

# PERFORMANCE IN REACT

- ▶ Startup performance
- ▶ React performance
- ▶ Redux performance
- ▶ UX/UI tricks

# STARTUP PERFORMANCE

Minify all the  
things



# Set NODE\_ENV to 'production'

webpack.config.js

```
plugins: [
  new webpack.DefinePlugin({
    'process.env': {
      NODE_ENV: JSON.stringify('production')
    }
  }),
  new webpack.optimize.UglifyJSPlugin(),
  // ...
]
```

6.69 Mb

2.69 Mb

# React Constant Elements Transform

Hr.js

```
// in
const Hr = () => {
  return <hr className="hr" />;
};

// out
const _ref = <hr className="hr" />;
const Hr = () => {
  return _ref;
};
```

# React Inline Elements Transform

Hr.js

```
// in
<Baz foo="bar" key="1"></Baz>;
```

```
// out
babelHelpers.jsx(Baz, {
  foo: "bar"
}, "1");
```

# React Remove PropTypes Transform

Baz.js

```
// in
const Baz = (props) => (
  <div {...props} />
);

Baz.propTypes = {
  className: PropTypes.string
};

// out
const Baz = (props) => (
  <div {...props} />
);
```

# Transform Pure Class To Function

Baz.js

```
// in
class Baz extends React.Component {
  static propTypes = { ... };

  render() { ... };
}

// out
function Baz(props) { ... };

Baz.propTypes = { ... };
```

# Only in production!

.babelrc

```
{  
  "presets": ["es2015", "react"],  
  "env": {  
    "production": {  
      "plugins": [  
        "transform-react-constant-elements",  
        "transform-react-inline-elements",  
        "transform-react-remove-prop-types",  
        "transform-react-pure-class-to-function",  
      ]  
    }  
  }  
}
```

# React optimize preset

.babelrc

```
{  
  "presets": ["es2015", "react"],  
  "env": {  
    "production": {  
      "presets": ["react-optimize"]  
    }  
  }  
}
```

# Specify babel target browsers

```
.babelrc

{
  "presets": [
    "env": {
      "targets": {
        "browsers": ["last 2 versions"]
      }
    }
  ]
}
```

2.69 Mb

2.09 Mb

# Minimize CSS

webpack.config.js

```
{  
  loader: 'css-loader',  
  options: {  
    minimize: true || /* CSSNano Options */  
  }  
}
```

<https://github.com/webpack-contrib/css-loader#minimize>

# Prefix only what you need

webpack.config.js

```
 autoprefixer: {  
   browsers: [  
     'last 2 version',  
     'ie >= 11',  
   ],  
 },
```

<https://github.com/postcss/autoprefixer>

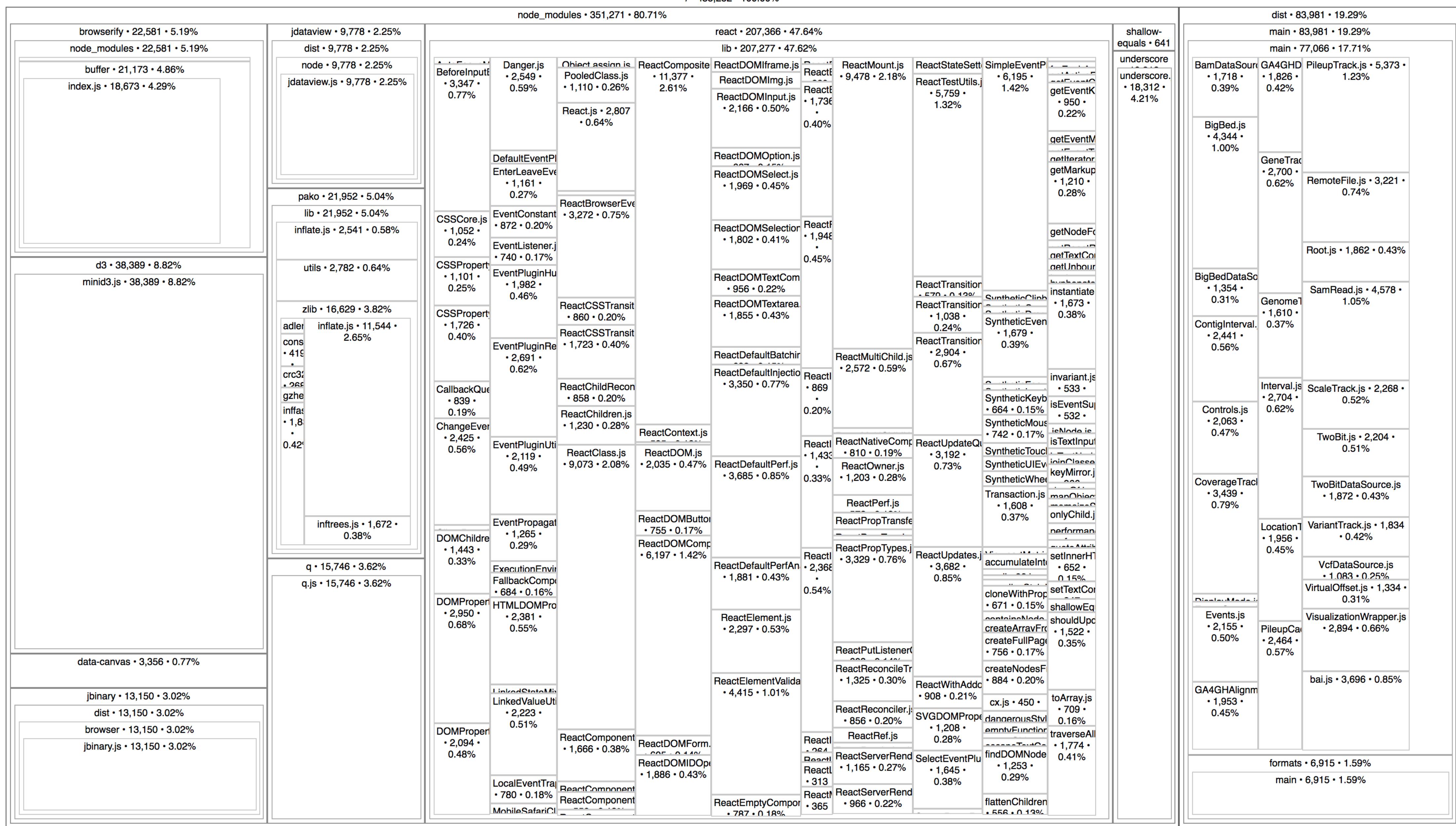


# Analyze

# Source Map Explorer

```
npm install -g source-map-explorer
```

```
source-map-explorer bundle.js bundle.js.map
```



**moment • 427 kB • 4.8%**

**locale • 304 kB • 3.4%**

ru.js	cs.js	sl.js	sk.js	uk.js	mr.js	hr.js	be.js	bs.js
• 6.77	• 6.01	• 5.81	• 5.1	• 4.9	• 4.7	• 4.4	• 4.1	• 4.0
lb.js	is.js	ar.js	lt.js	zh-	me	sr-	ta.js	sr.js
• 4.6	• 4.1	• 4.0	• 3.9	• 3.8	• 3.7	• 3.6	• 3.5	• 3.5
ar-	pl.js	fi.js	lv.js	pa-	bo.js	hi.js	el.js	ne.
nl-	nl.js	br.js	he.	zh-	az.	zh-	hy-	fa.j
bg.	ss.	ar-	te.j	de-	cy.	de.	es.	ca.
tr.js	ms	gl.j	ml.	my	vi.j	eo.	fy.j	ky.
								gd
								kk.
								af.
								ro.

**moment.js • 123 kB • 1.4%**

# Remove unused locales from moment

index.js

```
plugins: [
  new webpack.DefinePlugin({
    'process.env': {
      NODE_ENV: '"production"',
    },
  }),
  new webpack.optimize.DedupePlugin(),
  new webpack.ContextReplacementPlugin(/moment[\\/]locale$/, /ru|en|uk/),
  new webpack.optimize.UglifyJsPlugin({
    compress: {
      warnings: false,
    },
  }),
],
]
```

**2.09 Mb**

**1.91 Mb**

**babel-polyfill** • 74.5 kB • 2.5%

~ • 73.9 kB • 2.4%

**core-js** • 73.9 kB • 2.4%

**modules** • 72.4 kB • 2.4%

\_typed-	\_typed	es6.promise	es6.symbol	es7.weakref	\_core	\_es6	\_es7	\_es8	\_es9	\_es10	\_es11	\_es12	\_es13	\_es14	\_es15	\_es16	\_es17	\_es18	\_es19	\_es20	\_es21	\_es22	\_es23	\_es24	\_es25	\_es26	\_es27	\_es28	\_es29	\_es30	\_es31	\_es32	\_es33	\_es34	\_es35	\_es36	\_es37	\_es38	\_es39	\_es40	\_es41	\_es42	\_es43	\_es44	\_es45	\_es46	\_es47	\_es48	\_es49	\_es50	\_es51	\_es52	\_es53	\_es54	\_es55	\_es56	\_es57	\_es58	\_es59	\_es60	\_es61	\_es62	\_es63	\_es64	\_es65	\_es66	\_es67	\_es68	\_es69	\_es70	\_es71	\_es72	\_es73	\_es74	\_es75	\_es76	\_es77	\_es78	\_es79	\_es80	\_es81	\_es82	\_es83	\_es84	\_es85	\_es86	\_es87	\_es88	\_es89	\_es90	\_es91	\_es92	\_es93	\_es94	\_es95	\_es96	\_es97	\_es98	\_es99	\_es100	\_es101	\_es102	\_es103	\_es104	\_es105	\_es106	\_es107	\_es108	\_es109	\_es110	\_es111	\_es112	\_es113	\_es114	\_es115	\_es116	\_es117	\_es118	\_es119	\_es120	\_es121	\_es122	\_es123	\_es124	\_es125	\_es126	\_es127	\_es128	\_es129	\_es130	\_es131	\_es132	\_es133	\_es134	\_es135	\_es136	\_es137	\_es138	\_es139	\_es140	\_es141	\_es142	\_es143	\_es144	\_es145	\_es146	\_es147	\_es148	\_es149	\_es150	\_es151	\_es152	\_es153	\_es154	\_es155	\_es156	\_es157	\_es158	\_es159	\_es160	\_es161	\_es162	\_es163	\_es164	\_es165	\_es166	\_es167	\_es168	\_es169	\_es170	\_es171	\_es172	\_es173	\_es174	\_es175	\_es176	\_es177	\_es178	\_es179	\_es180	\_es181	\_es182	\_es183	\_es184	\_es185	\_es186	\_es187	\_es188	\_es189	\_es190	\_es191	\_es192	\_es193	\_es194	\_es195	\_es196	\_es197	\_es198	\_es199	\_es200	\_es201	\_es202	\_es203	\_es204	\_es205	\_es206	\_es207	\_es208	\_es209	\_es210	\_es211	\_es212	\_es213	\_es214	\_es215	\_es216	\_es217	\_es218	\_es219	\_es220	\_es221	\_es222	\_es223	\_es224	\_es225	\_es226	\_es227	\_es228	\_es229	\_es230	\_es231	\_es232	\_es233	\_es234	\_es235	\_es236	\_es237	\_es238	\_es239	\_es240	\_es241	\_es242	\_es243	\_es244	\_es245	\_es246	\_es247	\_es248	\_es249	\_es250	\_es251	\_es252	\_es253	\_es254	\_es255	\_es256	\_es257	\_es258	\_es259	\_es260	\_es261	\_es262	\_es263	\_es264	\_es265	\_es266	\_es267	\_es268	\_es269	\_es270	\_es271	\_es272	\_es273	\_es274	\_es275	\_es276	\_es277	\_es278	\_es279	\_es280	\_es281	\_es282	\_es283	\_es284	\_es285	\_es286	\_es287	\_es288	\_es289	\_es290	\_es291	\_es292	\_es293	\_es294	\_es295	\_es296	\_es297	\_es298	\_es299	\_es300	\_es301	\_es302	\_es303	\_es304	\_es305	\_es306	\_es307	\_es308	\_es309	\_es310	\_es311	\_es312	\_es313	\_es314	\_es315	\_es316	\_es317	\_es318	\_es319	\_es320	\_es321	\_es322	\_es323	\_es324	\_es325	\_es326	\_es327	\_es328	\_es329	\_es330	\_es331	\_es332	\_es333	\_es334	\_es335	\_es336	\_es337	\_es338	\_es339	\_es340	\_es341	\_es342	\_es343	\_es344	\_es345	\_es346	\_es347	\_es348	\_es349	\_es350	\_es351	\_es352	\_es353	\_es354	\_es355	\_es356	\_es357	\_es358	\_es359	\_es360	\_es361	\_es362	\_es363	\_es364	\_es365	\_es366	\_es367	\_es368	\_es369	\_es370	\_es371	\_es372	\_es373	\_es374	\_es375	\_es376	\_es377	\_es378	\_es379	\_es380	\_es381	\_es382	\_es383	\_es384	\_es385	\_es386	\_es387	\_es388	\_es389	\_es390	\_es391	\_es392	\_es393	\_es394	\_es395	\_es396	\_es397	\_es398	\_es399	\_es400	\_es401	\_es402	\_es403	\_es404	\_es405	\_es406	\_es407	\_es408	\_es409	\_es410	\_es411	\_es412	\_es413	\_es414	\_es415	\_es416	\_es417	\_es418	\_es419	\_es420	\_es421	\_es422	\_es423	\_es424	\_es425	\_es426	\_es427	\_es428	\_es429	\_es430	\_es431	\_es432	\_es433	\_es434	\_es435	\_es436	\_es437	\_es438	\_es439	\_es440	\_es441	\_es442	\_es443	\_es444	\_es445	\_es446	\_es447	\_es448	\_es449	\_es450	\_es451	\_es452	\_es453	\_es454	\_es455	\_es456	\_es457	\_es458	\_es459	\_es460	\_es461	\_es462	\_es463	\_es464	\_es465	\_es466	\_es467	\_es468	\_es469	\_es470	\_es471	\_es472	\_es473	\_es474	\_es475	\_es476	\_es477	\_es478	\_es479	\_es480	\_es481	\_es482	\_es483	\_es484	\_es485	\_es486	\_es487	\_es488	\_es489	\_es490	\_es491	\_es492	\_es493	\_es494	\_es495	\_es496	\_es497	\_es498	\_es499	\_es500	\_es501	\_es502	\_es503	\_es504	\_es505	\_es506	\_es507	\_es508	\_es509	\_es510	\_es511	\_es512	\_es513	\_es514	\_es515	\_es516	\_es517	\_es518	\_es519	\_es520	\_es521	\_es522	\_es523	\_es524	\_es525	\_es526	\_es527	\_es528	\_es529	\_es530	\_es531	\_es532	\_es533	\_es534	\_es535	\_es536	\_es537	\_es538	\_es539	\_es540	\_es541	\_es542	\_es543	\_es544	\_es545	\_es546	\_es547	\_es548	\_es549	\_es550	\_es551	\_es552	\_es553	\_es554	\_es555	\_es556	\_es557	\_es558	\_es559	\_es560	\_es561	\_es562	\_es563	\_es564	\_es565	\_es566	\_es567	\_es568	\_es569	\_es570	\_es571	\_es572	\_es573	\_es574	\_es575	\_es576	\_es577	\_es578	\_es579	\_es580	\_es581	\_es582	\_es583	\_es584	\_es585	\_es586	\_es587	\_es588	\_es589	\_es590	\_es591	\_es592	\_es593	\_es594	\_es595	\_es596	\_es597	\_es598	\_es599	\_es600	\_es601	\_es602	\_es603	\_es604	\_es605	\_es606	\_es607	\_es608	\_es609	\_es610	\_es611	\_es612	\_es613	\_es614	\_es615	\_es616	\_es617	\_es618	\_es619	\_es620	\_es621	\_es622	\_es623	\_es624	\_es625	\_es626	\_es627	\_es628	\_es629	\_es630	\_es631	\_es632	\_es633	\_es634	\_es635	\_es636	\_es637	\_es638	\_es639	\_es640	\_es641	\_es642	\_es643	\_es644	\_es645	\_es646	\_es647	\_es648	\_es649	\_es650	\_es651	\_es652	\_es653	\_es654	\_es655	\_es656	\_es657	\_es658	\_es659	\_es660	\_es661	\_es662	\_es663	\_es664	\_es665	\_es666	\_es667	\_es668	\_es669	\_es670	\_es671	\_es672	\_es673	\_es674	\_es675	\_es676	\_es677	\_es678	\_es679	\_es680	\_es681	\_es682	\_es683	\_es684	\_es685	\_es686	\_es687	\_es688	\_es689	\_es690	\_es691	\_es692	\_es693	\_es694	\_es695	\_es696	\_es697	\_es698	\_es699	\_es700	\_es701	\_es702	\_es703	\_es704	\_es705	\_es706	\_es707	\_es708	\_es709	\_es710	\_es711	\_es712	\_es713	\_es714	\_es715	\_es716	\_es717	\_es718	\_es719	\_es720	\_es721	\_es722	\_es723	\_es724	\_es725	\_es726	\_es727	\_es728	\_es729	\_es730	\_es731	\_es732	\_es733	\_es734	\_es735	\_es736	\_es737	\_es738	\_es739	\_es740	\_es741	\_es742	\_es743	\_es744	\_es745	\_es746	\_es747	\_es748	\_es749	\_es750	\_es751	\_es752	\_es753	\_es754	\_es755	\_es756	\_es757	\_es758	\_es759	\_es760	\_es761	\_es762	\_es763	\_es764	\_es765	\_es766	\_es767	\_es768	\_es769	\_es770	\_es771	\_es772	\_es773	\_es774	\_es775	\_es776	\_es777	\_es778	\_es779	\_es780	\_es781	\_es782	\_es783	\_es784	\_es785	\_es786	\_es787	\_es788	\_es789	\_es790	\_es791	\_es792	\_es793	\_es794	\_es795	\_es796	\_es797	\_es798	\_es799	\_es800	\_es801	\_es802	\_es803	\_es804	\_es805	\_es806	\_es807	\_es808	\_es809	\_es810	\_es811	\_es812	\_es813	\_es814	\_es815	\_es816	\_es817	\_es818	\_es819	\_es820	\_es821	\_es822	\_es823	\_es824	\_es825	\_es826	\_es827	\_es828	\_es829	\_es830	\_es831	\_es832	\_es833	\_es834	\_es835	\_es836	\_es837	\_es838	\_es839	\_es840	\_es841	\_es842	\_es843	\_es844	\_es845	\_es846	\_es847	\_es848</

