Vue Fundamentals

Component Communication

Peter Kassenaar –
info@kassenaar.com


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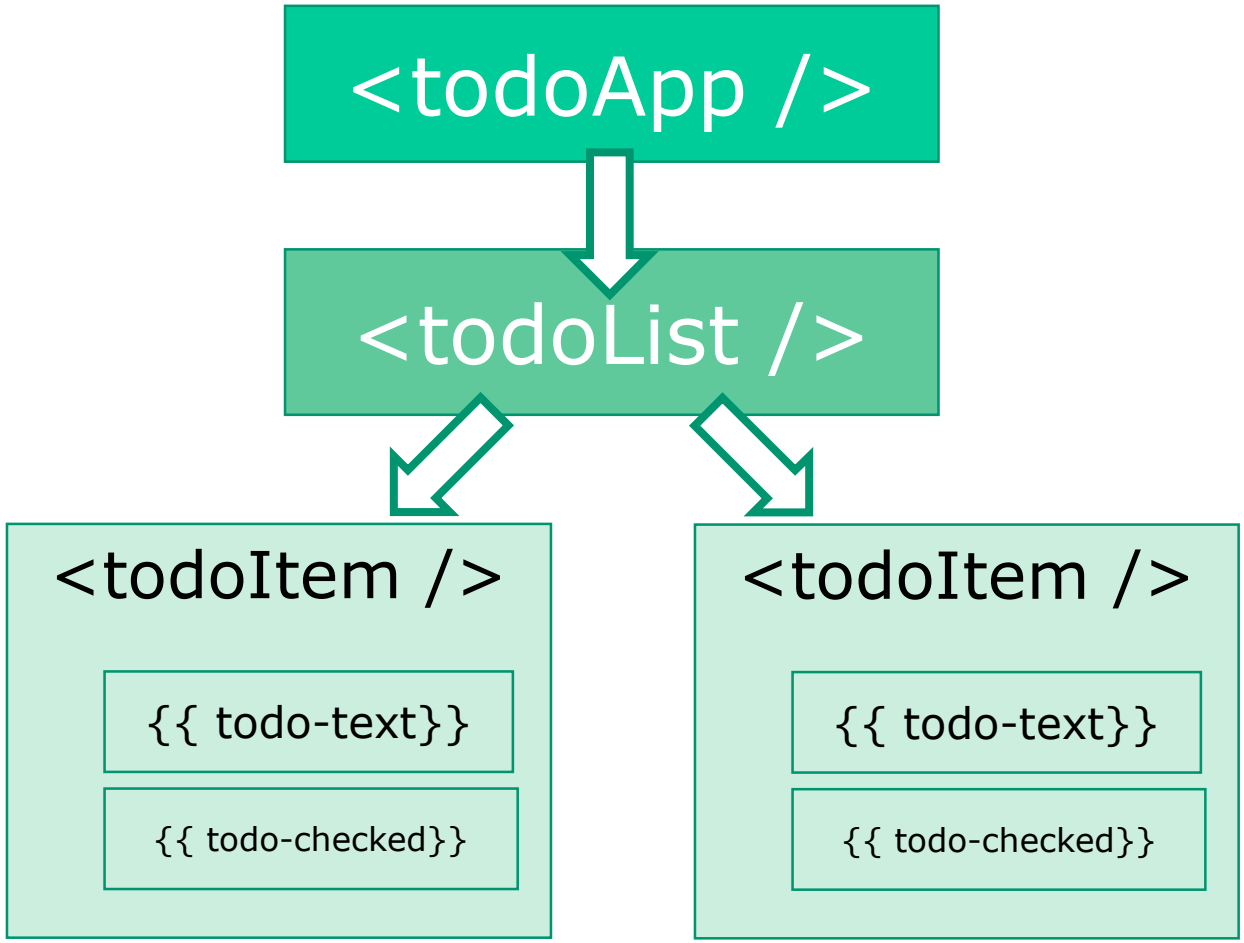
Contents

- Parent–child communication:
  - Using props to share data with child components
  - Validating component properties
- Child–parent communication
  - Passing data back to parent components
- Injecting content into child components using `slots`

Vue app : Tree of components



Recap – Multiple components?

1. Create new `.vue` components
2. Import them in the parent component using `import …`
3. Reference them in the HTML, using `<ComponentName />`
4. Repeat for every component

Creating a CountryDetail Component

- We’re creating a separate `CountryDetail` Component and move the HTML from the parent Component

