Front-end Javascript Frameworks: A Beginner's Guide

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When writing a front-end Javascript application you need to handle:

State

Keep track of dynamic data and user preferences

Organisation

Organise code clearly

HTML generation

```
"<div>" + myVal + "</div>"
```

Add and remove HTML elements dynamically

Testing

Unit test logic and test user interactions work as expected

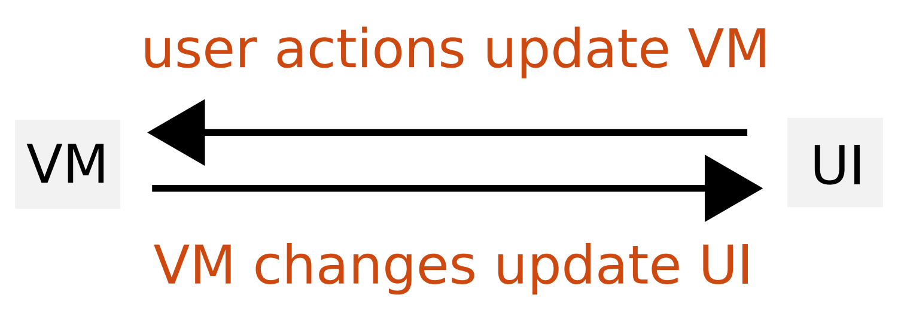
A framework can help by providing:

- ✓ state management and data-binding
- ✓ component based architecture
- ✓ HTML templating
- ✓ testing utilities

Key concepts:

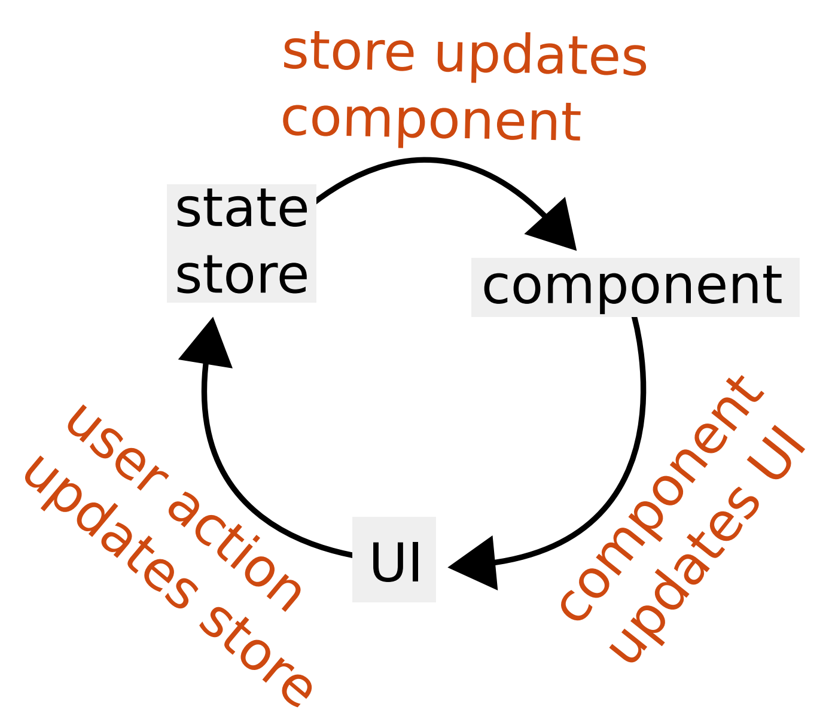
2-way data-binding

A **ViewModel** (VM) reflects the state of the UI



1-way data-binding

A pattern pioneered in React and known as **Flux**



Components

A component is like a custom HTML element with special behaviour attached:

```
<error-list errors="errArray">
</error-list>
```

Directives

A directive is like a custom data attribute on a regular HTML element, with special behaviour attached:

```
<span v-if="hasMessage">
    {{message}}
</span>
```

Templates

Here's an **HTML template**. It uses the v-for directive to loop over an array:

```
<ul class="list">
  <li v-for="e in errors">
      {{e}}
  </li>
</ul>
```

JSX is a syntax extension to Javascript that resembles HTML. Here's a JSX template:

```
<ul className="list">
    {errors.map(e =>
        <li>{e}</li>)}
</ul>
```

Testing

All major frameworks have testing libraries that make unit testing components easy.

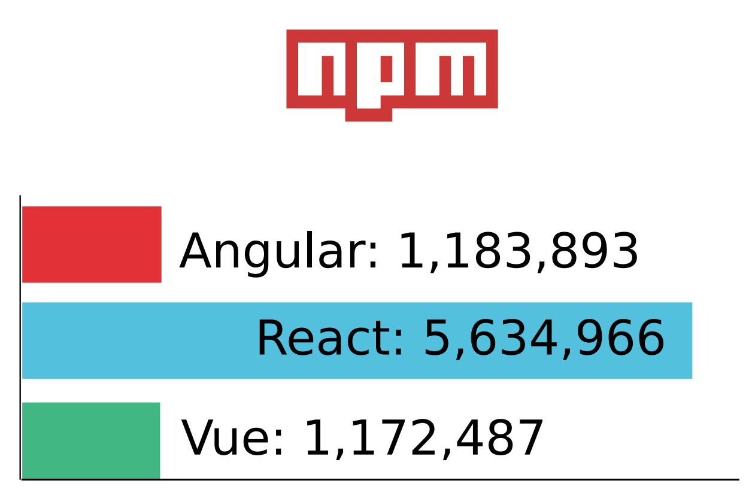
jsdom is a pure JS browser emulation that makes Selenium tests virtually obsolete!