# Replace babel-polyfill with things you actually need

index.js

```
import 'core-js/es6/array'  
import 'core-js/es6/function'  
import 'core-js/es6/map'  
import 'core-js/es6/number'  
import 'core-js/es6/object'  
import 'core-js/es6/promise'  
import 'core-js/es6/string'  
import 'core-js/fn/array/includes'
```

1.91 Mb

1.86 Mb

# Modular import

index.js

```
// bad
import _ from lodash';

_.merge(object, other);

// good
import merge from lodash.merge';

merge(obj1, obj2);
```

# Webpack 2 Tree Shaking

math.js

```
// isn't used at all
export function square(x) { return x * x; }

// gets included
export function cube(x) { return x * x * x; }
```

index.js

```
import { cube } from './math.js';
```

Divide

# Extract CSS

webpack.config.js

```
const ExtractTextPlugin = require("extract-text-webpack-plugin");

module.exports = {
  module: {
    rules: [
      {
        test: /\.css$/,
        use: ExtractTextPlugin.extract({
          fallback: "style-loader",
          use: "css-loader"
        })
      }
    ]
  },
  plugins: [
    new ExtractTextPlugin("styles.css"),
  ]
}
```

# Code splitting

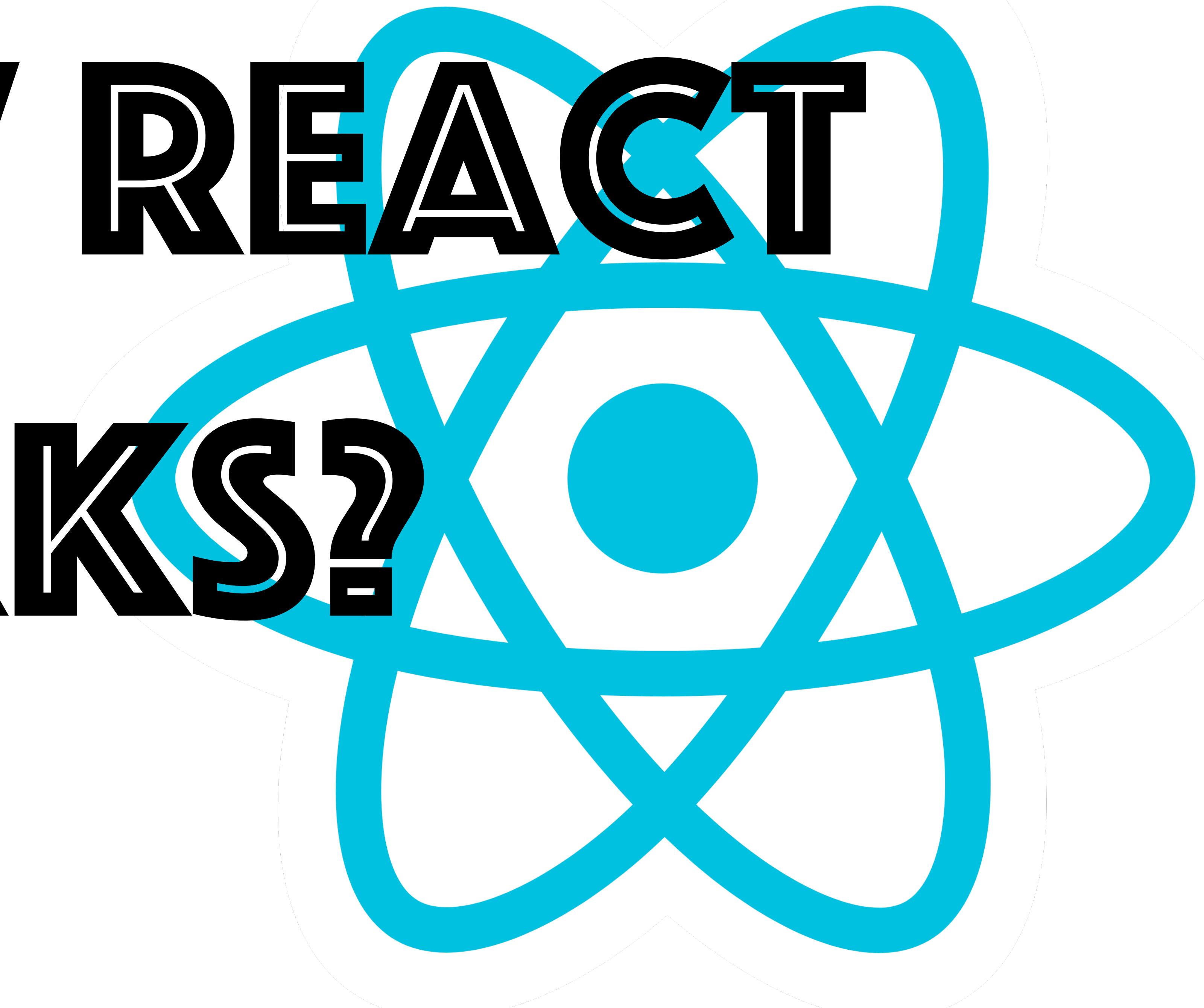
DEMO





# REACT PERFORMANCE

**HOW REACT  
WORKS?**



## main.js

```
class Counter extends Component {
  state = {
    count: 0,
  }

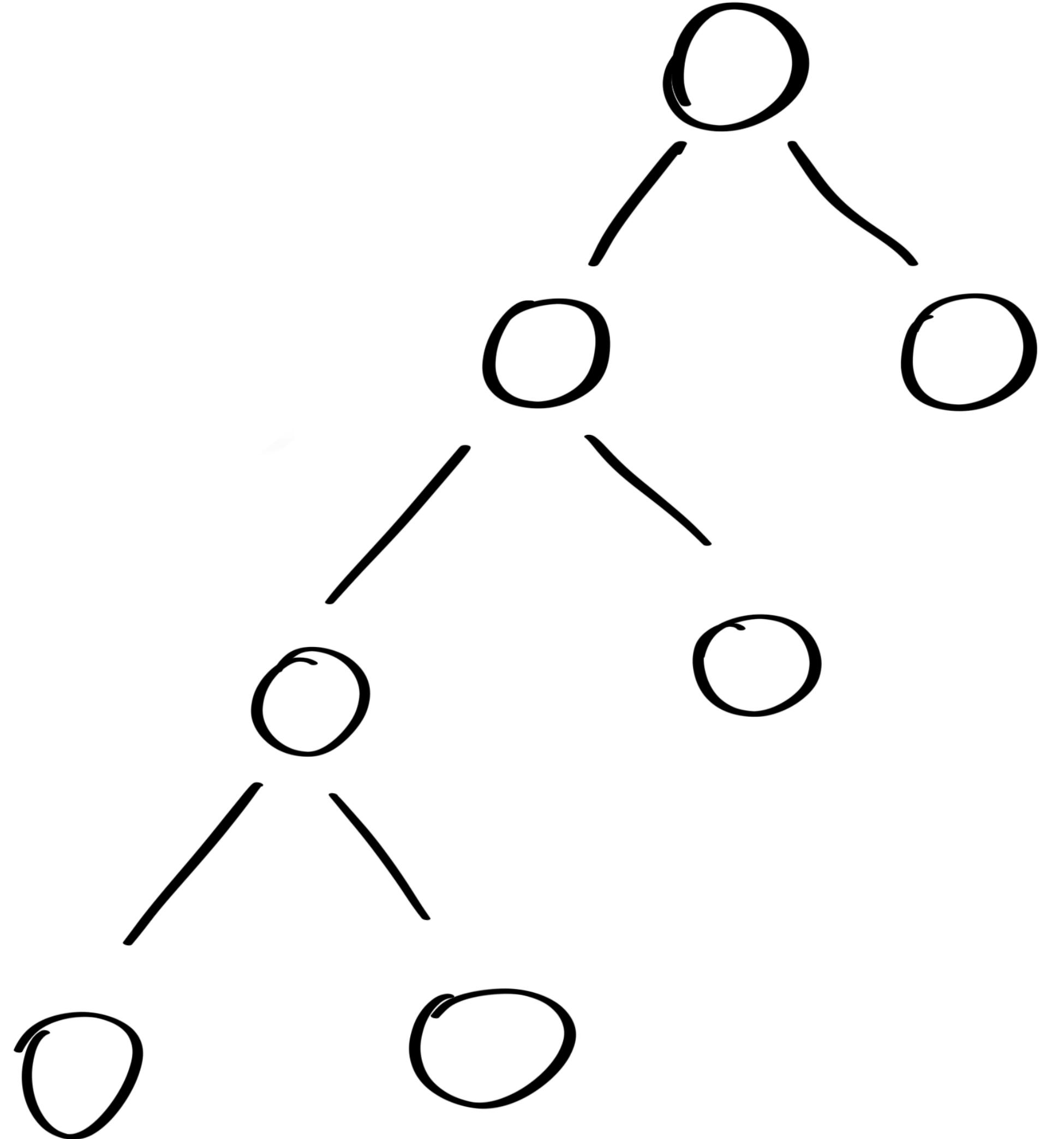
  render() {
    const { count } = this.state;

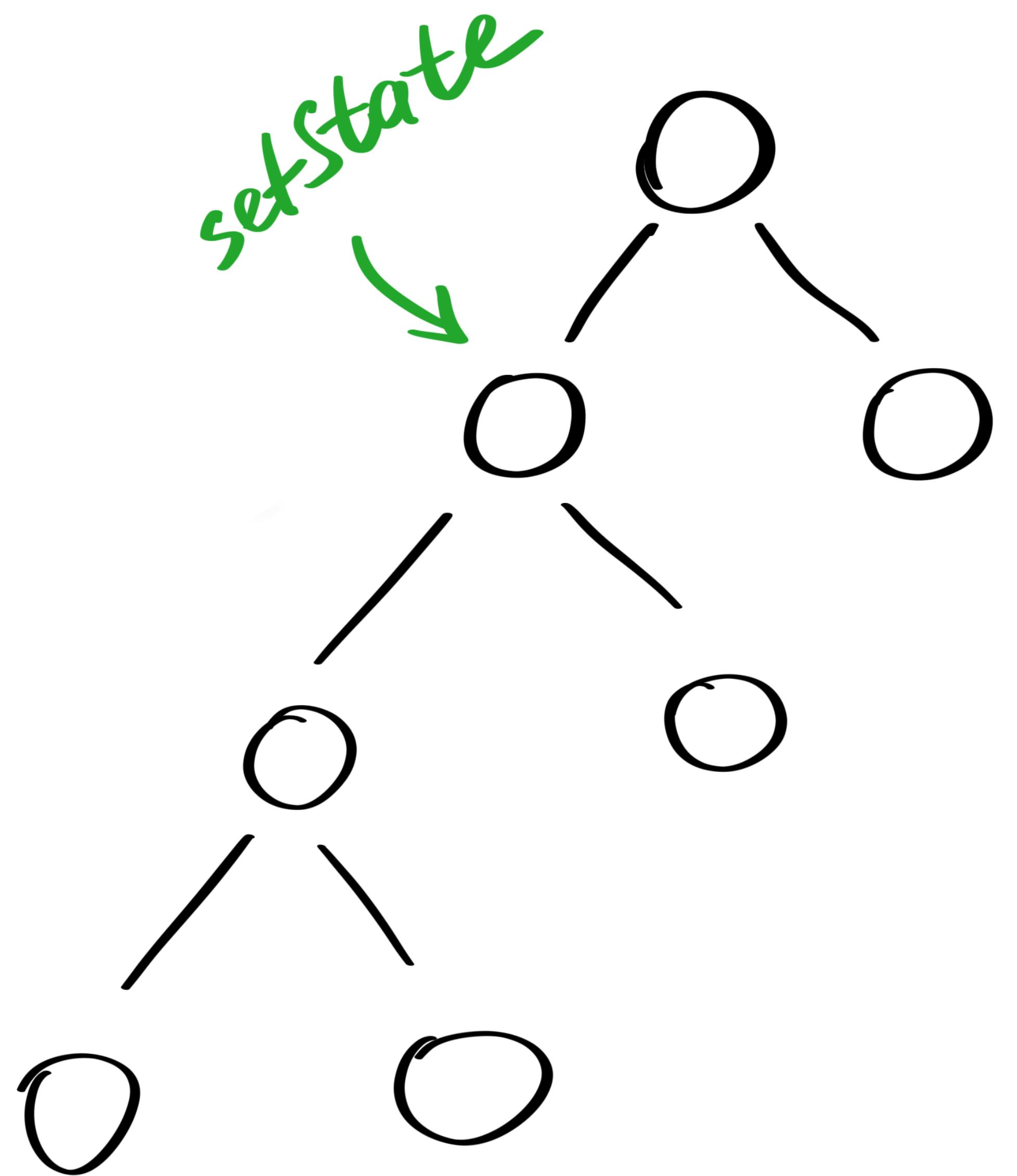
    return (
      <button onClick={() => this.setState({ count: count + 1 })}>
        {count}
      </button>
    );
  }
}
```