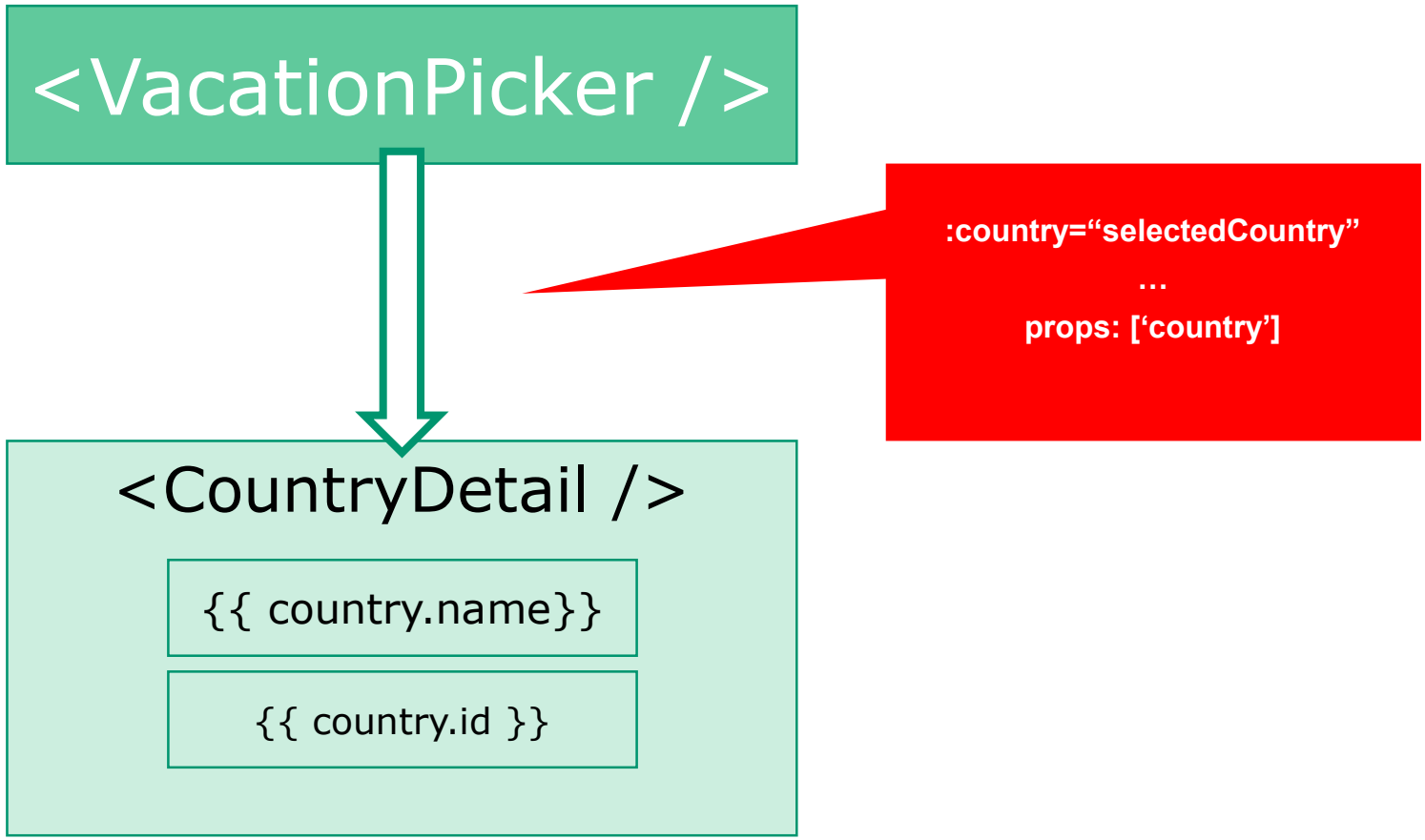
```
<template>
    <div>
        <h2>{{country.name }}</h2>
        <ul class="list-group">
            <li class="list-group-item">{{ country.id}}</li>
            …
        </ul>
    </div>
</template>

<script>
   export default {
      name: "CountryDetail",
   }
</script>
```

Data flow between components

"Data flows in to a component via `v-bind:` *bindings"*

Data flows out of a component via `v-on:` or `@event` *events"*

Parent-Child flow: `v-bind:` or `:`



1. Prepare Detail component to receive data

- The data you pass to a component are called *`props`*.
- Props can be strings, numbers, arrays, objects and so on.
- Props is an array on the component, like:

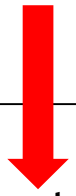
```
export default {
    name: "CountryDetail",
    props: ['country'],
}
```

We can then bind to the properties of

the passed in country with `country.id`, `country.name`, etc.

https://vuejs.org/v2/guide/components-props.html

2. Update Parent component to send data down



```
<div class="col-6">
   <CountryDetail v-if="showDetails" :country="country" />
</div>
…
<script>
   // import the country data
   import data from '../data/data';
   import CountryDetail from "./CountryDetail";

   export default {
      name: 'VacationPicker',
      components: {CountryDetail},
      …
   },

</script>
```

Move methods and computed properties

- Move or copy the necessary methods from the parent component to child component,
- In this example:
  - `getImgUrl(img)`
  - `isExpensive()`
  - `isOnsale()`

```
export default {
   name: "CountryDetail",
   props: ['country'],
   methods: {
      getImgUrl(img) {
         console.log(img);
         return require('../assets/countries/' + img);
      }
   },
   computed: {
      isExpensive() {
         return this.country.cost > 4000;
      },
      isOnSale() {
         return this.country.cost < 1000;
      }
   }
}
```

Casing of props

- HTML attributes are case-*insensitive*
- If you use camelCase on prop-names, use a hyphen in the html
  - i.e. `props: ['countryDetail', 'countryName']` become

    `<DetailComponent country-detail="…" country-name="…" />`
- If you are using string templates this limitiation does not apply

JS

```
Vue.component('blog-post', {
  // camelCase in JavaScript
  props: ['postTitle'],
  template: '<h3>{{ postTitle }}</h3>'
})
```

HTML

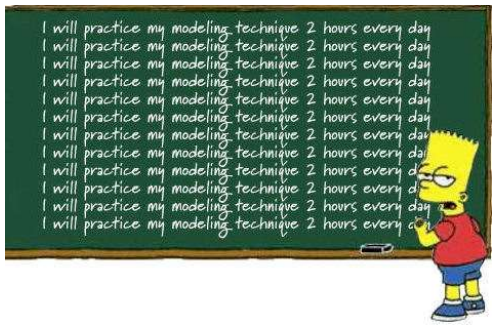
```
<!-- kebab-case in HTML -->
<blog-post post-title="hello!"></blog-post>
```

https://vuejs.org/v2/guide/components-props.html

Workshop

1. Create a DetailComponent on your own application and pass data. OR:
   - Create an extra prop on the CountryDetailComponent and pass it.
2. Create a new component with a textbox and a button.
   - When the button is clicked, the text in the box is passed as a prop to a child component.
   - Tip: Use `v-model` on the textbox.
3. Optional: implement the lifecycle hook `beforeupdate` on the child component, showing a counter that says how many times the component is updated.

