Vue Fundamentals
02 – Data and data binding

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First – add Bootstrap

- There are (a lot!) of other Vue-optimized UI-frameworks
  - We'll cover them later on
  - We now just add bootstrap to get some basic styling

https://getbootstrap.com/

Adding Bootstrap to a Vue project

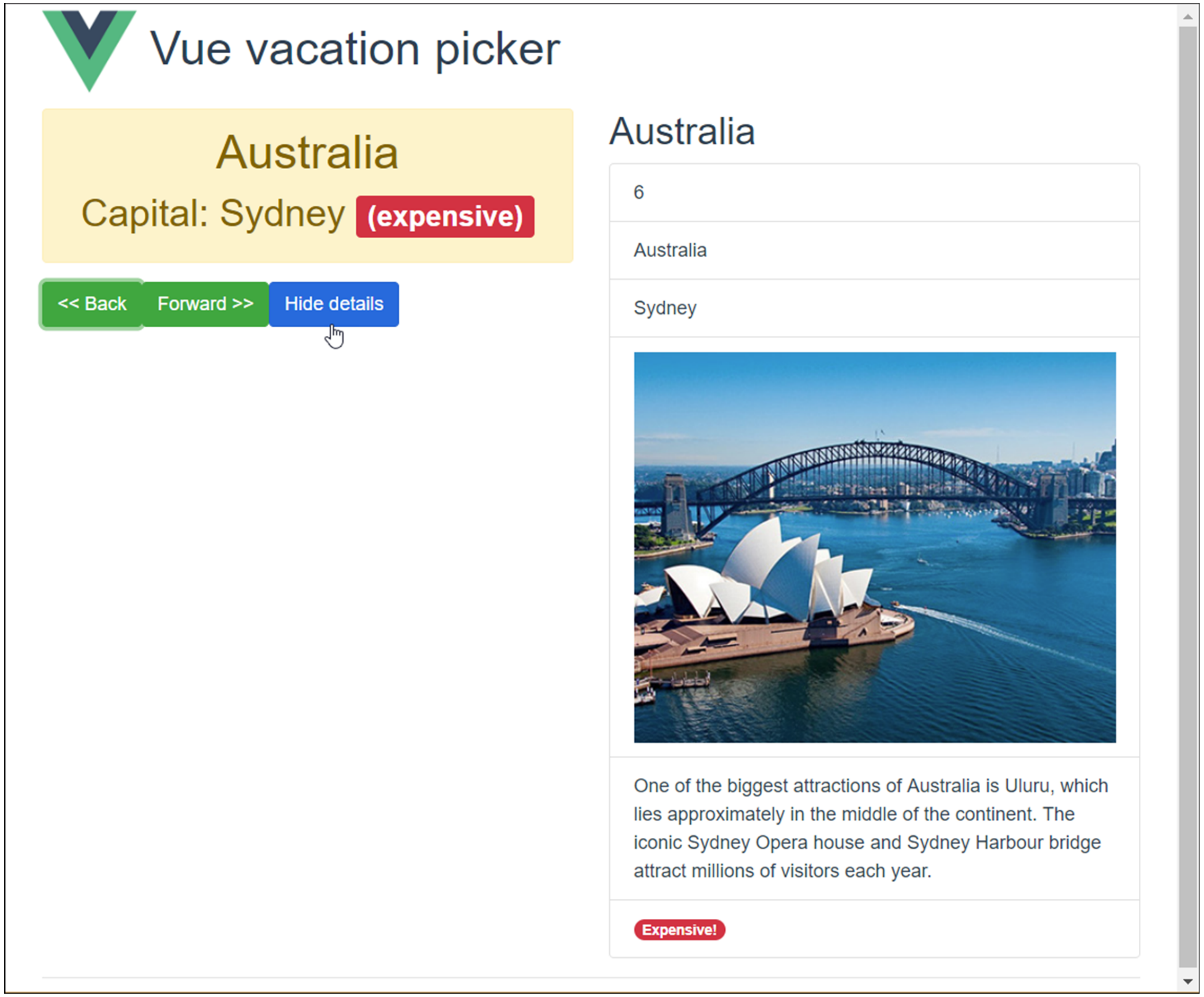
```
npm install bootstrap jquery popper.js --save
```

- `Bootstrap` for basic styling and components
- `JQuery` and `Popper.js` for components functionality

In `main.js`, add:

```
// Bootstrap styling
import 'bootstrap';
import 'bootstrap/dist/css/bootstrap.min.css';
```

What are we going to build


Vue vacation picker

Australia

Capital: Sydney (expensive)

Australia

6

Australia

Sydney

One of the biggest attractions of Australia is Uluru, which lies approximately in the middle of the continent. The iconic Sydney Opera house and Sydney Harbour bridge attract millions of visitors each year.

Expensive!

Building an app: VactionPicker

- We’re going to build a simple vacation picker.
  - Data comes from a separate `.js`-file (but will come from a real db in the future!)
- Requirements
  1. User can cycle through different destination countries
  2. User can show/hide details for each destination
  3. User can add trips to countries to a shopping cart
  4. Shopping cart can be send to the backend for processing

