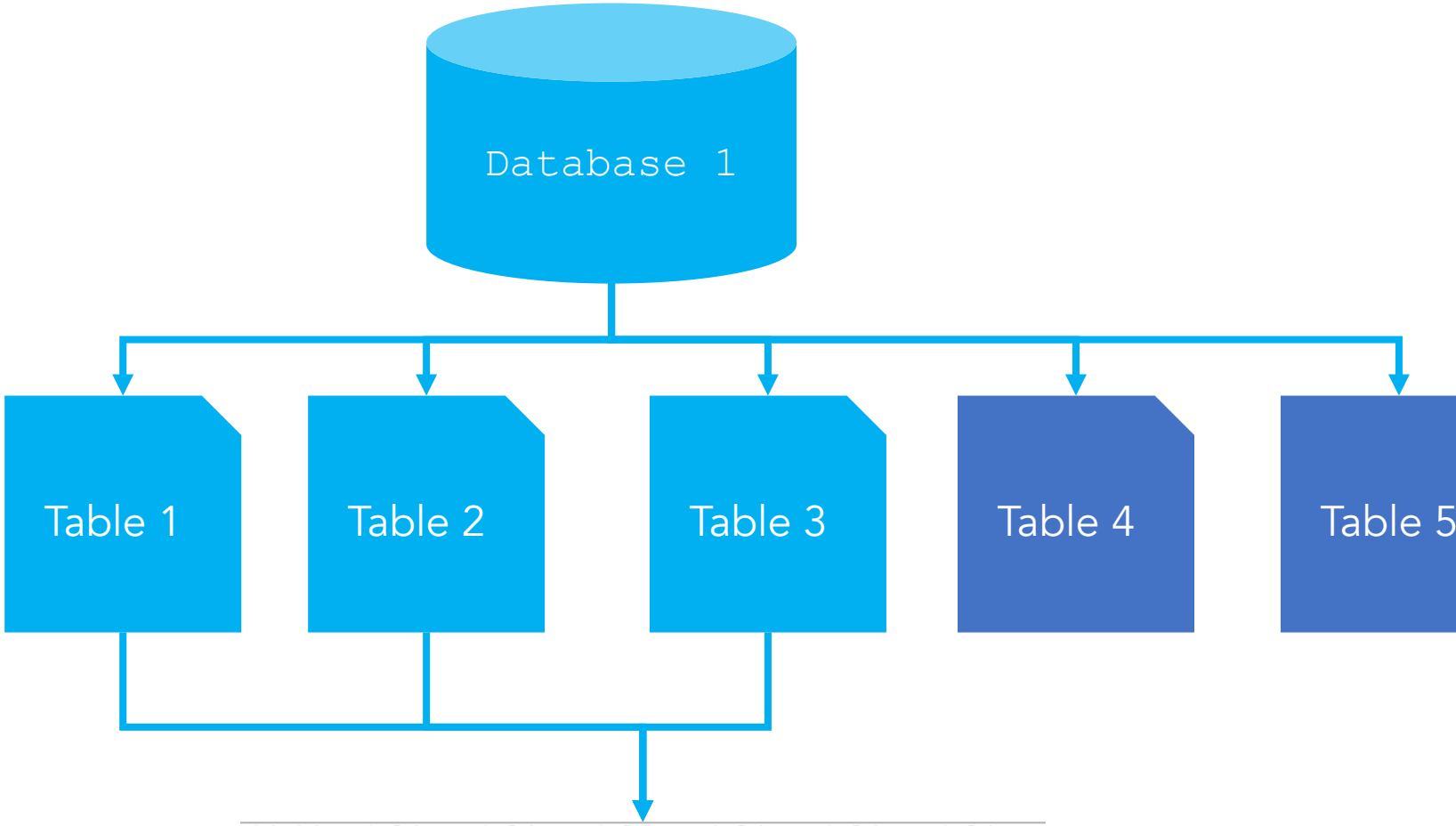
Data Frame

id	Field 1	Field 2	Field 3	Field 4
1	0.48864085	0.00366587	0.58474211	0.51938667
2	0.33876445	0.09769656	0.84166132	0.1030575
3	0.0278745	0.36673626	0.11164558	0.04700535
4	0.1763168	0.82417691	0.19927198	0.4810012
5	0.56424078	0.79502561	0.23455883	0.34132441
6	0.42115835	0.45674212	0.62794548	0.59208026
7	0.6158106	0.89786742	0.86752992	0.39943343
8	0.23344419	0.66442167	0.22883527	0.87996448
9	0.42737816	0.82922444	0.9400483	0.59218112
10	0.85595686	0.41012588	0.64374624	0.09399705
11	0.49237375	0.02784349	0.88235821	0.72331339
12	0.61511126	0.10467654	0.89272309	0.24495752

The CSV might be a custom view from a database.

Views are the results of a pre-defined query.

What if you need to build your own view?




```
id,id2,Field 1,Field 2,Field 3,Field 4,Field 5,Field 6
1,1,0.21,0.89,0.04,0.75,0.85,0.66
2,1,0.5,0.56,0.52,0.21,0.89,0.45
3,1,0.43,0.56,0.48,0.36,0.33,0.59
4,2,0.52,0.43,0.3,0.1,0.43,0.22
5,2,0.23,0.37,0.15,0.87,0.6,0.87
6,2,0.96,1,0.67,0.93,0.26,0.53
7,2,0.32,0.21,0.82,0.15,0.41,0.13
8,2,0.9,0.76,0.24,0.65,0.61,0.81
9,2,0.37,0.83,0.28,0.7,0.43,0.21
10,2,0.65,0.87,0.03,0.88,0.01,0.07
11,3,0.26,0.44,0.47,0.53,0.01,0.83
12,3,0.5,0.47,0.77,0.48,0.58,0.52
```

Option #1

Download the whole database and export individual tables.