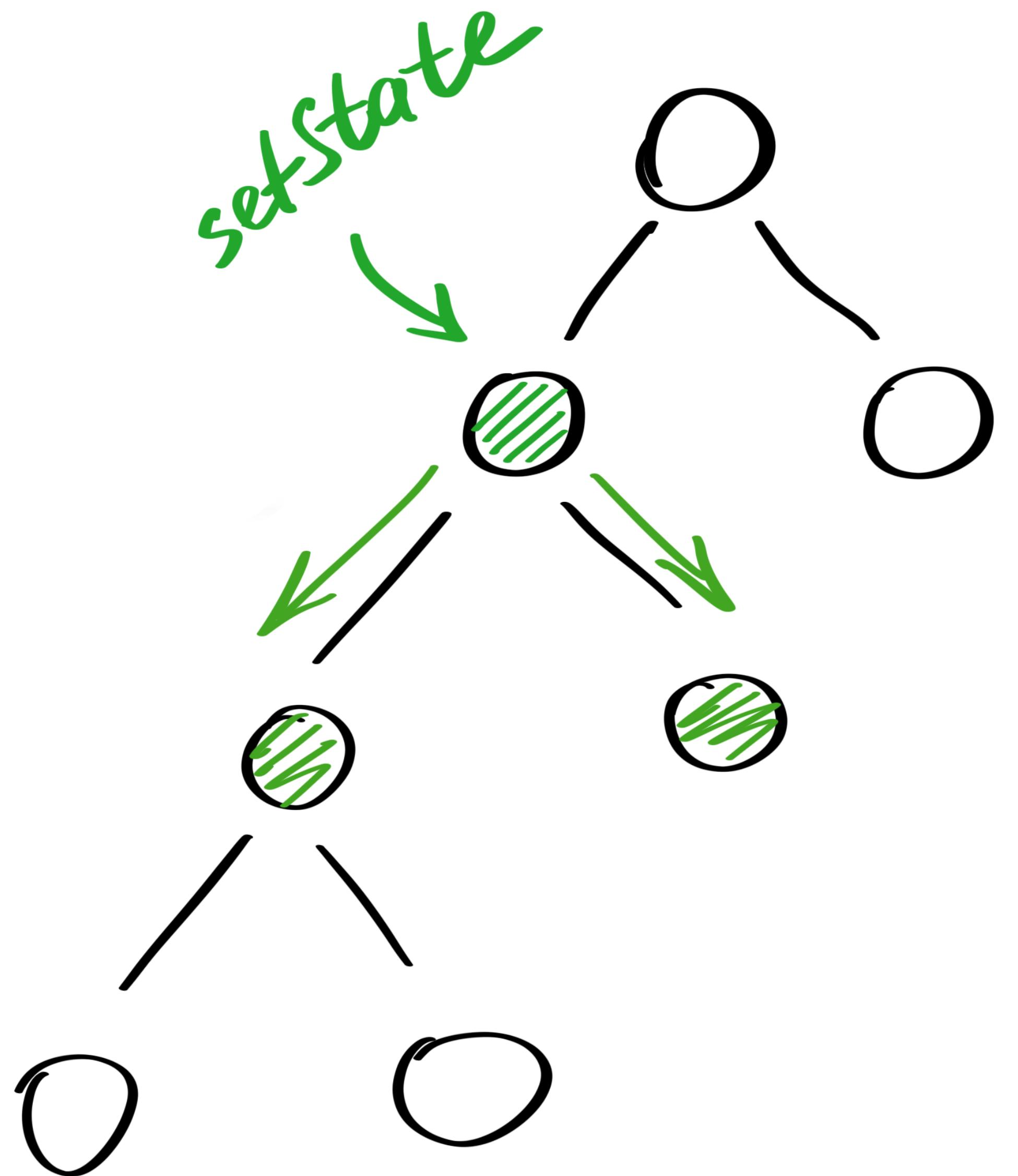
## main.js

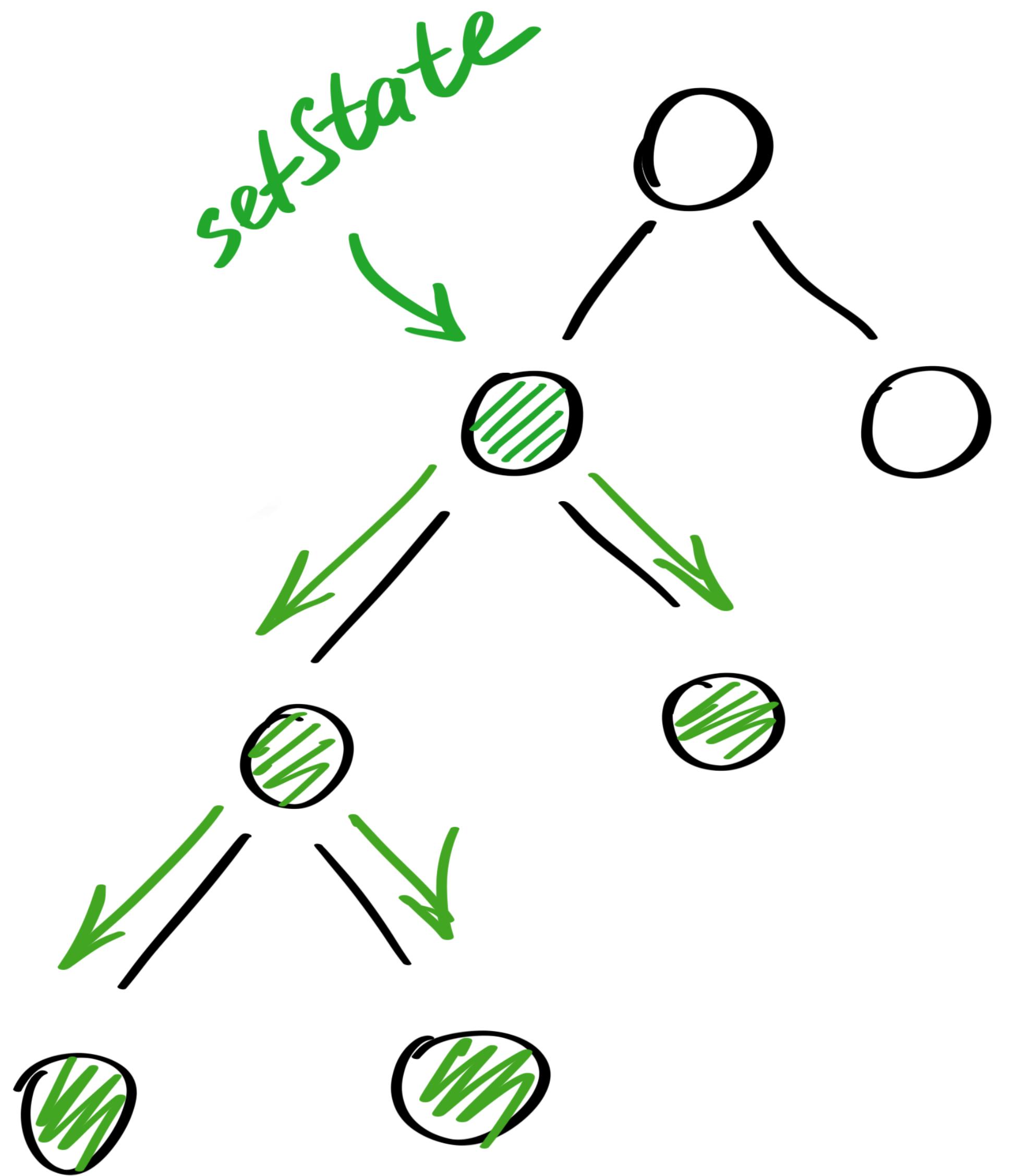
```
class App extends Component {
  render() {
    return (
      <div>
        <h1>Hello, {this.props.name}!</h1>
        <Counter />
      </div>
    );
  }
}

ReactDOM.render(
  <App name="React" />,
  document.getElementById('root')
);
```









# RECONCILIATION

<https://facebook.github.io/react/docs/reconciliation.html>

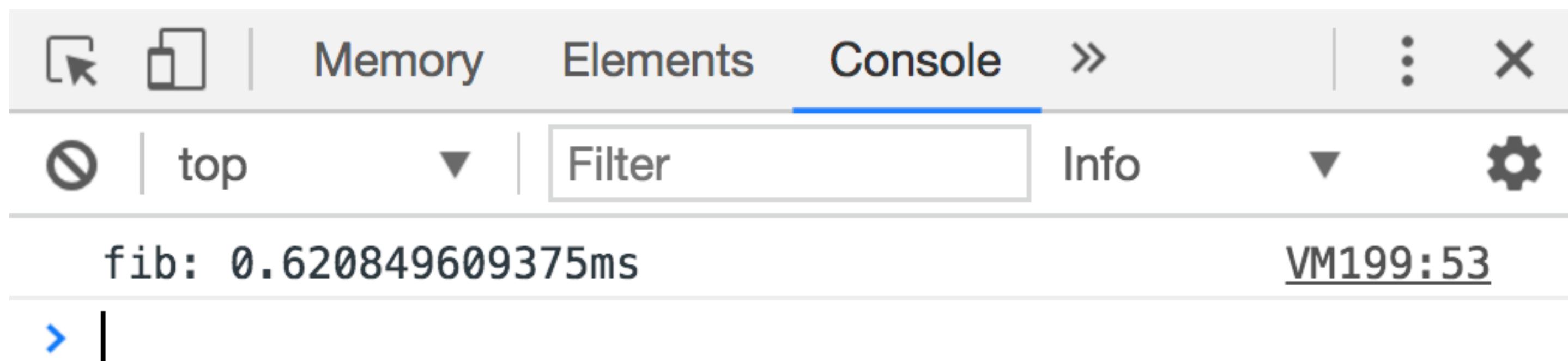


**Find  
bottlenecks**

# console.time

```
index.js

console.time('fib');
fib(23);
console.timeEnd('fib');
```



# Using window.performance

LoginPage.js

```
componentWillMount() {  
  window.performance.mark('LoginPage')  
}  
  
componentDidMount() {  
  console.log(window.performance.now('LoginPage'))  
}
```

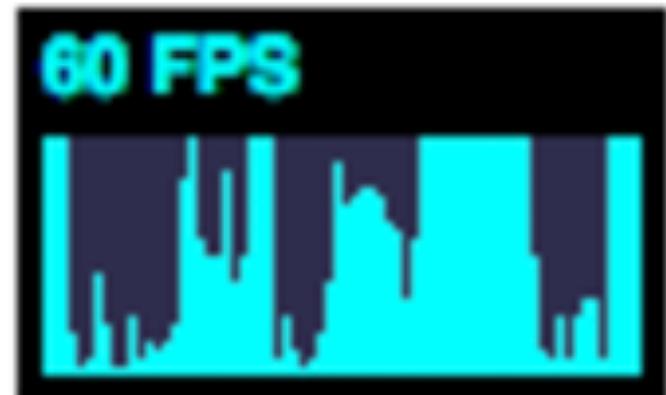
# FPS Meter

index.js

```
import { FPSStats } from 'react-stats';

// ...

<FPSStats isActive={process.env.NODE_ENV !== 'production'} />
```



<https://github.com/sebslomski/react-stats>

# React DevTools: Trace React Updates

javascript

0 starred users



[TJ Holowaychuk \(tj\)](#)

Apex

Founder of Apex <https://apex.sh> @tjholowaychuk on Twitter & Medium.

24895 followers

163 following

246 repos

531 gists



[Addy Osmani \(addyosmani\)](#)

Google

Engineer at Google working on Chrome & Web Platform

22734 followers

227 following

284 repos

153 gists



[Paul Irish \(paulirish\)](#)

star

star

star

React

Elements Console Network Redux Application Timeline

Trace React Updates Highlight Search Use Regular Expressions

<CountLabel> (\$r in the console)

Props

count: 0  
label: "starred users"

<Provider store={dispatch: dispatch(), subscribe: subscribe(), get...>

<Connect(AppContainer)>

<AppContainer users=[...], [...] isFetching=false languag...

<div>

<Picker value="javascript" options=["javascript", "java", "p...

<h3>

<CountLabel count=0 label="starred users">...

</h3>

<UserList users=[...], [...] onStarUser=fn() onUnstarU...

<div className="\_\_UserList\_\_root\_\_LtJtT">

<User key="tj" login="tj" name="TJ Holowaychuk" bio="Found...

<User key="addyosmani" login="addyosmani" name="Addy Osma...

<User key="paulirish" login="paulirish" name="Paul Irish"...

<User key="ruanyf" login="ruanyf" name="Ruan YiFeng" bio="...

<User key="sindresorhus" login="sindresorhus" name="Sindr...

<User key="daimajia" login="daimajia" name="代码家" bio="Y...

<User key="douglascrockford" login="douglascrockford" na...

<User key="mbostock" login="mbostock" name="Mike Bostock"...

<User key="jeresig" login="jeresig" name="John Resig" bio="...

<User key="mdo" login="mdo" name="Mark Otto" bio="Directo...

<User key="yyx990803" login="yyx990803" name="Evan You" b...

<User key="jlord" login="jlord" name="Jessica Lord" bio="...

<User key="JacksonTian" login="JacksonTian" name="Jackson...

<User key="substack" login="substack" name="James Hallida...

<User key="lifesinger" login="lifesinger" name="lifesinge...

<User key="mrdoob" login="mrdoob" name="Mr. doob" bio=null...

<User key="LeaVerou" login="LeaVerou" name="Lea Verou" bi...

<User key="karpathy" login="karpathy" name="Andrej" bio="...

<User key="hakimel" login="hakimel" name="Hakim El Hattab...

<User key="johnpapa" login="johnpapa" name="John Papa" bi...

<User key="fat" login="fat" name="fat" bio=null...>...

<User key="getify" login="getify" name="Kyle Simpson" bio="...

<User key="isaacs" login="isaacs" name="isaacs" bio="nom...

