

Web Programming

Vue.js I.

Web frameworks

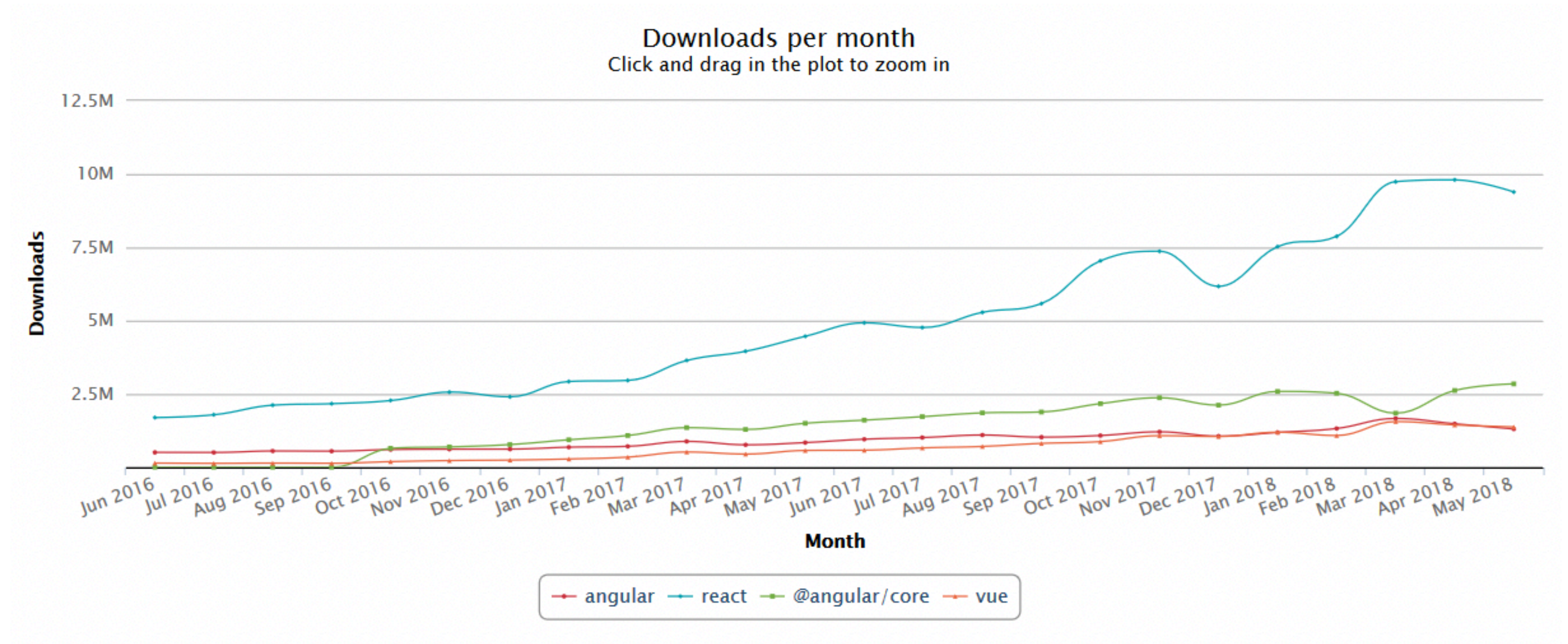
- Simplify development
- Code reuse
- Frameworks exist for all components, including
 - JavaScript
 - CSS
 - PHP
 - See: <http://www.bestwebframeworks.com/>

Simple JavaScript frameworks

- Aims
 - Consistent browser support
 - Simplified, easy-to-use functions
- Number of available options
 - jQuery
 - Prototype
 - Yahoo! UI Library
 - Dojo