Creating the data file

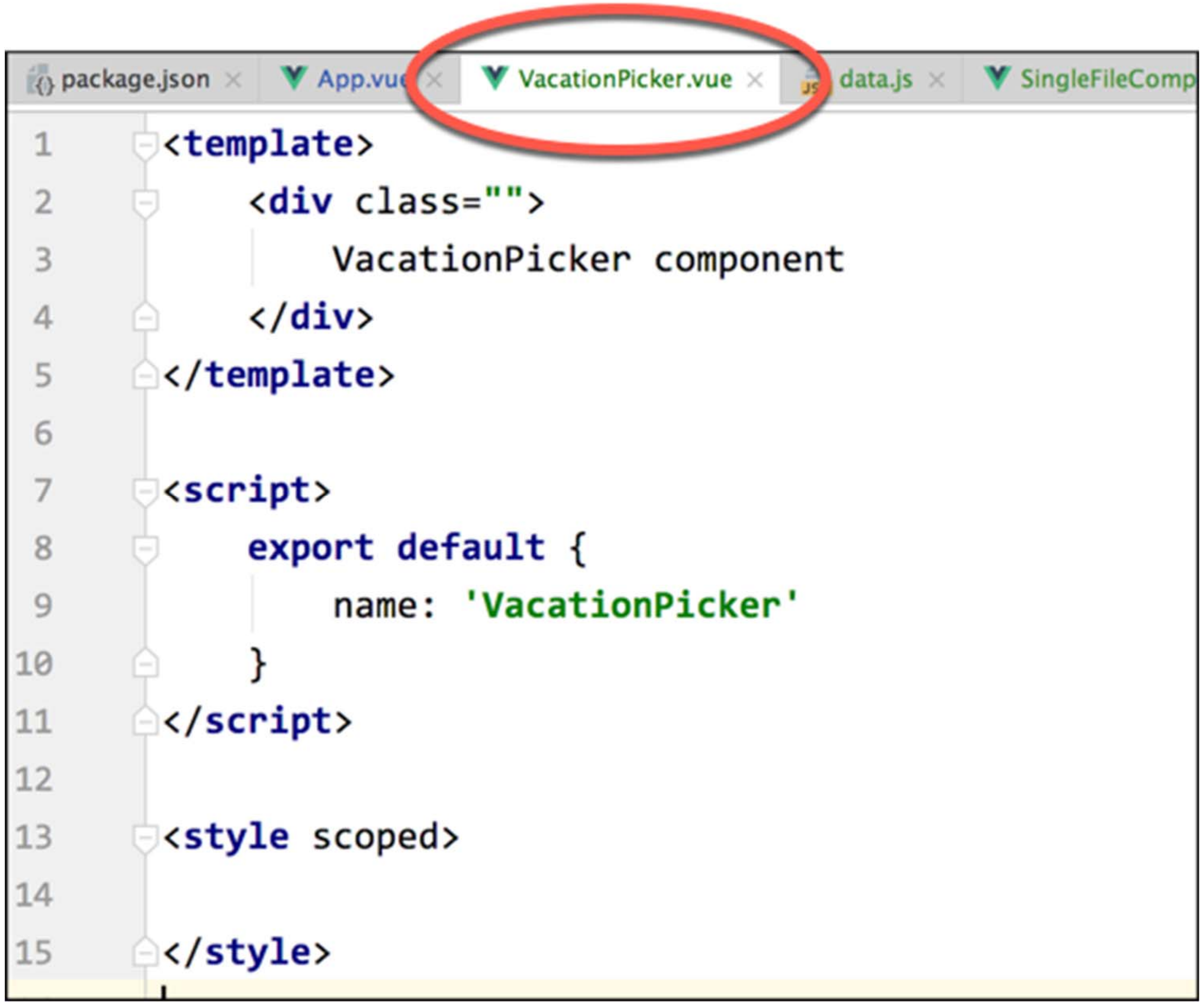
```
// data.js - holding an array of country/capital data.
// This of course will come from a real db in the future.
const data = {
   countries: [
      {
         id: 1,
         name: 'USA',
         capital: 'Washington',
         cost: 1250,
         details: 'United States are among the most visited country in the world.',
         img: 'washington.jpg'
      },
      {
         id: 2,
         name: 'Netherlands',
         capital: 'Amsterdam',
         cost: 795,
         details: 'The capital of the Netherlands, Amsterdam, is over 1000 years old.',
         img: 'amsterdam.jpg'
      },
      { …
}
```

Our example: a simple JavaScript object, holding an array

with countries and some (fake) data

Importing the data

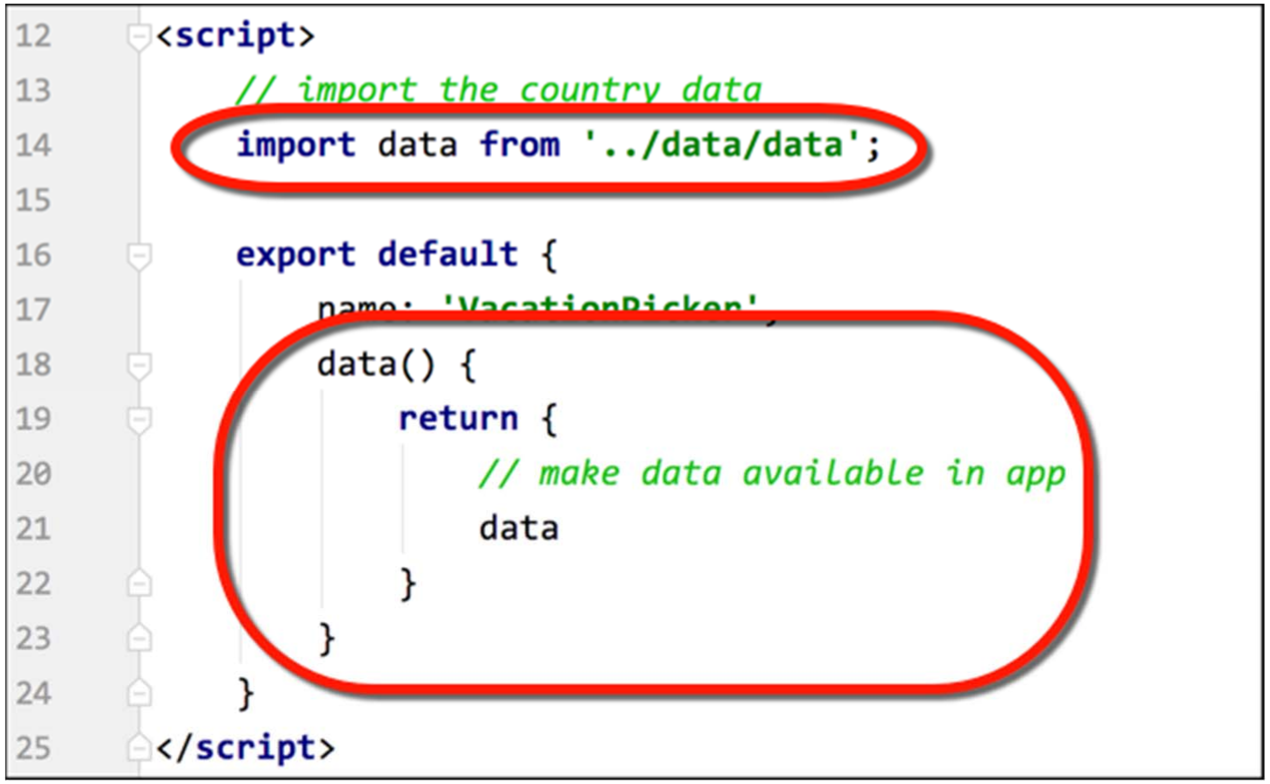
Create a new component, `VacationPicker.vue` with default content.



```
<template>
    <div class="">
        VacationPicker component
    </div>
</template>

<script>
    export default {
        name: 'VacationPicker'
    }
</script>

<style scoped>

</style>
```

Importing data

- Use default `import` statement for the `data.js` file
- Data is made available via a `data:{…}` property on the component



```
<script>
    // import the country data
    import data from '../data/data';

    export default {
        name: 'VacationPicker',
        data() {
            return {
                // make data available in app
                data
            }
        }
    }
</script>
```

Best practice for `data`

“Component data must be a function.