Provider Connect(AppContainer) AppContainer div h3

CountLabel

Search by Component Name

<https://chrome.google.com/webstore/detail/react-developer-tools/fmkadmapgofadoplbjkcapdkoienih>

# Chrome Devtools Elements Panel

The image shows three GitHub user profiles in a grid:

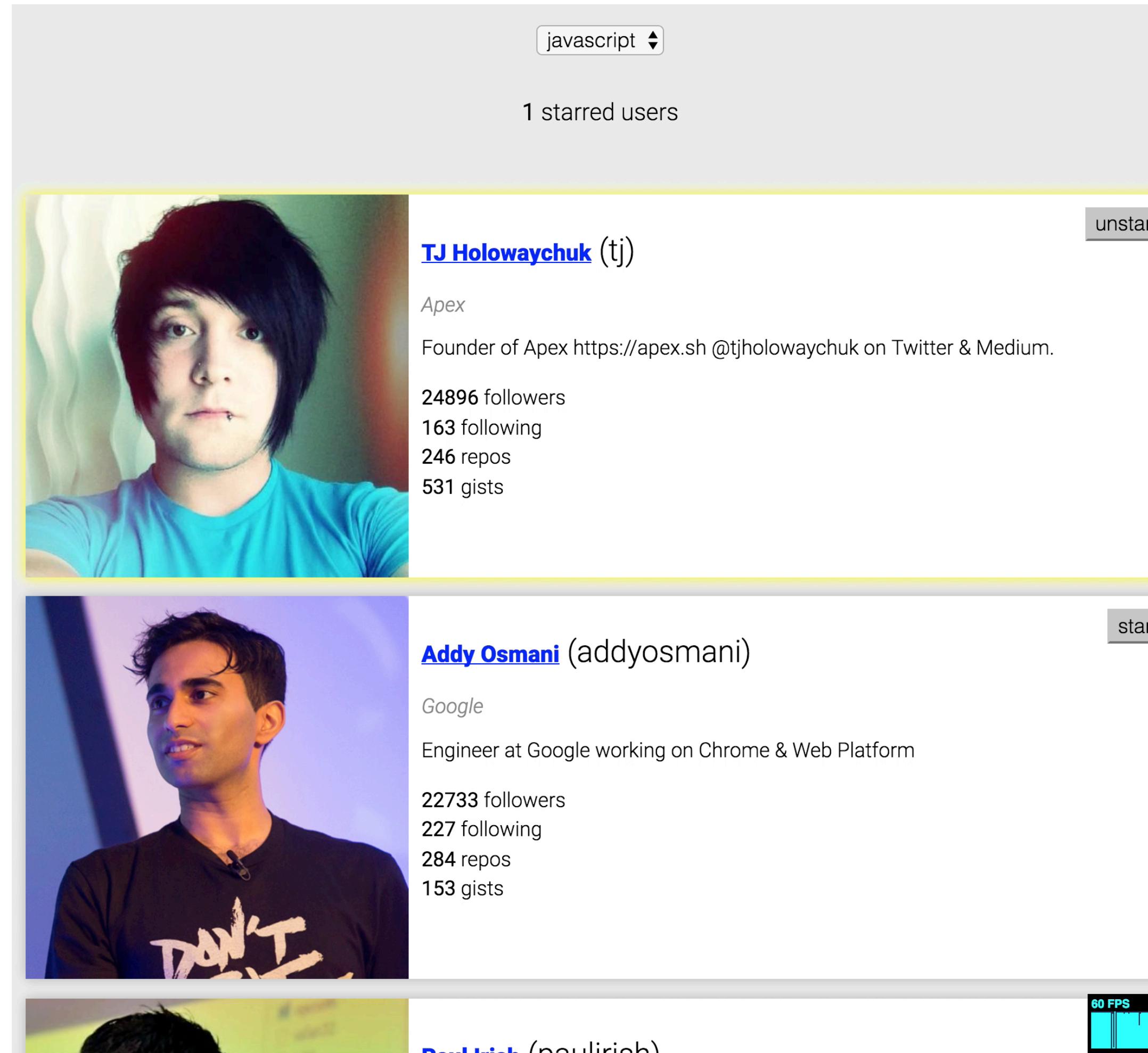
- David Walsh**: 22733 followers, 227 following, 284 repos, 153 gists.
- Paul Irish**: 22048 followers, 238 following, 253 repos, 106 gists.
- Ruan YiFeng**: 16442 followers, 0 following, 39 repos, 7 gists.

Each profile includes a small photo, the user's name and handle, their GitHub company (if applicable), and a "star" button.

The screenshot shows the Chrome Devtools Elements panel with the following details:

- DOM Tree:** The tree shows the structure of a GitHub user profile page. The root node is a div with class `__User_root__1TDLt`. Other nodes include `__User_avatar_2tCsH` (containing an image), `__User_info_2hzTv` (containing an h2 and a span with company information), and multiple `__CountLabel_root_2wB-8` nodes.
- Elements Tab:** The tab is selected, showing the current element being inspected.
- Styles Tab:** The styles tab is active, displaying CSS rules for the selected element. It includes a "Filter" dropdown, a "Styles" section with a list of rules, and a "Properties" section where the `__User_root__1TDLt` style is expanded. The properties shown are position: relative, margin: 15px, border: none, padding: 0, and width: 900px, height: 300px.
- Event Listeners, DOM Breakpoints, and Properties tabs:** These tabs are also visible in the Elements panel.

# React Addons Perf



The screenshot displays the React Addons Perf extension integrated into the Chrome DevTools Dev bar. On the left, a list of starred users is shown, each with a profile picture, name, bio, and social metrics. The first user, TJ Holowaychuk (tj), is currently selected, indicated by a yellow border around his card. The second user, Addy Osmani (addyosmani), is also visible. The third user, Paul Irish (paulirish), is partially visible at the bottom. On the right, the DevTools interface shows the 'Perf' tab selected, with a 'Start' button and a message indicating nothing to print yet.

User	Bio	Followers	Following	Repos	Gists
TJ Holowaychuk (tj)	Apex Founder of Apex https://apex.sh @tjholowaychuk on Twitter & Medium.	24896	163	246	531
Addy Osmani (addyosmani)	Google Engineer at Google working on Chrome & Web Platform	22733	227	284	153
Paul Irish (paulirish)					

<https://facebook.github.io/react/docs/perf.html> + React Perf Chrome Extension

# React Perf on Timeline

localhost:8090/?react\_perf

javascript

0 starred users

**TJ Holowaychuk (tj)**  
Apex  
Founder of Apex <https://apex.sh> @tjholowaychuk on Twitter & Medium.

24895 followers  
163 following  
246 repos  
531 gists

**Addy Osmani (addyosmani)**  
Google  
Engineer at Google working on Chrome & Web Platform

22734 followers  
227 following  
284 repos  
153 gists

**Paul Irish (paulirish)**

To capture a new timeline, click the record toolbar button or hit ⌘ E.  
To evaluate page load performance, hit ⌘ R to record the reload.

After recording, select an area of interest in the overview by dragging.  
Then, zoom and pan the timeline with the mousewheel and WASD keys.

<https://facebook.github.io/react/blog/2016/11/16/react-v15.4.0.html#profiling-components-with-chrome-timeline>

OPTIMIZE

# shouldComponentUpdate

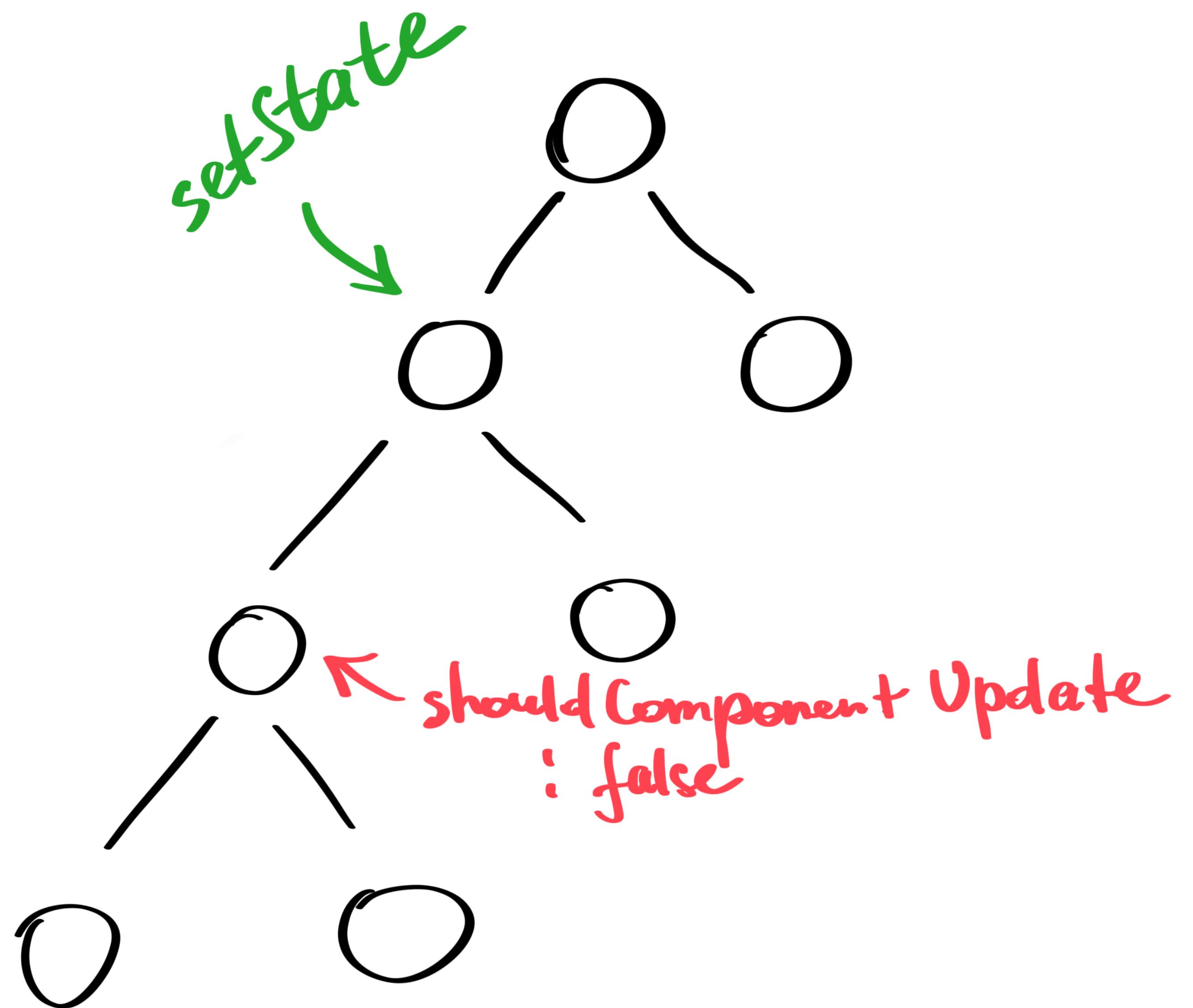
Component.js

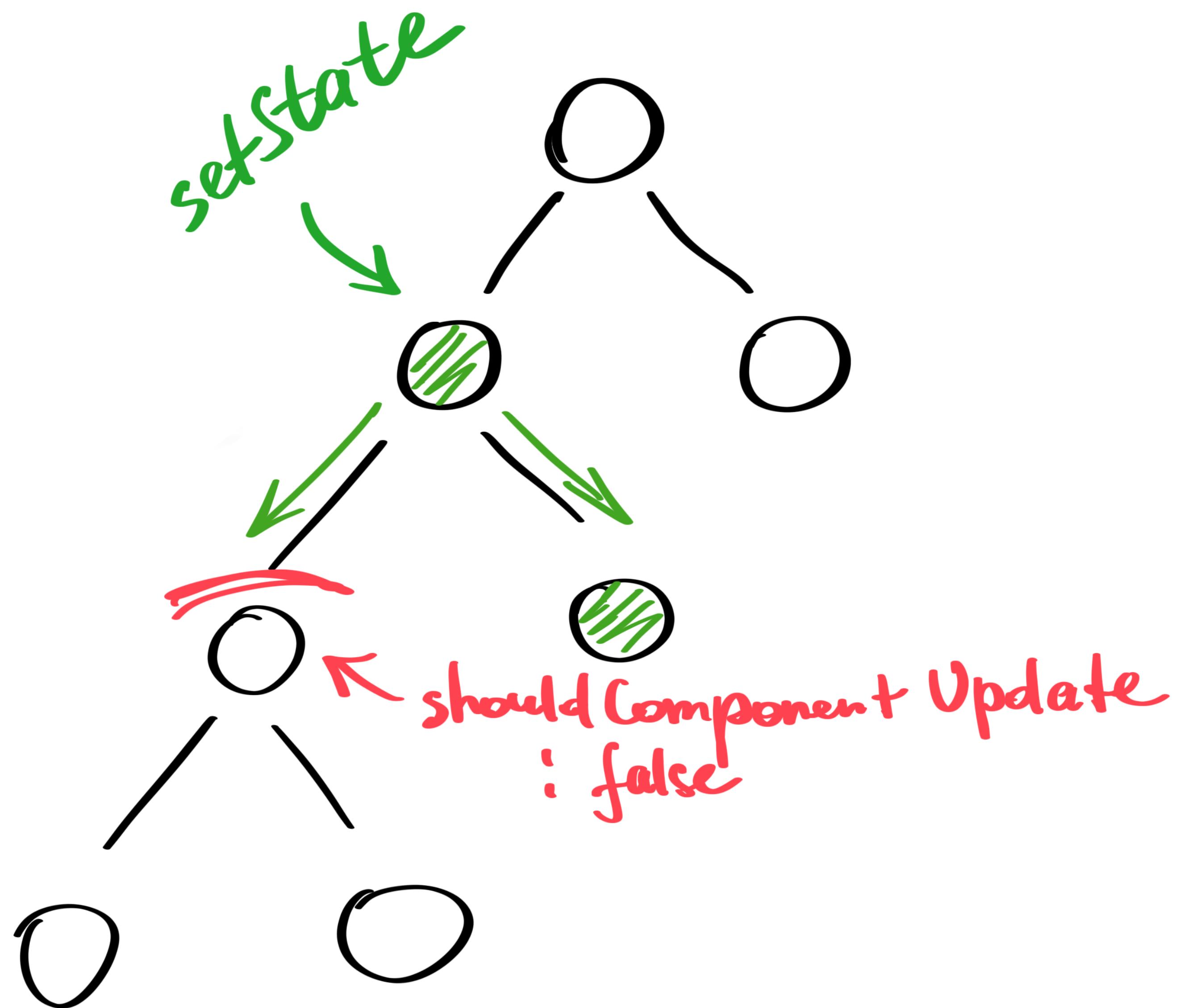
```
shouldComponentUpdate(nextProps, nextState) {  
  return true;  
}
```

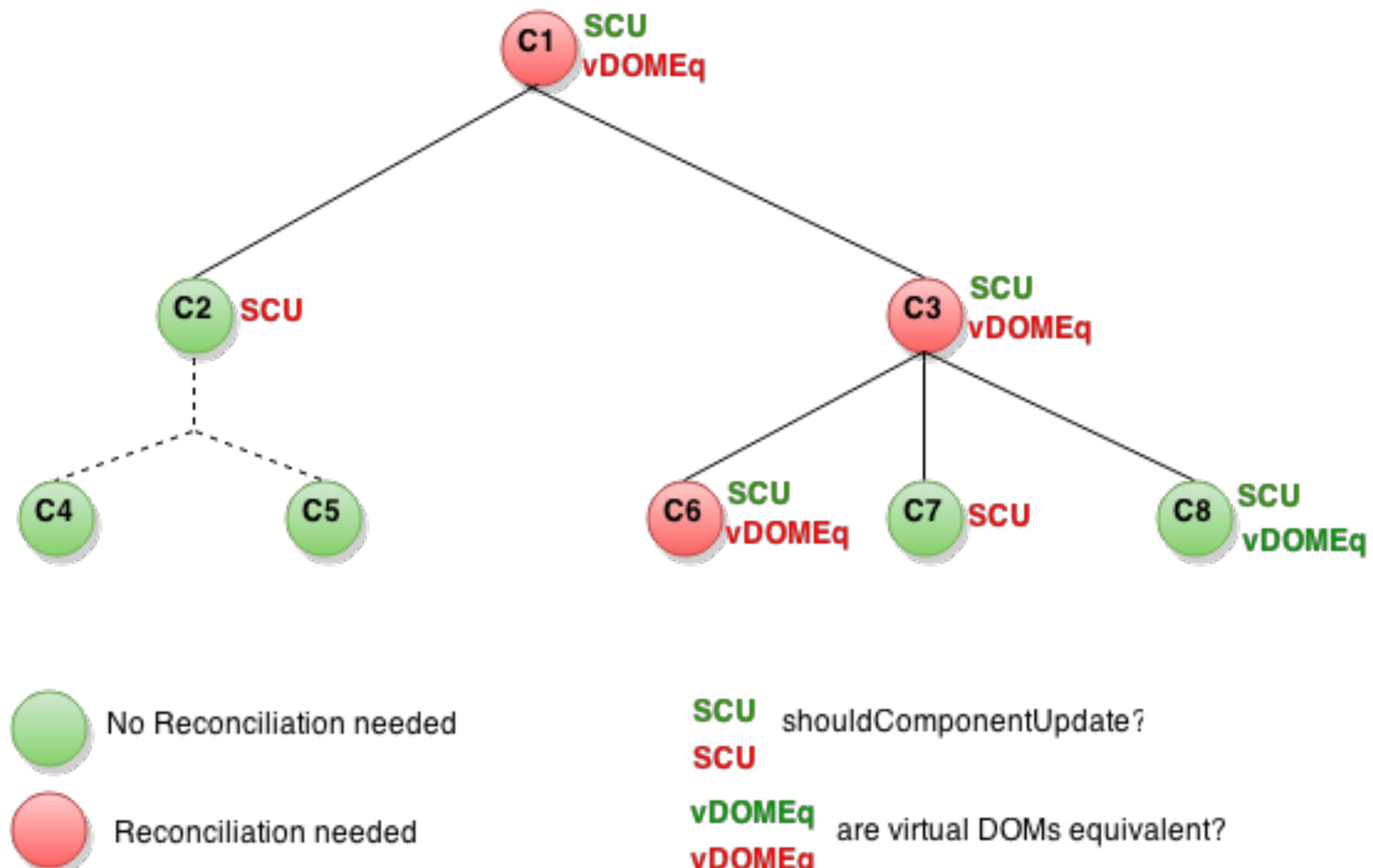
# shouldComponentUpdate

Component.js

```
shouldComponentUpdate(nextProps, nextState) {  
  return nextProps.text !== this.props.text;  
}
```







