

Unit Testing React & Redux

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Slides: github.com/djkirby/react-symposium-unit-testing



Overview

- What is unit testing, benefits
- Automated javascript testing
- Unit testing redux
- Unit testing React components
- Real world examples
- Visual testing (Storybook)
- Resources

- **What is unit testing, benefits**
- Automated javascript testing
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What is Unit Testing

unit test

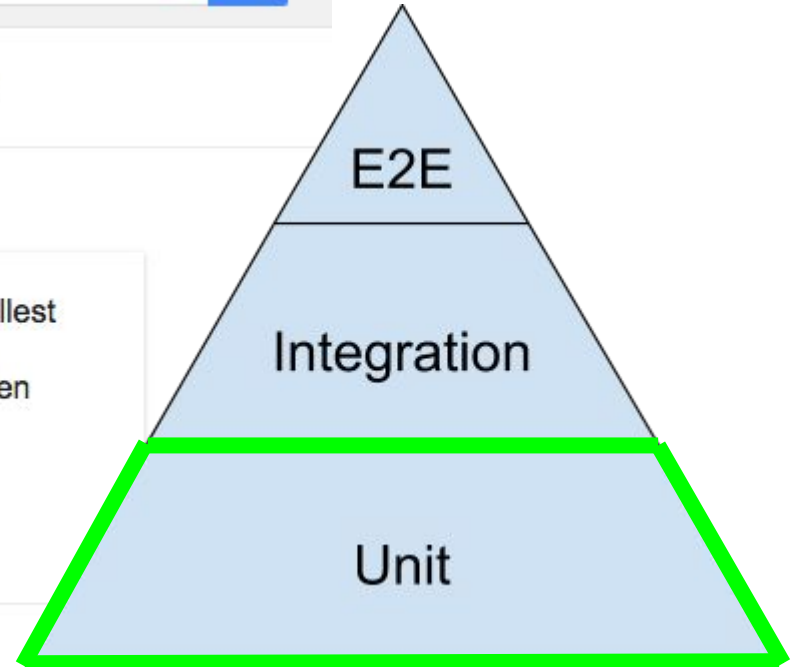
All Books Images Videos News More Search tools

About 30,700,000 results (0.53 seconds)

Unit testing is a software development process in which the smallest testable parts of an application, called units, are individually and independently scrutinized for proper operation. **Unit testing** is often automated but it can also be done manually.

[What is unit testing? - Definition from WhatIs.com](#)
searchsoftwarequality.techtarget.com/definition/unit-testing

More about Unit testing



Why unit test?

- Check our code behaves as we expect it to
- Check our code handles edge cases/errors correctly
- Check our code is syntactically correct (especially in a dynamic language)
- Reduce dependency on end-to-end tests - faster, more accurate
- Tests act as "executable documentation" for our code
- Tests enable refactoring with confidence
- Tests can help us write better code

April 2016 London React User Group



Red Badger



500

<https://www.youtube.com/watch?v=kkqArkYV4fw>

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javascript test runner



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About 1,800,000 results (0.44 seconds)

Karma - Spectacular Test Runner for Javascript

<https://karma-runner.github.io/> ▾

Brings a productive **testing** environment to developers.

[How It Works](#) · [Installation](#) · [Configuration File](#) · [Configuration](#)

GitHub - avajs/ava: Futuristic JavaScript test runner

<https://github.com/avajs/ava> ▾

Even though **JavaScript** is single-threaded, IO in Node.js can happen in parallel due to its **async** nature. AVA takes advantage of this and runs your **tests** concurrently, which is especially beneficial for IO heavy **tests**. ... Switching from Mocha to AVA in Pageres brought the **test** time ...

Wallaby - intelligent test runner for JavaScript, TypeScript, and ...

<https://wallabyjs.com/> ▾

Smart and fast **test** runner for **JavaScript**/**TypeScript**/**CoffeeScript**, it enables continuous testing, TDD and BDD with instant feedback in your text editor.