When using the `data` property on a component (i.e. anywhere except on `new Vue`), the value must be a function that returns an object.”

https://vuejs.org/v2/style-guide/#Component-data-essential

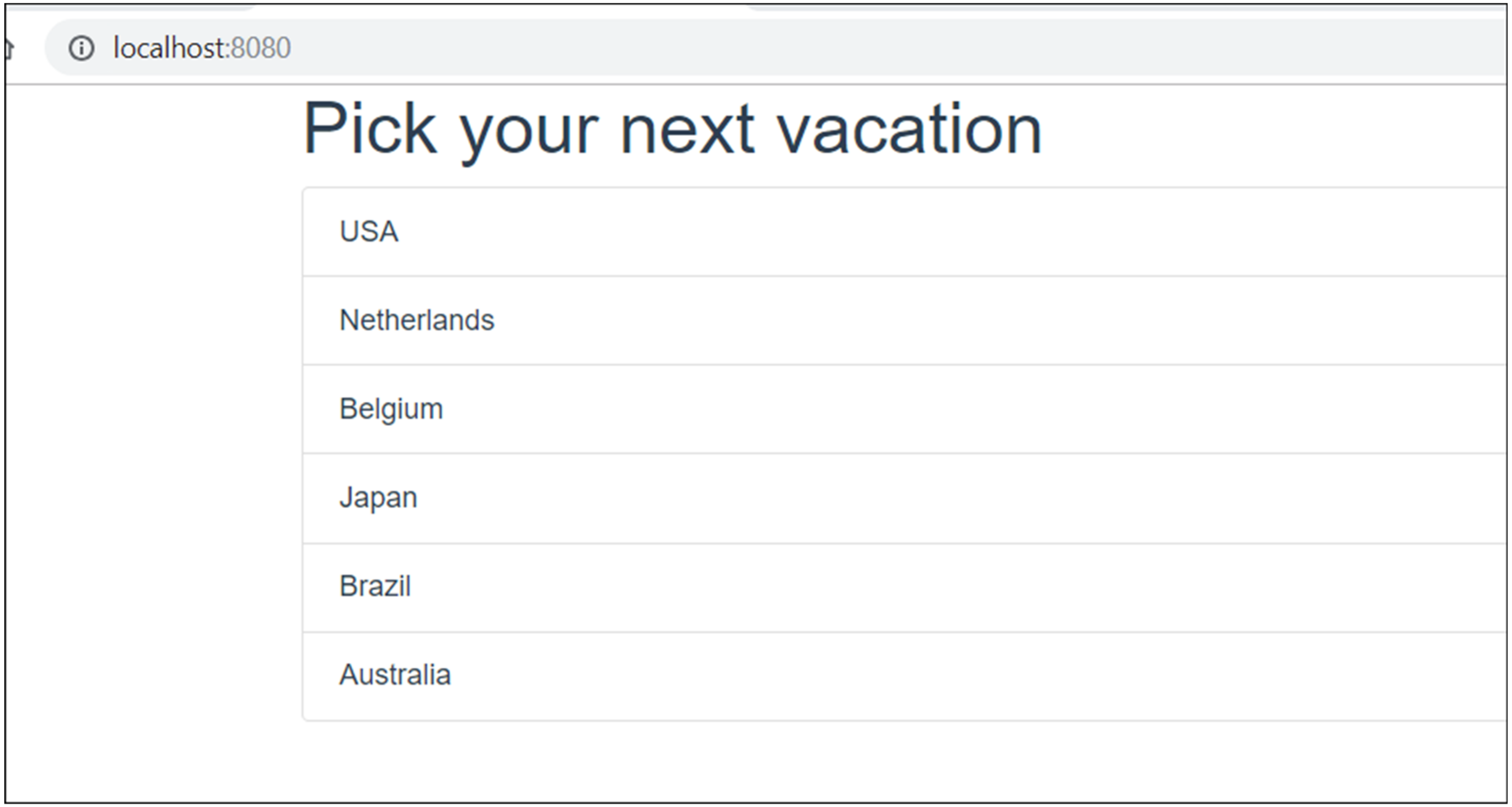
Binding to the data

Use the v-for directive to render a list of items, based on an array

```
<ul class="list-group">
    <li class="list-group-item" v-for="country in data.countries">
       {{country.name}}
    </li>
</ul>
```