# Pure Render

Component.js

```
shouldComponentUpdate(nextProps, nextState) {  
  return !shallowEqual(this.props, nextProps) ||  
    !shallowEqual(this.state, nextState);  
}
```

# 1. Pure Render Mixin

Component.js

```
var React = require('react');
var PureRenderMixin = require('react-addons-pure-render-mixin');

var Test = React.createClass({
  mixins: [
    PureRenderMixin
  ],

  render: function() {
    return <div></div>;
  }
});
```

# 2. Pure Render Decorator

Component.js

```
import {Component} from 'react';
import pureRender from 'pure-render-decorator';

class Test extends Component {
  render() {
    return <div />;
  }
}

export default pureRender(Test);
```

# 3. Pure Render Decorator + decorators syntax

Component.js

```
import {Component} from 'react';
import pureRender from 'pure-render-decorator';

@pureRender
export default class Test extends Component {
  render() {
    return <div />;
  }
}
```

# 4. PureComponent

Component.js

```
import { PureComponent } from 'react';

export default class Test extends PureComponent {
  render() {
    return <div />;
  }
}
```

react v15.3 and higher

# **OPTIMIZING FOR PURE COMPONENTS**

# 1. function.bind / arrow functions

index.js

```
function sum(a, b) {
  return a + b;
}

const bindedSum1 = sum.bind(null, 2);
const bindedSum2 = sum.bind(null, 2);

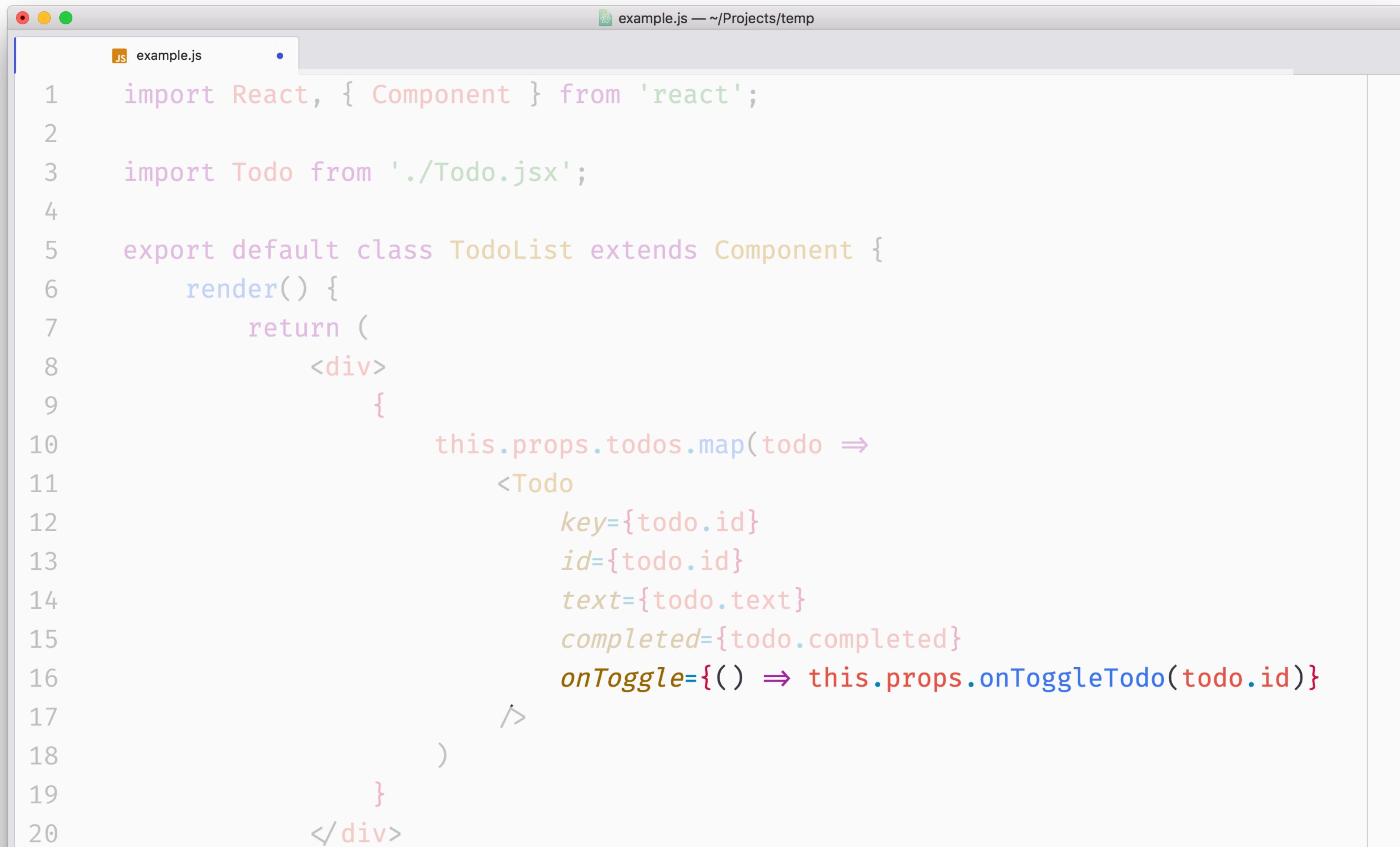
console.log(bindedSum1 === bindedSum2); // false
```

# 1. function.bind / arrow functions

index.js

```
const sum1 = (a, b) => a + b;  
const sum2 =(a, b) => a + b;  
  
console.log(sum1 === sum2); // false
```

# 1. function.bind / arrow functions



A screenshot of a code editor window titled "example.js — ~/Projects/temp". The file contains the following React component code:

```
1 import React, { Component } from 'react';
2
3 import Todo from './Todo.jsx';
4
5 export default class TodoList extends Component {
6   render() {
7     return (
8       <div>
9         {
10           this.props.todos.map(todo =>
11             <Todo
12               key={todo.id}
13               id={todo.id}
14               text={todo.text}
15               completed={todo.completed}
16               onToggle={() => this.props.onToggleTodo(todo.id)}
17             />
18         )
19       )
20     </div>
21   }
22 }
```

*the  
new  
function  
every  
render*

# 1. function.bind / arrow functions

```
JS example.js
example.js — ~/Projects/temp

1 import React, { Component } from 'react';
2
3 import styles from './Todo.less';
4
5 export default class Todo extends Component {
6   handleToggle() {
7     this.props.onToggle(this.props.id);
8   }
9
10  render() {
11    const { text, completed } = this.props;
12
13    return (
14      <div
15        className={completed ? styles.completed : styles.root}
16        onClick={this.handleToggle}
17      >
18        {text}
19      </div>
20    );
}
```

better to  
pass props  
in child  
component

# 1. function.bind / arrow functions

A screenshot of a code editor window titled "example.js — ~/Projects/temp". The code editor shows a file named "example.js" with the following content:

```
13 handleNoteDelete(noteId) {
14     this.setState({
15         notes: this.state.notes.filter(note => note.id !== noteId)
16     });
17 }
18
19 handleNoteAdd(newNote) {
20     this.setState({
21         notes: [ ...this.state.notes, newNote]
22     });
23 }
24
25 render() {
26     return (
27         <div className="app">
28             <h2 className="app_header">NotesApp</h2>
29
30             <NoteEditor onNoteAdd={this.handleNoteAdd.bind(this)} />
31
32             <NotesGrid
33                 notes={this.state.notes || []}>
```

Handwritten notes on the right side of the code editor:

again, we create a new function every render

An arrow points from the handwritten text to the line `onNoteAdd={this.handleNoteAdd.bind(this)}`.

# 1. function.bind / arrow functions



A screenshot of a code editor window titled "example.js — ~/Projects/temp". The code editor shows a file named "example.js" with the following content:

```
8  export default class NotesApp extends Component {
9    constructor() {
10      super();
11
12      this.state = {
13        notes: []
14    };
15
16    this.handleNoteDelete = this.handleNoteDelete.bind(this);
17    this.handleNoteAdd = this.handleNoteAdd.bind(this);
18  }
19
20  handleNoteDelete(noteId) {
21    this.setState({
22      notes: this.state.notes.filter(note => note.id !== noteId)
23    });
24
25  handleNoteAdd(newNote) {
26    this.setState({
27      notes: [newNote, ...this.state.notes]
28    });
29  }
30}
```

← better to  
bind 'this'  
in the  
constructor

# 1. function.bind / arrow functions

The screenshot shows a code editor window with a tab labeled "example.js". The file contains the following code:

```
8  export default class NotesApp extends Component {
9      state = {
10         notes: []
11     }
12
13     handleNoteDelete = (noteId) => {
14         this.setState({
15             notes: this.state.notes.filter(note => note.id !== noteId)
16         });
17     }
18
19     handleNoteAdd = (newNote) => {
20         this.setState({
21             notes: [newNote, ...this.state.notes]
22         });
23     }
24
25     render() {
26         return (
27             <div className="app">
28                 <h2 className="app__header">NotesApp</h2>
```

Handwritten notes on the right side of the editor window:

or even  
better to  
use arrow  
functions for  
methods

A curved arrow points from the handwritten text "use arrow functions for methods" towards the arrow function definitions in the code.

## **2. ARRAYS / OBJECTS CREATION**

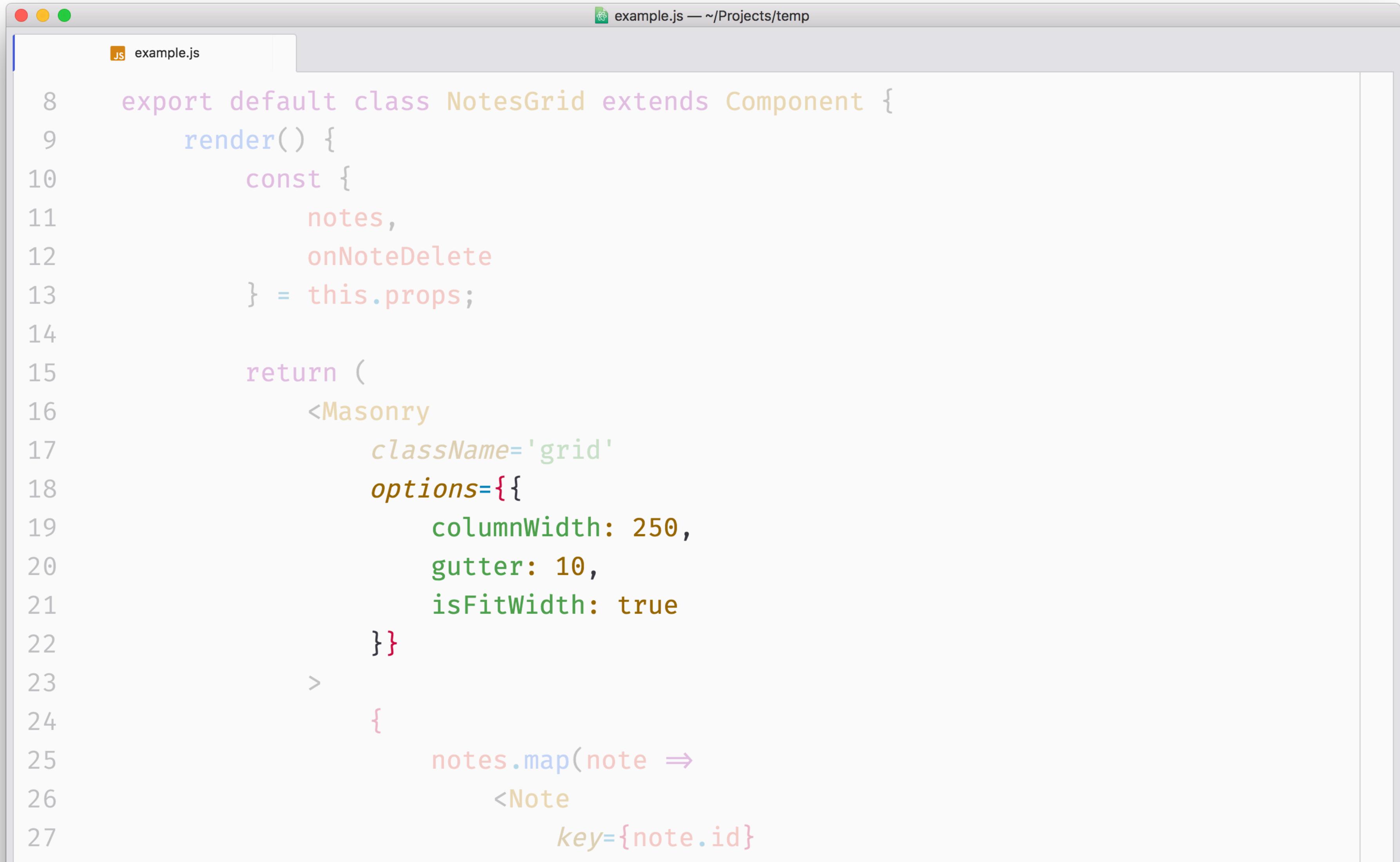
# 2. arrays / objects creation

index.js

```
const arr1 = [ ];
const arr2 = [ ];

console.log(arr1 === arr2); // false
```

