GLUB TRAINING MANAGER

**FRONT-END FRAMEWORKS RESEARCH**

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# VUE

# Introduction

VUE.js is an open-sourced front-end Javascript framework, created by Evan You, who worked on Angular.js for Google. Vue.js as a framework is mostly used for building single-page applications and user-interfaces. According to resources, in 2016, Vue.js was one of the most rapidly growing frameworks. (pixelpassion, 2020). Vue’s used by big companies such as Gitlab and Nintendo.

To research more about Vue.js, I have read the introduction (You, 2020) and have followed a 10-step tutorial on how to make a simple application using Vue.js (Vue Mastery, 2020). The tutorial talked about bindings, rendering, components, events, and V-models. Although nothing about the connectivity from front-end to back-end.

# Pros and Cons

## Pros

* Vue.js is adaptable due to its architecture and design that is like React and Angular.
* Vue.js has circumstantial documentation that fastens the learning curve and allows developers to develop with only basic knowledge of HTML and Javascript.
* Vue.js has reactive two-way data binding, which makes it easier to update related components.
* Vue.js mostly uses components (Single-file components), which are great for reusability, code readability, and unit-testing.
* Vue.js as a framework is tiny, which allows better performance and impacts UX.

## Cons

* Vue.js has a lack of support in large-scale projects.
* Vue.js has a Chinese background, so most elements and descriptions are in Chinese.
* Vue.js gives developers a risk for over-flexibility, giving different programming approaches.

# REACT

# Introduction

React (also known as React.js or ReactJS) is an open-source, front end, JavaScript library for building user interfaces or UI components. It is maintained by Facebook and a community of individual developers and companies. React can be used as a base in the development of single-page or mobile applications. However, React is only concerned with state management and rendering that state to the DOM, so creating React applications usually requires the use of additional libraries for routing. React Router is an example of such a library. And also large and complicated applications are required to make AJAX calls to fetch or mutate data. You can use any library you like with React such as Axios, JQuery AJAX or the browser built-in window fetch. (Wikipedia, 2021)

# Ease of Learning

Both Angular and React require a more complex project setup with advanced developer tooling (like Webpack) to (realistically) get started. Though, bigger Vue projects (where you want to use the above-mentioned “Single File Component” syntax) also require a more complex project setup.

Creating projects with fitting setups is made easy though - you do have the Angular CLI for Angular projects and create-react-app for React projects. In case you need a more complex Vue project setup, you can easily get it with help of the Vue CLI. (Schwarzmüller, 2020)

React is definitely a bit more difficult to get into than Vue is yet simpler than Angular.

# Performance

## Startup Performance

Angular tends to be a bit bigger than Vue and React apps - with Vue then being a bit smaller than React.

For bigger apps, all three frameworks should produce roughly equally-sized code bundles - assuming you are using optimization techniques like “Lazy Loading” which all three frameworks support. (Schwarzmüller, 2020)

## Runtime Performance

React is not just focusing on using all possible JavaScript tricks to detect and perform all necessary UI updates efficiently. Instead, it also utilizes techniques where it priorizies certain tasks to make the loaded page feel faster to the end user. It might, for example, handle user input with priority and delay the update of some text being output somewhere on the screen. Of course, when I write “delay” here, we’re typically only talking about (a few hundred) milliseconds. (Schwarzmüller, 2020)

# Integration with backend

React was designed to make it painless to create interactive UIs. Its state management is efficient and only updates components when your data changes. Component logic is written in JavaScript, which means you can keep state out of the DOM and create components that are encapsulated.

Developers like CRUD (create, read, update, and delete) apps because they show a lot of the base functionality that you need when creating an app. Once you have the basics of CRUD completed in an app, most of the client-server plumbing is finished, and you can move on to implementing the necessary business logic.

React is one of the easiest to integrate with a Java backend application, even if you search online you can find a lot of tutorials on full-stack applications specifically for React and Spring Boot combination. (Raible, 2018)

# Angular

# Introduction

AngularJS is a JavaScript-based open-source front-end web framework mainly maintained by Google and by a community of individuals and corporations to address many of the challenges encountered in developing single-page applications. It aims to simplify both the development and the testing of such applications by providing a framework for client-side model–view–controller (MVC) and model–view–view model (MVVM) architectures, along with components commonly used in rich Internet applications. (Wikipedia, 2021)

# Ease of Learning

Angular is a fairly tricky framework because of it’s many connections and features. As a novice Angular developer, you find that you have to alter your programming mindset. This takes time and a frustrating process. It dramatically decreases your development productivity. (Fairweather, 2020)

# Performance

The earlier versions of Angular didn’t rank high on the performance metrics. However, with the release of Angular 9, many performance optimization problems are sorted because of the framework’s capability of dealing with them. (Dhaduk, 2020)

Recent versions of the angular framework work better than their predecessors .

|  |  |  |  |
| --- | --- | --- | --- |
|  | Vue.JS | React JS | Angular |
| Ease of learning | Very easy to learn, need basic knowledge of HTML and Javascript | React is a bit more difficult to get into than Vue is, yet simpler than Angular. | Angular is a bit complicated because of the multiple components for developing. |
| Performance | The speed and performance are great, due to Vue.js being tiny in size. | Faster than Angular but a bit slower than Vue | Angular performs highly, both in speed and reliability. |
| Completeness of framework | Pretty young, so it’s not very complete. | The Framework is permanently sustained by Facebook and by the huge community of React JS. | Angular web framework is very sustainable, it makes work easier due to the multiple packages that can be installed, It also able to carry out testing. |
| Integration with back-end | Two-way data binding | In our specific case very easy to integrate through Spring Boot. | Angular can easily integrate most types of backend. And in the case of our project is compatible with the Springboot. |
| Resources used | Majority in Chinese, some in English. | A lot of tutorials and information online as well as for the libraries developed by the community. | A lot of tutorials and information online as well as for the libraries developed by the community. |
| Popularity | According to resources, Vue has the most stars on Github projects. (Daityari, 2021) | The most popular framework by usage and by the projects developed based on angular, as well as by the number of jobs offered. | Angular is more popular than Vue JS, but less popular than ReactJS in today’s world. |

# Conclusion

After reviewing these three frameworks and looking at their differences and which could best for the goal of the project, it was decided to work with the ReactJS framework for the implementation of the frontend part of the project. This is because it has been around for quite sometime now and is not as heavy as the angular framework and it also is easy to learn and implement which is great, moreover it has a huge community and a lot of resources to learn from, and since I will be doing some kind of a social network and React stands by idea of building resources and then combining them to form pages it will be great for the projects case.

# Research Methods

**Library:**

* Available product analysis
* Competitive analysis
* Literature study

**Field:**

* Observation

**Workshop:**

* Requirements prioritization

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