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

Result


localhost:8080

Pick your next vacation

USA

Netherlands

Belgium

Japan

Brazil

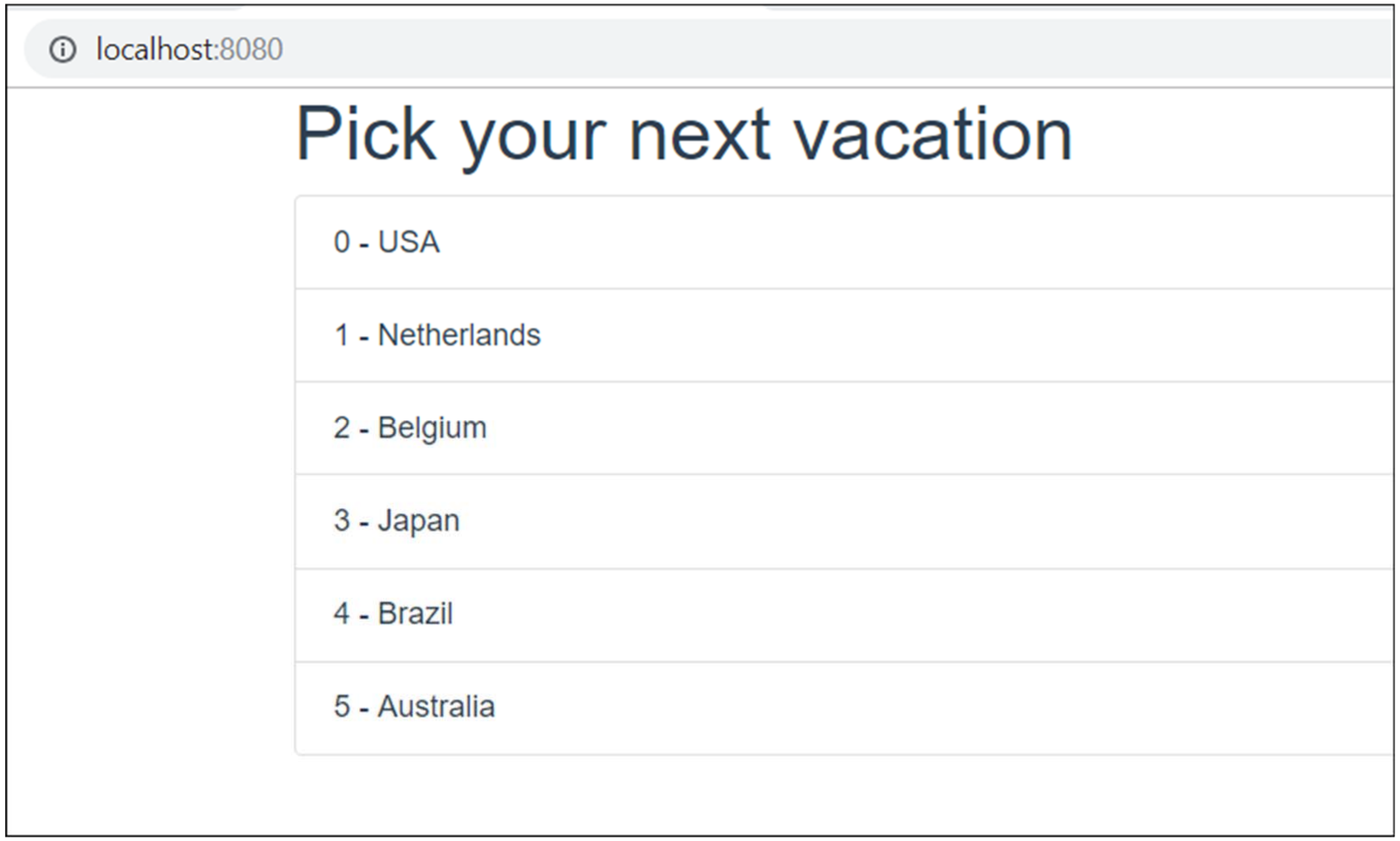
Australia

(assumes you updated `App.vue` to include the `VacationPicker` component and update/remove some styles)

Data binding expression

- Inside `v-for` blocks we have full access to parent scope properties.
  - Use the data binding expression `{{ … }}` to bind to properties
- `v-for` also supports an optional second argument for the `index` of the current item.

```
<li v-for="(country, index) in data.countries">
   {{ index }} - {{country.name}}
</li>
```



Pick your next vacation

```
0 - USA
1 - Netherlands
2 - Belgium
3 - Japan
4 - Brazil
5 - Australia
```

More data binding

- You can bind to any property exposed by the data function:

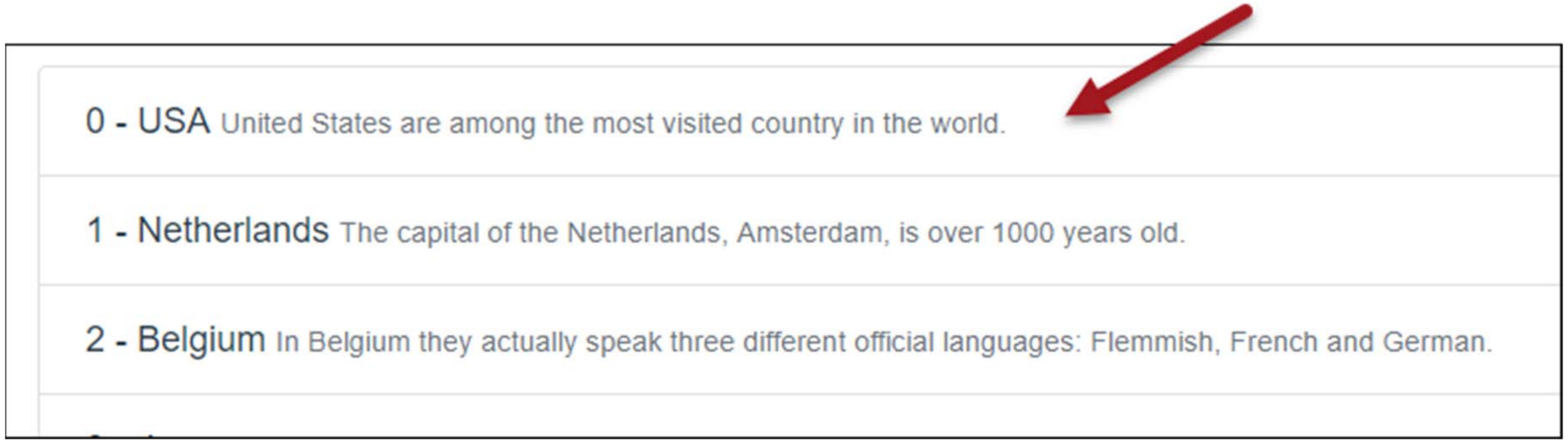
```
data() {
    return {
        // make data available in app
        data,
        header: 'Pick your next vacation'
    }
}
```

```
<h1>{{ header }}</h1>
```

Binding - using v-text and v-html

- Alternatives to {{ .. }}
  - v-text shows text inside the element
  - v-html shows markup inside the element

```
<span class="small text-muted" v-html="country.details"></span>
```


0 - USA United States are among the most visited country in the world.

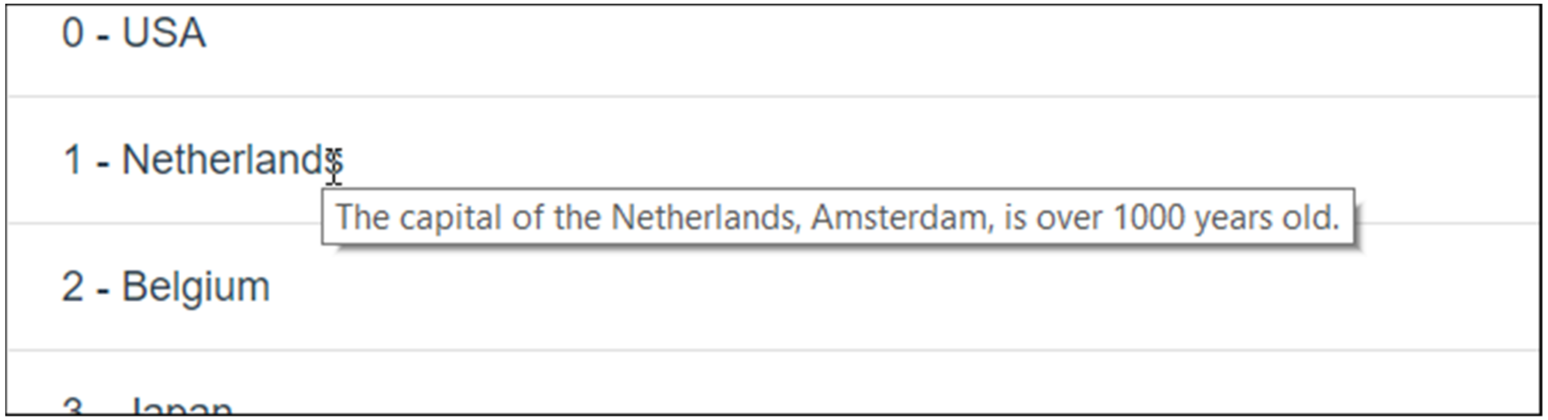
1 - Netherlands The capital of the Netherlands, Amsterdam, is over 1000 years old.

2 - Belgium In Belgium they actually speak three different official languages: Flemmish, French and German.