# 2. arrays / objects creation

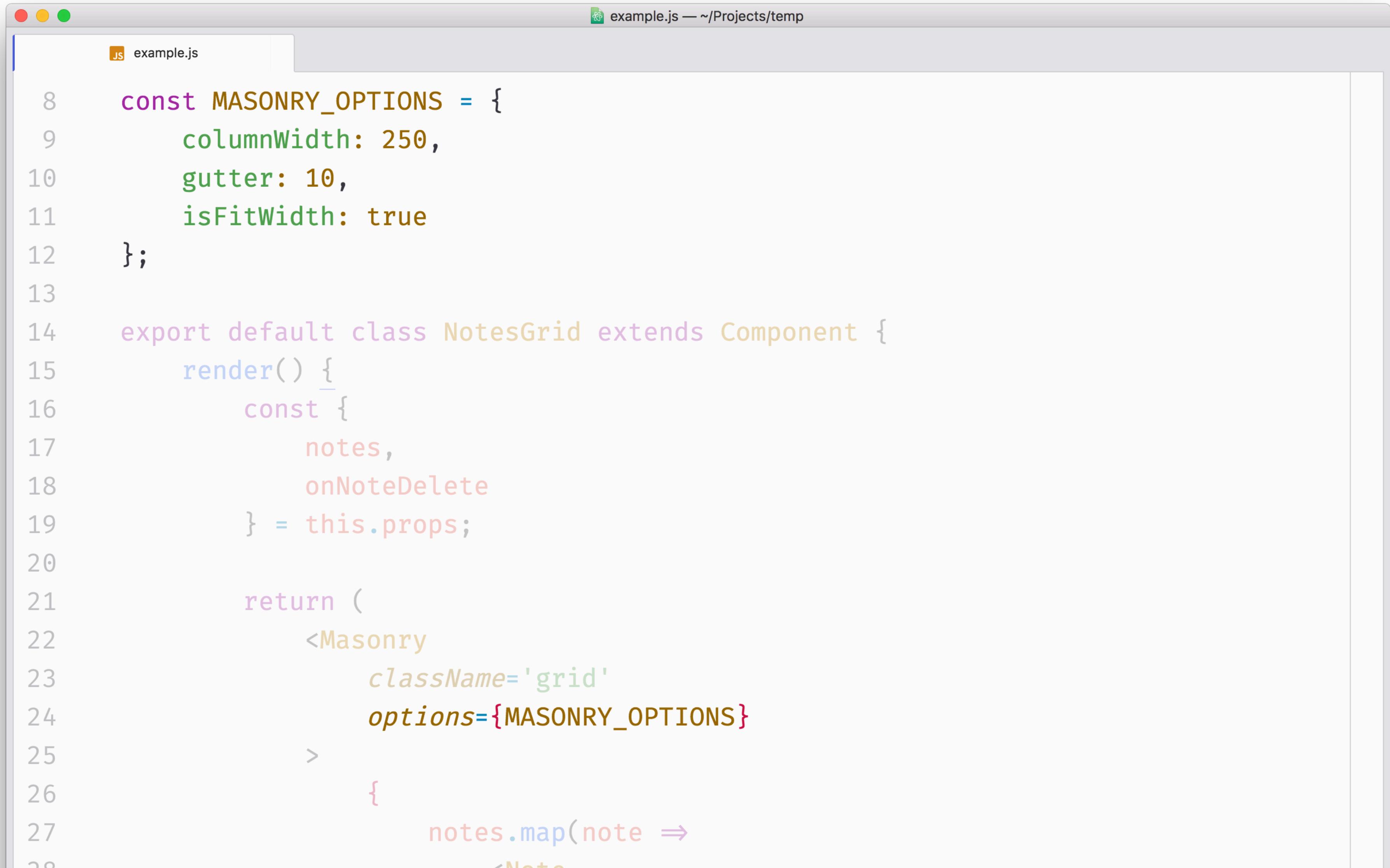


The code editor shows a file named `example.js` with the following content:

```
8  export default class NotesGrid extends Component {
9    render() {
10      const {
11        notes,
12        onNoteDelete
13      } = this.props;
14
15      return (
16        <Masonry
17          className='grid'
18          options={{
19            columnWidth: 250,
20            gutter: 10,
21            isFitWidth: true
22          }}
23        >
24        {
25          notes.map(note =>
26            <Note
27              key={note.id}
```

*the  
new  
object is created  
every render*

# 2. arrays / objects creation



```
example.js — ~/Projects/temp
JS example.js

8 const MASONRY_OPTIONS = {
9   columnWidth: 250,
10  gutter: 10,
11  isFitWidth: true
12 };
13
14 export default class NotesGrid extends Component {
15   render() {
16     const {
17       notes,
18       onNoteDelete
19     } = this.props;
20
21     return (
22       <Masonry
23         className='grid'
24         options={MASONRY_OPTIONS}
25       >
26       {
27         notes.map(note =>
28           <Note>
```

better-  
same reference,  
no additional  
re-renders

# 2. arrays / objects creation



```
example.js — ~/Projects/temp
JS example.js

19  handleNoteAdd = (newNote) => {
20    this.setState({
21      notes: [...this.state.notes, newNote]
22    });
23  }
24
25  render() {
26    return (
27      <div className="app">
28        <h2 className="app__header">NotesApp</h2>
29
30        <NoteEditor onNoteAdd={this.handleNoteAdd} />
31
32        <NotesGrid
33          notes={this.state.notes || []}
34          onNoteDelete={this.handleNoteDelete}>
35        </NotesGrid>
36      </div>
37    );
38  }
}
```

The same  
[] !== [],  
so new array  
is created on  
every render

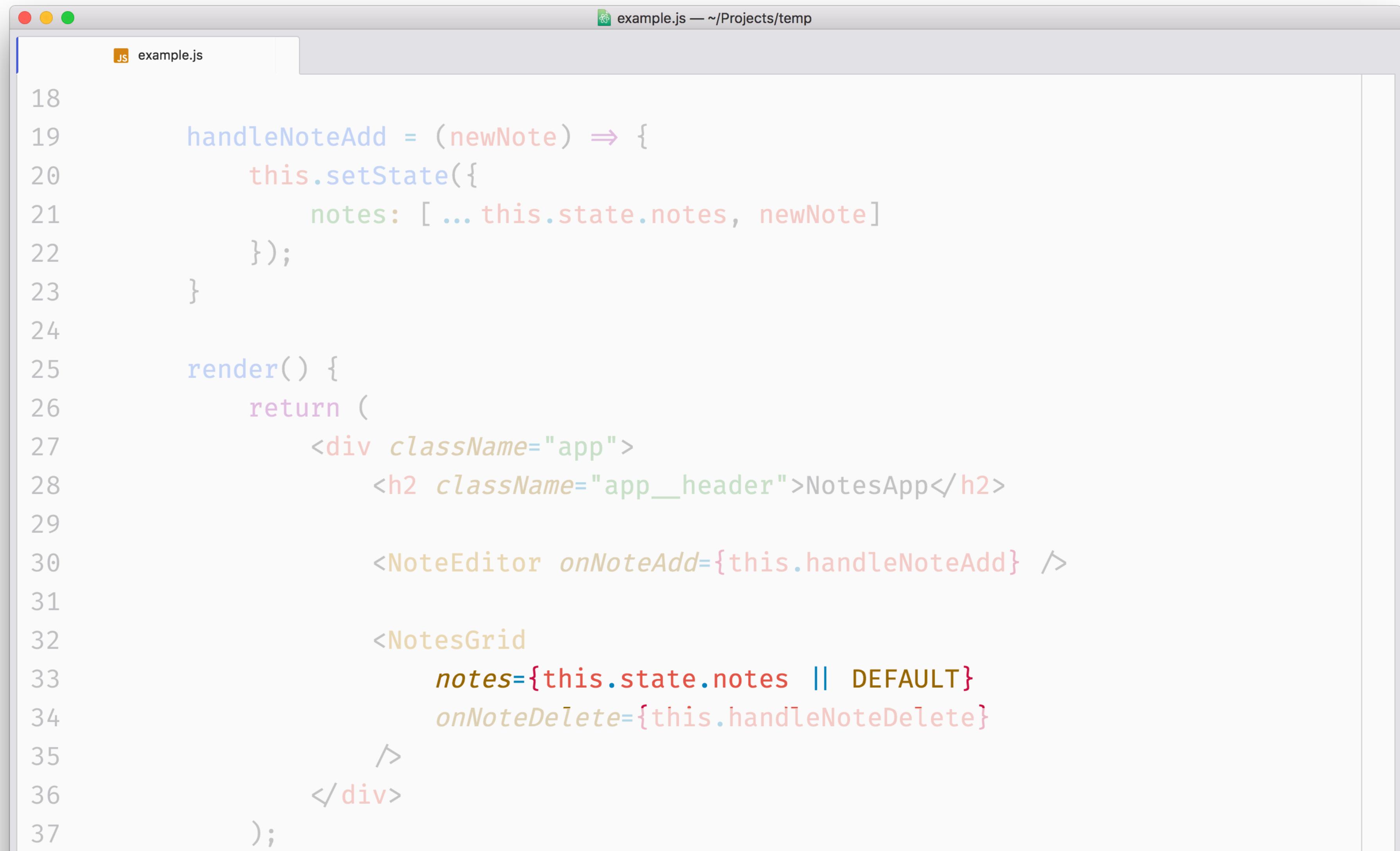
# 2. arrays / objects creation

```
example.js — ~/Projects/temp
JS example.js

8  export default class NotesGrid extends Component {
9    static defaultProps = {
10      notes: []
11    }
12
13   render() {
14     const {
15       notes,
16       onNoteDelete
17     } = this.props;
18
19     return (
20       <Masonry
21         className='grid'
22         options={MASONRY_OPTIONS}
23       >
24         {
25           notes.map(note =>
26             <Note
27               key={note.id}
28               onNoteDelete={onNoteDelete}
29             >
30           )
31         }
32       </Masonry>
33     );
34   }
35
36   static getDerivedStateFromProps(nextProps, prevState) {
37     if (nextProps.notes !== prevState.notes) {
38       return { notes: nextProps.notes };
39     }
40     return null;
41   }
42
43   render() {
44     return (
45       <div>
46         <h1>Notes Grid</h1>
47         <NotesGrid
48           notes={notes}
49           onNoteDelete={onNoteDelete}
50         />
51       </div>
52     );
53   }
54 }
```

move it  
to defaultProps

# 2. arrays / objects creation



The screenshot shows a code editor window with a tab labeled "example.js". The file contains the following code:

```
18
19     handleNoteAdd = (newNote) => {
20         this.setState({
21             notes: [...this.state.notes, newNote]
22         });
23     }
24
25     render() {
26         return (
27             <div className="app">
28                 <h2 className="app__header">NotesApp</h2>
29
30                 <NoteEditor onNoteAdd={this.handleNoteAdd} />
31
32                 <NotesGrid
33                     notes={this.state.notes || DEFAULT}
34                     onNoteDelete={this.handleNoteDelete}
35                 />
36             </div>
37     );
}
```

Handwritten notes on the right side of the screen:

use reference  
or a to an empty  
array created once

A handwritten arrow points from the word "array" to the spread operator "...this.state.notes" in the code.

# 3. modification by reference

index.js

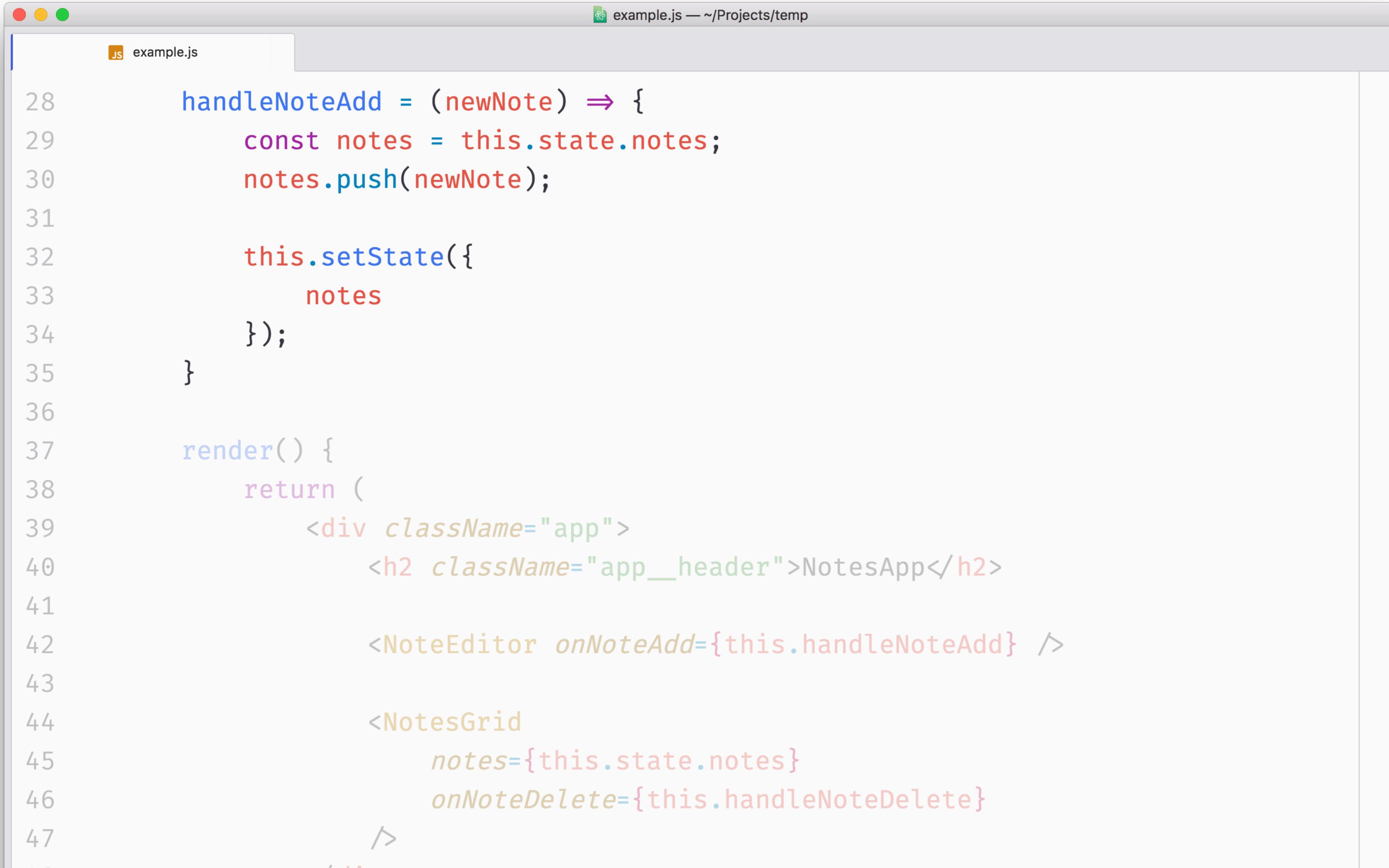
```
const arr1 = [1, 2, 3];
const arr2 = arr1;

arr2.push(4);

console.log(arr1); // [1, 2, 3, 4]
console.log(arr2); // [1, 2, 3, 4]

console.log(arr1 === arr2); // true
```