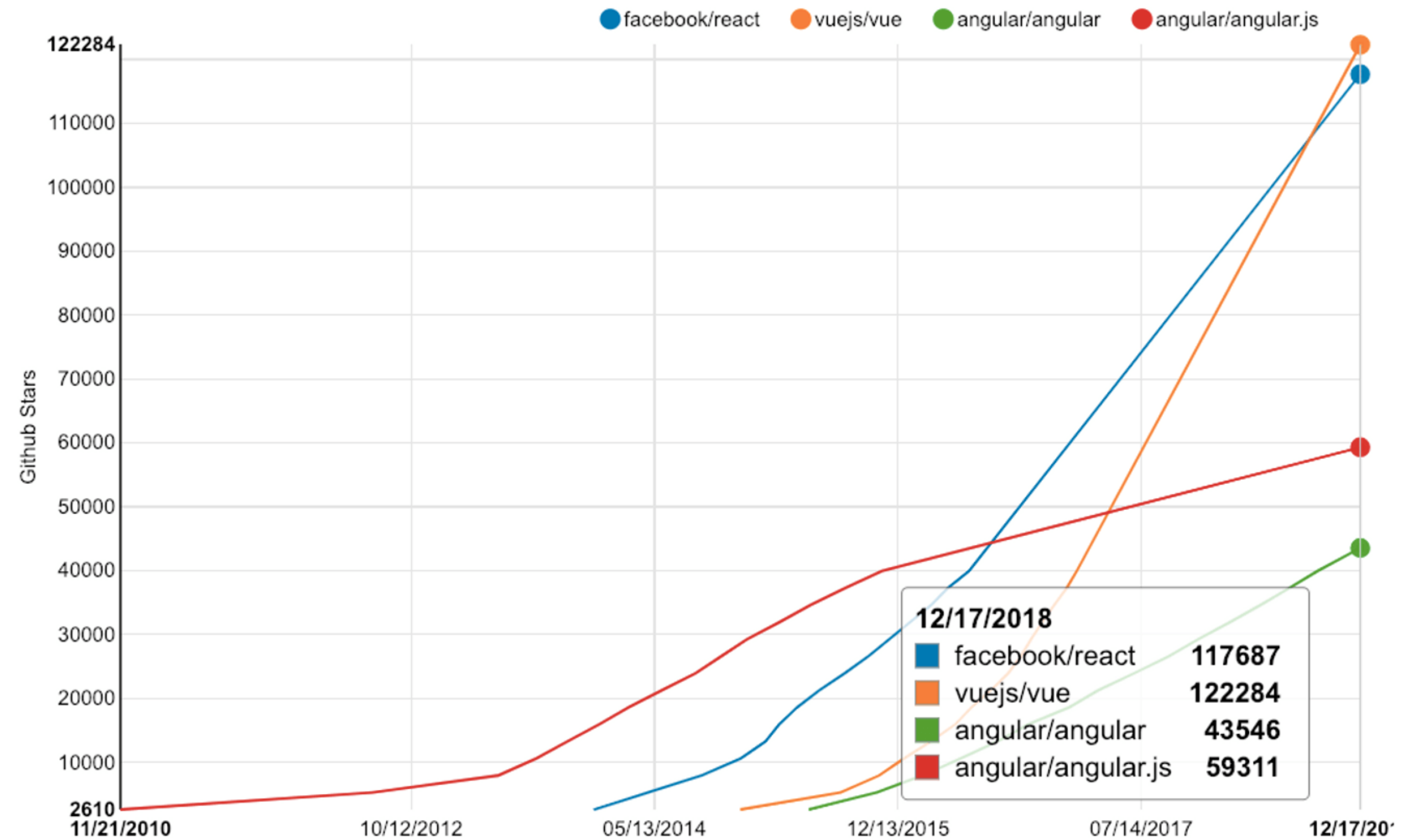
The three big ones

- Angular
- React
- Vue



The three big ones

- Angular
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- Vue



Pure JS

(what is the problem?)

- Source of truth (JS vs. HTML)
- Verbose DOM manipulation
- Difficult to separate application logic from display

Source of truth

- Can be in the DOM or in JS

```
// This function uses the DOM (html) as source of truth
function add(){
  counter = document.getElementById("count");
  count = parseInt(counter.innerText) + 1;
  counter.innerText = count;
}

// a global variable
let count = 0;
// increment uses the global count
function increment(){
  count += 1;
  document.getElementById("count_2").innerText = count;
}
```