Not recommended as databases can be huge

Option #2

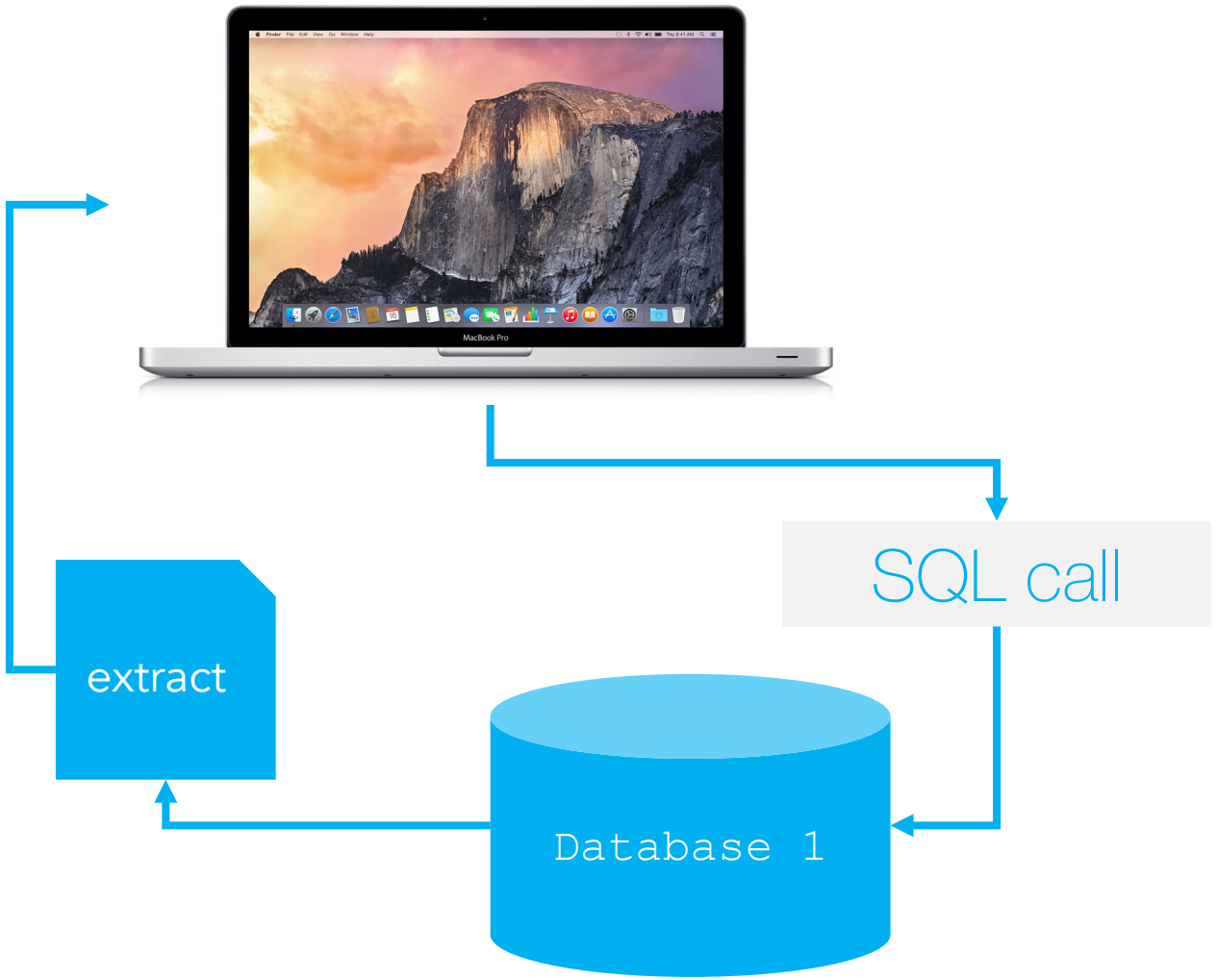
Beg the database administrator (the gate keeper) to build specific views and extract tables for you.

Too many custom modifications means your work will be largely dependent on one person to give you data.

Option #3

Learn to query databases using **Structured Query Language** or **SQL**

Structured Query Language (See-Qwell or S. Q. L.) is used to interact with and manage relational databases.