Mocha - the fun, simple, flexible JavaScript test framework

<https://mochajs.org/> ▾

Mocha is a feature-rich **JavaScript** test framework running on Node.js and in the browser, making which contains a Mocha **test** runner, among other things.

Chutzpah - A JavaScript Test Runner - Home

<https://chutzpah.codeplex.com/> ▾

Sep 16, 2014 - Open source **test** runner which runs unit tests using QUnit, Jasmine, Mocha, CoffeeScript and TypeScript.

In your editor:

```
var assert = require('chai').assert;
describe('Array', function() {
  describe('#indexOf()', function () {
    it('should return -1 when the value is not present', function () {
      assert.equal(-1, [1,2,3].indexOf(5));
      assert.equal(-1, [1,2,3].indexOf(0));
    });
  });
});
```

Back in the terminal:

```
$ mocha
```

```
.
```

```
✓ 1 test complete (1ms)
```

setup -> exercise -> verify -> teardown

```
describe('Array#length', () => {  
  const myList = [1, 2, 3, 4]; // Setup  
  const count = myList.length; // Exercise  
  it('returns the number of items in the array', () => {  
    expect(count).toEqual(4); // Verify  
  });  
});
```

<http://www.agile-code.com/blog/the-anatomy-of-a-unit-test/>

chai

Should

```
chai.should();

foo.should.be.a('string');
foo.should.equal('bar');
foo.should.have.length(3);
tea.should.have.property('flavors')
  .with.length(3);
```

[Visit Should Guide](#) ➔

Expect

```
var expect = chai.expect;

expect(foo).to.be.a('string');
expect(foo).to.equal('bar');
expect(foo).to.have.length(3);
expect(tea).to.have.property('flavors')
  .with.length(3);
```

[Visit Expect Guide](#) ➔

Assert

```
var assert = chai.assert;

assert.typeOf(foo, 'string');
assert.equal(foo, 'bar');
assert.lengthOf(foo, 3);
assert.property(tea, 'flavors');
assert.lengthOf(tea.flavors, 3);
```

[Visit Assert Guide](#) ➔

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Testing redux action creators

```
const addTodo = text => ({ type: 'ADD_TODO', text });

describe('add todo action', () => {
  it('should create an action to add a todo', () => {
    const action = addTodo('Give presentation');
    const expectedAction = { type: 'ADD_TODO', text: 'Give presentation' };
    expect(action).to.deep.equal(expectedAction);
  });
});
```

Testing redux reducers

```
const todos = (state = [], action) => {  
  switch (action.type) {  
    case 'ADD_TODO':  
      return [...state, action.text];  
    default:  
      return state;  
  }  
};
```

```
describe('todos reducer', () => {  
  it('should return the initial state', () => {  
    const newState = todos(undefined, {});  
    expect(newState).to.deep.equal([]);  
  });  
  
  it('should handle ADD_TODO', () => {  
    const action = { type: 'ADD_TODO', text: 'Mow the lawn' };  
    const newState = todos(['Give presentation'], action);  
    expect(newState).to.deep.equal(['Give presentation', 'Mow the lawn']);  
  });  
});
```

```
it('should handle many actions', () => {  
  const actions = [  
    { type: 'ADD_TODO', text: 'foo' },  
    { type: 'ADD_TODO', text: 'bar' },  
    { type: 'ADD_TODO', text: 'baz' }  
  ];  
  const newState = actions.reduce(todos, []);  
  expect(newState).to.deep.equal(['foo', 'bar', 'baz']);  
});
```

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Unit Testing React Components

- Check it renders as expected given certain props/state
- Check it handles interactions as expected

- React addons test utils
- Enzyme

React Addons Test Utils

- Simulate events
- Render component into DOM
- Shallow render

Enzyme

- JavaScript Testing utility for React that makes it easier to assert, manipulate, and traverse your React Components' output
- Uses React test utilities, provides different interface to reduce boilerplate
- jQuery-like syntax
- Shallow rendering, full DOM rendering
- Guides for using w/ different test runners

chai-enzyme

Chai.js assertions and convenience functions for testing React Components with enzyme

```
expect(wrapper.find(Button)).to.have.length(1);
```

```
=> expect(wrapper).to.have.exactly(1).descendants(Button);
```

```
expect(wrapper.contains('Hello World')).to.be.true
```

```
=> expect(wrapper).to.contain('Hello World');
```

```
expect(wrapper.find('.my-button').hasClass('disabled')).to.be(true);
```

```
=> expect(wrapper).to.have.className('disabled');
```

