Software Engineering

Mo.Agamia

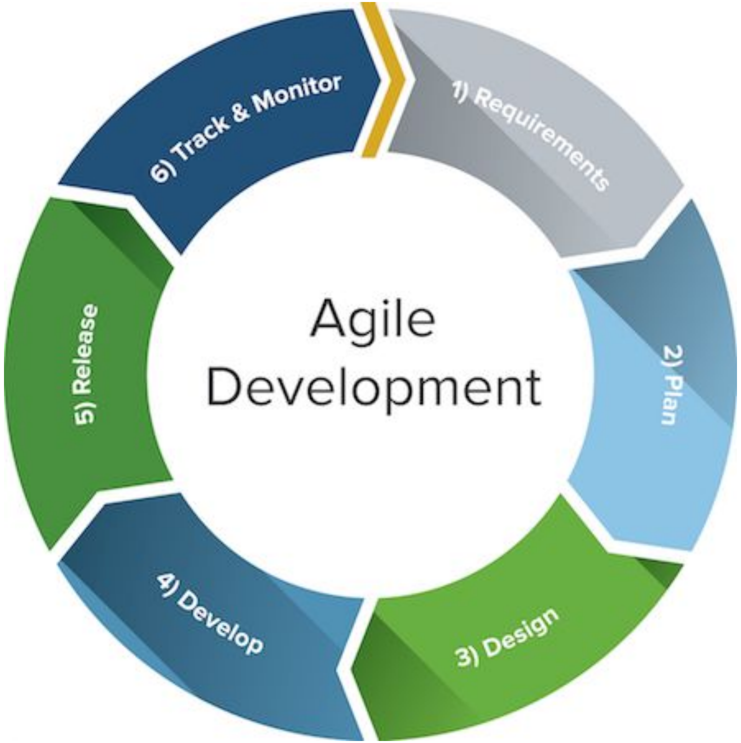
Plan

- Requirement Engineering
- Road Map
- HTML
- CSS
- JavaScript
- Angular
- Vue.js