What's a Relational Database

Relational databases organizes information into one or more tables such that each table is an entity type, a columns contain attributes that describe the entity and may be used to link tables

ssn	firstname	lastname
123-45-6789	john	Sobrenome
912-34-5678	Jorge	Apellido
891-23-4567	Gianni	Cognome

state	desc
1	New York
2	Virginia
3	Washington

id	ssn	state	income
1	123-45-6789	1	$100,000
2	912-34-5678	1	$30,000
3	891-23-4567	3	$75,000

SQL CRUD Operations

CRUD Operations are four basic operations that SQL can help undertake in a database

- Create – **INSERT** statement
- Read – **SELECT** statement
- Update – **UPDATE** statement
- Delete – **DELETE** statement

SQL CRUD Operations

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Data scientists and analysts largely work in this step but may occasionally work with all four

SQL A few examples

```
SELECT *
FROM tbl
```

R equivalent

```
> tbl
```

"Retrieve all fields (*) and records FROM table named tbl"

SQL A few examples

```
SELECT income
FROM tbl
```

R equivalent

```
> tbl[, c("income")]
```

"Retrieve 'income' field and records FROM table named tbl"

SQL A few examples

```
SELECT income, state
FROM tbl
```

R equivalent

```
> tbl[, c("income","state")
```

"Retrieve 'income' and 'state' fields and records FROM table named tbl"

SQL A few examples

```
SELECT income, state
FROM tbl
LIMIT 10
```

R equivalent

```
> tbl[1:10, c("income","state")
```

"Retrieve first 10 records of 'income' and 'state' fields FROM table named tbl"

SQL A few examples

```
SELECT income, state
FROM tbl
WHERE region = 'Midwest'
LIMIT 10
```

R equivalent

```
> a <- tbl[tbl$region == "Midwest",
c("income","state")
> b <- a[1:10,]
```

"Retrieve first 10 records of 'income' and 'state' fields FROM table named tbl if region is in the 'Midwest' "

SQL How to use

- Usually, SQL statements would be executed via command line or an Interactive Development Environment (IDE) to interact with databases
- In R, SQL can only be used via the library *sqldf*, which operates on data frames.
  - Good way to get accustomed

<Code Time/>

US' and UK's Export and Financial Sanction Lists

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Why should we focus on websites in data science and public policy?

- While the main value of data science is the algorithmic outputs and understanding, websites and visualizations are used as "proxies of productivity" for non-technical audiences
- Fewer people on the business/strategy side understand how web projects work, but expect something to be done – regardless of how it works [recipe for disaster]

FEATURE

Why Are So Many IT Projects Failing?

A recent study reports that 50 percent of companies had an IT project fail in the last 12 months. Busine leaders who blame IT are missing the real project management issues.

By Sharon Florentine

Senior Writer, CIO | DEC 4, 2013 7:00 AM PT

FEATURE

Why Are So Many IT Projects Failing?

A recent study reports that 50 percent of companies had an IT project fail in the last 12 months. Busine leaders who blame IT are missing the real project management issues.

"We've moved away from an era of hardware and operating systems and it's all about applications. Nobody on the business side cares how solutions are delivered, they care about the value of the application."

By Sharon Florentine

Senior Writer, CIO | DEC 4, 2013 7:00 AM PT


https://www.healthcare.gov/
DHHS
U WANT
DOCTR?
YES
NO
ENCARTA'95

Point of Part 2 of Today

- Provide enough of an understanding of web technologies
- Develop a basic understanding of what goes into a website

What we see in the browser

Secure https://projects.fivethirtyeight.com/2017-nba-predictions/?ex_cid=rrpromo

FiveThirtyEight

UPDATED 8:24 PM EDT | APR 2, 2017

2016-17 NBA Predictions

Based on "CARM-Elo," a mix of team Elo ratings and our CARMELO player projections. Updated after every game.

More NBA: CARMELO projections | Every team's Elo history

Games on Apr. 2, 2017

Win probability | Point spread

Away team	BOS✓	CHA✓	DAL✓	MEM	UTA	ATL	CHI✓	DEN	IND	PHI	WSH	HOU
Pre-game win probabilities	67%	25%	25%	72%	23%	48%	27%	31%	26%	17%	15%	81%
	33%	75%	75%	28%	77%	52%	73%	69%	74%	83%	85%	19%
Home team	NY	OKC	MIL	LAL✓	SA✓	BKN LIVE	NO	MIA LIVE	CLE LIVE	TOR✓	GS LIVE	PHX

