Accessibility and Test Driven Development

A perfect match

Rita Castro | SDC:LX @ VW Digital Solutions | 2022-06-16 JS Nation

INTERNAL

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Hello ~~World~~ JS Nation!

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SOFTWARE DEVELOPMENT CENTER : LISBON

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Accessibility and Test Driven Development

“easily used or accessed by people with disabilities”

“adapted for use by people with disabilities”

“capable of being understood or appreciated and reached”

People talking vector created by pch.vector [Adapted]

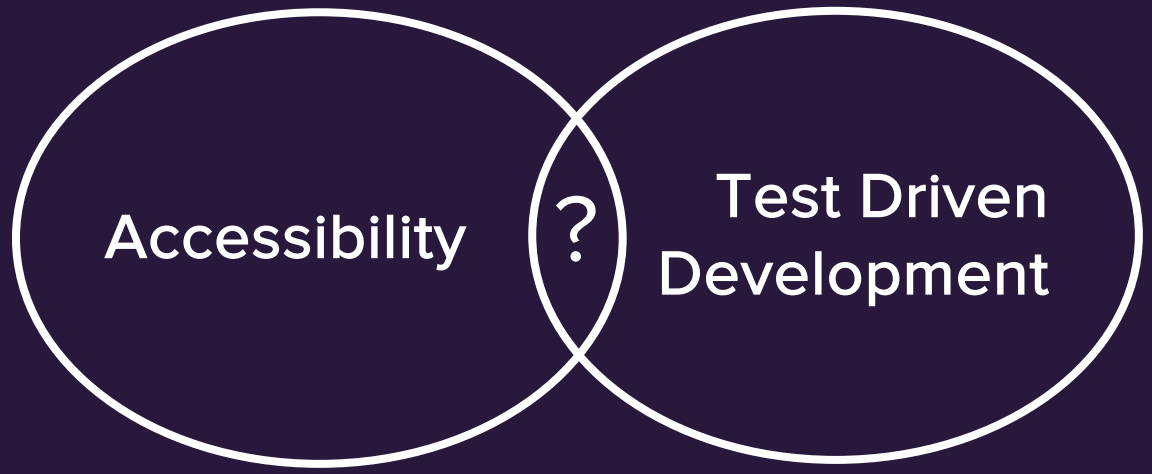
INTERNAL

Accessibility and Test Driven Development

”Software Requirements are converted into test cases before SW is developed”

https://en.wikipedia.org/wiki/Test-driven_development

INTERNAL



Bad food vector created by pch.vector - www.freepik.com [Adapted]

INTERNAL

Accessibility

a11y

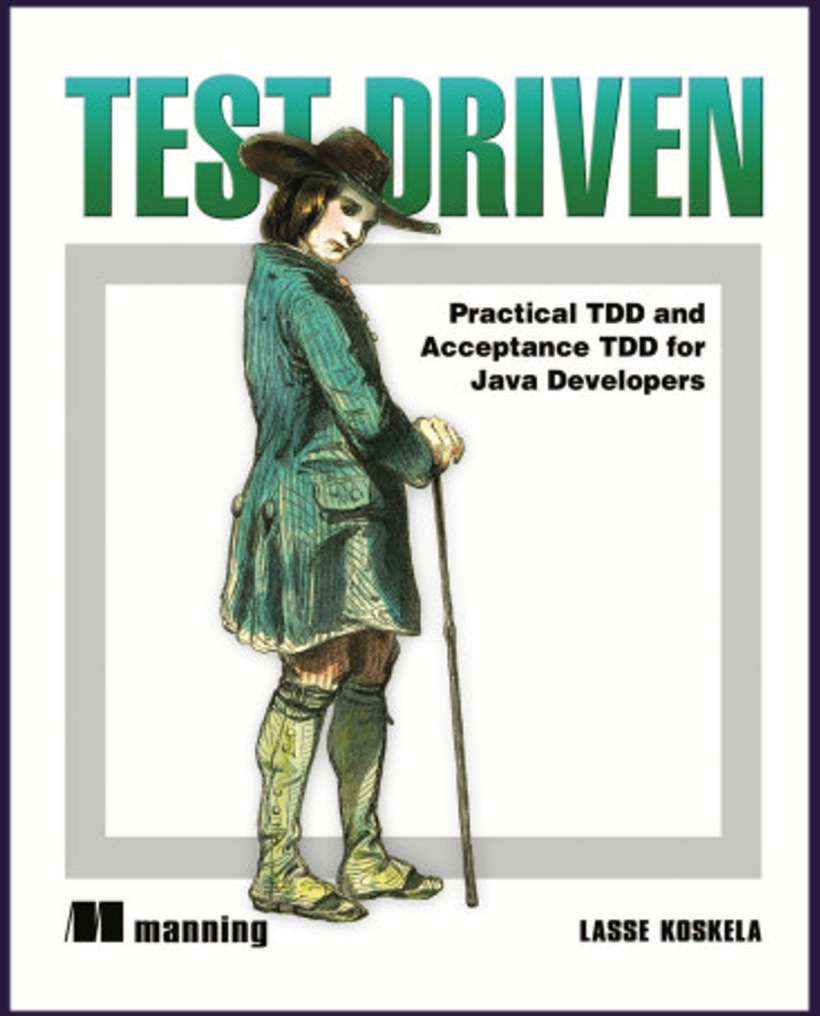
“enabling as many people as possible to use websites