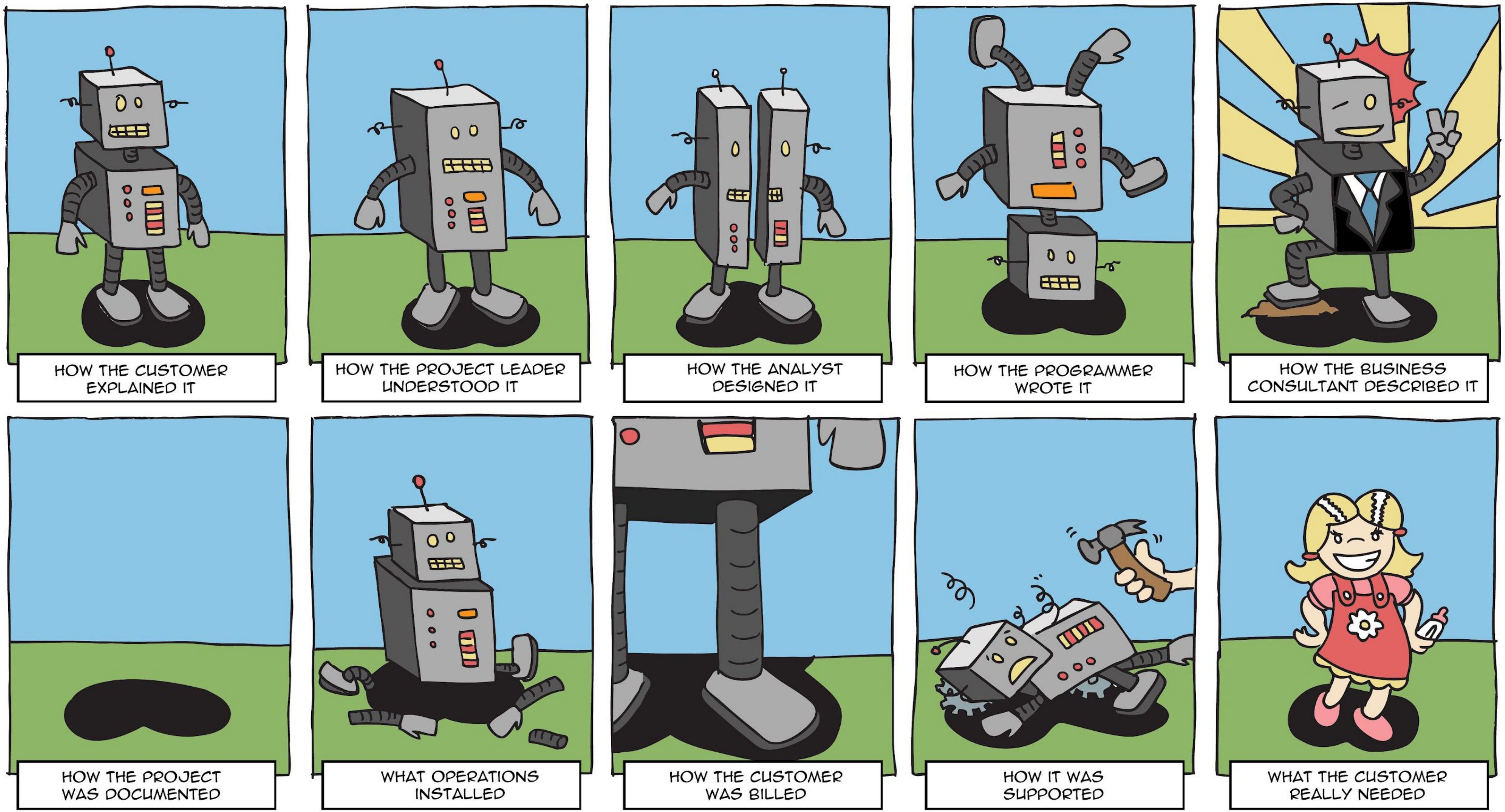
1

Requirement Engineering

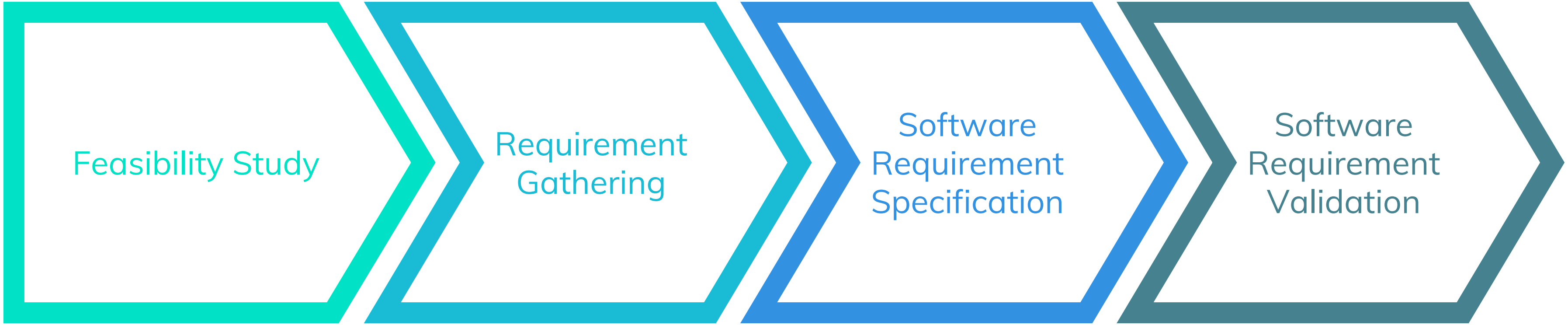
Agile Development Cycle



“Requirements engineering (RE) refers to the process of defining, documenting and maintaining requirements”


HOW THE CUSTOMER EXPLAINED IT
HOW THE PROJECT LEADER UNDERSTOOD IT
HOW THE ANALYST DESIGNED IT
HOW THE PROGRAMMER WROTE IT
HOW THE BUSINESS CONSULTANT DESCRIBED IT
HOW THE PROJECT WAS DOCUMENTED
WHAT OPERATIONS INSTALLED
HOW THE CUSTOMER WAS BILLED
HOW IT WAS SUPPORTED
WHAT THE CUSTOMER REALLY NEEDED

RE Process



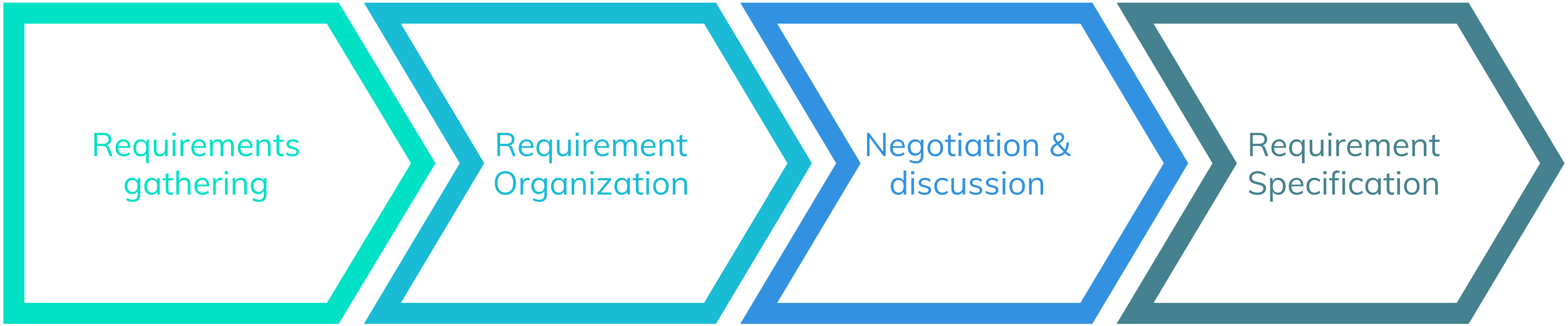
Feasibility Study

Requirement Gathering

Software Requirement Specification

Software Requirement Validation

Requirement Gathering (Elicitation)



Requirements gathering

Requirement Organization

Negotiation & discussion

Requirement Specification

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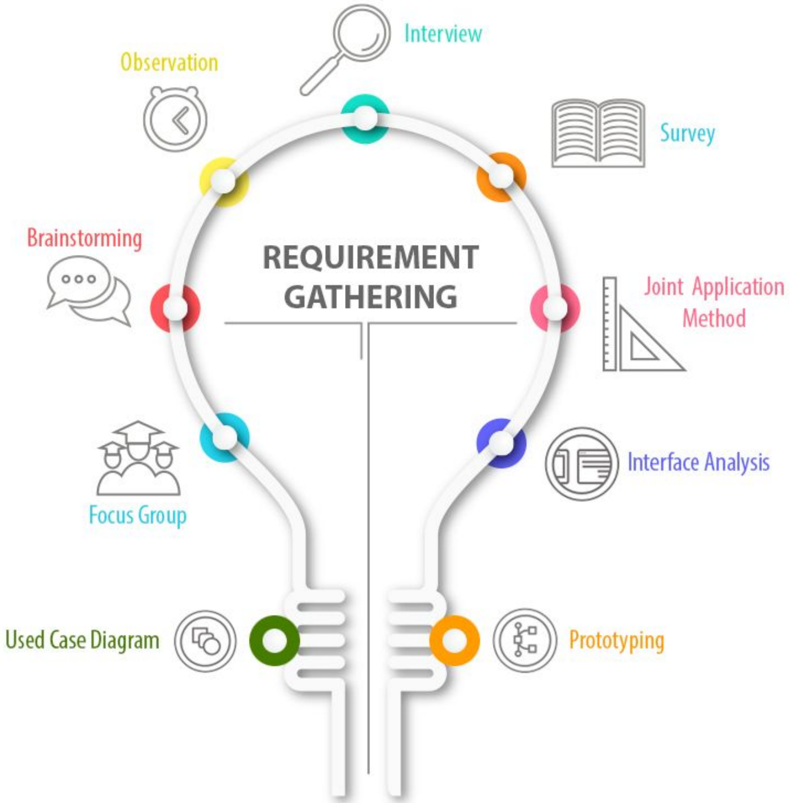
RG Techniques

- Interviews
- Surveys
- Questionnaires
- Task analysis
- Domain analysis
- Brainstorming
- Prototyping
- Observation



RG Characteristics

- Clear
- Correct
- Consistent
- Coherent
- Comprehensible
- Modifiable
- Verifiable
- Prioritized
- Unambiguous
- Traceable
- Credible source

Software Requirements

Functional, defines what a system is supposed to do.