Used more often v-bind:

- Add `v-bind:` as prefix to an HTML-property to set it’s content
- If you want to add an `id` and `title` attribute for example:

```
<span v-bind:id="country.id"
      v-bind:title="country.details">
    {{ index}} - {{country.name}}
</span>
```


0 - USA

1 - Netherlands

The capital of the Netherlands, Amsterdam, is over 1000 years old.

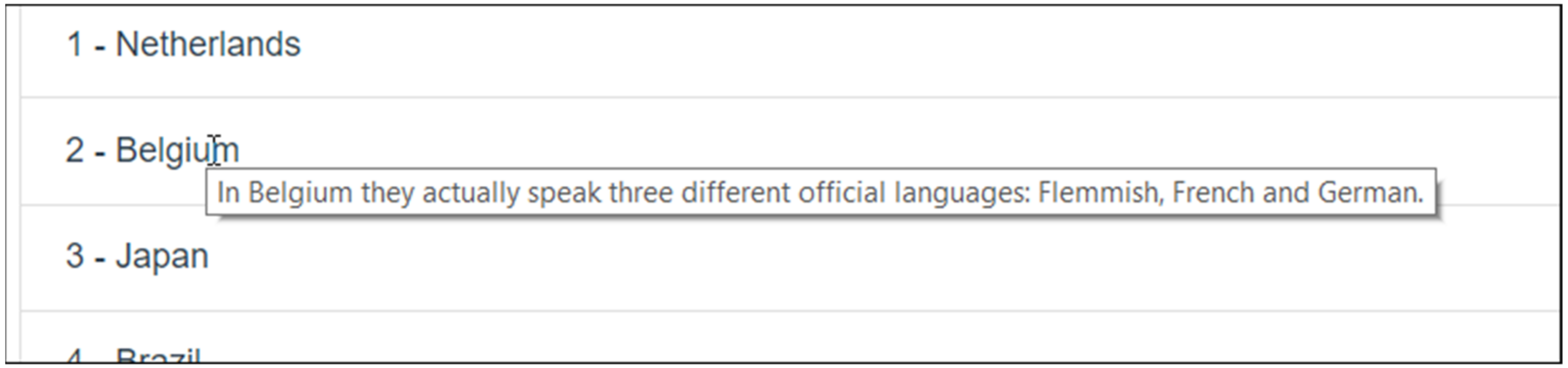
2 - Belgium

3 - Japan

Using shorthand notation :

Same effect: using just : as a shorthand notation for v-bind:

```
<span :id="country.id"
      :title="country.details">
    {{ index}} - {{country.name}}
</span>
```



1 - Netherlands

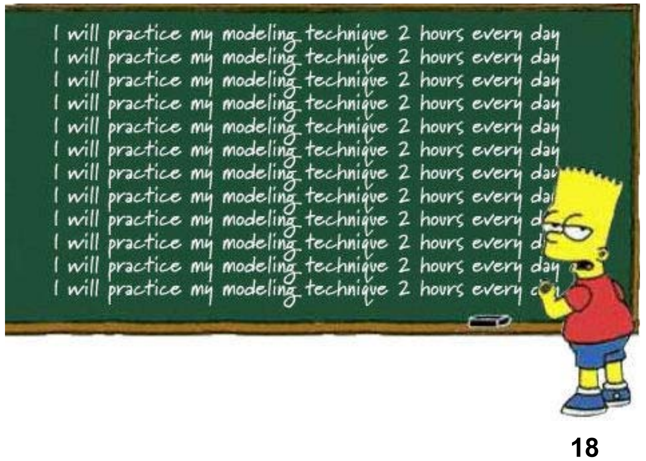
2 - Belgium

In Belgium they actually speak three different official languages: Flemmish, French and German.

3 - Japan

Workshop

- Add a data file to your application.
  - You can use `data.js` as an example, or build your own data file
- Import the data file to your application
- Show its contents in a new component, using `v-for`
- Experiment with `v-text` and `v-html`
- Add a property `isDisabled :true` to the component data
- Create a button on the page, set its state to the state of the `isDisabled` flag, using `v-bind:` or `:`.
  - Tip: the property you want to adjust is literally `disabled`



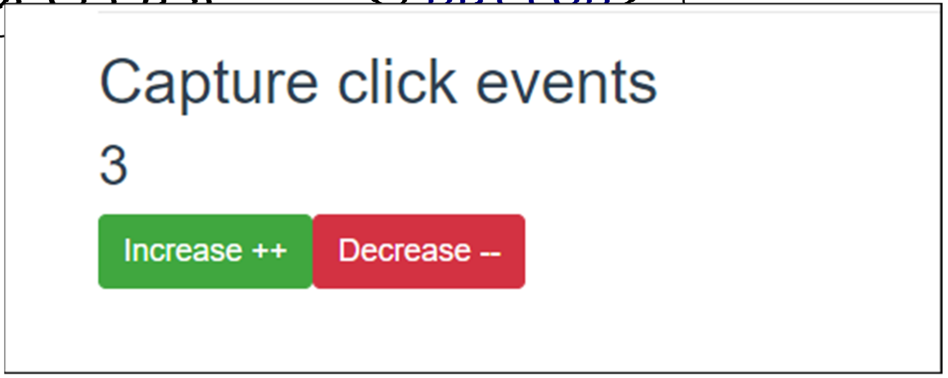
Using event binding

Handling events from the user interface

Binding events with v-on

- You can bind to DOM-events using the `v-on:` syntax
  - Events like `click`, `blur`, `focus`, `mouseover`, etc
  - https://developer.mozilla.org/en-US/docs/Web/Events
  - (add the `counter` variable to the data property)

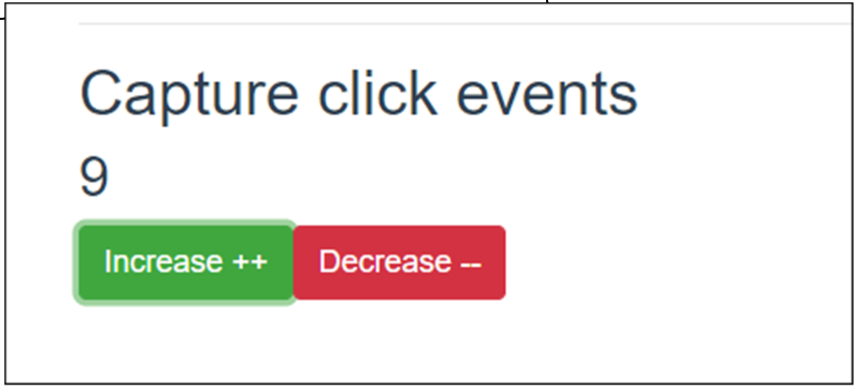
```
<h3>{{ counter }}</h3>
<button v-on:click="counter++">Increase ++ </button>
<button v-on:click="counter--">Decrease -- </button>
```