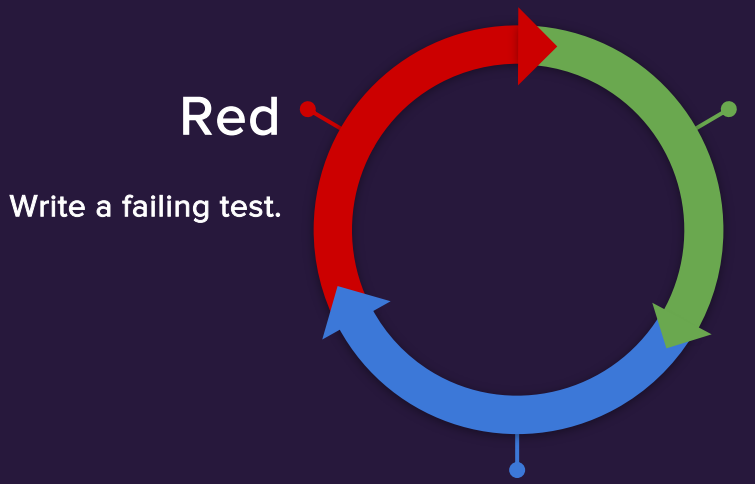
even when those people's abilities are limited in some way”

https://developer.mozilla.org/en-US/docs/Web/Accessibility

INTERNAL

Test Driven Development





Red

Write a failing test.

Green

Make the test pass. Be as lean as possible.

Refactor

Improve your tests and code.

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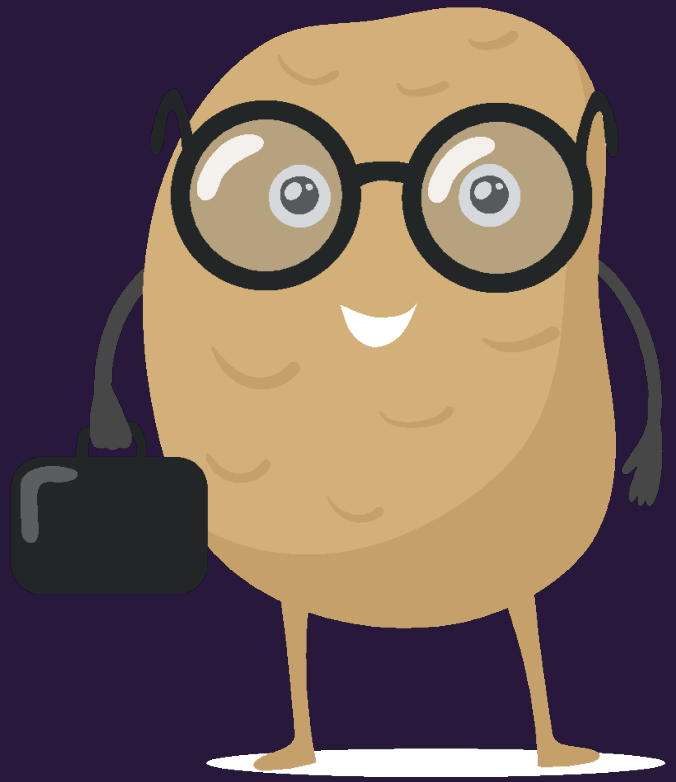
The Potato example



The User wants to be able to peel a potato.

With a knife?

  Does the knife have a wooden handle?

With a potato peeler?

  Sideways or cross-section?

We should boil the potato and peel it afterwards!

We should peel it top to bottom!

Vegetable cartoon vector created by pch.vector [Adapted]

INTERNAL

The Potato example

```
describe("The Potato example", () => {

    it("is peeled!", () => {
        // Arrange
        let potato = Farm.get("Potato")

        // Act
        potato.peel()

        // Assert
        expect(potato).toBePeeled()
    })
})
```

INTERNAL

JS Nation asks stuff

Personal details

Enter your name:

Enter your surname:

Enter your email:

Will you also attend React Summit?

Yes, of course! Wouldn't miss it!

Hangout Day

Are you going?

Yes, of course!
I can't :(

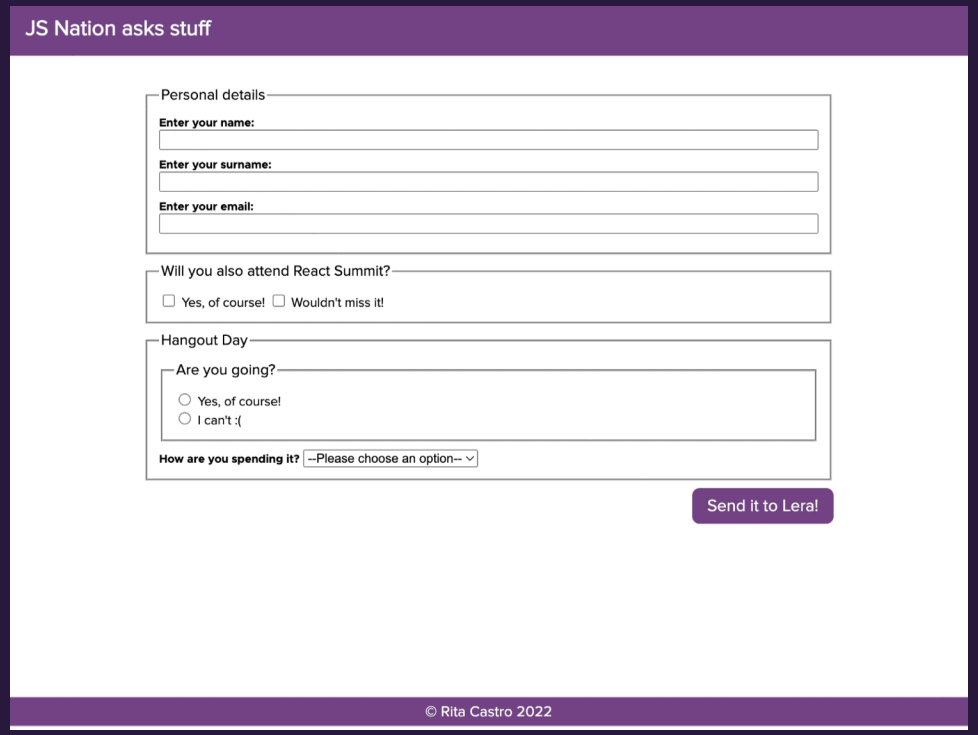
How are you spending it? --Please choose an option--