Example:

- User should be able to mail any report to management.
- Users can be divided into groups and groups can be given separate rights.

Non-Functional, defines how a system is supposed to be.

- Security
- Logging
- Storage
- Configuration
- Performance
- Cost
- Interoperability
- Flexibility
- Disaster recovery
- Accessibility

Software Requirements

Must Have

Software cannot be said operational without them.

Should Have

Enhancing the functionality of software.

Could Have

Software can still properly function with these requirements.

Wish List

These requirements do not map to any objectives of software.

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Road Map

Web Developer Technologies

Browsers

Browsers are the interpreters of the web.

HTML

It provides the structure of a website so that web browsers know what to show.

CSS

It let's web designers change colors, fonts, animations, and transitions on the web. They make the web look good.

Programming Languages

Programming languages are ways to communicate to computers and tell them what to do.

- Javascript
- PHP
- Ruby

Frameworks

Frameworks are built to make building and working with programming languages easier.

- Node.js
- Ruby on Rails
- .NET

Databases

Databases are where all your data is stored.

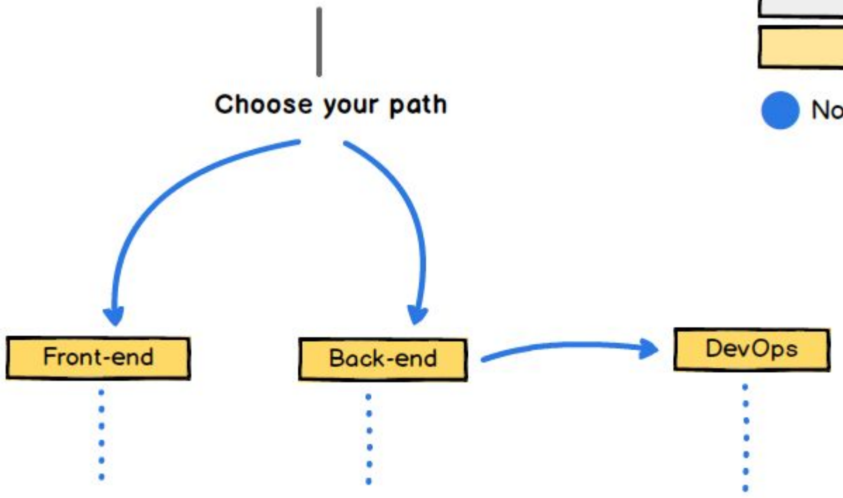
- MongoDB
- MySQL
- PostgreSQL

Web Developer in 2018

Required for any path

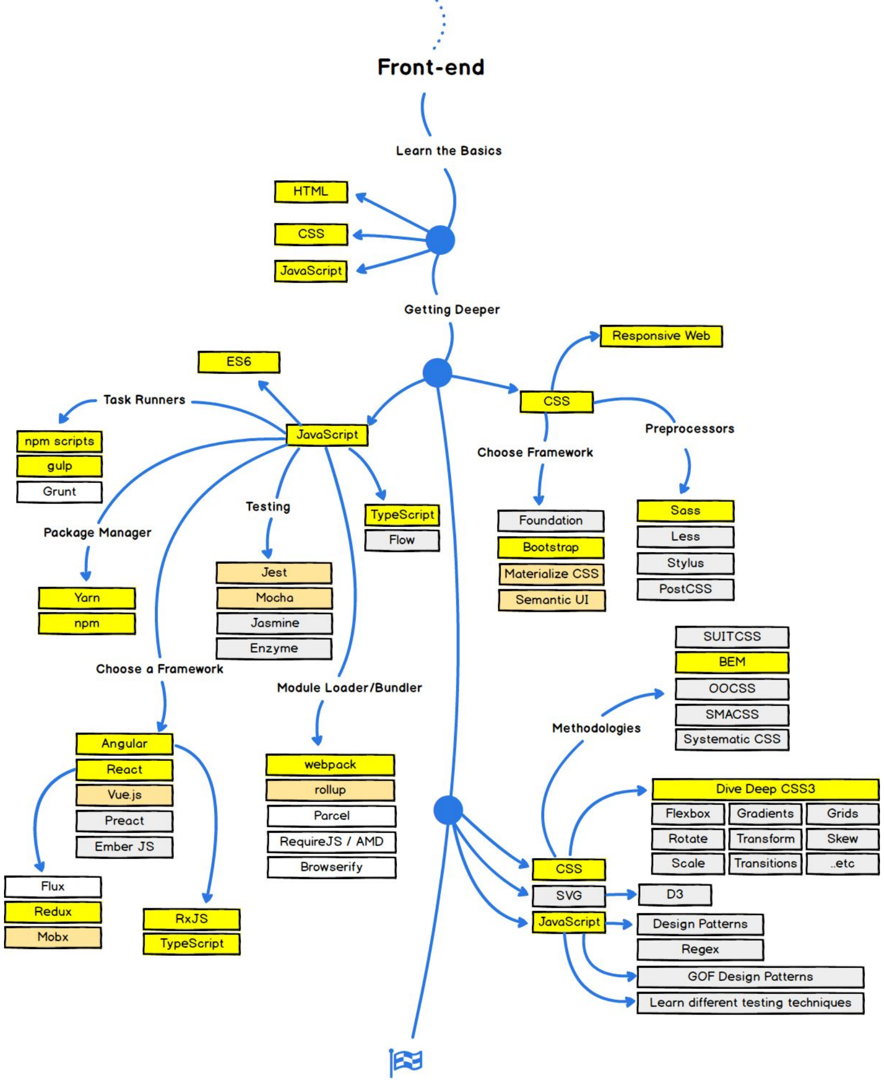
- Git - Version Control
- SSH
- HTTP/HTTPS and APIs
- Basic Terminal Usage
- Learn to Research
- Data Structures & Algorithms
- Character Encodings
- Design Patterns
- GitHub

Create a profile. Explore relevant open source projects. Make a habit of looking under the hood of projects you like. Create and contribute to open source projects.