- Generic Example on props: `../200-props`



Validating props

Making sure only specific kinds of data get passed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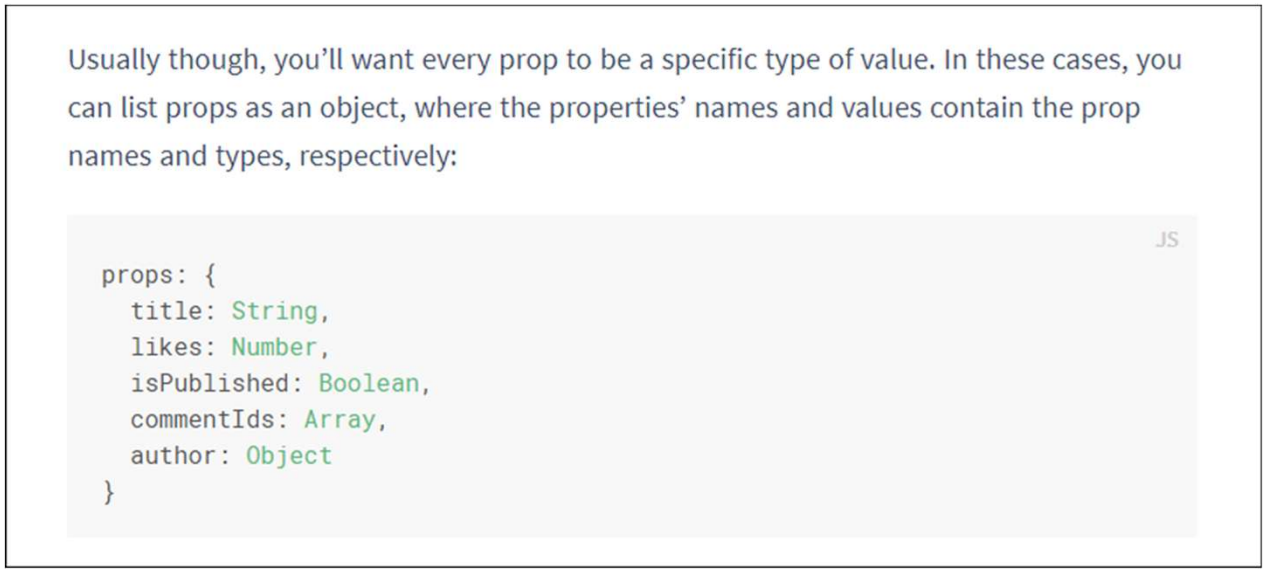
Validating props

- Prevent bad data being passed in.
- Use a keyed object instead of a simple array of props
- Optional: add extra attributes, like `required` or a `validator()` function.
- (With TypeScript the type checking of props is much easier)



Usually though, you'll want every prop to be a specific type of value. In these cases, you can list props as an object, where the properties' names and values contain the prop names and types, respectively:

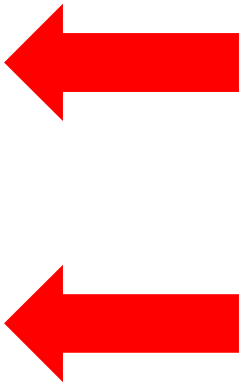
JS

```
props: {
  title: String,
  likes: Number,
  isPublished: Boolean,
  commentIds: Array,
  author: Object
}
```

https://vuejs.org/v2/guide/components-props.html#Prop-Types

Simple validation of `CountryDetail` props

```
export default {
    name: "CountryDetail",
    props: {
        country: {
            type: Object,
            required: true
        },
        name: {
            type: String,
            required: true
        }
    },
    …
}
```

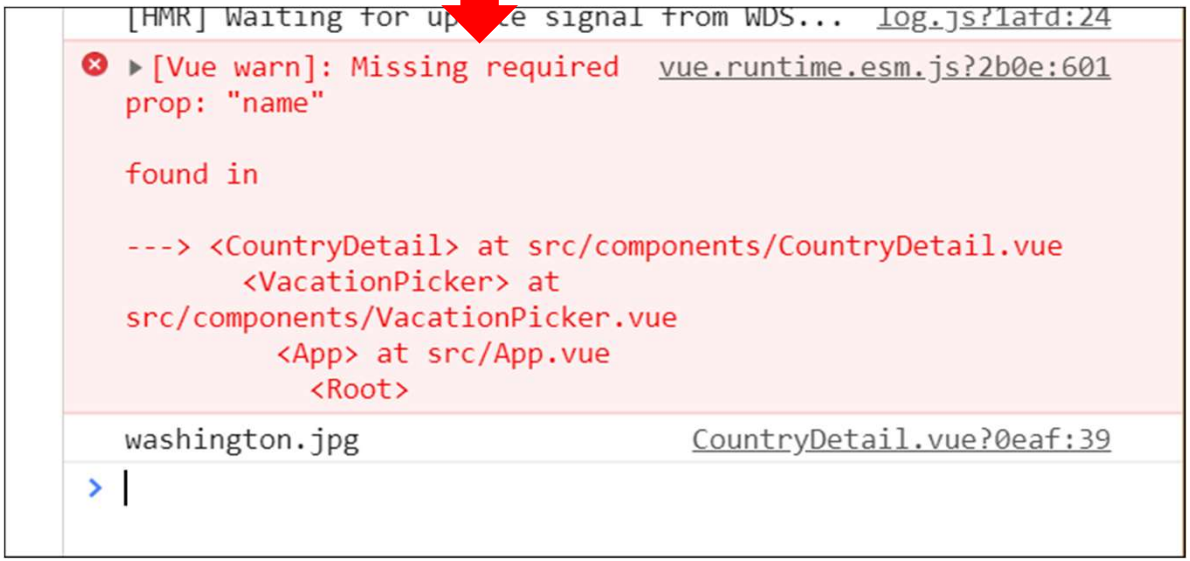


Console errors if prop has wrong value

```
<CountryDetail v-if="showDetails"
               :name="country.name"
               :country="'test'" />
```

Errors if you do not pass a `required` prop

```
<CountryDetail v-if="showDetails"
               :country="country" />
```



The application *will* continue to run, but shows the error in te console to help you further.

This kind of ‘validation’ does *not* stop you from assigning bad values.