Example #1

🔗 [examples/js/vue/no_vue/counter_local_state](#)

```
function createCounter(){
  let theCount = 0;
  let counter = document.createElement('div');
  counter.classList.add("counter");
  document.querySelector(".counter_container").appendChild(counter);

  let count = document.createElement('span');
  count.classList.add("count");
  count.innerText="0";
  counter.appendChild(count);

  let button = document.createElement('button');
  button.onclick = function(){
    theCount += 1;
    this.parentElement.querySelector(".count")
      .innerText = theCount;
  };
  button.innerText = "Add";
  counter.appendChild(button);
}
```


Vue.js

installation

- <https://vuejs.org/v2/guide/>
- Simply include the vue library.

```
<!-- Import Vue -->  
<!-- development version, includes helpful console warnings -->  
<script src="https://cdn.jsdelivr.net/npm/vue/dist/vue.js"></script>
```

Vue.js

My first app

- Create element to contain vue app:

```
<div id="app"></div>
```

- Create vue app in JS:

```
<script>
  let app = new Vue({
    // select the element for this app
    el: "#app",

    // specify a template
    template: "<strong>Hello</strong>"
  })
</script>
```

Vue.js

My first app with data

- Create element to contain vue app:

```
<div id="app"></div>
```

This element is replaced by the template.

- Create vue app in JS:

```
<script>
  let app = new Vue({
    // select the element for this app
    el: "#app",

    // specify a template
    template: "<strong>{{ message }}</strong>",
    // the data used in this app
    data: {
      message: "Hello Vue!"
    }
  })
</script>
```

Vue.js

Specifying templates

- Plain JS string:

```
template: "<strong>{{ message }}</strong>"
```

- Template literal (multiline string)

```
template: `  
  <strong>  
    {{ message }}  
  </strong>  
`
```

- In the HTML (not good if component is reused)

```
<div id="app">  
  <strong>  
    {{ message }}  
  </strong>  
</div>
```

Vue.js

Reactive

- Vue is **reactive**. If the data in JS changes, the DOM changes

```
<script>
  let app = new Vue({
    // select the element for this app
    el: "#app",
    // specify a template
    template: "<strong>{{ message }}</strong>",
    // the data used in this app
    data: {
      message: "Hello Vue!"
    }
  })
</script>
```

- In the JS Console, we can change **message**

```
>>> app.message = "Hello World!"
```

v-bind attributes

- `{{ value }}` only works for text content!
- To assign a data element to an html attribute use **v-bind:**

```
// template including bound attributes
```

```
template: `
```

```
  <img
```

```
    v-bind:src='image'
```

```
    v-bind:alt='desc'
```

```
  >`,
```

```
data: {
```

```
  image: "images/logo.png",
```

```
  desc: "Vue logo"
```

```
}
```

To bind **attr** use **v-bind:attr**.

No need for `{{ }}`.

v-on and methods

- Specify methods of our app (component):

```
data: {  
  message: "Hello Vue!"  
},  
methods: {  
  toggleMessage: function(){  
    if (this.message == "Hello Vue!")  
      this.message = "Can I help you?";  
    else this.message = "Hello Vue!";  
  }  
}
```

Access **message** in **data** as
this.message

Can pass arguments here, e.g.
method(argument)

- Add event handler to template **v-on:event="method"**

```
template: `  
  <div  
    v-on:mouseover="toggleMessage"  
    v-on:mouseout="toggleMessage"  
  >{{ message }}  
  </div>`,
```

or

```
template: `  
  <div  
    v-on:mouseover="toggleMessage()"  
    v-on:mouseout="toggleMessage()"  
  >{{ message }}  
  </div>`,
```


Exercise #1, #1b



[github.com/dat310-spring20/course-info/tree/master/
exercises/js/vue](https://github.com/dat310-spring20/course-info/tree/master/exercises/js/vue)

Expressions and computed properties

- You can specify expressions within {{ }}

```
<div id="app">
  {{ has_error ? "Oops": "OK" }}
</div>
```

- or

```
<div id="app">
  {{ count + 2 }}
</div>
```

- For complex expression use a computed property

```
template: "<p>{{ isEven ? 'even': 'odd' }}</p>",
computed: {
  isEven: function(){
    return (this.count%2 == 0);
  }
}
```

Conditionals v-if, v-else

- Use **v-if="condition"** in the template
 - render only if **condition** is **true**
 - Can add element with **v-else**

```
template: `  
  <div v-if="easy" class="success">Have fun!</div>  
  <div v-else class="error">Oh no!</div>`,  
data: {  
  easy: true  
}
```