Shallow Rendering

`shallow(node[, options]) => ShallowWrapper`

<code>at(index)</code>	<code>last()</code>
<code>childAt()</code>	<code>map(fn)</code>
<code>children()</code>	<code>not(selector)</code>
<code>closest(selector)</code>	<code>parent()</code>
<code>contains(nodeOrNodes)</code>	<code>parents()</code>
<code>context([key])</code>	<code>prop([key])</code>
<code>debug()</code>	<code>props()</code>
<code>equals(node)</code>	<code>reduce(fn[, initialValue])</code>
<code>every(selector)</code>	<code>reduceRight(fn[, initialValue])</code>
<code>everyWhere(predicate)</code>	<code>render()</code>
<code>filter(selector)</code>	<code>setContext(context)</code>
<code>filterWhere(predicate)</code>	<code>setProps(nextProps)</code>
<code>find(selector)</code>	<code>setState(nextState)</code>
<code>findWhere(predicate)</code>	<code>shallow([options])</code>
<code>first()</code>	<code>simulate(event[, data])</code>
<code>forEach(fn)</code>	<code>some(selector)</code>
<code>get(index)</code>	<code>someWhere(predicate)</code>
<code>hasClass(className)</code>	<code>state([key])</code>
<code>html()</code>	<code>text()</code>
<code>instance()</code>	<code>type()</code>
<code>is(selector)</code>	<code>unmount()</code>
	<code>update()</code>

```
const wrapper = shallow(  
  <Book  
    title="Huckleberry Finn"  
    cover={{  
      url: 'http://some.url/to/img.png',  
      width: 40,  
      height: 80  
    }}  
  />  
);  
console.log(wrapper.debug());
```

Outputs to console:

```
<div>  
  <h1 className="title">Huckleberry Finn</h1>  
  <BookCover cover={{...}} />  
</div>
```

Shallow Rendering

```
shallow(node[, options]) => ShallowWrapper
```

at(index)	last()
childAt()	map(fn)
children()	not(selector)
closest(selector)	parent()
contains(nodeOrNodes)	parents()
context([key])	prop([key])
debug()	props()
equals(node)	reduce(fn[, initialValue])
every(selector)	reduceRight(fn[, initialValue])
everyWhere(predicate)	render()
filter(selector)	setContext(context)
filterWhere(predicate)	setProps(nextProps)
find(selector)	setState(nextState)
findWhere(predicate)	shallow([options])
first()	simulate(event[, data])
forEach(fn)	some(selector)
get(index)	someWhere(predicate)
hasClass(className)	state([key])
html()	text()
instance()	type()
is(selector)	unmount()
	update()

```
// css selectors  
wrapper.find('.todo-list')  
wrapper.find('button')  
wrapper.find('div#some-id')  
  
// imported component  
wrapper.find(TodoList)  
  
// component displayName  
wrapper.find('TodoList')
```

Shallow Rendering

```
shallow(node[, options]) => ShallowWrapper
```

at(index)	last()
childAt()	map(fn)
children()	not(selector)
closest(selector)	parent()
contains(nodeOrNodes)	parents()
context([key])	prop([key])
debug()	props()
equals(node)	reduce(fn[, initialValue])
every(selector)	reduceRight(fn[, initialValue])
everyWhere(predicate)	render()
filter(selector)	setContext(context)
filterWhere(predicate)	setProps(nextProps)
find(selector)	setState(nextState)
findWhere(predicate)	shallow([options])
first()	simulate(event[, data])
forEach(fn)	some(selector)
get(index)	someWhere(predicate)
hasClass(className)	state([key])
html()	text()
instance()	type()
is(selector)	unmount()
	update()

```
expect(  
  wrapper.find('Thumbnail').prop('path')  
) .to.equal('foo.jpg');
```