Capture click events

3

Or, use the shorthand notation @

```
<h3>{{ counter }}</h3>

<button @click="counter++">Increase ++ </button>

<button @click="counter--">Decrease -- </button>
```


Capture click events

9

More likely, you'll be calling a function

- Functions for components are called `methods`
- They are defined on the component script block
- Methods can accept parameters, like any other function
- Refer to the data of the component using `this.<propertyName>`

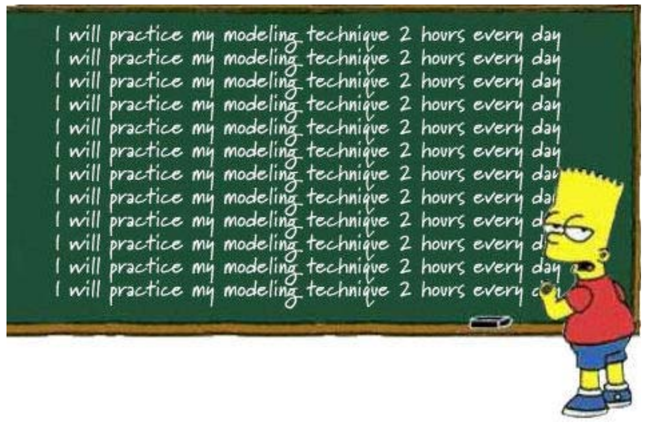
```
    <h3>{{ counter }}</h3>
    <button @click="increase()">Increase ++ </button>
    <button @click="decrease()">Decrease -- </button>
    …
</template>

<script>
export default {
   …,
   methods:{
      increase(){
         this.counter++;
      },
      decrease(){
          this.counter--;
      }
   }
  …

</script>
```

```
methods:{
   // Long-hand notation:
   increase: function(){
      this.counter++;
   },
   decrease: function(){
      …
   }
}
```

Vue Style guide: “use shorthand function notation”

Workshop

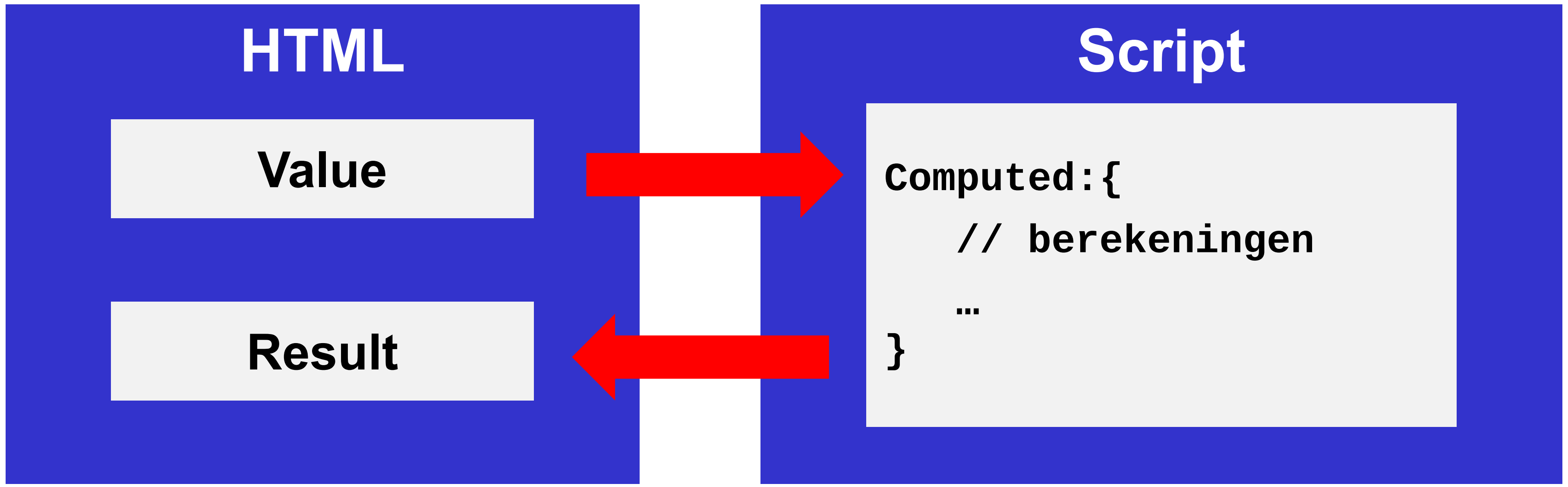
- Add a button to the page that sets/shows a certain variable when clicked
  - You can copy the button example from before
- When a specific country in the list is clicked, show it's name and capital in a JavaScript `alert()` box (or use `console.log`)
- Log the name of the current country and it's index to the console on a mouseover
- Use `v-on:` and @-notation
- Example: `../104-eventbinding`



Computed properties

Binding to more complex properties and update them on changing

Architecture of computed properties



```
Computed:{
    // berekeningen
    …
}
```

Selecting a specific country

- We want to select a `country` (or `product`, or `employee`, or whatever) when a user clicks on them
- Create a `computed{…}` object on the component that composes and returns the requested data
  - Here: we're setting a property that holds the currently selected index
  - Update the computed property when the index changes
- Computed properties avoid having to do complex computations inside the HTML-view!
- A computed property is only evaluated once its dependencies change

1. In the view

```
<li @click="selectCountry(country)"
    class="list-group-item" v-for="country in data.countries"">
```

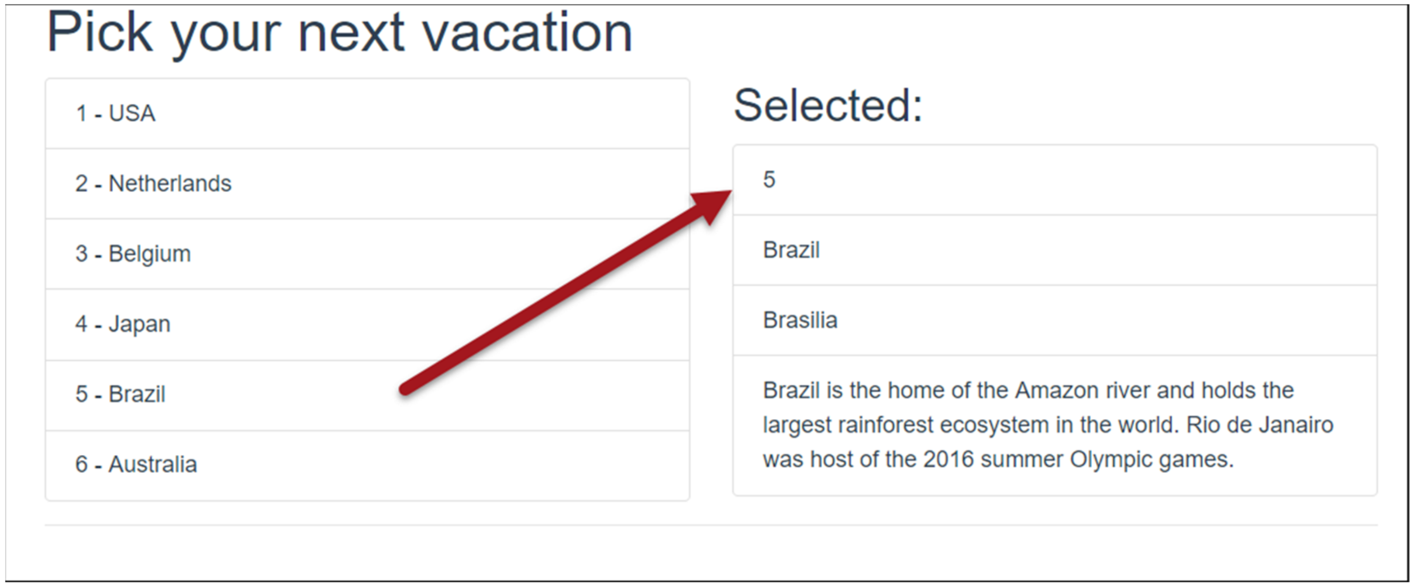
2. On the component

```
methods: {
   selectCountry(country) {
      this.selectedCountryIndex = this.data.countries.indexOf(country);
   }
},
computed: {
   selectedCountry() {
      return {
         // use the spread operator to return all properties
         ...this.data.countries[this.selectedCountryIndex]
      }
   }
```