Legends

- Personal Recommendation!
- Possibilities
- Pick any!
- ● Now build something



Front-end

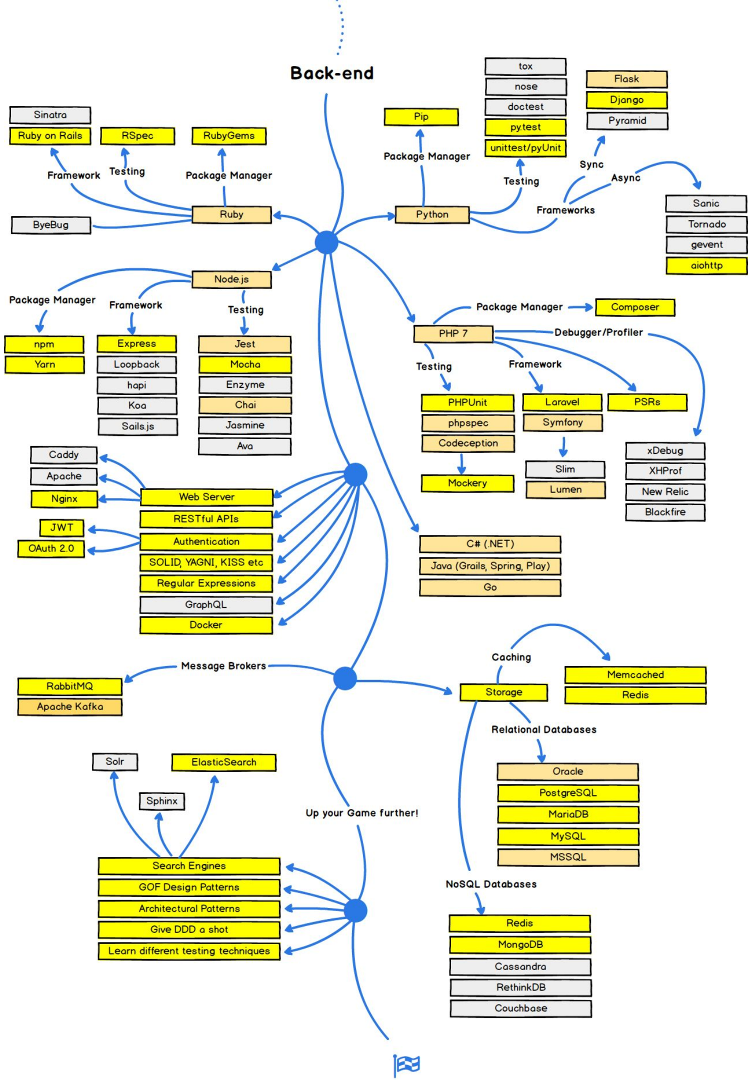
Learn the Basics

- HTML
- CSS
- JavaScript

Getting Deeper

- CSS
  - Responsive Web
  - Choose Framework
    - Foundation
    - Bootstrap
    - Materialize CSS
    - Semantic UI
  - Preprocessors
    - Sass
    - Less
    - Stylus
    - PostCSS
- JavaScript
  - ES6
  - Task Runners
    - npm scripts
    - gulp
    - Grunt
  - Package Manager
    - Yarn
    - npm
  - Testing
    - Jest
    - Mocha
    - Jasmine
    - Enzyme
  - TypeScript
  - Flow
  - Choose a Framework
    - Angular
    - React
    - Vue.js
    - Preact
    - Ember JS
    - Flux
    - Redux
    - Mobx
    - RxJS
    - TypeScript
  - Module Loader/Bundler
    - webpack
    - rollup
    - Parcel
    - RequireJS / AMD
    - Browserify

- CSS
  - Methodologies
    - SUITCSS
    - BEM
    - OOCSS
    - SMACSS
    - Systematic CSS
  - Dive Deep CSS3
    - Flexbox
    - Gradients
    - Grids
    - Rotate
    - Transform
    - Skew
    - Scale
    - Transitions
    - ..etc
- SVG
  - D3
- JavaScript
  - Design Patterns
  - Regex
  - GOF Design Patterns
  - Learn different testing techniques



Back-end

Ruby
Framework: Sinatra, Ruby on Rails
Testing: RSpec
Package Manager: RubyGems
ByeBug

Python
Package Manager: Pip
Testing: tox, nose, doctest, py.test, unittest/pyUnit
Frameworks
Sync: Flask, Django, Pyramid
Async: Sanic, Tornado, gevent, aiohttp

Node.js
Package Manager: npm, Yarn
Framework: Express, Loopback, hapi, Koa, Sails.js
Testing: Jest, Mocha, Enzyme, Chai, Jasmine, Ava

PHP 7
Package Manager: Composer
Debugger/Profiler: xDebug, XHProf, New Relic, Blackfire
Testing: PHPUnit, phpspec, Codeception, Mockery
Framework: Laravel, Symfony, Slim, Lumen
PSRs

C# (.NET)
Java (Grails, Spring, Play)
Go

Web Server: Caddy, Apache, Nginx
RESTful APIs
Authentication: JWT, OAuth 2.0
SOLID, YAGNI, KISS etc
Regular Expressions
GraphQL
Docker

Message Brokers: RabbitMQ, Apache Kafka

Storage
Caching: Memcached, Redis
Relational Databases: Oracle, PostgreSQL, MariaDB, MySQL, MSSQL
NoSQL Databases: Redis, MongoDB, Cassandra, RethinkDB, Couchbase

Up your Game further!
Search Engines: Solr, Sphinx, ElasticSearch
GOF Design Patterns
Architectural Patterns
Give DDD a shot
Learn different testing techniques