Shallow Rendering

```
shallow(node[, options]) => ShallowWrapper
```

at(index)
childAt()
children()
closest(selector)
contains(nodeOrNodes)
context([key])
debug()
equals(node)
every(selector)
everyWhere(predicate)
filter(selector)
filterWhere(predicate)
find(selector)
findWhere(predicate)
first()
forEach(fn)
get(index)
hasClass(className)
html()
instance()
is(selector)

last()
map(fn)
not(selector)
parent()
parents()
prop([key])
props()
reduce(fn[, initialValue])
reduceRight(fn[, initialValue])
render()
setContext(context)
setProps(nextProps)
setState(nextState)
shallow([options])
simulate(event[, data])
some(selector)
someWhere(predicate)
state([key])
text()
type()
unmount()
update()

```
expect(wrapper).to.have.className('active');
```

Shallow Rendering

```
shallow(node[, options]) => ShallowWrapper
```

at(index)	last()
childAt()	map(fn)
children()	not(selector)
closest(selector)	parent()
contains(nodeOrNodes)	parents()
context([key])	prop([key])
debug()	props()
equals(node)	reduce(fn[, initialValue])
every(selector)	reduceRight(fn[, initialValue])
everyWhere(predicate)	render()
filter(selector)	setContext(context)
filterWhere(predicate)	setProps(nextProps)
find(selector)	setState(nextState)
findWhere(predicate)	shallow([options])
first()	simulate(event[, data])
forEach(fn)	some(selector)
get(index)	someWhere(predicate)
hasClass(className)	state([key])
html()	text()
instance()	type()
is(selector)	unmount()
	update()

```
expect(
  wrapper.find('.cart-count').text()
).toEqual('2');
```

Shallow Rendering

```
shallow(node[, options]) => ShallowWrapper
```

at(index)	last()
childAt()	map(fn)
children()	not(selector)
closest(selector)	parent()
contains(nodeOrNodes)	parents()
context([key])	prop([key])
debug()	props()
equals(node)	reduce(fn[, initialValue])
every(selector)	reduceRight(fn[, initialValue])
everyWhere(predicate)	render()
filter(selector)	setContext(context)
filterWhere(predicate)	setProps(nextProps)
find(selector)	setState(nextState)
findWhere(predicate)	shallow([options])
first()	simulate(event[, data])
forEach(fn)	some(selector)
get(index)	someWhere(predicate)
hasClass(className)	state([key])
html()	text()
instance()	type()
is(selector)	unmount()
	update()

```
expect(
  wrapper
    .find('.todo-list')
    .children()
    .filterWhere(node => node.hasClass('completed'))
    .length()
).to.equal(3);
```

Shallow Rendering

`shallow(node[, options]) => ShallowWrapper`

<code>at(index)</code>	<code>last()</code>
<code>childAt()</code>	<code>map(fn)</code>
<code>children()</code>	<code>not(selector)</code>
<code>closest(selector)</code>	<code>parent()</code>
<code>contains(nodeOrNodes)</code>	<code>parents()</code>
<code>context([key])</code>	<code>prop([key])</code>
<code>debug()</code>	<code>props()</code>
<code>equals(node)</code>	<code>reduce(fn[, initialValue])</code>
<code>every(selector)</code>	<code>reduceRight(fn[, initialValue])</code>
<code>everyWhere(predicate)</code>	<code>render()</code>
<code>filter(selector)</code>	<code>setContext(context)</code>
<code>filterWhere(predicate)</code>	<code>setProps(nextProps)</code>
<code>find(selector)</code>	<code>setState(nextState)</code>
<code>findWhere(predicate)</code>	<code>shallow([options])</code>
<code>first()</code>	<code>simulate(event[, data])</code>
<code>forEach(fn)</code>	<code>some(selector)</code>
<code>get(index)</code>	<code>someWhere(predicate)</code>
<code>hasClass(className)</code>	<code>state([key])</code>
<code>html()</code>	<code>text()</code>
<code>instance()</code>	<code>type()</code>
<code>is(selector)</code>	<code>unmount()</code>
	<code>update()</code>

```
describe('when the thumbnail is clicked', () => {
  const handleClick = sinon.spy();

  const wrapper = shallow(
    <Thumbnail path='foo.jpg' onClick={handleClick} />
  );

  wrapper.simulate('click');

  it('calls the click callback', () => {
    expect(handleClick.calledOnce).to.equal(true);
  });
});
```