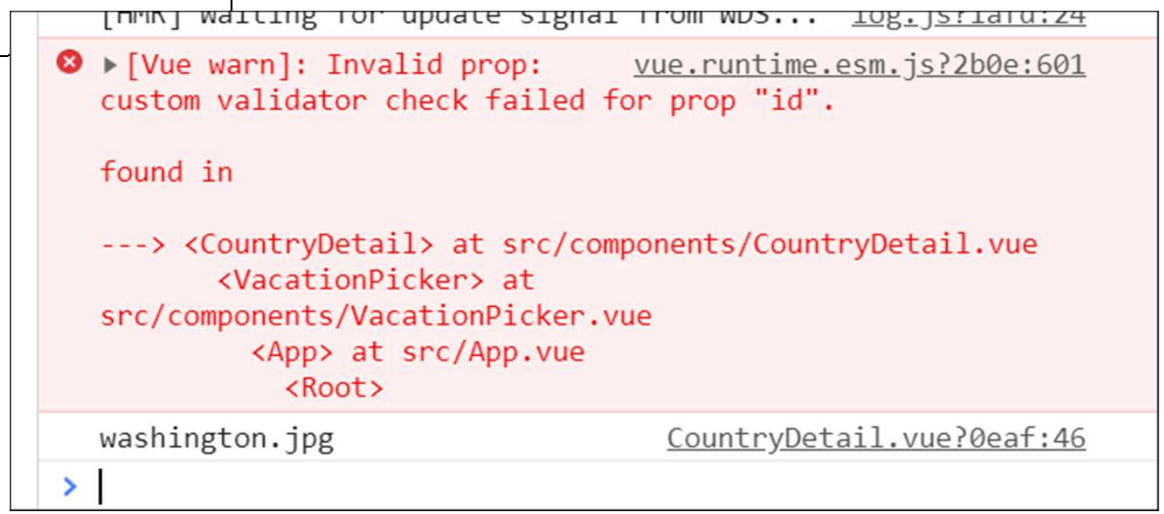
Validator functions for props

- You can pass in a `validator` function to validate the input. For example:
  - we want to pass in an `id`,
  - It has to fall inside a specific range
  - (in real life apps of course you wouldn't hardcode this).
  - Validator has to return `true` or `false`

```
id:{
   type: Number,
    required:true,
    validator:function (value) {
        return [1, 2, 3, 4, 5, 6].includes(value)
   }
}
```

Errors in console on validation

```
countries: [
   {
      id: 100,
      name: 'USA',
      capital: 'Washington’,
      …
   },
```



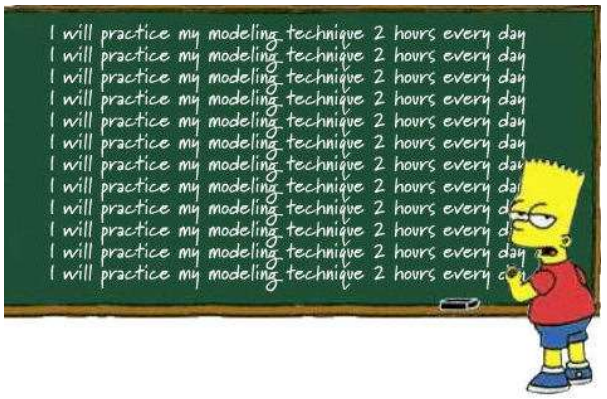
One-way data binding

*"All props form a **one-way-down binding** between the child property and the parent one: when the parent property updates, it will flow down to the child, but **not the other way around**. This prevents child components from accidentally mutating the parent's state."*

https://vuejs.org/v2/guide/components-props.html#Prop-Validation

Workshop

- Use your own component, add validation to the props it receives.
- Check different types: `String`, `Number`, `Boolean`, and so on
- Write a validation function on a string.
  - Use the `.includes()` (array), or `indexOf()` (string) methods to check if a requested value is available.
- Optional: use a `default` value for props!
  - We haven't covered this, look this up for yourself
  - https://alligator.io/vuejs/property-validation/
- Generic example: `../210-props-validation`



Passing data back

Communicating from child to parent component by sending events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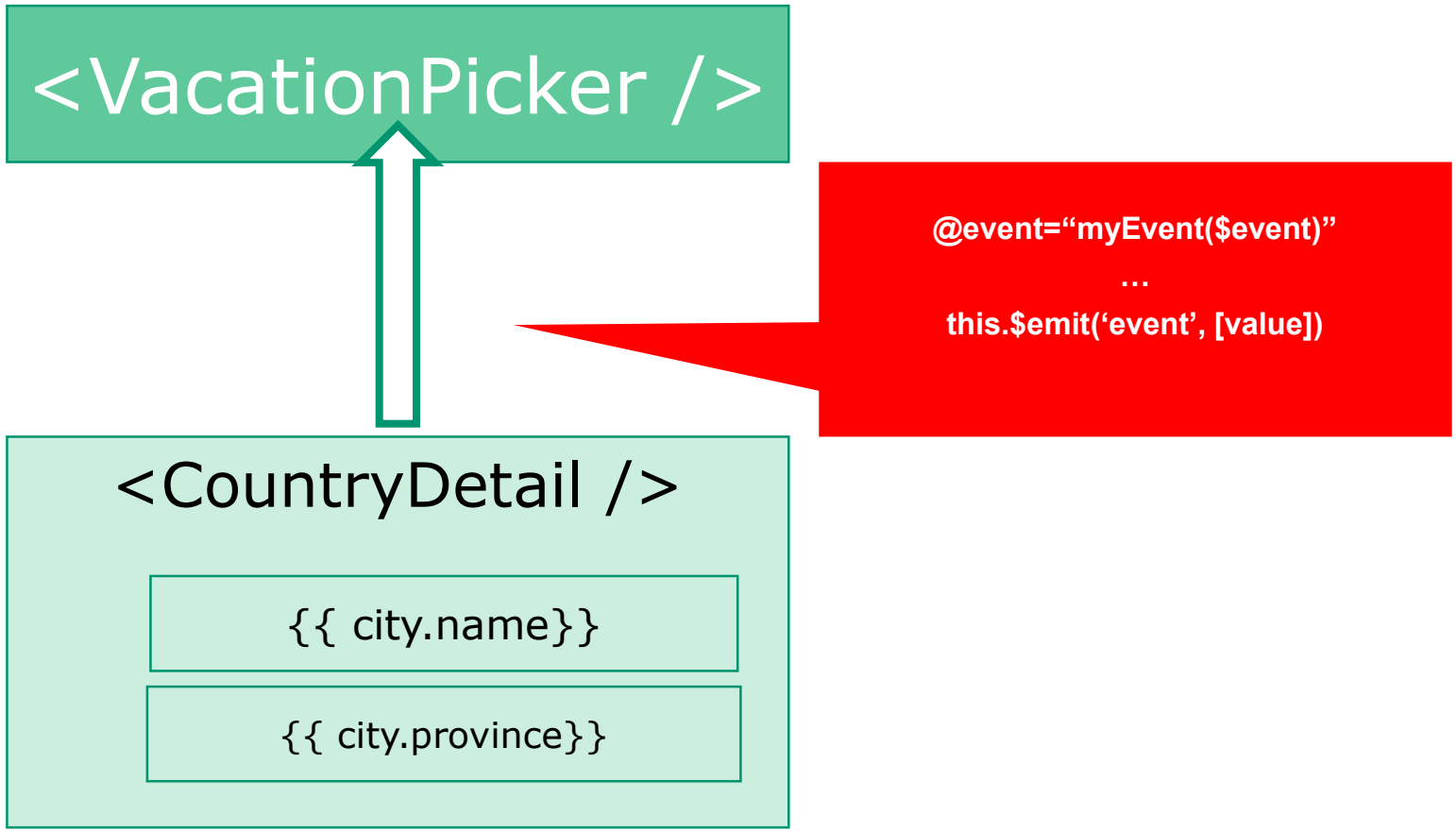
Child-Parent flow: custom events