# 3. modification by reference

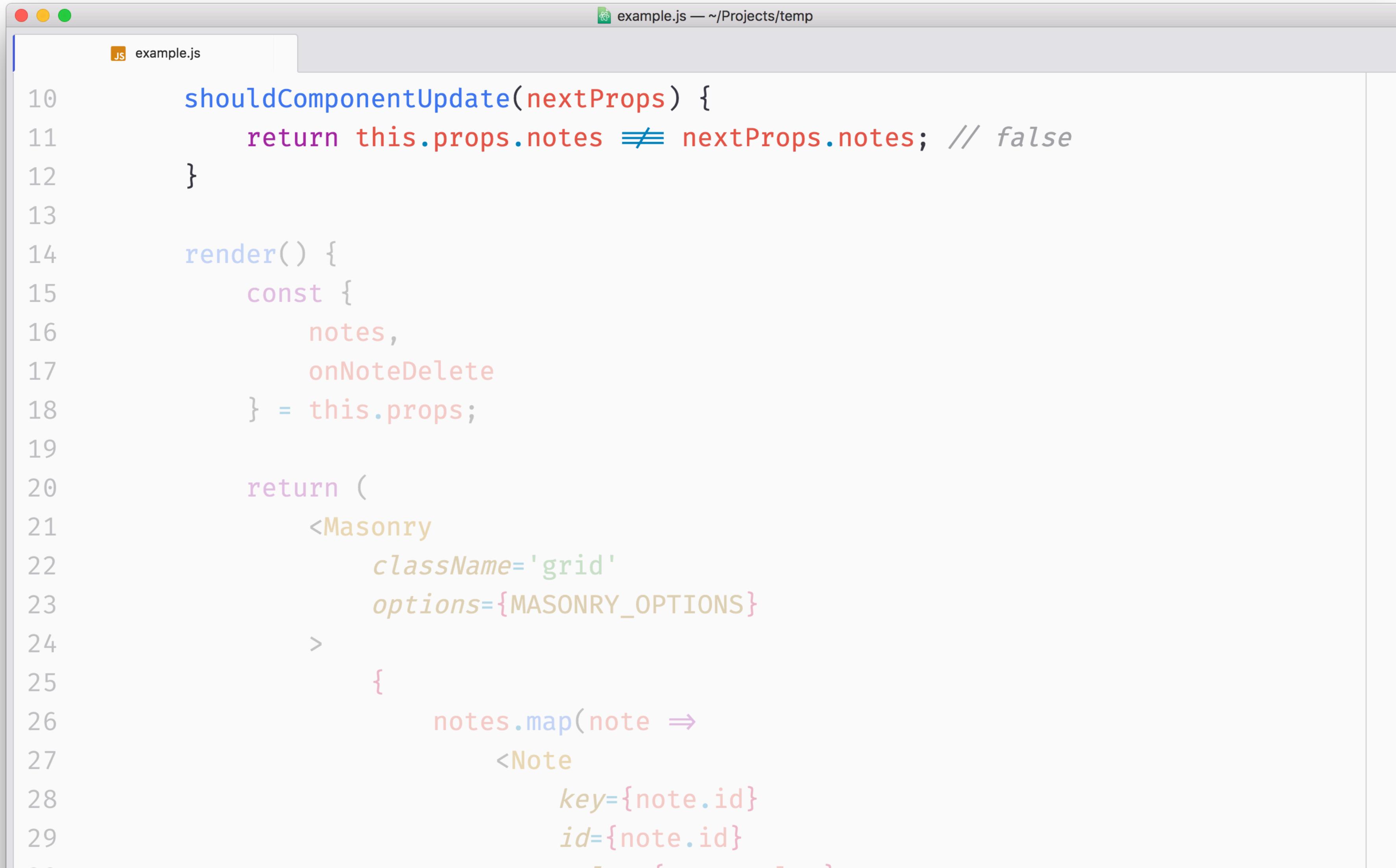


```
example.js — ~/Projects/temp
JS example.js

28     handleNoteAdd = (newNote) => {
29         const notes = this.state.notes;
30         notes.push(newNote);
31
32         this.setState({
33             notes
34         });
35     }
36
37     render() {
38         return (
39             <div className="app">
40                 <h2 className="app__header">NotesApp</h2>
41
42                 <NoteEditor onNoteAdd={this.handleNoteAdd} />
43
44                 <NotesGrid
45                     notes={this.state.notes}
46                     onNoteDelete={this.handleNoteDelete}>
47             </NotesGrid>
48         </div>
49     );
50 }
```

↑ the same  
reference

# 3. modification by reference



A screenshot of a code editor window titled "example.js — ~/Projects/temp". The code editor shows a file named "example.js" with the following content:

```
10     shouldComponentUpdate(nextProps) {
11         return this.props.notes !== nextProps.notes; // false
12     }
13
14     render() {
15         const {
16             notes,
17             onNoteDelete
18         } = this.props;
19
20         return (
21             <Masonry
22                 className='grid'
23                 options={MASONRY_OPTIONS}
24             >
25             {
26                 notes.map(note =>
27                     <Note
28                         key={note.id}
29                         id={note.id}
30                         ...
31                 </Note>
32             )
33         );
34     }
35 }
```

↑ so, shallow  
comparison  
produces  
'false'

# 3. modification by reference

A screenshot of a code editor window titled "example.js — ~/Projects/temp". The code is a class-based React component named NotesApp. It has a state with an array of notes. The handleNoteDelete method filters the notes array to exclude the note with the specified id. The handleNoteAdd method adds a new note to the notes array. The code uses the spread operator (...). Handwritten notes on the right side of the window suggest using ES2015 spread operator or map/filter/etc. methods instead.

```
8  export default class NotesApp extends Component {
9    state = {
10      notes: []
11    }
12
13    handleNoteDelete = (noteId) => {
14      this.setState({
15        notes: this.state.notes.filter(note => note.id !== noteId)
16      );
17    }
18
19    handleNoteAdd = (newNote) => {
20      this.setState({
21        notes: [...this.state.notes, newNote]
22      );
23    }
24
25    render() {
26      return (
27        <div className="app">
```

use  
ES2015 spread  
operator or  
map, filter etc.  
methods

# **NOT MUTATING DATA WITH IMMUTABLE.JS**

<https://facebook.github.io/immutable-js/>

# No modification by reference

index.js

```
const arr1 = new List([1, 2, 3]);  
  
const arr2 = arr1.push(4);  
  
console.log(arr1); // List([1, 2, 3])  
console.log(arr2); // List([1, 2, 3, 4])  
  
console.log(arr1 === arr2); // false
```

# No modification by reference

index.js

```
const me = new Map({ name: 'Katya', age: 21 });

const olderMe = user.set('age', 22);

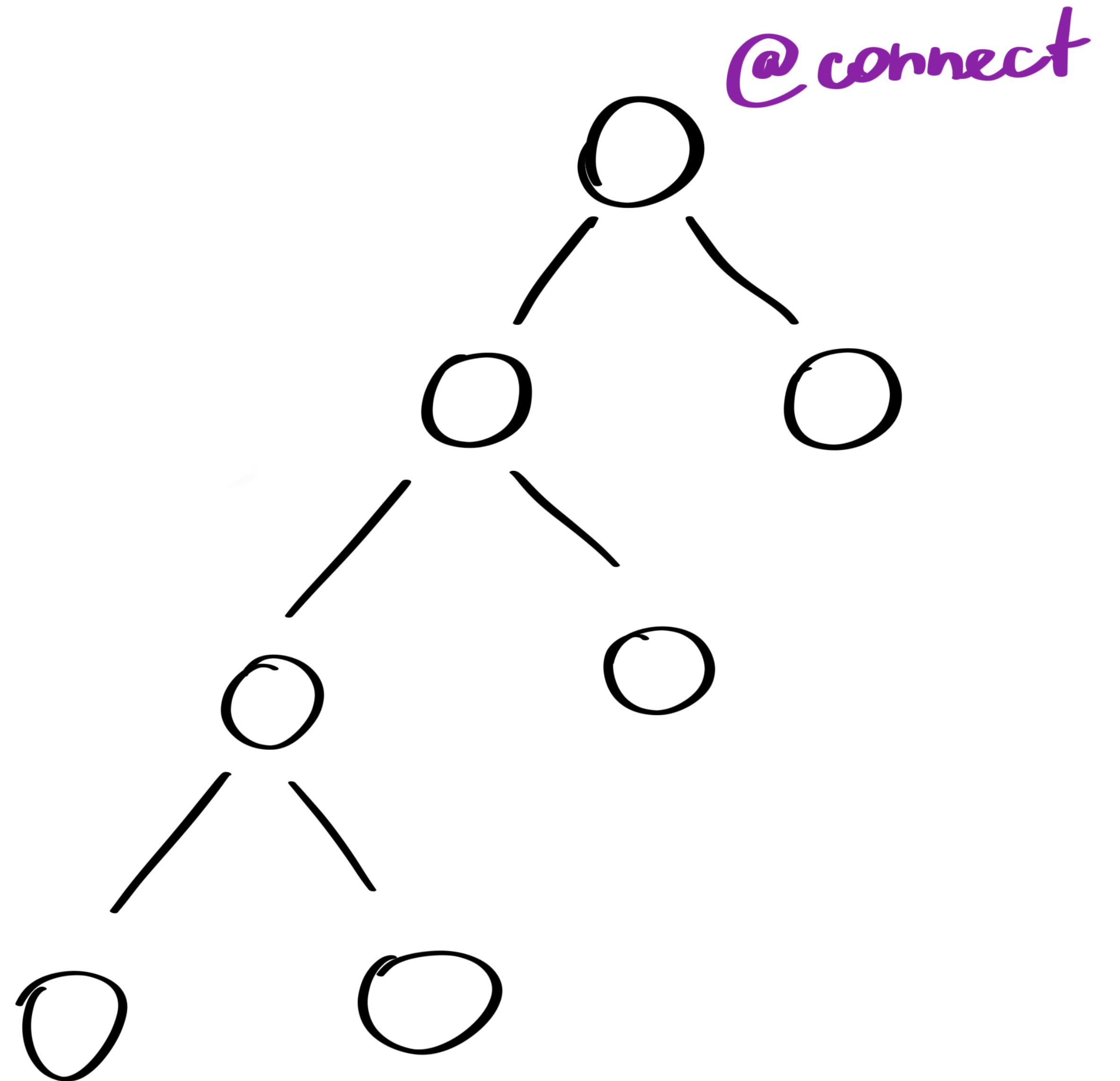
console.log(me); // Map({ name: 'Katya', age: 21 })
console.log(olderMe); // Map({ name: 'Katya', age: 22 })

console.log(me === olderMe); // false
```

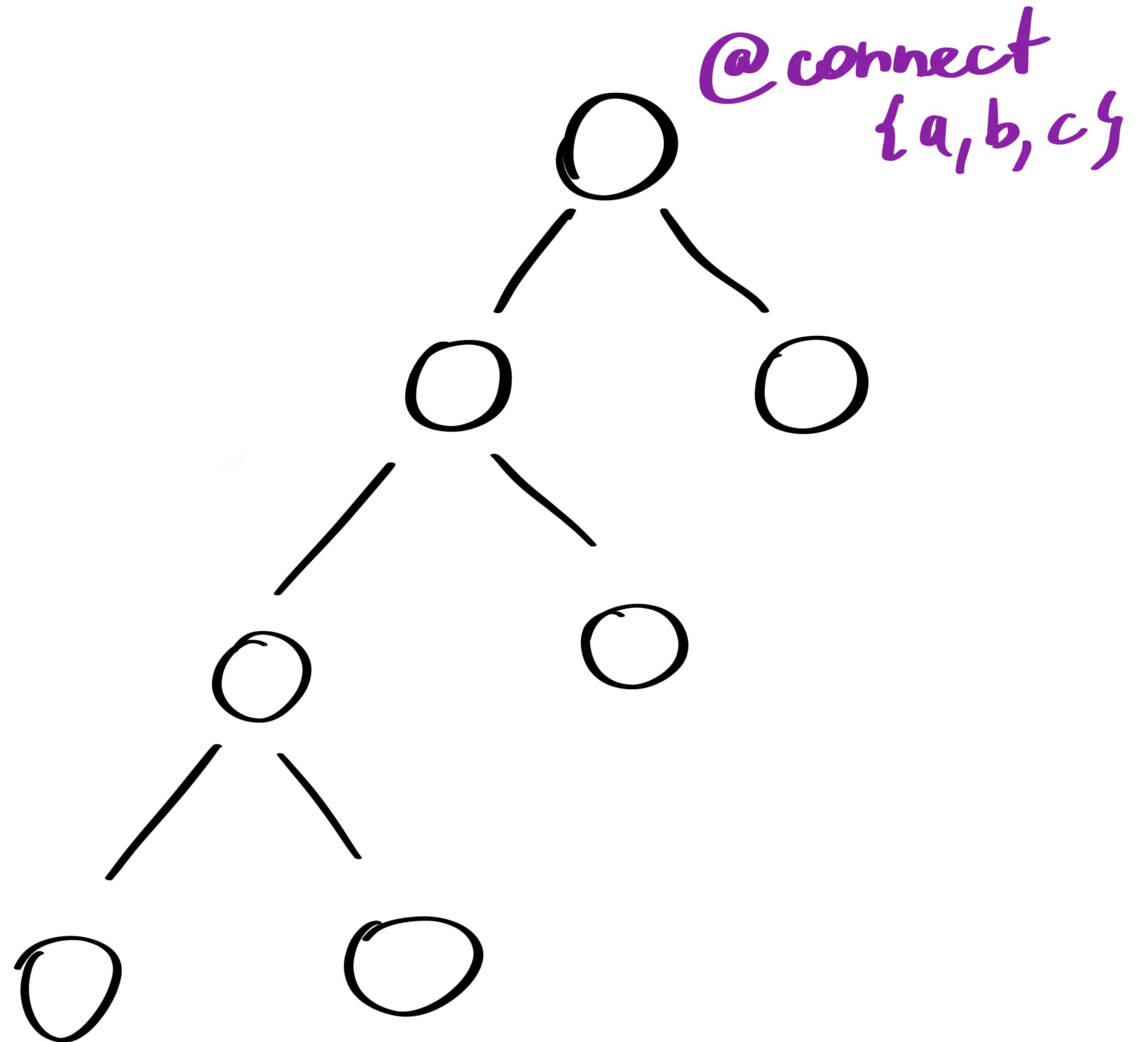
**MOVE EXPENSIVE CALCULATIONS TO**  
**componentDidMount**