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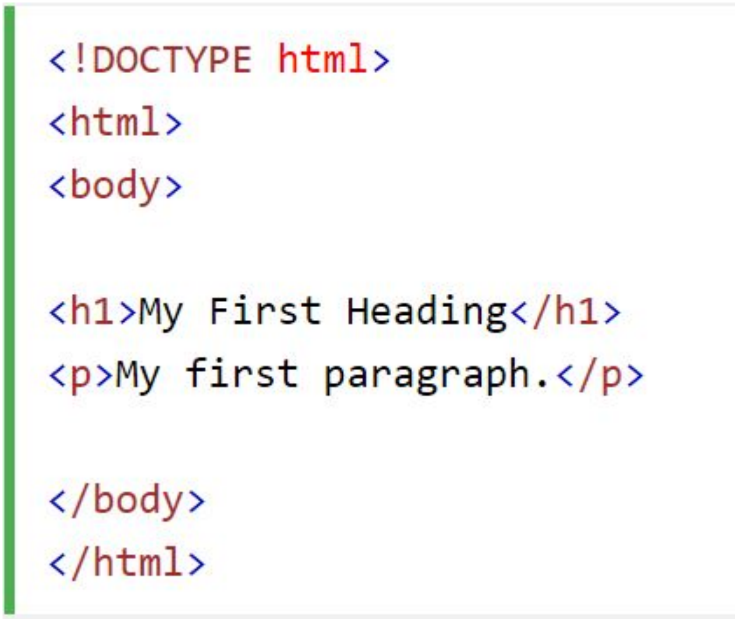
HTML

“HyperText Markup Language is a markup language. It provides the structure of a website so that web browsers know what to show.”

HTML Documents

- All HTML documents must start with a document type declaration: <!DOCTYPE html>.
- The HTML document itself begins with <html> and ends with </html>.
- The visible part of the HTML document is between <body> and </body>.



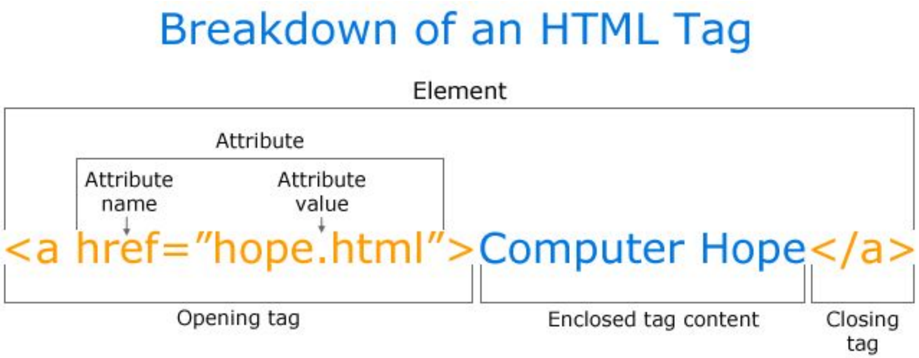
```html
<!DOCTYPE html>
<html>
<body>

<h1>My First Heading</h1>
<p>My first paragraph.</p>

</body>
</html>
```

HTML Documents

- An HTML element usually consists of a start tag and end tag, with the content inserted in between
- The HTML element is everything from the start tag to the end tag



Breakdown of an HTML Tag

Element

Attribute

Attribute name

Attribute value

<a href="hope.html">Computer Hope</a>

Opening tag

Enclosed tag content

Closing tag

HTML Basic Tags

Tag	***Description***
<!DOCTYPE>	Defines the document type
<html>	Defines an HTML document
<head>	Defines information about the document
<title>	Defines a title for the document
<body>	Defines the document's body
<h1> to <h6>	Defines HTML headings
<p>	Defines a paragraph
<br>	Inserts a single line break
<hr>	Defines a thematic change in the content
<!--...-->	Defines a comment

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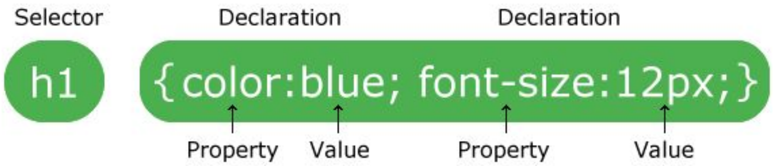
CSS

> “Cascading Style Sheet is used to style and layout web pages — for example, to alter the font, colour, size and spacing of your content, split it into multiple columns, or add animations and other decorative features.”

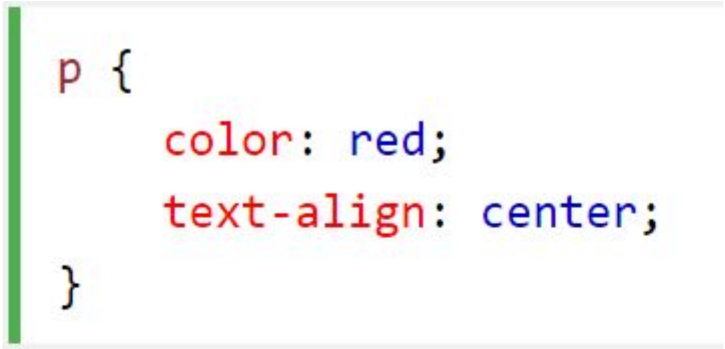
HTML Documents

A CSS rule-set consists of a selector and a declaration block.

- ◇ The selector points to the HTML element you want to style.
- ◇ The declaration block contains one or more declarations separated by semicolons.
- ◇ Each declaration includes a CSS property name and a value, separated by a colon.
- ◇ A CSS declaration always ends with a semicolon, and declaration blocks are surrounded by curly braces.