Binding to custom events

- Custom component can throw custom events, by using the `this.$emit('eventName')` method
  - It is automatically available on every component
  - You can define the name of the event yourself
  - You can pass data in the event
- In the parent component, use the well-known `@eventName="handler($event)"` notation
  - Call a local event handler to handle the event
  - `$event` is a magic variable, containing the value from the child

https://vuejs.org/v2/guide/components-custom-events.html

Vue 3 – register the event to emit

- In Vue 3 applications you *have* to tell Vue that a Child component emits an event.
- Otherwise, you'll get an error/warning in the browser console

```
export default {
  name: "CountryDetail",
  …
  emits:['rating', 'favorite'],
  …
}
```

Example custom events - Child

Prepare the child component to emit its custom event(s)

```
<span class="float-right">
    <button @click="setRating(1)">+1</button>
    <button @click="setRating(-1)">-1</button>
</span>
```

```
methods: {
   …
   setRating(value){
        this.$emit('rating', value);
   }
}
```

Example custom events – parent

Prepare the parent component to receive custom event(s)

```
<CountryDetail v-if="showDetails"
               @rating="onRating($event)"
               :country="country" />
```

1. Catch event

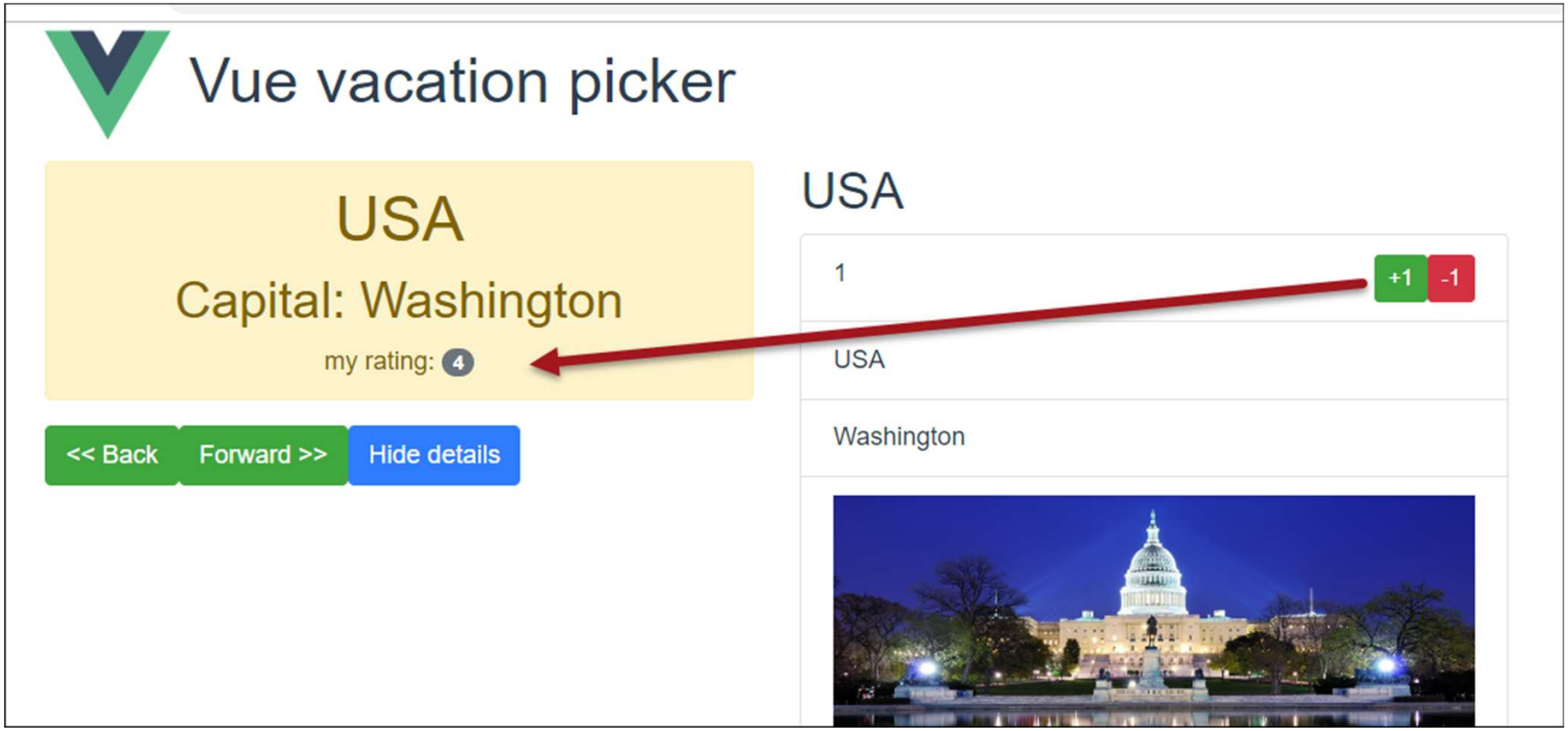
```
onRating(rating){
   console.log('rating received for ' + this.country.name);
   this.data.countries[this.currentCountryIndex].rating += rating;
}
```