Send it to Lera!

INTERNAL

```
describe("Filling out Lera's form", () => {
    it ("we got this!", () => {
        // We open the page

        // In the page, we find the section of the Personal Details

        // We click "Enter your name" and...

        // ... we start typing on the input

        // We press tab to go for the "surname" field

        // ... and we keep tab'ing until we have filled the entire form

        // We look for the button with the text "Send it to Lera"...

        // ... and we click it!

        // The End :)
    })
})
```

INTERNAL


JS Nation asks stuff
Personal details
Enter your name:
Enter your surname:
Enter your email:
Will you also attend React Summit?
Yes, of course!
Wouldn't miss it!
Hangout Day
Are you going?
Yes, of course!
I can't :(
How are you spending it?
--Please choose an option--
Send it to Lera!
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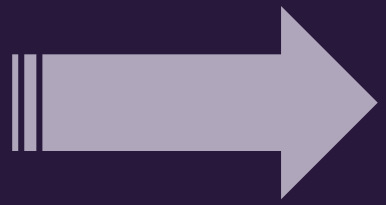

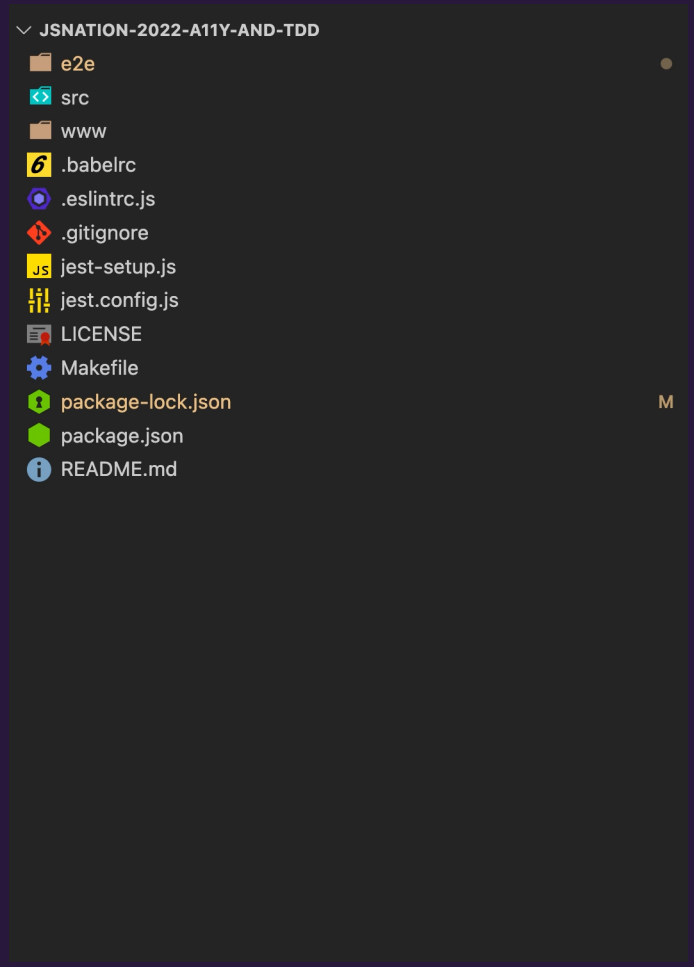
JSNATION-2022-A11Y-AND-TDD
e2e
src
www
.babelrc
.eslintrc.js
.gitignore
jest-setup.js
jest.config.js
LICENSE
Makefile
package-lock.json
M
package.json
README.md

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Atomic Design

It “details all that goes into creating and maintaining robust design systems, allowing you to roll out higher quality, more consistent UIs faster than ever before".

Atoms Molecules Organisms Templates Pages

[Brad Frost, https://bradfrost.com/blog/post/atomic-web-design/]

INTERNAL

`text-input` molecule


```
import "./text-input"

describe("text-input module", () => {

    it("has the title and the input box", () => {
        document.body.innerHTML = `<text-input></text-input>`

        expect(document.body.querySelector("p")).toHaveTextContent("Hi, welcome")

        expect(document.body.querySelector("input")).toBeInTheDocument()
    })
})
```

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`text-input` molecule

```
FAIL src/ui/molecules/text-input/text-input.test.js
  text-input module
    × has the title and the input box (13 ms)

  ● text-input module › has the title and the input box

    expect(received).toHaveTextContent()

    received value must be a Node.
    Received has value: null

       6 |         document.body.innerHTML = `<text-input></text-input>`
       7 |
     > 8 |         expect(document.body.querySelector("p")).toHaveTextContent("Hi, welcome")
         |                                                  ^
       9 |
      10 |         expect(document.body.querySelector("input")).toBeInTheDocument()
      11 |     })

      at __EXTERNAL_MATCHER_TRAP__ (node_modules/expect/build/index.js:346:30)
      at Object.throwingMatcher [as toHaveTextContent] (node_modules/expect/build/index.js:347:15)
      at Object.toHaveTextContent (src/ui/molecules/text-input/text-input.test.js:8:50)
```