Team-by-team forecast

Forecast from Today

What the browser sees

Secure | view-source:https://projects.fivethirtyeight.com/2017-nba-predictions/?ex_cid=rrpromo

```
<!DOCTYPE html><html lang="en"><head><meta charset="UTF-8"><meta name="viewport" content="width=device-width, initial-scale=1.0, minimum-scale=1.0, maximum-scale=1.0, user-scalable=no"><meta http-equiv="X-UA-Compatible" content="IE=edge"><title>2016-17 NBA Predictions | FiveThirtyEight</title><meta name="google-site-verification" content="u4S1gkGQ7IEq1C4S6i3KdYNnPhtuqfsaSIeP0Qqin68"><meta property="og:type" content="article"><meta property="og:title" content="2016-17 NBA Predictions"><meta property="og:url" content="https://projects.fivethirtyeight.com/2017-nba-predictions/"><meta property="og:description" content="FiveThirtyEight's NBA Forecast projects the winner of each game and predicts each team's chances of advancing to the playoffs and winning the NBA finals."><meta property="article:published_time" content="2016-10-19T21:00:00-04:00"><meta property="article:modified_time" content="2017-04-02T20:24:09-04:00"><meta property="og:site_name" content="FiveThirtyEight"><meta property="og:locale" content="en_US"><meta property="og:image" content="https://espnfivethirtyeight.files.wordpress.com/2016/10/promo_4x3_nba_predictions.jpg"><meta name="twitter:image:src" content="https://espnfivethirtyeight.files.wordpress.com/2016/10/promo_4x3_nba_predictions.jpg"><meta name="twitter:card" content="summary_large_image"><meta property="article:publisher" content="https://www.facebook.com/FiveThirtyEight"><meta property="fb:app_id" content="797620670264818"><meta name="twitter:widgets:csp" content="on"><meta name="twitter:maxage" content="300"><meta name="twitter:site" content="FiveThirtyEight"><meta name="twitter:site:id" content="2303751216"><meta name="twitter:creator" content="jayboice"><meta name="twitter:creator:id" content="961152319"><link rel="search" type="application/opensearchdescription+xml" href="http://fivethirtyeight.com/osd.xml" title="FiveThirtyEight"><link rel="search" type="application/opensearchdescription+xml" href="https://wordpress.com/opensearch.xml" title="WordPress.com"><meta name="application-name" content="FiveThirtyEight"><meta name="description" content="FiveThirtyEight's NBA Forecast projects the winner of each game and predicts each team's chances of advancing to the playoffs and winning the NBA finals."><meta name="author" content="Jay Boice, Reuben Fischer-Baum and Nate Silver"><meta property="article:author" content="http://fivethirtyeight.com/contributors/jay-boice/"><meta name="news_keywords" content="NBA, NBA Predictions, NBA Picks, Basketball"><link rel="author" href="http://fivethirtyeight.com/contributors/jay-boice/"><link rel="shortlink" href=""><link rel="shortcut icon" type="image/x-icon" href="https://projects.fivethirtyeight.com/shared/favicon.ico"><link rel="icon" type="image/x-icon" href="https://projects.fivethirtyeight.com/shared/favicon.ico"><link rel="apple-touch-icon" href="https://projects.fivethirtyeight.com/shared/apple-touch-icon.png"><link rel="mask-icon" href="https://projects.fivethirtyeight.com/shared/safari-pinned-tab.svg" color="#ed713a"><link rel="canonical" href="https://projects.fivethirtyeight.com/2017-nba-predictions/"><script type="text/javascript">var trackingConfig = {
  postId: "131004",
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  fullUrl: "https://projects.fivethirtyeight.com/2017-nba-predictions/",
  shortUrl: "",
  twitterText: "FiveThirtyEight's 2016-17 NBA Predictions"
}</script><script async src="//www.google-analytics.com/analytics.js"></script><script>window.ga=window.ga||function(){(ga.q=ga.q||[]).push(arguments)};ga.l=+new Date;
ga('create', 'UA-60673836-2', 'auto');</script><link rel="stylesheet" href="//projects.fivethirtyeight.com/2017-nba-predictions/css/app.css?v=ff76f0d3c577e425928f0c3349cd1499"/></head><body><div id="ad"></div><header class="page-header vertical-sports"><div class="header-wrapper"><a href="http://fivethirtyeight.com" class="logo"><img width="163" height="20" alt="FiveThirtyEight"
```

What the browser sees

Secure | view-source:https://projects.fivethirtyeight.com/2017-nba-predictions/?ex_cid=rrpromo

```
<!DOCTYPE html><html lang="en"><head><meta charset="UTF-8"><meta name="viewport" content="width=device-width, initial-scale=1.0, minimum-scale=1.0, maximum-scale=1.0, user-scalable=no"><meta http-equiv="X-UA-Compatible" content="IE=edge"><title>2016-17 NBA Predictions | FiveThirtyEight</title><meta name="google-site-verification" content="u4S1gkGQ7IEq1C4S6i3KdYNnPhtuqfsaSIeP0Qqin68"><meta property="og:type" content="article"><meta property="og:title" content="2016-17 NBA Predictions"><meta property="og:url" content="https://projects.fivethirtyeight.com/2017-nba-predictions/"><meta property="og:description" content="FiveThirtyEight's NBA Forecast projects the winner of each game and predicts each team's chances of advancing to the playoffs and winning the NBA finals."><meta property="article:published_time" content="2016-10-19T21:00:00-04:00"><meta property="article:modified_time" content="2017-04-02T20:24:09-04:00"><meta property="og:site_name" content="FiveThirtyEight"><meta property="og:locale" content="en_US"><meta property="og:image" content="https://espnfivethirtyeight.files.wordpress.com/2016/10/promo_4x3_nba_predictions.jpg"><meta name="twitter:image:src" content="https://espnfivethirtyeight.files.wordpress.com/2016/10/promo_4x3_nba_predictions.jpg"><meta name="twitter:card" content="summary_large_image"><meta property="article:publisher" content="https://www.facebook.com/FiveThirtyEight"><meta property="fb:app_id" content="797620670264818"><meta name="twitter:widgets:csp" content="on"><meta name="twitter:maxage" content="300"><meta name="twitter:site" content="FiveThirtyEight"><meta name="twitter:site:id" content="2303751216"><meta name="twitter:creator" content="jayboice"><meta name="twitter:creator:id" content="961152319"><link rel="search" type="application/opensearchdescription+xml" href="http://fivethirtyeight.com/osd.xml" title="FiveThirtyEight"><link rel="search" type="application/opensearchdescription+xml" href="https://wordpress.com/opensearch.xml" title="WordPress.com"><meta name="application-name" content="FiveThirtyEight"><meta name="description" content="FiveThirtyEight's NBA Forecast projects the winner of each game and predicts each team's chances of advancing to the playoffs and winning the NBA finals."><meta name="author" content="Jay Boice, Reuben Fischer-Baum and Nate Silver"><meta property="article:author" content="http://fivethirtyeight.com/contributors/jay-boice/" name="keywords" content="NBA, NBA Predictions, NBA Picks, Basketball"><link rel="author" href="http://fivethirtyeight.com/contributors/jay-boice/"><link rel="shortlink" href=""><link rel="shortcut icon" type="image/x-icon" href="https://projects.fivethirtyeight.com/shared/favicon.ico"><link rel="icon" type="image/x-icon" href="https://projects.fivethirtyeight.com/shared/favicon.ico"><link rel="apple-touch-icon" href="https://projects.fivethirtyeight.com/shared/apple-touch-icon.png"><link rel="mask-icon" href="https://projects.fivethirtyeight.com/shared/safari-pinned-tab.svg" color="#e71a3a"><link rel="canonical" href="https://projects.fivethirtyeight.com/2017-nba-predictions/"><script type="text/javascript">var trackingConfig = {
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ga('create', 'UA-60673836-2', 'auto');</script><link rel="stylesheet" href="//projects.fivethirtyeight.com/2017-nba-predictions/css/app.css?v=ff76f0d3c577e425928f0c3349cd1499"/></head><body><div id="ad"></div><header class="page-header vertical-sports"><div class="header-wrapper"><a href="http://fivethirtyeight.com" class="logo"><img width="163" height="20" alt="FiveThirtyEight"
```