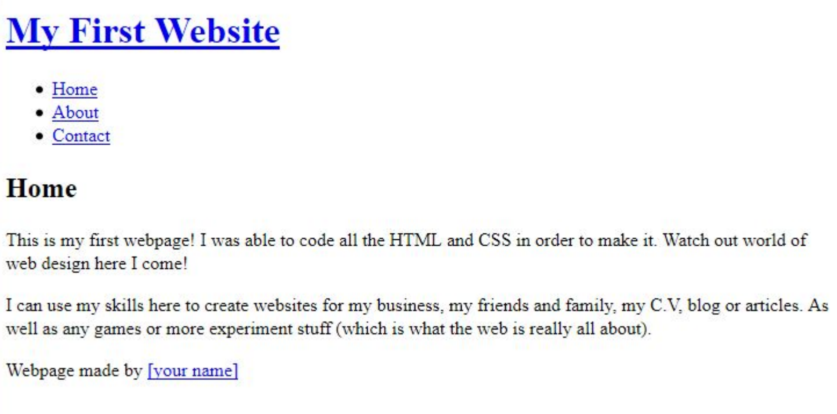


```
h1 {color:blue; font-size:12px;}
```



```
p {
    color: red;
    text-align: center;
}
```

HTML with/without CSS



My First Website

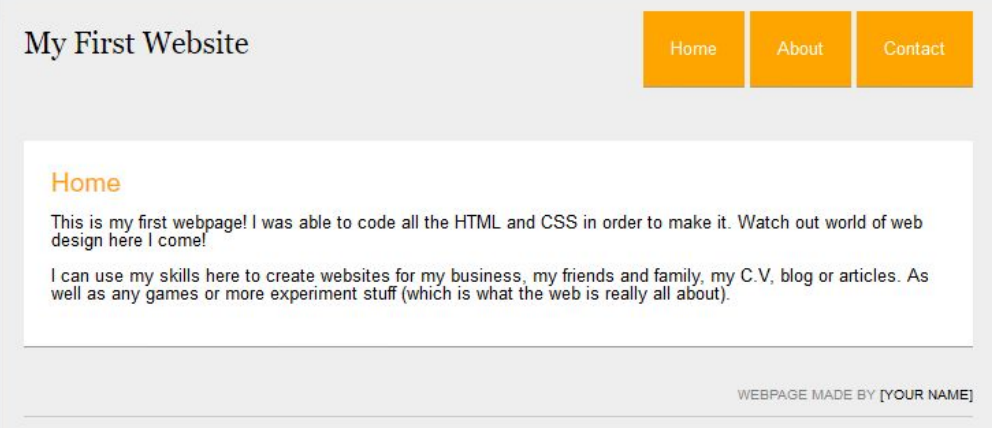
- Home
- About
- Contact

Home

This is my first webpage! I was able to code all the HTML and CSS in order to make it. Watch out world of web design here I come!

I can use my skills here to create websites for my business, my friends and family, my C.V, blog or articles. As well as any games or more experiment stuff (which is what the web is really all about).

Webpage made by [your name]



My First Website

Home

This is my first webpage! I was able to code all the HTML and CSS in order to make it. Watch out world of web design here I come!

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WEBPAGE MADE BY [YOUR NAME]

5 JavaScript

“JavaScript was initially created to make webpages alive.”

JavaScript

Can

- ◇ Add new HTML to the page, change the existing content, modify styles.
- ◇ React to user actions, run on mouse clicks, pointer movements, key presses.
- ◇ Send requests over the network to remote servers, download and upload files (so-called AJAX and COMET technologies).
- ◇ Get and set cookies, ask questions to the visitor, show messages.
- ◇ Remember the data on the client-side ("local storage").

Can Not

- ◇ JavaScript on a webpage may not read/write arbitrary files on the hard disk.
- ◇ Different tabs/windows generally do not know about each other.
- ◇ JavaScript can easily communicate over the net to the server where the current page came from. But its ability to receive data from other sites/domains is crippled.

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Angular

> “Angular is an open-source web framework for building web applications and apps in JavaScript, html, and TypeScript, which is a superset of JavaScript.”

Why Angular

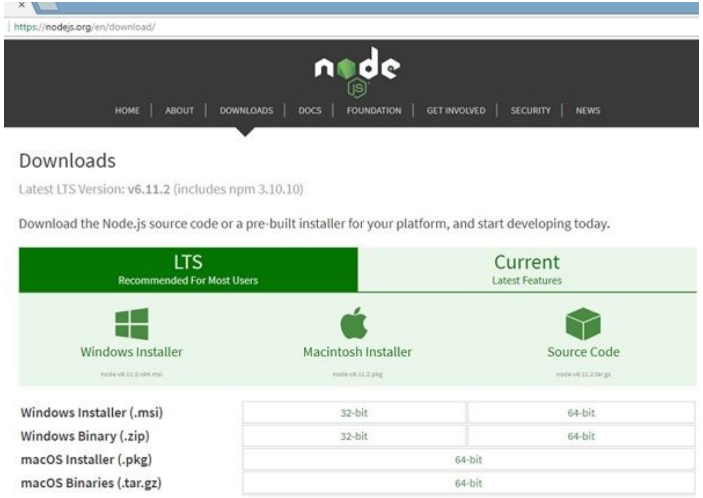
- Provides improved application design architecture.
- Promotes code reusability.
- Offers plug and play components.
- Consists of easy-to-remove components.
- Employs two-way data binding.
- Allows better teamwork.

Angular Setup

- ◇ Nodejs

  https://nodejs.org/en/download

- ◇ Npm



https://nodejs.org/en/download/

node js
HOME | ABOUT | DOWNLOADS | DOCS | FOUNDATION | GET INVOLVED | SECURITY | NEWS

Downloads

Latest LTS Version: **v6.11.2** (includes npm 3.10.10)

Download the Node.js source code or a pre-built installer for your platform, and start developing today.

Windows Installer (.msi)	32-bit	64-bit
Windows Binary (.zip)	32-bit	64-bit
macOS Installer (.pkg)	64-bit	
macOS Binaries (.tar.gz)	64-bit	

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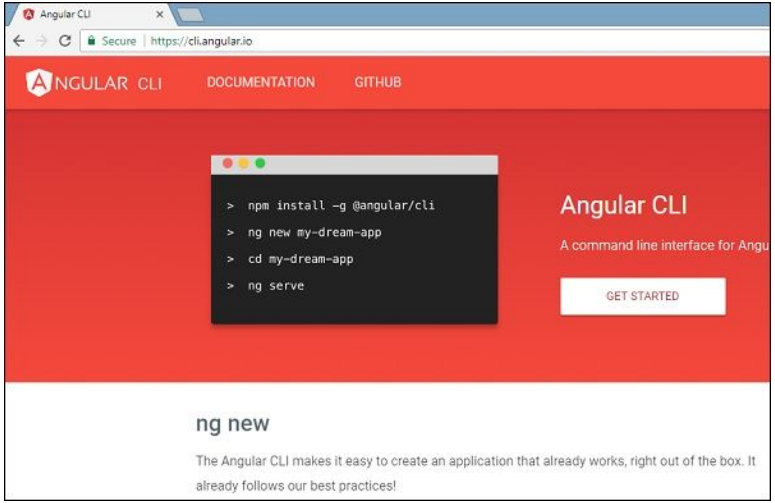
Angular Setup