INTERNAL

`text-input` molecule

```
class TextInput extends HTMLElement {

    constructor() {
        super()
    }

    connectedCallback() {
      this.innerHTML = `
        <p>Hi, welcome</p>
        <input/>
      `
    }
}

window.customElements.define("text-input", TextInput)
```

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL

PASS src/ui/molecules/text-input/text-input.test.js
  text-input module
    √ has the title and the input box (15 ms)
```

INTERNAL

`text-input` molecule

```
import "./text-input"

describe("text-input module", () ⇒ {

    it ("has a custom title and is a controlled input", () ⇒ {

        document.body.innerHTML = `<text-input title="Some random title" value="Awesome"></text-input>`

        expect(document.body.querySelector("p")).toHaveTextContent("Some random title")
        expect(document.body.querySelector("input")).toHaveValue("Awesome")
    })
})
```

INTERNAL

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`text-input` molecule

```
FAIL src/ui/molecules/text-input/text-input.test.js
  text-input module
    √ has the title and the input box (13 ms)
    × has a custom title and is a controlled input (4 ms)

  ● text-input module › has a custom title and is a controlled input

    expect(element).toHaveTextContent()

    Expected element to have text content:
      Some random title
    Received:
      Hi, welcome

      15 |         document.body.innerHTML = `<text-input title="Some random title" value="Awesome"></text-input>`
      16 |
    > 17 |         expect(document.body.querySelector("p")).toHaveTextContent("Some random title")
         |                                                  ^
      18 |         expect(document.body.querySelector("input")).toBeInTheDocument()
      19 |     })
      20 | })

      at Object.toHaveTextContent (src/ui/molecules/text-input/text-input.test.js:17:50)

Test Suites: 2 failed, 2 total
Tests:       1 failed, 1 passed, 2 total
Snapshots:   0 total
Time:        1.304 s, estimated 2 s
```

INTERNAL

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`text-input` molecule

```
class TextInput extends HTMLElement {

  constructor() {
    super()
    this.value = this.getAttribute("value")
  }

  connectedCallback() {
    this.innerHTML = `
        ${this.title}
        <input value=${this.value}></input>`
  }
}

window.customElements.define("text-input", TextInput)
```

INTERNAL

`text-input` molecule

Attributes

The `<input>` element is so powerful because of its attributes; the `type` attribute, described with examples above, being the most important. Since every `<input>` element, regardless of type, is based on the `HTMLInputElement` interface, they technically share the exact same set of attributes. However, in reality, most attributes have an effect on only a specific subset of input types. In addition, the way some attributes impact an input depends on the input type, impacting different input types in different ways.

This section provides a table listing all the attributes with a brief description. This table is followed by a list describing each attribute in greater detail, along with which input types they are associated with. Those that are common to most or all input types are defined in greater detail below. Attributes that are unique to particular input types—or attributes which are common to all input types but have special behaviors when used on a given input type—are instead documented on those types' pages.

Attributes for the `<input>` element include the global HTML attributes and additionally:

Attribute	Type or Types	Description
`accept`	file	Hint for expected file type in file upload controls
`alt`	image	alt attribute for the image type. Required for accessibility
`autocomplete`	all	Hint for form autofill feature
`capture`	file	Media capture input method in file upload controls
`checked`	radio, checkbox	Whether the command or control is checked
`dirname`	text, search	Name of form field to use for sending the element's directionality in form submission
`disabled`	all	Whether the form control is disabled

Restrictions vector created by pch.vector [Adapted]

INTERNAL

Teamwork people vector created by pch.vector [Adapted]

INTERNAL

form organism

```
import "./form"

describe("form organism", () => {

    it ("asks for first name and last name and sends it", () => {
        document.body.innerHTML = `<jsnation-form></jsnation-form>`

        expect(document.body.querySelector("p")).toHaveTextContent("First Name")
        expect(document.body.querySelector("p")).toHaveTextContent("Last Name")

        expect(document.body.querySelector("button")).toHaveTextContent("Send it to Lera!")
    })
})
```

INTERNAL

form organism

```
import "../../molecules/text-input/text-input"

class JsNationForm extends HTMLElement {

    constructor() {
        super()
    }

    connectedCallback() {
      this.innerHTML = `
        <text-input title="First Name"></text-input>
        <text-input title="Last Name"></text-input>

        <button>Send it to Lera!</button>
      `
    }
}

window.customElements.define("jsnation-form", JsNationForm)
```

INTERNAL

form organism

```
FAIL src/ui/organisms/form/form.test.js
  form organism
    × asks for first name and last name and sends it (20 ms)

  ● form organism › asks for first name and last name and sends it

    expect(element).toHaveTextContent()

    Expected element to have text content:
      Last Name
    Received:
      First Name

       7 |
       8 |         expect(document.body.querySelector("p")).toHaveTextContent("First Name")
     > 9 |         expect(document.body.querySelector("p")).toHaveTextContent("Last Name")
         |                                                  ^
      10 |
      11 |         expect(document.body.querySelector("button")).toHaveTextContent("Send it to Lera!")
      12 |     })

      at Object.toHaveTextContent (src/ui/organisms/form/form.test.js:9:50)
      at TestScheduler.scheduleTests (node_modules/@jest/core/build/TestScheduler.js:317:13)
      at runJest (node_modules/@jest/core/build/runJest.js:407:19)

Test Suites: 1 failed, 1 total
Tests:       1 failed, 1 total
Snapshots:   0 total
Time:        0.491 s, estimated 1 s
Ran all test suites matching /src\/ui\/organisms\/form\/form\.test\.js/i.