Do I really need a framework?
If your app is not very interactive the costs may outweight the benefits:
- steep learning curve
- slow to develop
- lots of 'boilerplate' code

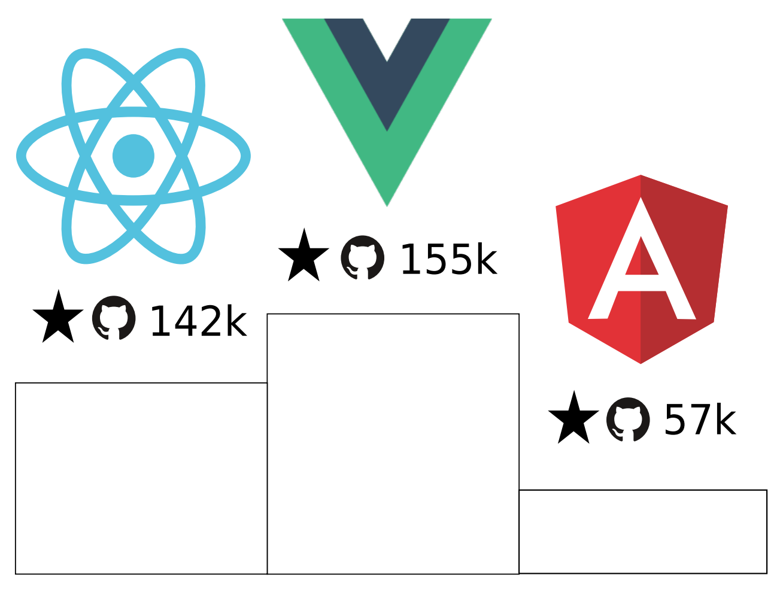
The Big 3: Angular, React & Vue

	Directives	Components	Template Language(s)	2-way data binding
Angular	✓	✓	HTML	✓
React	✗	✓	JSX	✗
Vue	✓	✓	HTML, JSX	✓

React has the most weekly downloads [1.]

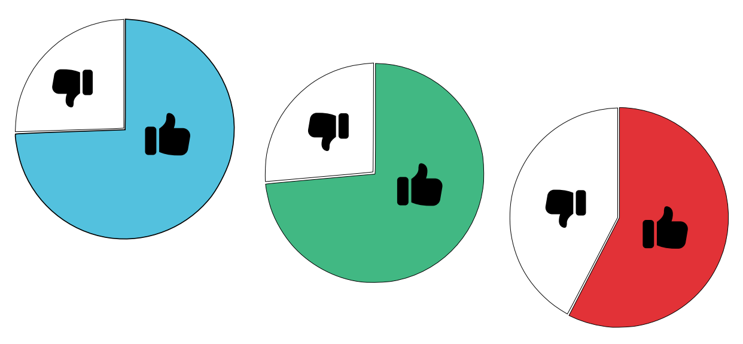


Vue has the most GitHub stars [2.]

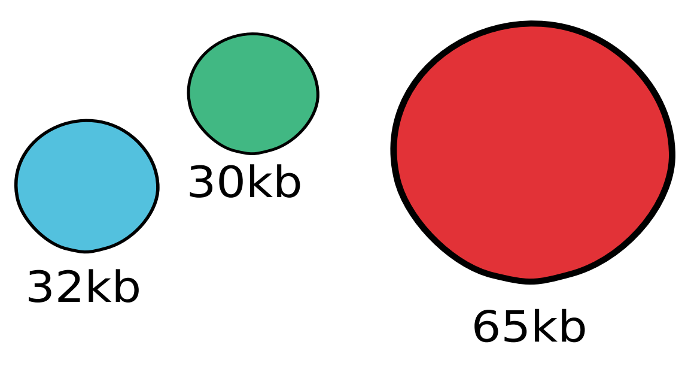


Vue is the easiest to learn
(And Angular the hardest)

Developers don't like Angular as much [3.]



React & Vue are more lightweight [4.]
min app bundle size



React & Vue are slightly faster than Angular [4.]
(but they're all pretty fast!)

RESIDE

MRC Centre for Global Infectious Disease Analysis

Imperial College London

1. https://www.npmjs.com/
2. https://github.com/
3. https://insights.stackoverflow.com/survey/2019
4. https://blog.bitsrc.io/benchmarking-angular-react-and-vue-for-small-web-applications-e3cbd62d6565