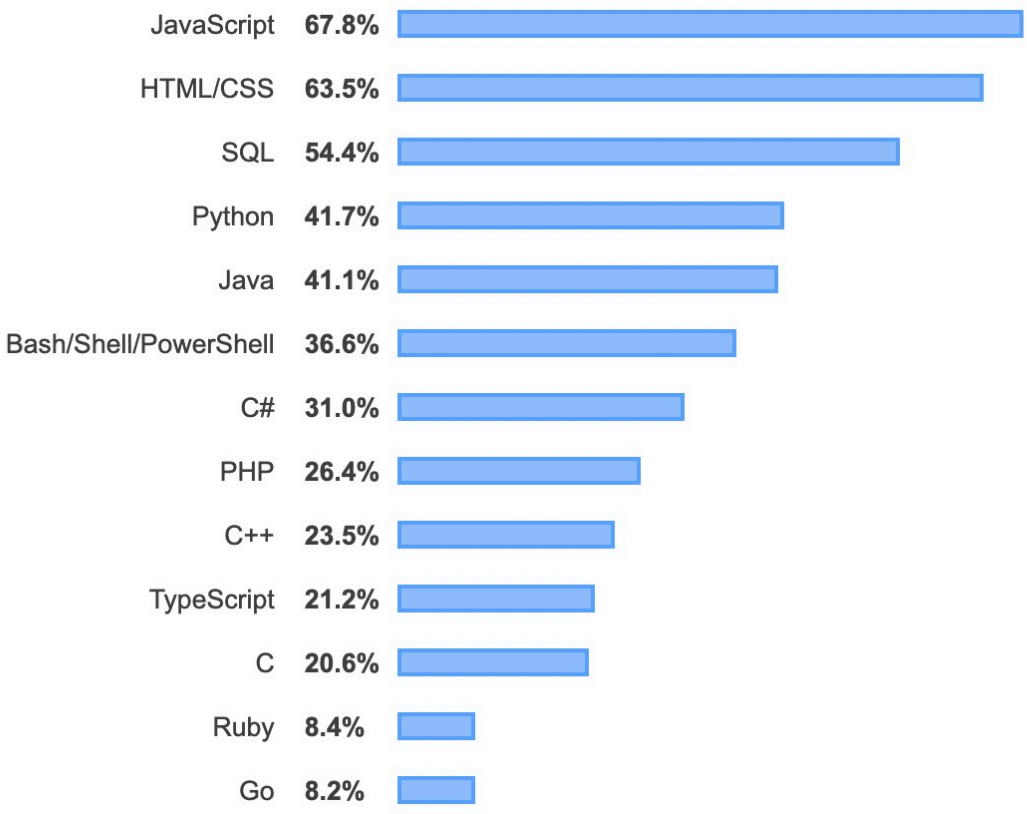
Backend

When I start programming the backend, 3 options came in to my mind, Java, Python and Node.js, I learned Java and Python in first year, and second. After research, Java and Python is not the best technology to develop the web backend.

| | Pors | Cons |
|---|---|---|
| Java | • "Write Once, Run Anywhere"<br>• multi-threaded web server<br>• Java libraries are open-source and supported and updated by experienced Java developers | • Backend only<br>• Developers cannot transfer a piece of Java code to the browser<br>• Deadlock |
| Python | • Simple and compact<br>• Backend and frontend<br>• A lot of available tools and farmeworks | • Not event-driven<br>• Slower due to single flow |
| Node.js | • Non-blocking, event-driven<br>• A lot of available tools and farmeworks<br>• Same language across both frontend and backend | • Ecosystem needs a lot of additional features and upgrades<br>• User VS code |

The Most popular Technologies(Data from StackOverflow 2019 survey)



After all the research and comparison, we choose use Node.js, which is the most popular technologies in 2019. Aside from the popularity, Node.js is known and loved for its “JavaScript Everywhere” approach, and JavaScript is one of the most important technologies in frontend, then Node.js is easy to combined with frontend. Secondly, Node.js has millions mature frameworks. Which means that we can save tones of time by using Node.js for our backend. More over, the Node.js is simple to learn, and still useful, which means that Node.js is a great choose for the small project, like what we have.

After all, we choose Node.js to develop our backend. First, Node.js is faster than Java and Python. Secondly, Node.js is good for both frontend and backend. Lastly, the Node.js is a challenge, because we will choose a new framework.

Framework: egg.js
Features:
- Provide capability to customizd framework base on Egg
- Highly extensible plugin mechanism
- Built-in cluster
- Based on Koa with high performance
- Stable core framework with high test coverage
- Progressive development

Database: MongoDB
- Document-based information storing and retrieving.
- Indexing and querying small documents from a big heap of files.
- Integrating with JS-based backend.