2. Handle event

```
<div v-if="country.rating !== 0">
    my rating:
    <span class="badge badge-secondary badge-pill">{{country.rating}}</span>
</div>
```

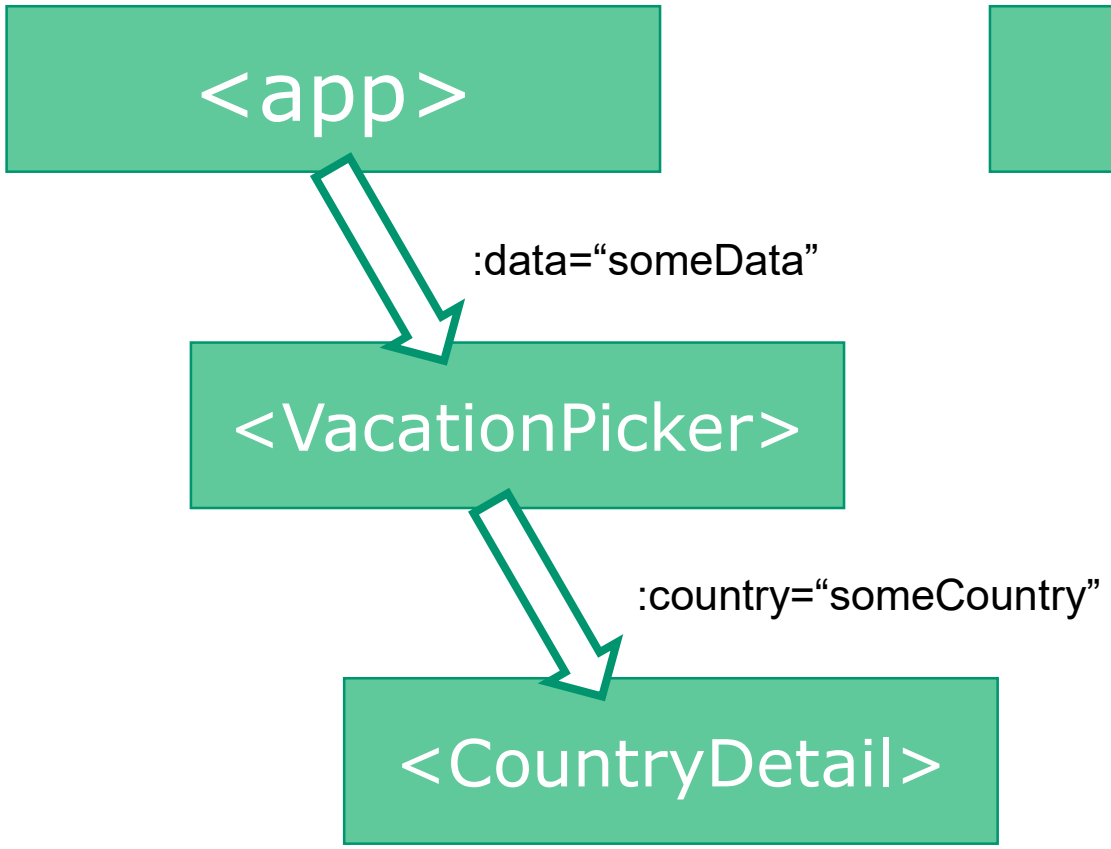
3. Show result in UI

Result

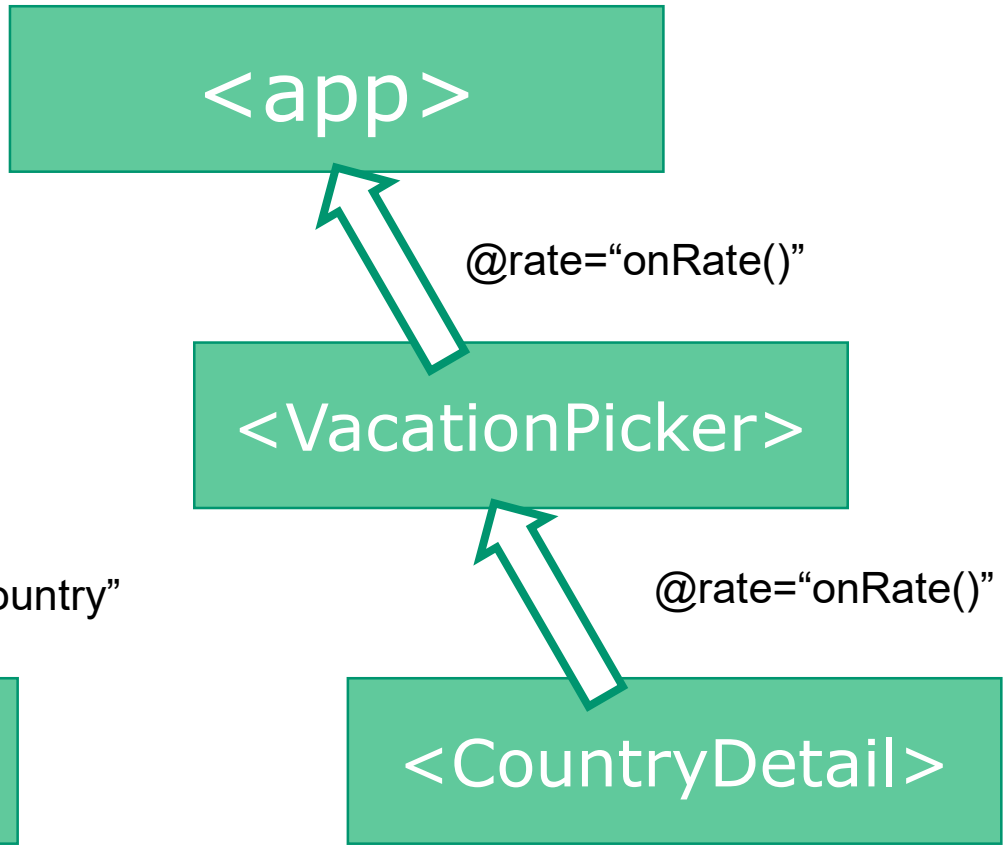

Vue vacation picker
USA
Capital: Washington
my rating: 4
<< Back
Forward >>
Hide details
USA
1
+1
-1
USA
Washington