- Angular CLI

  https://cli.angular.io/

- IDE for writing your code



```
> npm install -g @angular/cli
> ng new my-dream-app
> cd my-dream-app
> ng serve
```

Angular CLI

A command line interface for Angu

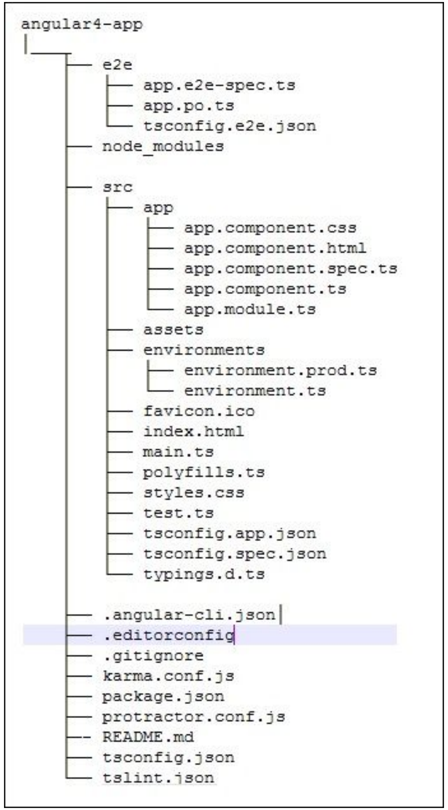
ng new

The Angular CLI makes it easy to create an application that already works, right out of the box. It already follows our best practices!

Folder Structure

<project name>

- e2e – end to end test folder. Mainly e2e is used for integration testing and helps ensure the application works fine.
- node_modules – The npm package installed is node_modules. You can open the folder and see the packages available.
- src – This folder is where we will work on the project.
  - app.component.html – The html code will be available in this file.
  - app.component.css – You can write your css structure over here.
  - app.module.ts – It has reference to different libraries, which are imported.



```
angular4-app
|
|_____
     ├── e2e
     │    ├── app.e2e-spec.ts
     │    ├── app.po.ts
     │    └── tsconfig.e2e.json
     ├── node_modules
     │
     ├── src
     │    ├── app
     │    │    ├── app.component.css
     │    │    ├── app.component.html
     │    │    ├── app.component.spec.ts
     │    │    ├── app.component.ts
     │    │    └── app.module.ts
     │    ├── assets
     │    ├── environments
     │    │    ├── environment.prod.ts
     │    │    └── environment.ts
     │    ├── favicon.ico
     │    ├── index.html
     │    ├── main.ts
     │    ├── polyfills.ts
     │    ├── styles.css
     │    ├── test.ts
     │    ├── tsconfig.app.json
     │    ├── tsconfig.spec.json
     │    └── typings.d.ts
     │
     ├── .angular-cli.json
     ├── .editorconfig
     ├── .gitignore
     ├── karma.conf.js
     ├── package.json
     ├── protractor.conf.js
     ├-- README.md
     ├── tsconfig.json
     └── tslint.json
```

Angular Components

Modules

A Module is a mechanism to group components, directives, pipes and services that are related, in such a way that can be combined with other modules to create an application.

Controllers

A Controller is an object that's responsible for managing other objects. What that means is, the Controller doesn't actually know the specifics about an object.

Services

A service is used to organize and share data and functions across the application, communicate data across the controllers in a consistent way and keep data across the lifetime of the angular app.

Directives

Directives are simply custom html attributes that AngularJS knows what to do with. The browser will ignore them and Angular will use them,

Angular

Expressions

AngularJS binds data to HTML using Expressions.

Data Binding

Data binding in AngularJS is the synchronization between the model and the view.

Controllers

AngularJS controllers control the data of AngularJS applications.

AngularJS controllers are regular JavaScript Objects.

Filters

Filters can be added in AngularJS to format data.

Service

In AngularJS, a service is a function, or object, that is available for, and limited to, your AngularJS application.

- $http
- $timeout

Events

AngularJS has its own HTML events directives.

- ng-click
- ng-copy
- ng-dblclick

Angular

Animation

AngularJS provides animated transitions, with help from CSS.

Routing

Navigates to different pages in your application

Select Boxes

AngularJS lets you create drop down lists based on items in an array, or an object.

Tables

AngularJS let's you displaying tables.

Bootstrap

- Bootstrap includes HTML and CSS based design templates for typography, forms, buttons, tables, navigation, models, image carousels and many other, as well as optional JavaScript plugins.
- Bootstrap also gives you the ability to easily create responsive designs.

ToDo

- https://www.w3schools.com/html/default.asp
- https://javascript.info/
- https://www.youtube.com/watch?v=oa9cnWTpqP8
- https://courses.edx.org/courses/course-v1:Microsoft+DEV220x+1T2018/course/
- https://getbootstrap.com/

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Vue.js

> “Vue.js is an open-source progressive JavaScript framework for building user interfaces. Vue is designed from the ground up to be incrementally adoptable.”

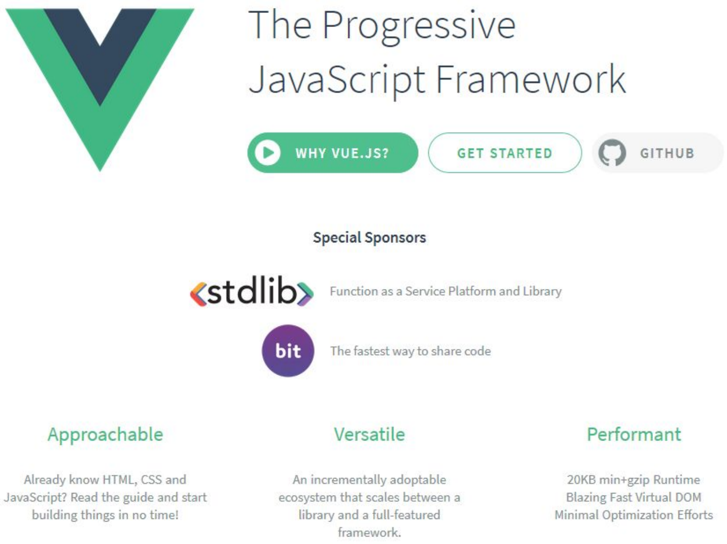
Why Vue.js

- ◇ Documentation
- ◇ Focuses on building user interfaces.
- ◇ Simplicity.
- ◇ Reactivity.
- ◇ Flexibility.
- ◇ Components.
- ◇ Copying competitors.