Most websites use

Hypertext Markup Language (HTML)

to codify the structure and contents of a web page.

HTML

```
<html>
    <body>
      <h1> Hello World!</h1>
    </body>
</html>
```

HTML

```
<html>
    <body>
      <h1> Hello World!</h1>
    </body>
</html>
```

- text in <> are “tags”
- Each tag represents a type of content
  - <html> = root element of structure
  - <body> = contains visible content
  - <h1> = large heading

HTML

```
<h1> Hello World!</h1>
```

<tags> tend to come in pairs to indicate where the element starts and ends.

HTML

```
<!DOCTYPE html>
<head>
      <style> </style>
      <title> Site Name </title>
</head>

<body>

      <h1> Large heading </h1>
      <h2> Smaller heading </h2>
      <p> A text paragraph. </p>


</body>

</html>
```

HTML: Tags Galore

Basics
<body>
<html>
<title>

Breaks
<hr>

Links
<a>
<nav>

Sections

<section>

Text
<h1>
<h2>
<h3>
<h4>
<h5>
<p>

Images
<img>
<picture>
<canvas>

Frames
<iframe>

Lists

Tables
<table>
<td>
<th>
<tr>

Styles
<style>
<head>

Programming
<script>

There are many types of tags that can be creatively strung together to structure of webpage.

HTML

But how about the styles?
(who wants a website from the 90's?)

What the browser sees

Secure | view-source:https://projects.fivethirtyeight.com/2017-nba-predictions/?ex_cid=rrpromo