Summary

Parent → Child

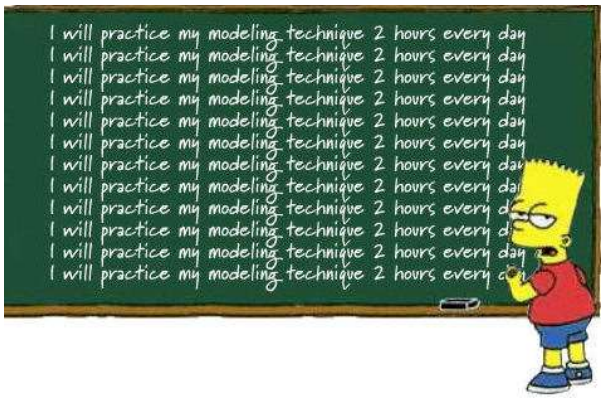


Child → Parent



Workshop

- Use `../220-emit-events` as a source, or use your own project
- Add a `favorite` event to the CountryDetail component, so a user can mark a country as favorite.
  - Update the data model with a `favorite` property.
  - Update the child component to `$emit` the event.
  - Update the parent component to receive and handle the event
- Generic example: `../220-emit-events`



Injecting content

Using slots on the child component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Inject data into a component

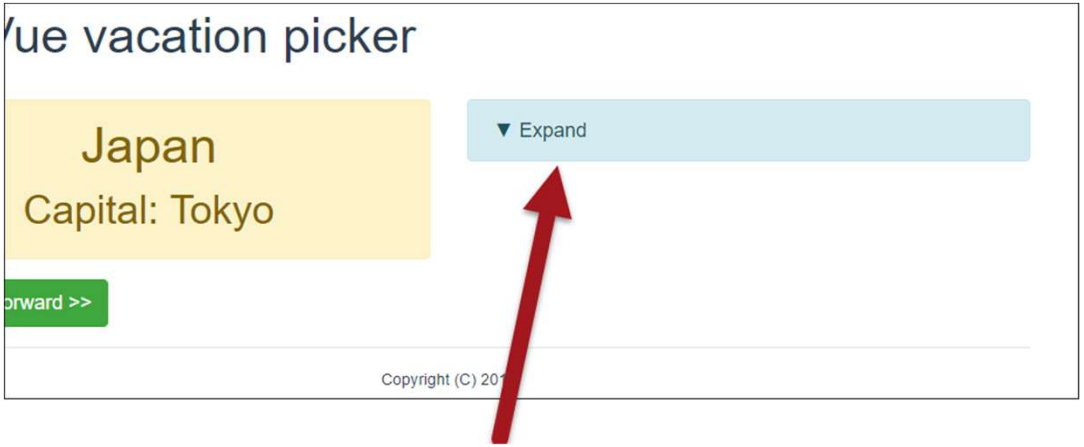
- Sometimes you want to create a component that you can pass content into.
- This component is responsible for showing the data in the right place.
- For instance, we want `<CountryDetail />` to be in a collapsible `div`.
  - The show/hide content is on the header of this `div`, instead of somewhere else
- The structure then becomes like:

```
<CollapsibleSection>
    <CountryDetail @rating="onRating($event)"
                   :country="country" />
</CollapsibleSection>
```

https://vuejs.org/v2/guide/components-slots.html

Reusing components

- We create a reusable component `<CollapsibleSection />`, that takes all kinds of content
- Best practice: put reuseables in a `\shared` folder
- We can then also simplify our parent component
  - No more button needed (as the `CollapsibleSection` is responsible for showing/hiding content)
  - No more variable and `v-if` needed on the `CountryDetail` component (idem).