Watch Usage: Press w to show more.
```

INTERNAL

form organism

```
FAIL src/ui/organisms/form/form.test.js
  form organism
    × asks for first name and last name and sends it (20 ms)

  ● form organism › asks for first name and last name and sends it

    expect(element).toHaveTextContent()

    Expected element to have text content:
      Last Name
    Received:
      First Name

       7 |
       8 |         expect(document.body.querySelector("p")).toHaveTextContent("First Name")
     > 9 |         expect(document.body.querySelector("p")).toHaveTextContent("Last Name")
         |                                                  ^
      10 |
      11 |         expect(document.body.querySelector("button")).toHaveTextContent("Send it to Lera!")
      12 |     })

      at Object.toHaveTextContent (src/ui/organisms/form/form.test.js:9:50)
      at TestScheduler.scheduleTests (node_modules/@jest/core/build/TestScheduler.js:317:13)
      at runJest (node_modules/@jest/core/build/runJest.js:407:19)

Test Suites: 1 failed, 1 total
Tests:       1 failed, 1 total
Snapshots:   0 total
Time:        0.491 s, estimated 1 s
Ran all test suites matching /src\/ui\/organisms\/form\/form\.test\.js/i.

Watch Usage: Press w to show more.
```

INTERNAL

form organism

```
import "./form"

describe("form organism", () => {

    it ("asks for first name and last name and sends it", () => {
        document.body.innerHTML = `<jsnation-form></jsnation-form>`

        expect(document.body.querySelectorAll("p")[0]).toHaveTextContent("First Name")
        expect(document.body.querySelectorAll("p")[1]).toHaveTextContent("Last Name")

        expect(document.body.querySelector("button")).toHaveTextContent("Send it to Lera!")
    })
})
```

```
PASS src/ui/organisms/form/form.test.js
  form organism
    √ asks for first name and last name and sends it (5 ms)

Test Suites: 1 passed, 1 total
Tests:       1 passed, 1 total
Snapshots:   0 total
Time:        0.255 s, estimated 1 s
Ran all test suites matching /src\/ui\/organisms\/form\/form\.test\.js/i.

Watch Usage: Press w to show more.
```

INTERNAL

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form organism

```
connectedCallback() {
  this.innerHTML = `
  <text-input title="Last Name"></text-input>
  <text-input title="First Name"></text-input>

  <button>Send it to Lera!</button>
  `
  const button = this.querySelector("button")
  button.addEventListener("click", () => {
    this.dispatchEvent(
      new CustomEvent("onClick")
    )
  })
```

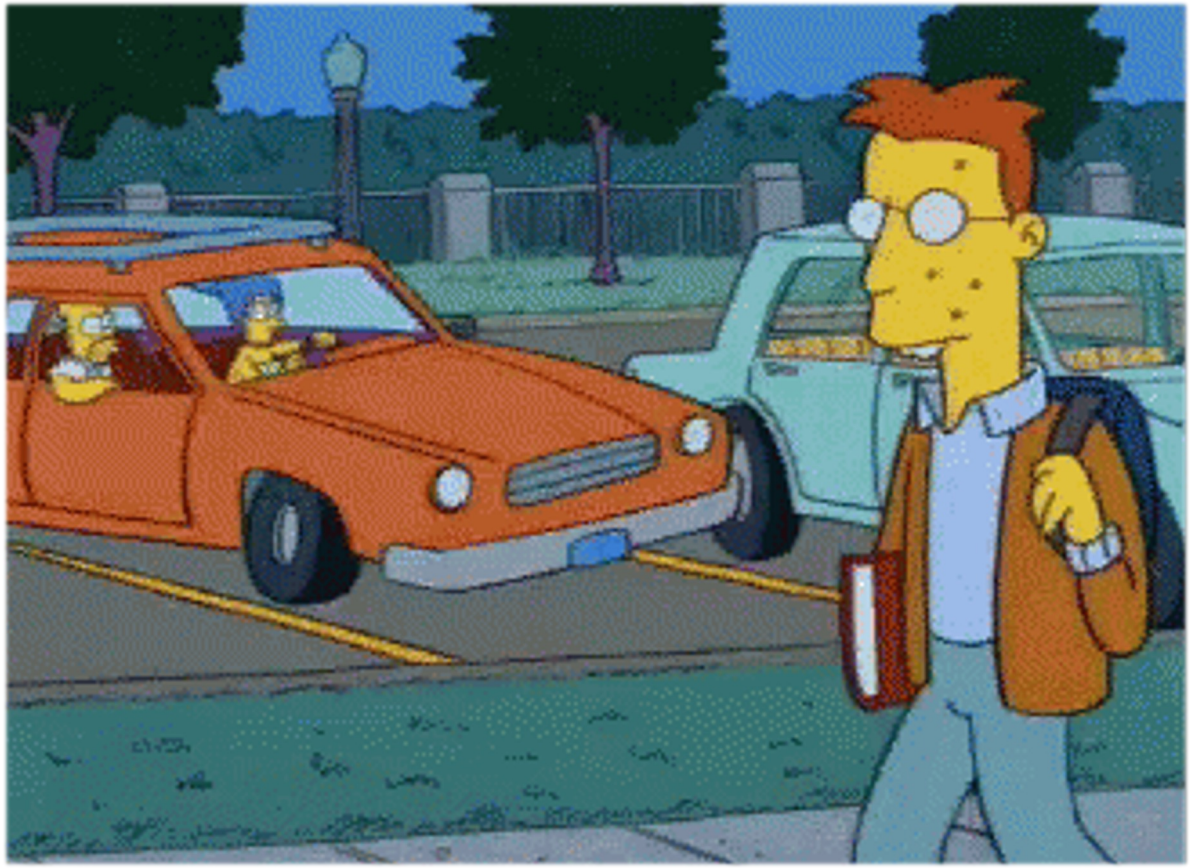
```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL

FAIL src/ui/organisms/form/form.test.js
  form organism
    × asks for first name and last name and sends it (6 ms)

  ● form organism › asks for first name and last name and sends it

    expect(element).toHaveTextContent()

    Expected element to have text content:
      First Name
    Received:
      Last Name

       9 |         form.addEventListener("onClick", sendItFn)
      10 |
    > 11 |         expect(document.body.querySelectorAll("p")[0]).toHaveTextContent("First Name")
         |                                                        ^
      12 |         expect(document.body.querySelectorAll("p")[1]).toHaveTextContent("Last Name")
      13 |
      14 |         const sentItButton = document.body.querySelector("button")

      at Object.toHaveTextContent (src/ui/organisms/form/form.test.js:11:56)
      at TestScheduler.scheduleTests (node_modules/@jest/core/build/TestScheduler.js:317:13)
      at runJest (node_modules/@jest/core/build/runJest.js:407:19)

Test Suites: 1 failed, 1 total
Tests:       1 failed, 1 total
Snapshots:   0 total
Time:        0.302 s, estimated 1 s
Ran all test suites matching /src\/ui\/organisms\/form\/form\.test\.js/i.
```

INTERNAL

a11 and TDD: A perfect match

localhost:8000

JS Nation asks stuff



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The more your tests resemble the way your software is used, the more confidence they can give you.

[Kent C. Dodds, https://twitter.com/kentcdodds/status/977018512689455106?lang=en]

INTERNAL

```
import { screen } from "@testing-library/dom"
import userEvent from "@testing-library/user-event"
import "./form"

describe("form organism", () => {
    it("asks for first name and last name", () => {
        document.body.innerHTML = "<jsnation-form></jsnation-form>"

        expect(screen.getByText("Last Name")).toBeInTheDocument()
        expect(screen.getByText("First Name")).toBeInTheDocument()

        expect(screen.getByRole("button", { name: "Send it to Lera!" })).toBeInTheDocument()
    })
})
```

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About labels...

“a small piece of paper (…) attached to an object and giving information about it”

The **`<label>`** HTML element represents a caption for an item in a user interface.

INTERNAL

INTERNAL

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`text-input` molecule revisited

```
import {screen} from "@testing-library/dom"
import "./text-input"

describe("text-input module", () => {

  it ("has a label and is a controlled input", () => {
    document.body.innerHTML = `
      <text-input labelText="Some random label" name="text" value="Awesome"></text-input>
    `
    expect(screen.getByLabelText("Some random label")).toBeInTheDocument()

    const input = screen.getByRole("textbox", {name: "Some random label"})
    expect(input).toHaveValue("Awesome")
    expect(input).toHaveAttribute("name", "text")
  })
})
```

INTERNAL

```
FAIL src/ui/molecules/text-input/text-input.test.js
  text-input module
    × has a custom title and is a controlled input (8 ms)

  ● text-input module › has a custom title and is a controlled input

    TestingLibraryElementError: Unable to find a label with the text of: Some random title

    Ignored nodes: comments, <script />, <style />
    <body>
      <text-input
        title="Some random title"
        value="Awesome"
      >


        <p>
          Some random title
        </p>


        <input
          value="Awesome"
        />


      </text-input>
    </body>
```

INTERNAL

```
class TextInput extends HTMLElement {

    constructor() {
        super()
        this.value = this.getAttribute("value")
        this.labelText = this.getAttribute("labelText")
        this.name = this.getAttribute("name")
    }

    connectedCallback() {
        this.innerHTML = `
          <label for="${this.name}">
            ${this.labelText}
          </label>
          <input id="${this.name}" name="${this.name}" value=${this.value}></input>
        `
    }
}

window.customElements.define("text-input", TextInput)
```

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```
it ("populates data and sends it", async() => {
  const sendItFn = jest.fn()
  document.body.innerHTML = "<jsnation-form></jsnation-form>"
  const form = document.body.querySelector("jsnation-form")
  form.addEventListener("onSubmit", sendItFn)

  expect(screen.getByRole("form")).toBeInTheDocument()

  const firstNameInput = screen.getByLabelText("First Name")
  userEvent.click(firstNameInput)

  await userEvent.type(firstNameInput, "Rita")
  expect(firstNameInput).toHaveValue("Rita")

  userEvent.tab()
  expect(screen.getByLabelText("Last Name")).toHaveFocus()

  const lastNameInput = screen.getByRole("textbox", {name: "Last Name"})
  await userEvent.type(lastNameInput, "Castro")

  expect(lastNameInput).toHaveValue("Castro")

  await userEvent.click(screen.getByRole("button"))
  expect(sendItFn).toHaveBeenCalledWith(
    new CustomEvent({detail: {firstName: "Rita", lastName: "Castro"}})
  )
})
```