Vue.js Setup

◇ Vue.js documentation

https://vuejs.org/v2/guide/installation.html



The Progressive JavaScript Framework

Special Sponsors

<stdlib> Function as a Service Platform and Library

bit The fastest way to share code

Approachable

Already know HTML, CSS and JavaScript? Read the guide and start building things in no time!

Versatile

An incrementally adoptable ecosystem that scales between a library and a full-featured framework.

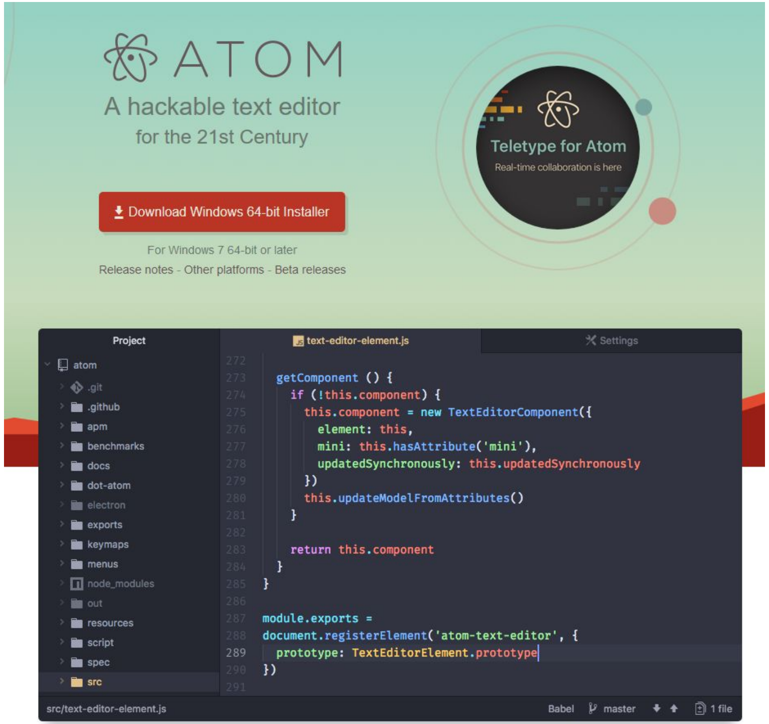
Performant

20KB min+gzip Runtime
Blazing Fast Virtual DOM
Minimal Optimization Efforts

Vue.js Setup

- Text editor

  https://atom.io/



ATOM

A hackable text editor for the 21st Century

Download Windows 64-bit Installer

For Windows 7 64-bit or later

Release notes - Other platforms - Beta releases

Teletype for Atom

Real-time collaboration is here

```

  getComponent () {
    if (!this.component) {
      this.component = new TextEditorComponent({
        element: this,
        mini: this.hasAttribute('mini'),
        updatedSynchronously: this.updatedSynchronously
      })
      this.updateModelFromAttributes()
    }

    return this.component
  }
}

module.exports =
document.registerElement('atom-text-editor', {
  prototype: TextEditorElement.prototype
})

```

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Vue.js

Interpolations

- Text
- Raw HTML
- Attributes
- Using JavaScript Expressions

Directives

- Arguments
- Modifiers
- Shorthands

Computed Properties

- Computed Caching
- Methods
- Watched Property

Class and Style Bindings

- Object Syntax
- Array Syntax
- Binding Inline Styles

Conditional Rendering

- V-if
- v-else
- V-if-else
- v-show

Event Handling

- Listening to Events
- Method Event Handlers
- Event Modifiers
- Key Modifiers
- System Modifier Keys

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Vue.js

Form Input Bindings

- Basic Usage
- Value Bindings
- Modifiers

Components

They help you extend basic HTML elements to encapsulate reusable code.

Transitions & Animations

- Enter/Leave & List Transitions
- State Transitions

Filters

Vue.js allows you to define filters that can be used to apply common text formatting.

Bootstrap

- Bootstrap includes HTML and CSS based design templates for typography, forms, buttons, tables, navigation, models, image carousels and many other, as well as optional JavaScript plugins.
- Bootstrap also gives you the ability to easily create responsive designs.

ToDo

- https://www.w3schools.com/html/default.asp
- https://javascript.info/
- https://vuejs.org/v2/guide/
- https://www.youtube.com/watch?v=5LYrN_cAJoA&index=1&list=PL4cUxeGkcC9gQcYgjhBoeQH7wiAyZNrYa
- https://www.youtube.com/watch?v=r2sW2DgDtgQ&list=PLLkc_UP_4rbgwSfhZd9Cgyx6IJXSJ2UtG
- https://getbootstrap.com/
- https://www.youtube.com/watch?v=oa9cnWTpqP8
- https://courses.edx.org/courses/course-v1:Microsoft+DEV220x+1T2018/course/
- https://getbootstrap.com/

Thanks!

Any questions?

You can find me at:

- Github: https://github.com/MoAgamia/SE-Boot-Camp

References

- https://github.com/kamranahmedse/developer-roadmap
- https://www.w3schools.com/html/default.asp
- https://www.w3schools.com/css/default.asp
- https://www.w3schools.com/js/default.asp
- https://www.w3schools.com/html/default.asp
- https://javascript.info/
- https://www.youtube.com/watch?v=oa9cnWTpqP8
- https://courses.edx.org/courses/course-v1:Microsoft+DEV220x+1T2018/course/
- https://getbootstrap.com/