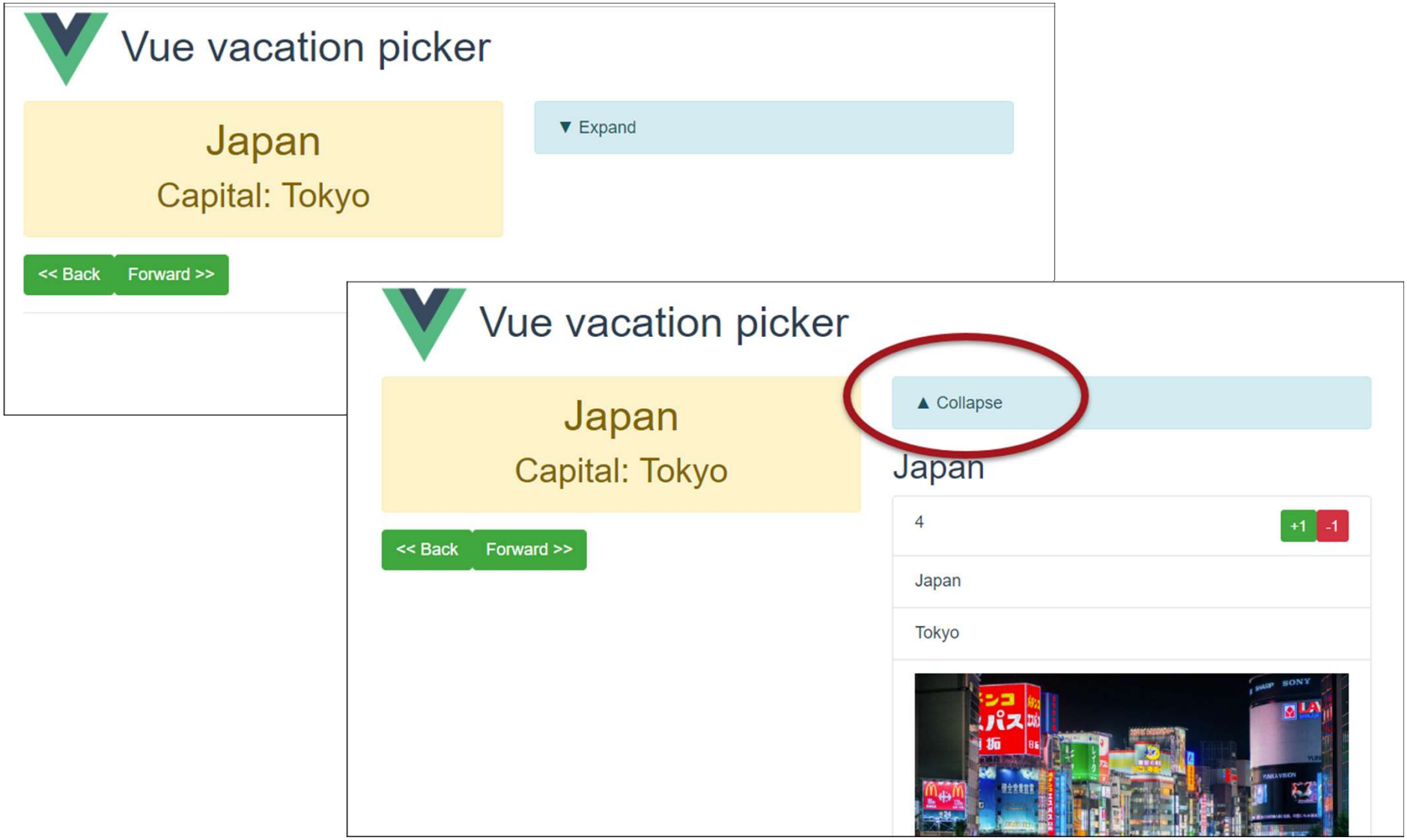
Structure of `CollapsibleSection`

Just a template and a toggle/flag `open`:

```
<template>
    <div>
        <div class="alert alert-info" style="cursor: pointer">
            <span v-if="open" @click="open = !open">&#x25B2; Collapse</span>
            <span v-if="!open" @click="open = !open">&#x25BC; Expand</span>
        </div>
        <!--Injected content here-->
        <slot v-if="open"></slot>
    </div>
</template>

<script>
   export default {
      name: "CollapsibleSection",
        data(){
         return {
            open: false
         }
        }
   }
</script>
```

- The `&#x25B2` is just the HTML code for up/down arrow
- We use a simple bootstrap `alert` class here
- We give the header a `style` so a cursor is shown
- The `<slot>` is where the magic happens
- It is only visible if the collapsible is `open`

Result


Vue vacation picker
Japan
Capital: Tokyo
▼ Expand
<< Back
Forward >>
Vue vacation picker
Japan
Capital: Tokyo
▲ Collapse
Japan
4
+1
-1
Japan
Tokyo

Extra info on `<slot>` 's

- You can add default content inside a slot, like so:
  - `<slot> <div>…my default content…</div> </slot>`
- We can pass data into shared/reusable/slot component with props like normal.
- As you saw, slots can contain, HTML, or other components.
- We can have multiple slots on a component (see next slide)
  - Every slot gets its own `name`
  - You can target a slot by using its `name` in the parent component
  - Unnamed slots act as a 'catch all' slot for unnamed content

Multiple slots in a component

```
<div class="container">
    <slot name="header"></slot>
    <slot></slot>
    <slot name="footer"></slot>
</div>
```

Option 1: using `template` tag

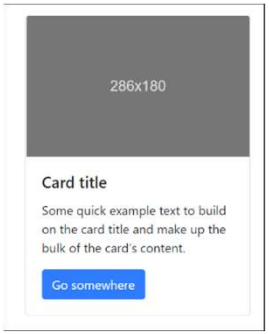
```
<template slot="header">
    <h1>This is the page title</h1>
</template>
<p>No name - so a paragraph for the main content.</p>
<p>And another one.</p>
<template slot="footer">
    <p>Footer contains contact info, disclaimer, etc</p>
</template>
```

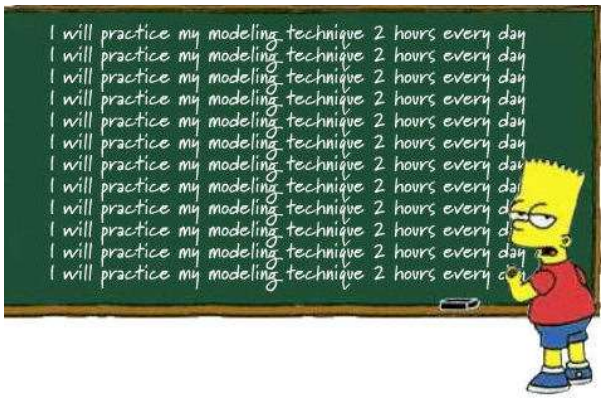
Option 2: simple HTML, using the `slot` attribute

```
<h1 slot="header">This is the page title</h1>

<p>No name - so a paragraph for the main content.</p>
<p>And another one.</p>

<p slot="footer">Footer contains contact info, disclaimer, etc</p>
```

Workshop

- Use `../230-slots` as a source, or use your own project
  - In your own project: create a generic component using slots
- In example project: Create a new component, designed as a Bootstrap `Card` component
  - Create a `.vue` component and use slots to inject content
  - Documentation: https://getbootstrap.com/docs/4.0/components/card/
  - Call this component inside the `CountryDetail` component and pass data to the correct slots.
  - I.e. We want your `CountryDetail` to look like a Bootstrap `Card`.
- Generic example: `../230-slots`





Animation

- You can animate content if you want to
  - Use the `<transition name="someName">…</transition>` element as a wrapper
  - Write CSS-classes providing the transformation / animation
- For instance:

```
<!--Injected content here-->
<transition name="fade">
    <slot v-if="open"></slot>
</transition>
```

```
<style scoped>
    .fade-enter-active, .fade-leave-active {
        transition: opacity .5s;
    }
    .fade-enter, .fade-leave-to {
        opacity: 0;
    }
</style>
```

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

Checkpoint

- You know how to pass data down the component chain by creating and using props.
- You know about extending props with types and validating props.
- You can pass data back up the component chain by creating and capturing custom events.
- You know about working with [multiple] slots in your project to project content from parent components.