Full DOM Rendering - mount()

`mount(node[, options]) => ReactWrapper`

<code>at(index)</code>	<code>map(fn)</code>
<code>contains(nodeOrNodes)</code>	<code>mount()</code>
<code>childAt()</code>	<code>not(selector)</code>
<code>children()</code>	<code>parent()</code>
<code>closest(selector)</code>	<code>parents()</code>
<code>context([key])</code>	<code>prop([key])</code>
<code>debug()</code>	<code>props()</code>
<code>detach()</code>	<code>reduce(fn[, initialValue])</code>
<code>every(selector)</code>	<code>reduceRight(fn[, initialValue])</code>
<code>everyWhere(predicate)</code>	<code>ref(refName)</code>
<code>filter(selector)</code>	<code>render()</code>
<code>filterWhere(predicate)</code>	<code>setContext(context)</code>
<code>find(selector)</code>	<code>setProps(nextProps)</code>
<code>findWhere(predicate)</code>	<code>setState(nextState)</code>
<code>first()</code>	<code>simulate(event[, data])</code>
<code>forEach(fn)</code>	<code>some(selector)</code>
<code>get(index)</code>	<code>someWhere(predicate)</code>
<code>hasClass(className)</code>	<code>state([key])</code>
<code>html()</code>	<code>text()</code>
<code>instance()</code>	<code>type()</code>
<code>is(selector)</code>	<code>unmount()</code>
<code>last()</code>	<code>update()</code>

```
import { mount } from 'enzyme';
```

```
describe('<Foo />', () => {
```

```
  it('calls componentDidMount', () => {
```

```
    spy(Foo.prototype, 'componentDidMount');
```

```
    const wrapper = mount(<Foo />);
```

```
    expect(Foo.prototype.componentDidMount.calledOnce).toEqual(true);
```

```
  });
```

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Examples

MediaGallery

when there are no images

✓ does not render any images

when there is one image

✓ renders one featured image

when there are two images

✓ renders two featured images

when there are three images

✓ renders the first image as featured and the rest normal

when there are four images

✓ renders the first image as featured and the rest normal

when there are five images

✓ renders the first image as featured and the rest normal

when there are more than five images

✓ renders the first five images

✓ renders the first image as featured and the rest normal

✓ has a label with the full count of images on the last th



<Rating />

when the rating is 0

✓ renders five empty stars

✓ renders no half stars

✓ renders no full stars

when the rating is 2

✓ renders two full stars

✓ renders no half filled stars

✓ renders three empty stars

when the rating is 3.5

✓ renders three full stars

✓ renders one half filled star

✓ renders one empty star

when the rating is 5

✓ renders no empty stars

✓ renders no half stars

✓ renders five full stars

1

2

3

4

5

6

7

8

NEXT

<PaginateButtons />

previous button

when the first page is active

✓ does not render a previous button

when the first page is not active

✓ renders a previous button

next button

when the last page is active

✓ does not render a next button

when the last page is not active

✓ renders a next button

when a page is active

✓ is the only page with an active class applied

on page change

when the previous button is clicked

✓ calls onChange with the previous page number

when the next button is clicked

✓ calls onChange with the next page number

when a page button is clicked

✓ calls onChange with the page number

110 passing (862ms)

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Resources

[Testing React Applications - April 2016 London React User Group](#)

[Test Driven React Tutorial - Spencer Dixon](#)

[Enzyme - Airbnb](#)

[Storybook - KadirHQ](#)

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