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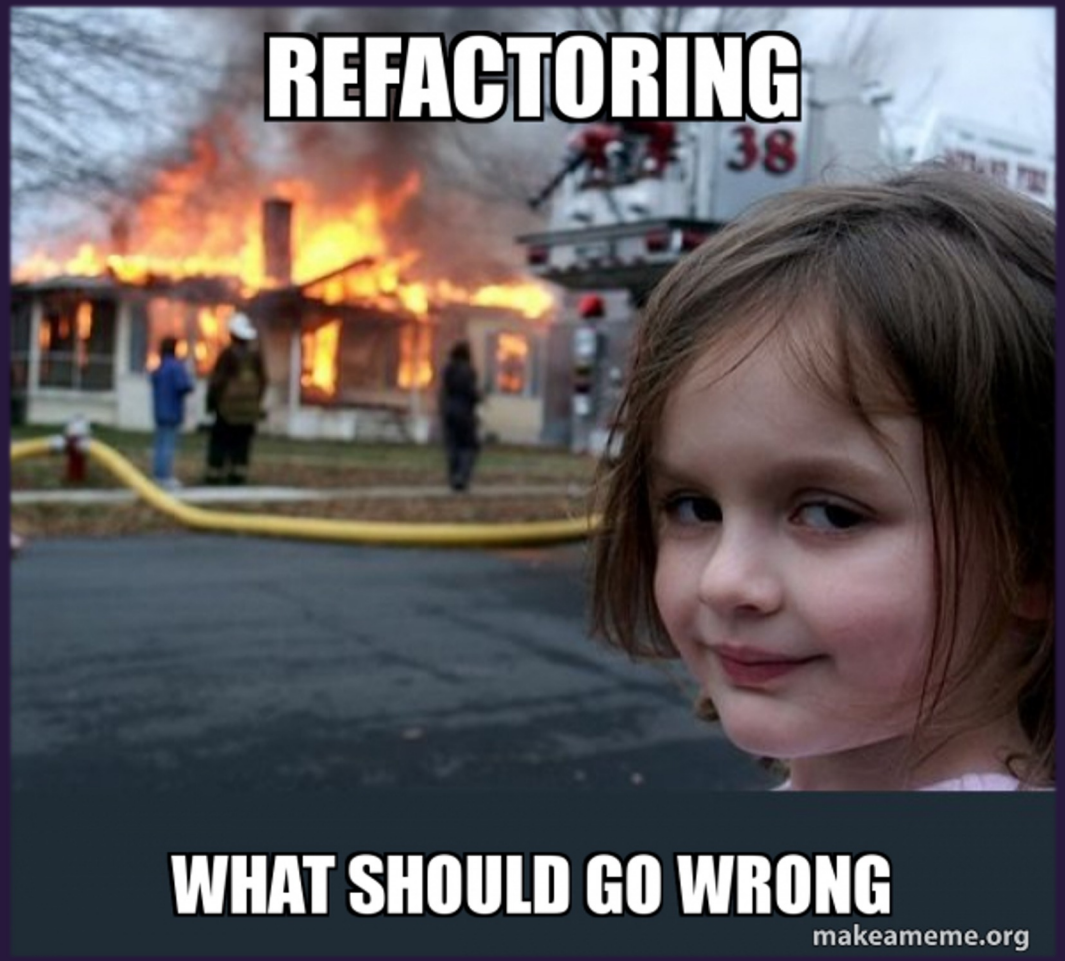
```
PASS src/ui/organisms/form/form.test.js
  form organism
    ✓ asks for first name and last name and sends it (30 ms)
    ✓ populates data and sends it (94 ms)

Test Suites: 1 passed, 1 total
Tests:       2 passed, 2 total
Snapshots:   0 total
Time:        0.385 s, estimated 1 s
Ran all test suites matching /src\/ui\/organisms\/form\/form\.test\.js/i.

Watch Usage: Press w to show more.
```

INTERNAL

Refactor time!



INTERNAL

personal-details organism

```
import "../../molecules/text-input/text-input"

class PersonalDetails extends HTMLElement {

  constructor() {
    super()
  }

  connectedCallback() {
    this.innerHTML = `
        <fieldset name="Personal details">
          <legend>Personal details</legend>

          <text-input labelText="Enter your name:" name="firstName" value=""></text-input>
          <text-input labelText="Enter your surname:" name="lastName" value=""></text-input>
          <text-input type="email" labelText="Enter your email:" name="email" value=""></text-input>

        </fieldset>
      `
  }
}

window.customElements.define("personal-details", PersonalDetails)
```

INTERNAL

```
import "../personal-details/personal-details"

class JsNationForm extends HTMLElement {

  constructor() {
    super()
    this.sendIt = this.getAttribute("sendIt")
  }

  connectedCallback() {
    this.innerHTML = `
      <form name="jsnation">

        <personal-details></personal-details>

        <input type="submit" value="Send it to Lera!" />
      </form>
    `

    // Submitting the data
```