Render lists: v-for

- Use **v-for="item in array"** in the template
- Displays one element for each item in array

```
template: `  
  <ul>  
    <li v-for="fruit in fruits">{{ fruit }}</li>  
  </ul>`,  
data: {  
  fruits: ["apple", "pear", "banana", "kiwi"]  
}
```

- Use **v-for="item, index in array"** to get both item and index

```
template: `  
  <ul>  
    <li v-for="(fruit, index) in fruits">#{{ index }} {{ fruit }}</li>  
  </ul>`,
```

Render lists: v-for

- Use computed property to filter array

```
template: `  
  <ul>  
    <li v-for="fruit in shortFruits">{{ fruit }}</li>  
  </ul>`,  
data: {  
  fruits: ["apple", "pear", "banana", "kiwi"]  
},  
computed: {  
  shortFruits: function(){  
    return this.fruits  
      .filter(function(value){return (value.length <= 4)}))  
  }  
}  
}
```

v-for change detection

- Vue detects changes does using these functions:
 - **push**
 - **pop**
 - **shift**
 - **unshift**
 - **splice**
 - **sort**
 - **reverse**

v-for change detection

- Vue does not detect assignment to array items
- This does not work:

```
methods: {  
  firstOrange: function(){  
    this.fruits[0] = "Orange";  
  }  
}
```

- This does not work either:

```
methods: {  
  firstOrange: function(){  
    let fruits = this.fruits;  
    fruits[0] = "Orange";  
    this.fruits = fruits;  
  }  
}
```


v-for change detection

- Vue does not detect assignment to array items
 - You can copy the array using **slice()** and then reassign

```
methods: {  
  firstOrange: function(){  
    let fruits = this.counts.slice();  
    fruits[0] = "Orange";  
    this.fruits = fruits;  
  }  
}
```

- **this.\$set(target, index, value)** to set item

```
methods: {  
  firstOrange: function(){  
    this.$set(this.fruits, 0, "Orange");  
  }  
}
```

Exercise #2



[github.com/dat310-spring20/course-info/tree/master/](https://github.com/dat310-spring20/course-info/tree/master/exercises/js/vue)
exercises/js/vue

Forms

- **v-bind** only creates a one way binding
 - i.e. changes in input below are not reflected in JS

```
<input id="name" v-bind:value="john.name"/>
```

- use **v-model** to create two way binding

```
<input type="text" id="nickname" v-model="john.nickname"/>
```

Checkbox

- the model belonging to a checkbox will be true or false

```
<input id="checkbox" v-model="john.happy"/>
```

- multiple checkboxes with the same model result in an array

```
<input type="checkbox" value="CSS" v-model="skills"/>  
<input type="checkbox" value="JS" v-model="skills"/>  
<input type="checkbox" value="Python" v-model="skills"/>
```

```
data: {  
  skills: []  
}
```

Example #2

🔗 examples/js/vue/vue6_model/index.html

Handling forms

Name

John Doe

Nickname

jonni

Age

32

☒ is happy

John knows:

☒ JS☒ Python☐ SQL

Johns favorite framework:

☐ Angular☐ React☒ Vue

Favorite database:

MySQL

name

John Doe

nickname

jonni

skills

["JS", "Python"]

age

32

happy

true

favorite

Vue

db

B

Other

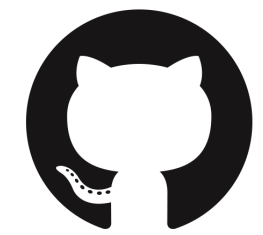
- **v-html** allows to update **innerHTML**

```
template: "<span v-html='msg'></span>",
data: {
  msg: "<em>Hello Vue!</em>"
}
```

- **v-show** can be used like **v-if**, but toggles **display: none;**

```
template: `
  <div v-show="easy" class="success">Have fun!</div>
  <div v-show="!easy" class="error">Oh no!</div>`,
```

Exercise #3, #4



[github.com/dat310-spring20/course-info/tree/master/](https://github.com/dat310-spring20/course-info/tree/master/exercises/js/vue)
exercises/js/vue