3. On the component again

```html
<h2>Selected:</h2>
<ul class="list-group">
    <li class="list-group-item">{{ selectedCountry.id}}</li>
    <li class="list-group-item">{{ selectedCountry.name}}</li>
    <li class="list-group-item">{{ selectedCountry.capital}}</li>
    <li class="list-group-item">{{ selectedCountry.details}}</li>
</ul>
```

4. Result



Pick your next vacation

1 - USA
2 - Netherlands
3 - Belgium
4 - Japan
5 - Brazil
6 - Australia

Selected:

5

Brazil

Brasilia

Brazil is the home of the Amazon river and holds the largest rainforest ecosystem in the world. Rio de Janairo was host of the 2016 summer Olympic games.

Computed properties or methods?

“Instead of a computed property, we can define the same function as a method instead. For the end result, the two approaches are indeed exactly the same. However, the difference is that **computed properties are cached based on their dependencies.** A computed property will only re-evaluate when some of its dependencies have changed. ”

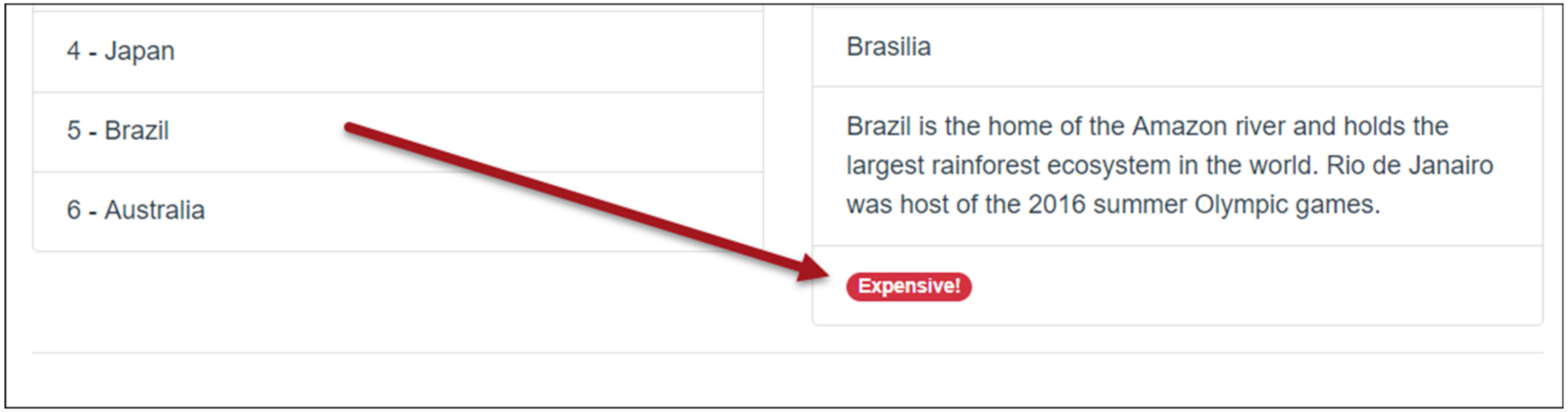
https://vuejs.org/v2/guide/computed.html

`v-if` and more computed properties

- Show a badge when a destination is expensive
- Use `v-if` to render a DOM element if a certain condition is `true`
  - You can use `v-else` and `v-else-if` to render elements (though used less often)

```
<li class="list-group-item" v-if="isExpensive">
    <span class="badge badge-danger badge-pill">Expensive!</span>
</li>
```

```
isExpensive() {
   return data.countries[this.selectedCountryIndex].cost > 4000;
}
```


4 - Japan

5 - Brazil

6 - Australia

Brasilia

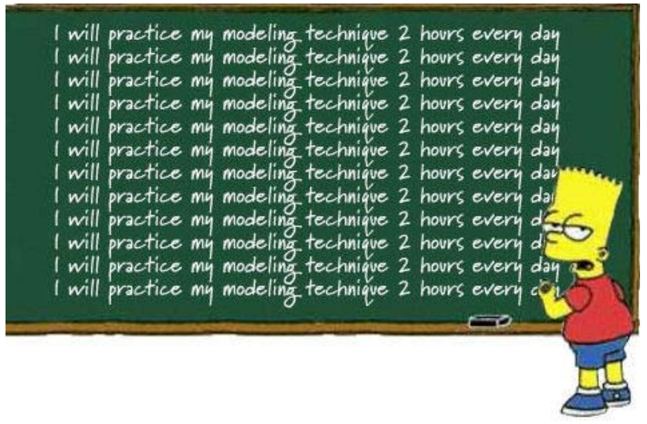
Brazil is the home of the Amazon river and holds the largest rainforest ecosystem in the world. Rio de Janairo was host of the 2016 summer Olympic games.

Expensive!

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

Workshop

- Create a detail view for your own app.
  - If an element/data is clicked, show details in the UI
- Create a computed property that show a destination as ‘on sale’ if the cost is less than 1000.
- Replace the text `Selected` with the actual name of the selected country
- Use `v-if` where appropriate
- Example: `../105-computed-properties`



`v-if` vs. `v-show`

- There is also a `v-show` directive in Vue
  - `v-show` – the element is rendered in the DOM, but hidden afterwards
  - `v-if` – the element is not rendered at all-in the DOM
- Documentation:

“Generally speaking, v-if has higher toggle costs while v-show has higher initial render costs.