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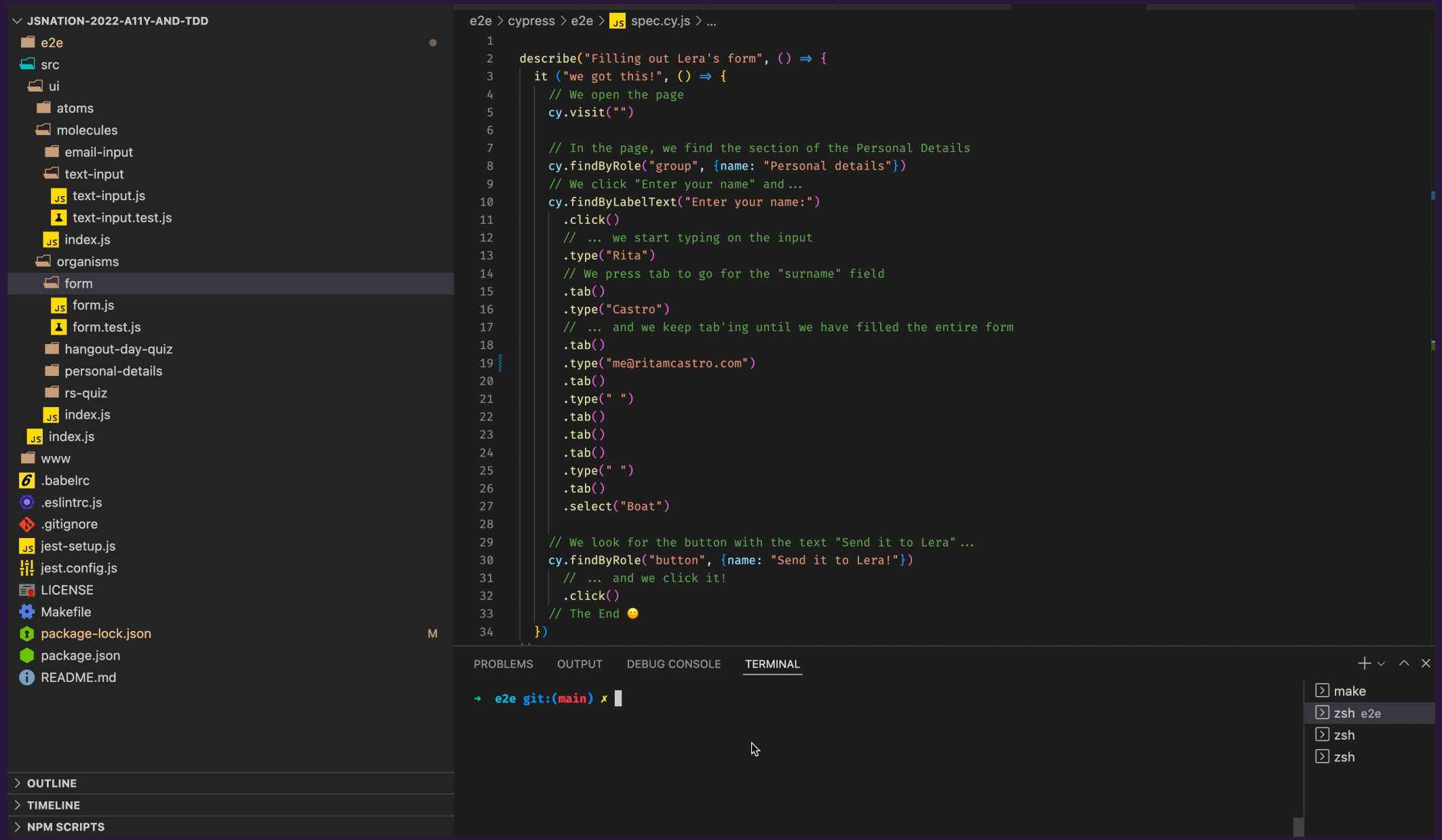
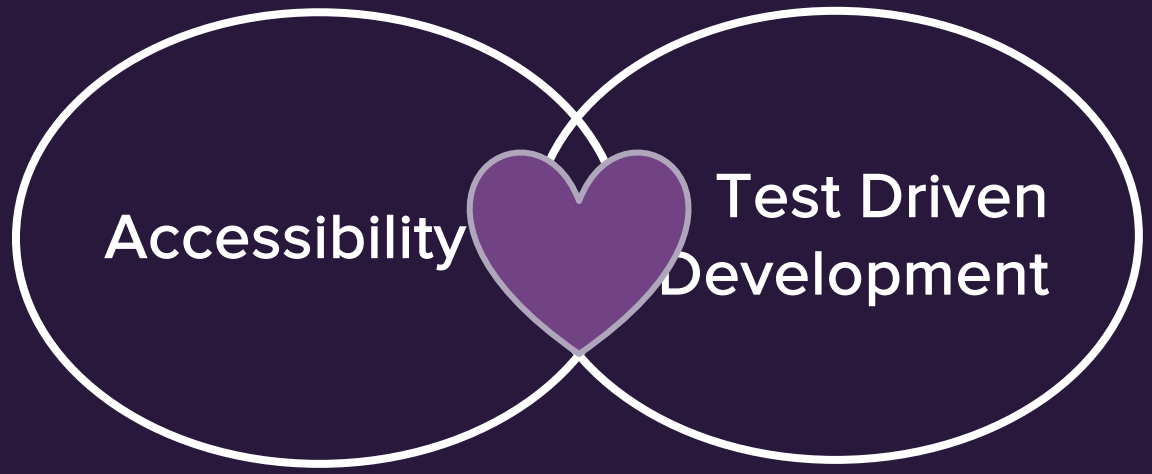


SOON https://github.com/ritamcastro/jsnation-2022-a11y-and-tdd

INTERNAL



To transform User Stories into tests that drive the implementation of websites (and tests) that are capable of being understood and appreciated.

By all of us.

INTERNAL

Thank you!

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https://github.com/ritamcastro

ritamcastro@gmail.com

https://www.linkedin.com/in/ritamcastro

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