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<!DOCTYPE html><html lang="en"><head><meta charset="UTF-8"><meta name="viewport" content="width=device-width, initial-scale=1.0, minimum-scale=1.0, maximum-scale=1.0, user-scalable=no"><meta http-equiv="X-UA-Compatible" content="IE=edge"><title>2016-17 NBA Predictions | FiveThirtyEight</title><meta name="google-site-verification" content="u4S1gkGQ7IEq1C4S6i3KdYNnPhtuqfsaSIeP0Qqin68"><meta property="og:type" content="article"><meta property="og:title" content="2016-17 NBA Predictions"><meta property="og:url" content="https://projects.fivethirtyeight.com/2017-nba-predictions/"><meta property="og:description" content="FiveThirtyEight's NBA Forecast projects the winner of each game and predicts each team's chances of advancing to the playoffs and winning the NBA finals."><meta property="article:published_time" content="2016-10-19T21:00:00-04:00"><meta property="article:modified_time" content="2017-04-02T20:24:09-04:00"><meta property="og:site_name" content="FiveThirtyEight"><meta property="og:locale" content="en_US"><meta property="og:image" content="https://espnfivethirtyeight.files.wordpress.com/2016/10/promo_4x3_nba_predictions.jpg"><meta name="twitter:image:src" content="https://espnfivethirtyeight.files.wordpress.com/2016/10/promo_4x3_nba_predictions.jpg"><meta name="twitter:card" content="summary_large_image"><meta property="article:publisher" content="https://www.facebook.com/FiveThirtyEight"><meta property="fb:app_id" content="797620670264818"><meta name="twitter:widgets:csp" content="on"><meta name="twitter:maxage" content="300"><meta name="twitter:site" content="FiveThirtyEight"><meta name="twitter:site:id" content="2303751216"><meta name="twitter:creator" content="jayboice"><meta name="twitter:creator:id" content="961152319"><link rel="search" type="application/opensearchdescription+xml" href="http://fivethirtyeight.com/osd.xml" title="FiveThirtyEight"><link rel="search" type="application/opensearchdescription+xml" href="https://wordpress.com/opensearch.xml" title="WordPress.com"><meta name="application-name" content="FiveThirtyEight"><meta name="description" content="FiveThirtyEight's NBA Forecast projects the winner of each game and predicts each team's chances of advancing to the playoffs and winning the NBA finals."><meta name="author" content="Jay Boice, Reuben Fischer-Baum and Nate Silver"><meta property="article:author" content="http://fivethirtyeight.com/contributors/jay-boice/"><meta name="keywords" content="NBA, NBA Predictions, NBA Picks, Basketball"><link rel="author" href="http://fivethirtyeight.com/contributors/jay-boice/"><link rel="shortlink" href=""><link rel="shortcut icon" type="image/x-icon" href="https://projects.fivethirtyeight.com/shared/favicon.ico"><link rel="canonical" href="https://projects.fivethirtyeight.com/2017-nba-predictions/"><script type="text/javascript">var trackingConfig = {
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ga('create', 'UA-60673836-2', 'auto');</script><link rel="stylesheet" href="//projects.fivethirtyeight.com/2017-nba-predictions/css/app.css?v=ff76f0d3c577e425928f0c3349cd1499"/></head><body><div id="ad"></div><header class="page-header vertical-sports"><div class="header-wrapper"><a href="http://fivethirtyeight.com" class="logo"><img width="163" height="20" alt="FiveThirtyEight"
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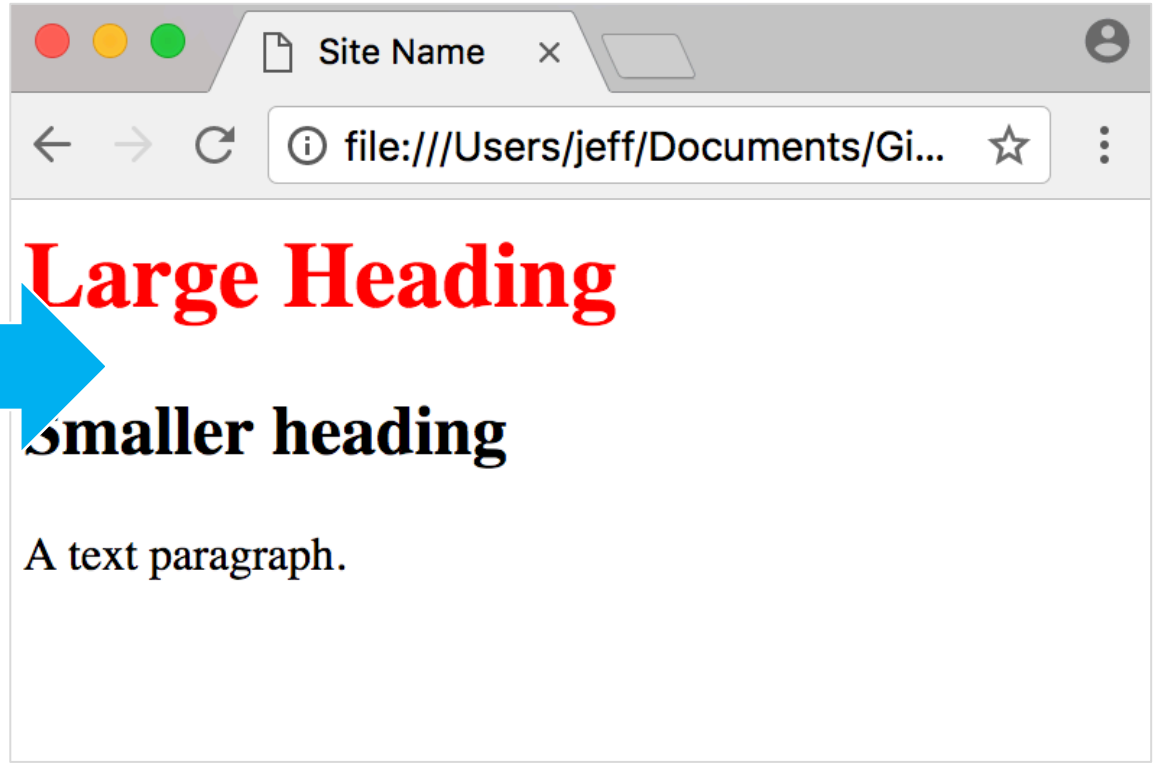
Most websites use
Cascading Style Sheets (CSS)
to format the HTML.

HTML + CSS

CSS can be included in the <style> tag to format all <h1> tags as red.