So prefer v-show if you need to toggle something very often, and prefer v-if if the condition is unlikely to change at runtime.”

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

Binding to images

We need a bit of WebPack magic here...

Dynamically binding to images

- Vue can not simply interpolate the name of an external resource and re-use it for binding
  - For instance, the `src` attribute of an image.
- So this is invalid:

```
<li class="list-group-item">
    <img :src="./assets/{{selectedCountry.img}}">
</li>
```

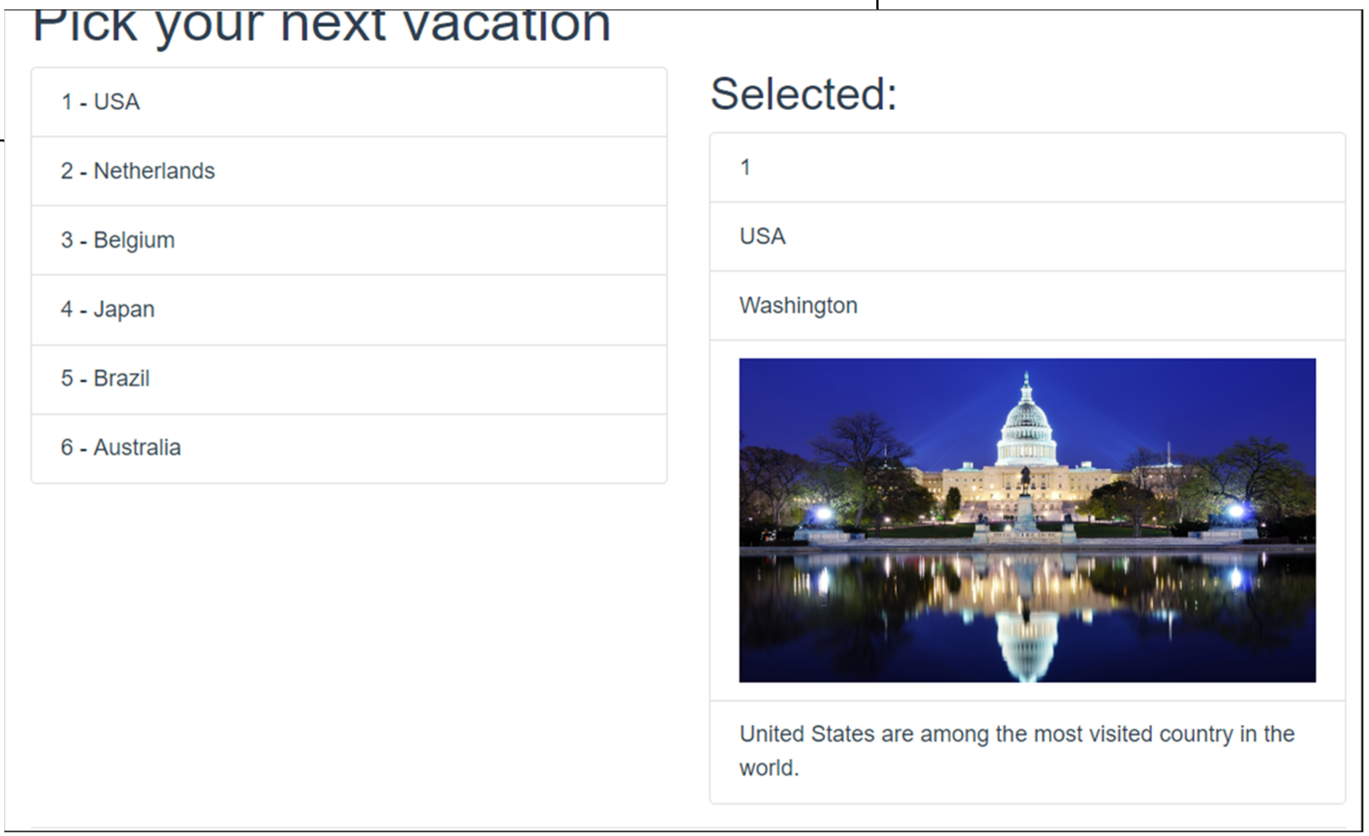
Invalid!

WebPack to the rescue

- Because WebPack builds JavaScript strings of everything, it needs to be able to determine the location of the requested file
- Create a method (or computed property) that returns a string with the correct location:

```
<li class="list-group-item">
    <img :src="getImgUrl(selectedCountry.img)"
         :alt="selectedCountry.img"
         class="img-fluid" >
</li>
```

```
methods: {
  …,
  getImgUrl(img){
     console.log(img);
     return require('../assets/countries/' + img);
  }
…
```



Pick your next vacation

1 - USA
2 - Netherlands
3 - Belgium
4 - Japan
5 - Brazil
6 - Australia

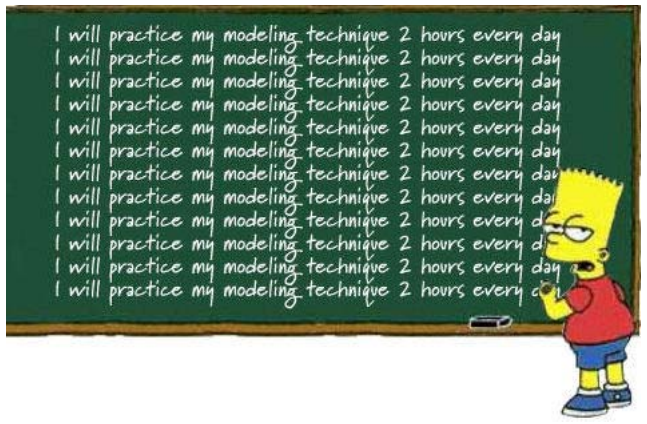
Selected:

1
USA
Washington

United States are among the most visited country in the world.

Workshop

- Static:
  - Create an array of images in your app, – has to be a complete URL!
  - Render them in a `v-for` loop. This can be done at any time.
  - See for instance https://www.youtube.com/watch?v=B8rVlxQm8Cs.
- Dynamic
  - Add/use an image as property of an object (like with the countries)
  - Render them conditionally/dynamically in the UI, like in the previous slides
  - Use the WebPack `require()` function.
- Example: `../106-image-binding`



Checkpoint

- You can import and use third party libraries
- You know the most important data binding concepts of Vue
- `v-bind:` or simply `:` for attribute binding
- `v-on:` or simply `@` for event binding
- `v-if` for conditional rendering
- Computed properties that update on a triggered change
- Some WebPack stuff to render images in the UI

Final Workshop

- Create the app shown in the beginning of the slides
  - One country is visible at a time
  - Its name and capital are shown
  - There are two buttons to cycle through the countries
  - User can hide/show details with a button
  - There are badges if visiting the country is Expensive, or On Sale
- Example: `../110-data-binding-wrap-up`
  - But first try it for yourself