Frontend

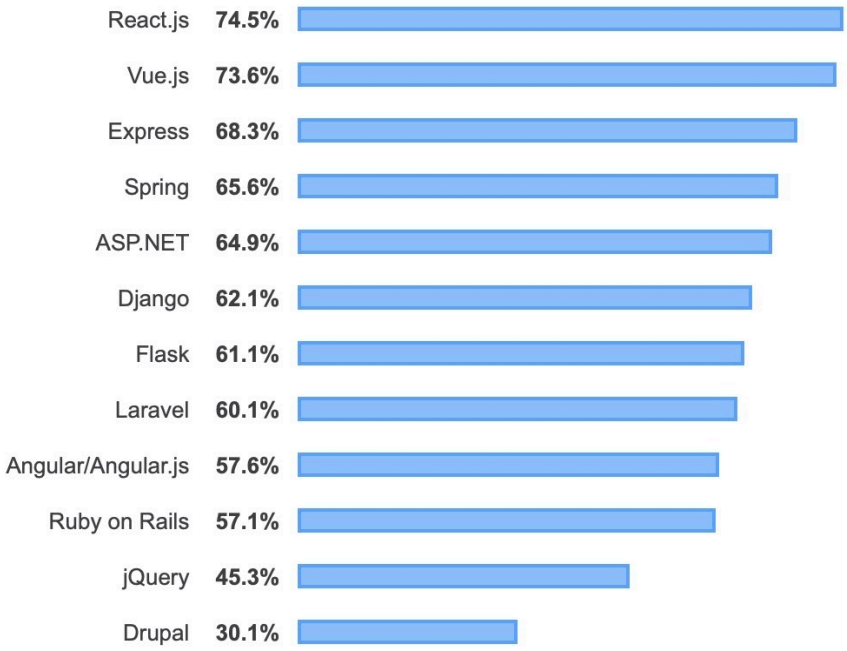
Following the developer roadmap, the front-end web development will be built through the use of HTML, CSS and JavaScript. Now the problem comes to how to judge and choose the JavaScript frameworks. By doing the primary research, we saw the interests mainly in Angular, React and Vue. We will make a comparison covering various aspects of these three frameworks to see how they suit our needs.

First, we are going to give an overview of the three frameworks.

| | Pors | Cons |
|---|---|---|
| React<br><br>React is developed as a component-based web framework with the one-way data flow. | • React introduced virtual DOM, *which gives better user experience in highly interactive web pages*<br><br>• The same React component can be used in Web, Mobile, Desktop and Back-end | • React is not an end-to-end framework |
| Angular<br><br>Angular is a TypeScript-based open-source web application framework<br><br>Angular is an end-to-end framework with the two-way data flow. | • Angular introduces TypeScript giving an advantage in large applications.<br><br>• Angular can be used to develop Web, Mobile and Desktop applications | • complex to get hands on<br><br>• heavy weight for small application |
| Vue | • Vue offers end-to-end application development like Angular and provides React like a Component-based framework<br><br>• Vue has a smaller bundle with faster loading time | • Not extensively in Mobile App development |

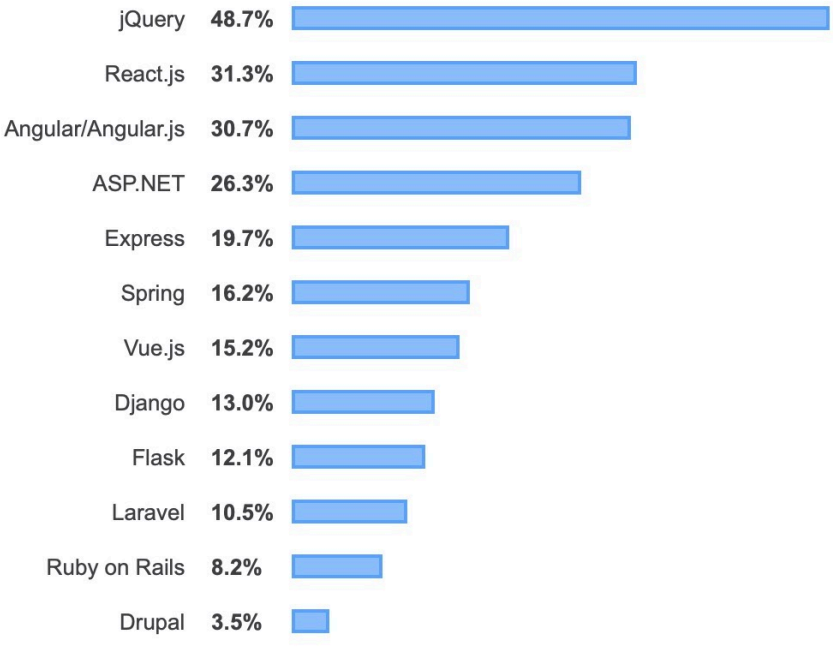
## Most Loved, Dreaded, and Wanted Web Frameworks

Loved | Dreaded | Wanted




## Web Frameworks

All Respondents | Professional Developers



Combine our analysis above, we want to choose React as the Javascript library we would use in the assignment. Aside from the pros and cons we ‘ve already had, we want to adapt the analysis to our application to illustrate why we make the choice. Firstly, React is the top web development tool hands down which is well covered in terms of design and debug tools. From the data given by StackOverflow 2019 survey, React has a rather high rank in terms of existing web development usage and developers preference. We infer that a popular library can be more mature and obtain more technical support. Moreover, we are more familiar with React than the other two libraries. React will be a relatively efficient and convenient library. Secondly, our checkout system is intended to be a small web application with basic features that React has enough functionalities to fulfill our needs. Angular is heavy in size and the rendering could be slow in such an application. Another nice feature of React is that it is component based. We can re-use the components which can make the system easier to develop and maintain. It can also help us keep a consistent look.