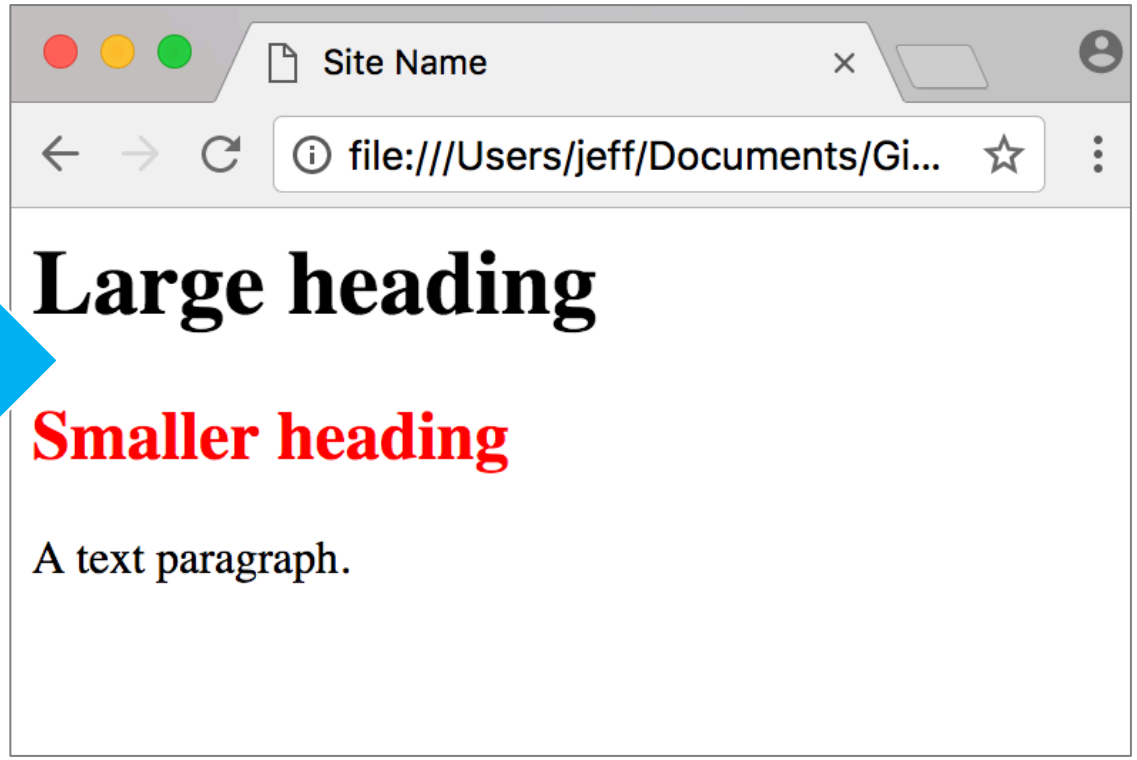
```
<!DOCTYPE html>
  <head>
        <style>
         h1{
            color: red;
         }
        </style>
        <title> Site Name </title>
  </head>
  <body>
        <h1> Large heading </h1>
        <h2> Smaller heading </h2>
        <p> A text paragraph. </p>
  </body>
</html>
```



HTML + CSS

CSS can be used to define a "class" of formats that can be applied anywhere the class is referenced.

```
<!DOCTYPE html>
  <head>
        <style>
         .col1{
            color: red;
         }
        </style>
        <title> Site Name </title>
  </head>
  <body>
        <h1 Large heading </h1>
        <h2 class="col1"> Smaller </h2>
        <p> A text paragraph. </p>
  </body>
</html>
```



HTML + CSS

CSS can be called into the HTML file from a .css file

index.html

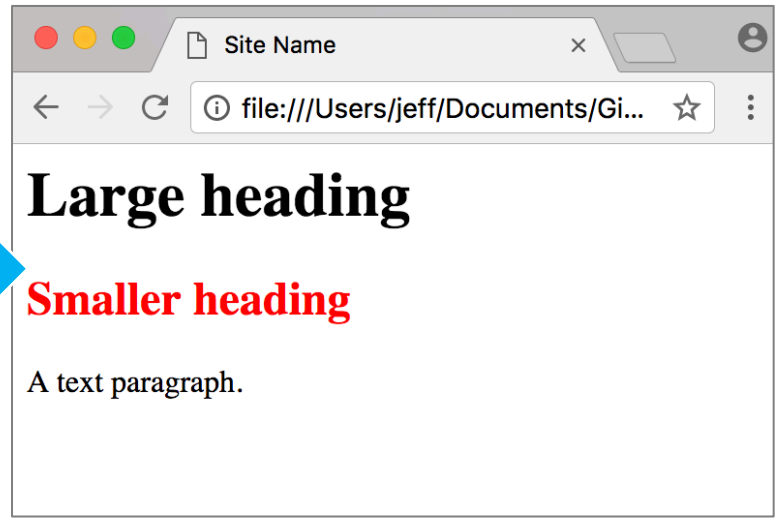
```
<!DOCTYPE html>
  <head>
        <link rel="stylesheet"
       href='css/custom.css'
       rel='stylesheet'
       type='text/css'>
        <title> Site Name </title>
  </head>

  <body>
        <h1 Large heading </h1>
        <h2 class="col1"> Smaller </h2>
        <p> A text paragraph. </p>
  </body>

</html>
```

custom.css

```
.col1{
    color: red;
}
```



A short aside

Secure | view-source:https://projects.fivethirtyeight.com/2017-nba-predictions/?ex_cid=rrpromo

```
<!DOCTYPE html><html lang="en"><head><meta charset="UTF-8"><meta name="viewport" content="width=device-width, initial-scale=1.0, minimum-scale=1.0, maximum-scale=1.0, user-scalable=no"><meta http-equiv="X-UA-Compatible" content="IE=edge"><title>2016-17 NBA Predictions | FiveThirtyEight</title><meta name="google-site-verification" content="u4S1gkGQ7IEq1C4S6i3KdYNnPhtuqfsaSIeP0Qqin68"><meta property="og:type" content="article"><meta property="og:title" content="2016-17 NBA Predictions"><meta property="og:url" content="https://projects.fivethirtyeight.com/2017-nba-predictions/"><meta property="og:description" content="FiveThirtyEight's NBA Forecast projects the winner of each game and predicts each team's chances of advancing to the playoffs and winning the NBA finals."><meta property="article:published_time" content="2016-10-19T21:00:00-04:00"><meta property="article:modified_time" content="2017-04-02T20:24:09-04:00"><meta property="og:site_name" content="FiveThirtyEight"><meta property="og:locale" content="en_US"><meta property="og:image" content="https://espnfivethirtyeight.files.wordpress.com/2016/10/promo_4x3_nba_predictions.jpg"><meta name="twitter:image:src" content="https://espnfivethirtyeight.files.wordpress.com/2016/10/promo_4x3_nba_predictions.jpg"><meta name="twitter:card" content="summary_large_image"><meta property="article:publisher" content="https://www.facebook.com/FiveThirtyEight"><meta property="fb:app_id" content="797620670264818"><meta name="twitter:widgets:csp" content="on"><meta name="twitter:maxage" content="300"><meta name="twitter:site" content="FiveThirtyEight"><meta name="twitter:site:id" content="2303751216"><meta name="twitter:creator" content="jayboice"><meta name="twitter:creator:id" content="961152319"><link rel="search" type="application/opensearchdescription+xml" href="http://fivethirtyeight.com/osd.xml" title="FiveThirtyEight"><link rel="search" type="application/opensearchdescription+xml" href="https://wordpress.com/opensearch.xml" title="WordPress.com"><meta name="application-name" content="FiveThirtyEight"><meta name="description" content="FiveThirtyEight's NBA Forecast projects the winner of each game and predicts each team's chances of advancing to the playoffs and winning the NBA finals."><meta name="author" content="Jay Boice, Reuben Fischer-Baum and Nate Silver"><meta property="article:author" content="http://fivethirtyeight.com/contributors/jay-boice/"><meta name="keywords" content="NBA, NBA Predictions, NBA Picks, Basketball"><link rel="author" href="http://fivethirtyeight.com/contributors/jay-boice/"><link rel="shortlink" href=""><link rel="shortcut icon" type="image/x-icon" href="https://projects.fivethirtyeight.com/shared/favicon.ico"><link rel="icon" type="image/x-icon" href="https://projects.fivethirtyeight.com/shared/favicon.ico"><link rel="apple-touch-icon" href="https://projects.fivethirtyeight.com/shared/apple-touch-icon.png"><link rel="mask-icon" href="https://projects.fivethirtyeight.com/shared/safari-pinned-tab.svg" color="#ed713a"><link rel="canonical" href="https://projects.fivethirtyeight.com/2017-nba-predictions/"><script type="text/javascript">var trackingConfig = {
  postId: "131004",
  section: "sports",
  primaryTag: "nba",
  pageName: "nba-forecast-2017",
  title: "2016-17 NBA Predictions",
  author: "Jay Boice, Reuben Fischer-Baum and Nate Silver",
  authorSlug: "boice_jay",
  fullUrl: "https://projects.fivethirtyeight.com/2017-nba-predictions/",
  shortUrl: "",
  twitterText: "FiveThirtyEight's 2016-17 NBA Predictions"
}</script><script async src="//www.google-analytics.com/analytics.js"></script><script>window.ga=window.ga||function(){(ga.q=ga.q||[]).push(arguments)};ga.l=+new Date;
ga('create', 'UA-60673836-2', 'auto');</script><link rel="stylesheet" href="//projects.fivethirtyeight.com/2017-nba-predictions/css/app.css?v=ff76f0d3c577e425928f0c3349cd1499"/></head><body><div id="ad"></div><header class="page-header vertical-sports"><div class="header-wrapper"><a href="http://fivethirtyeight.com" class="logo"><img width="163" height="20" alt="FiveThirtyEight"
```

Most websites use

JavaScript (JS)

to add interactivity and data handling capabilities.

A short aside

There are many libraries built on JavaScript (JS) including:

(Not covered in this course)

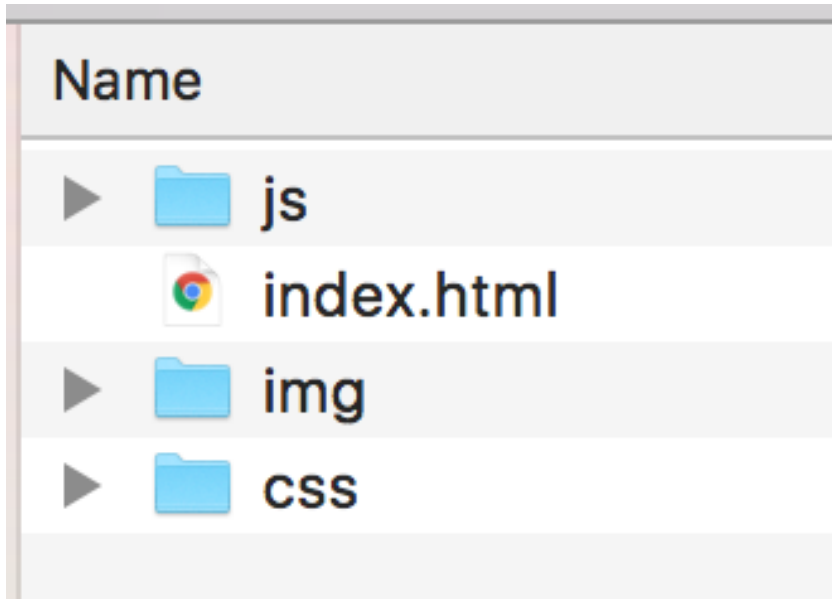
Data-Driven Documents

jQuery
write less, do more.

node JS

ANGULARJS

HTML + CSS



A typical static website has the following files and folders:

- **index.html** – is the html, links to all other files. Naming the file as index.html is out of convention and for functional purposes.
- **js** folder – contains all javascript files
- **img** folder – contains all image assets
- **css** folder – contains all style files

<Code Time/>