# REDUX PERFORMANCE

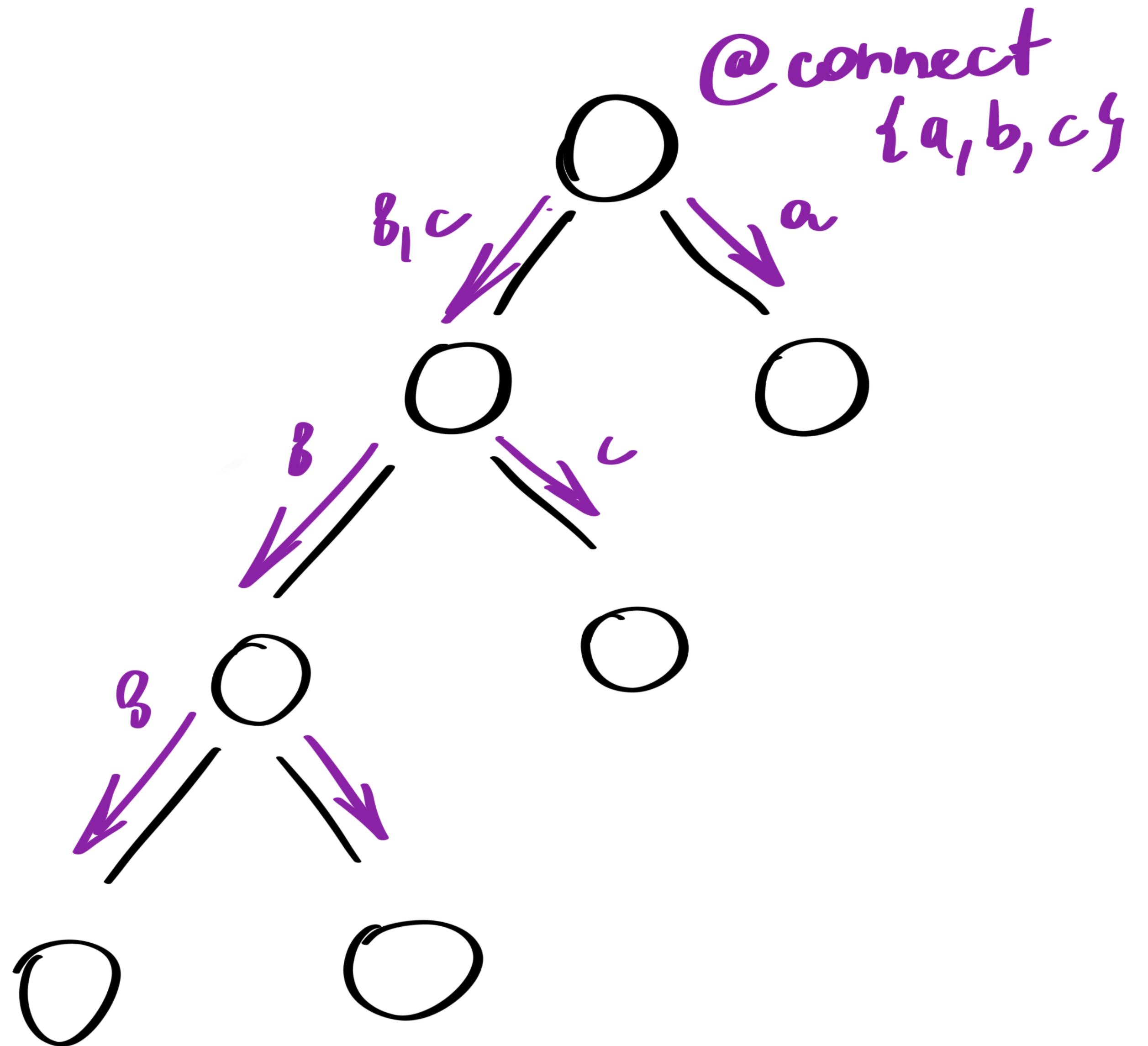
# React-redux connect

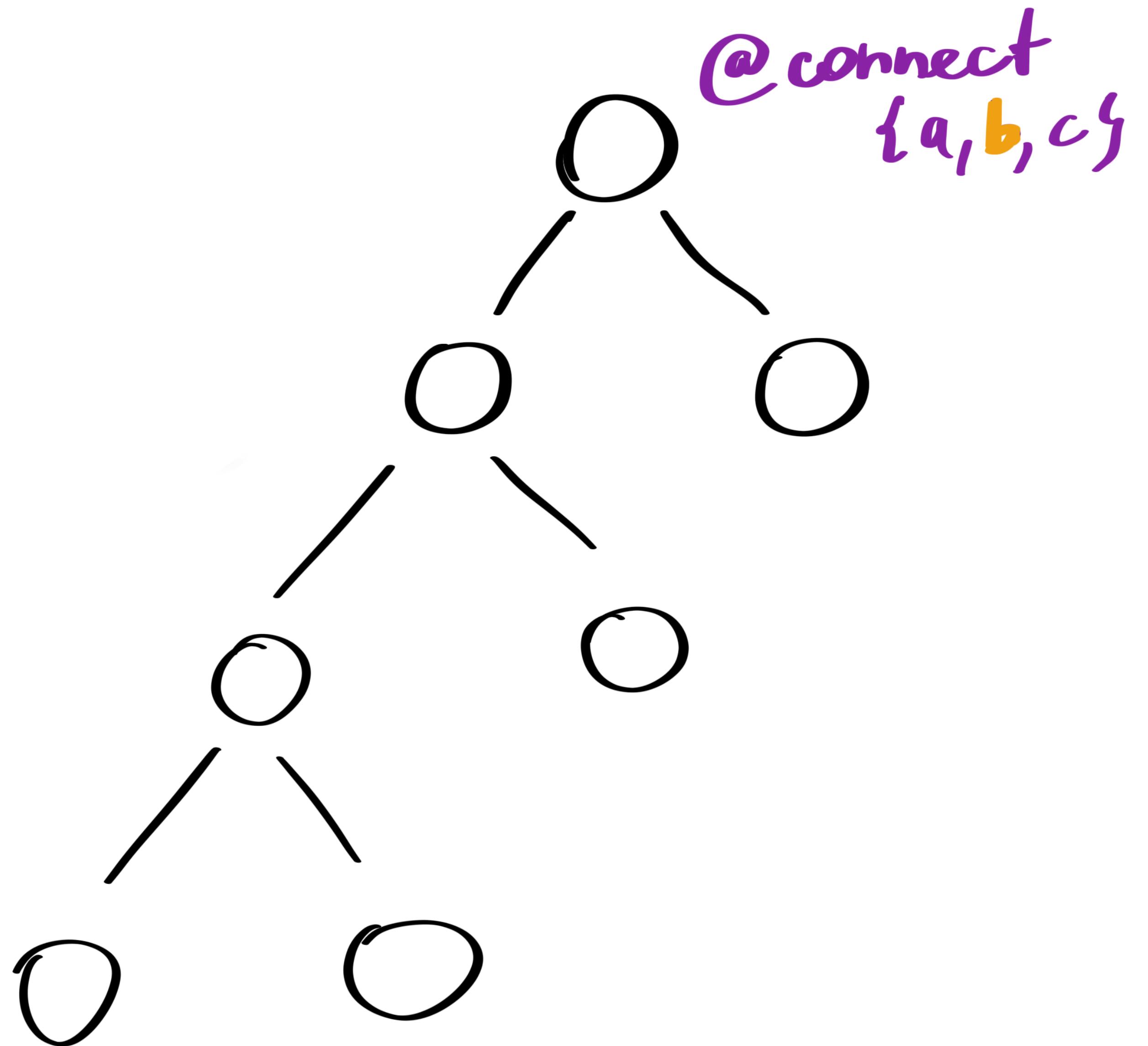


@connect

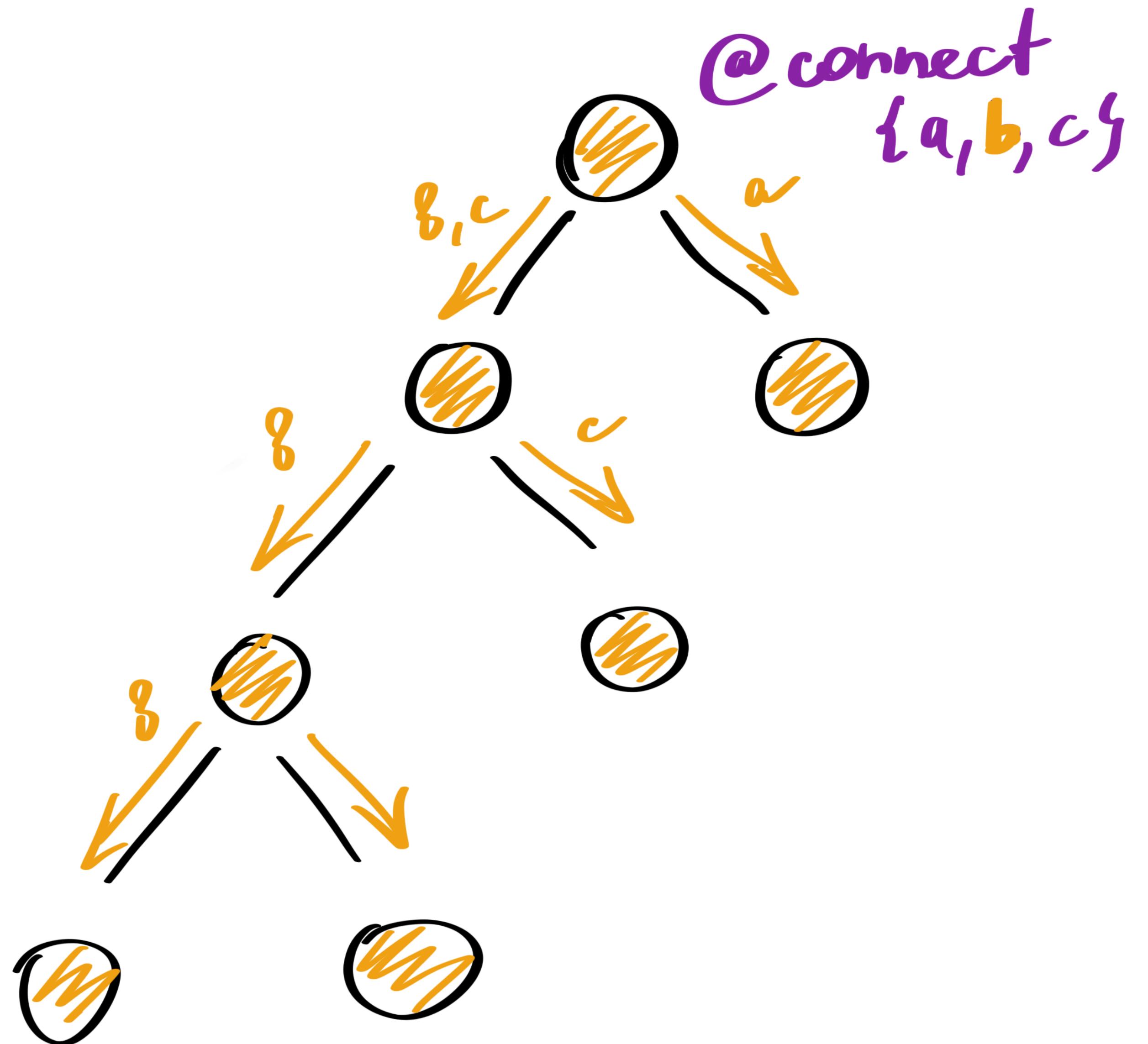


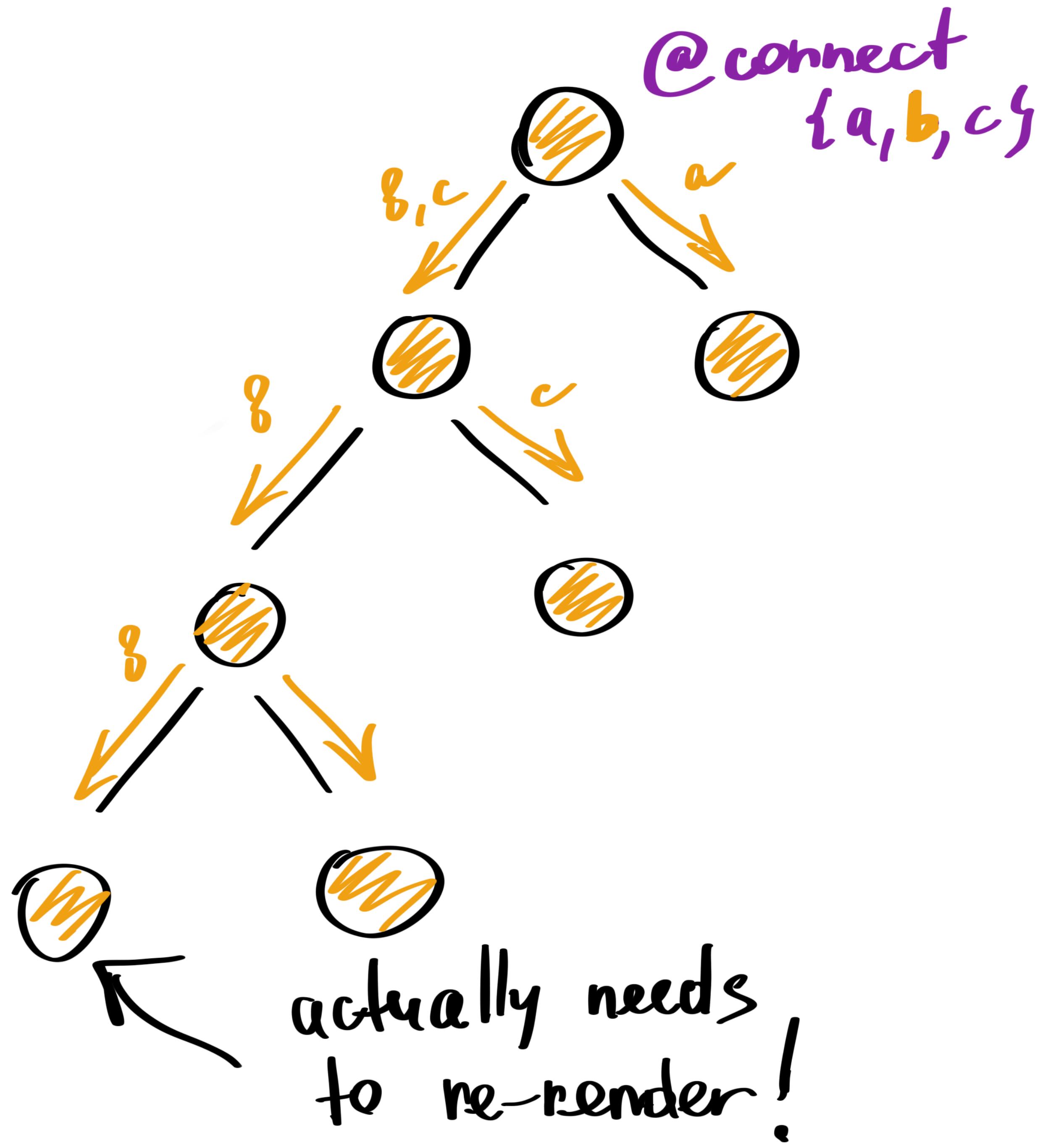
@connect  
{a,b,c}

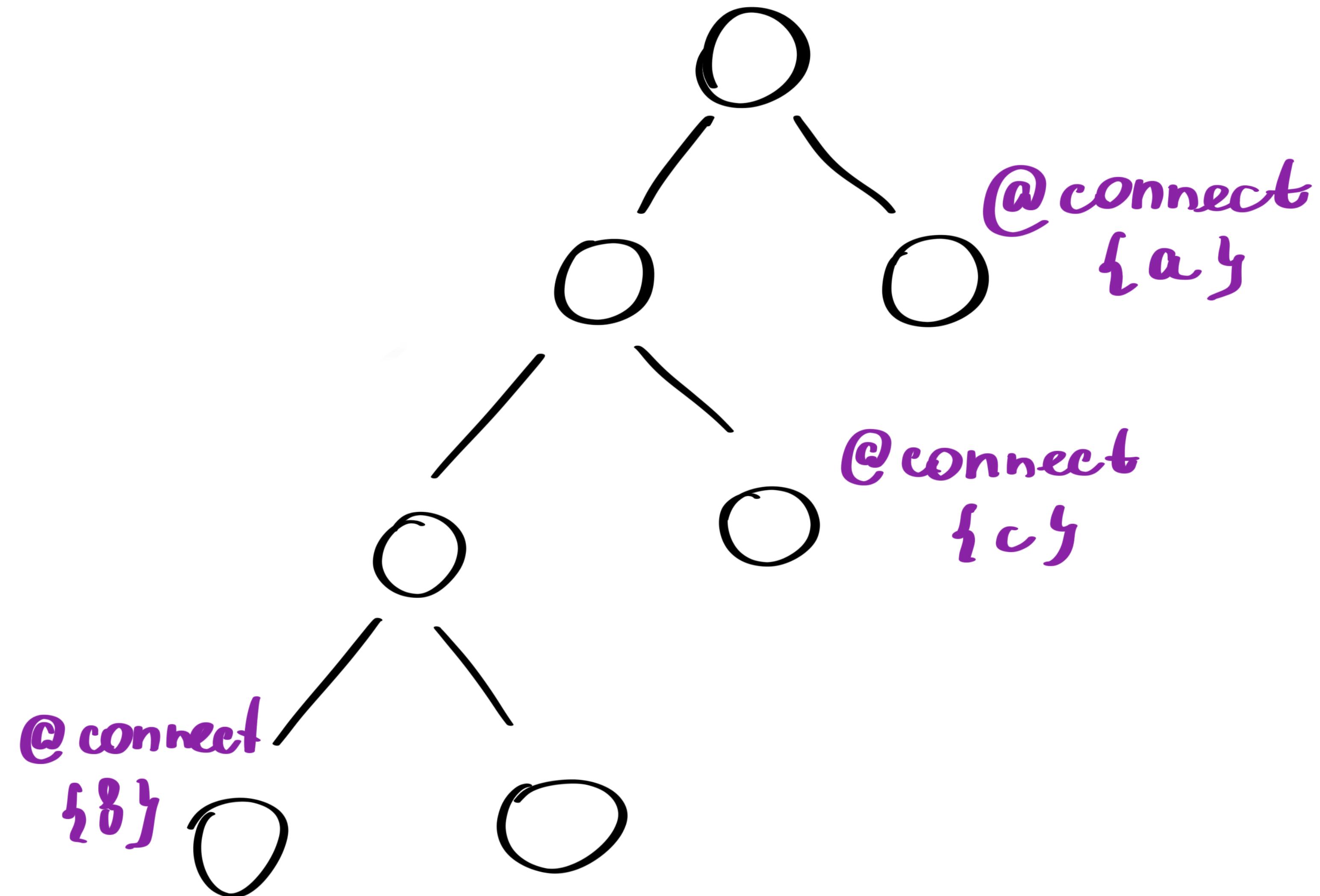


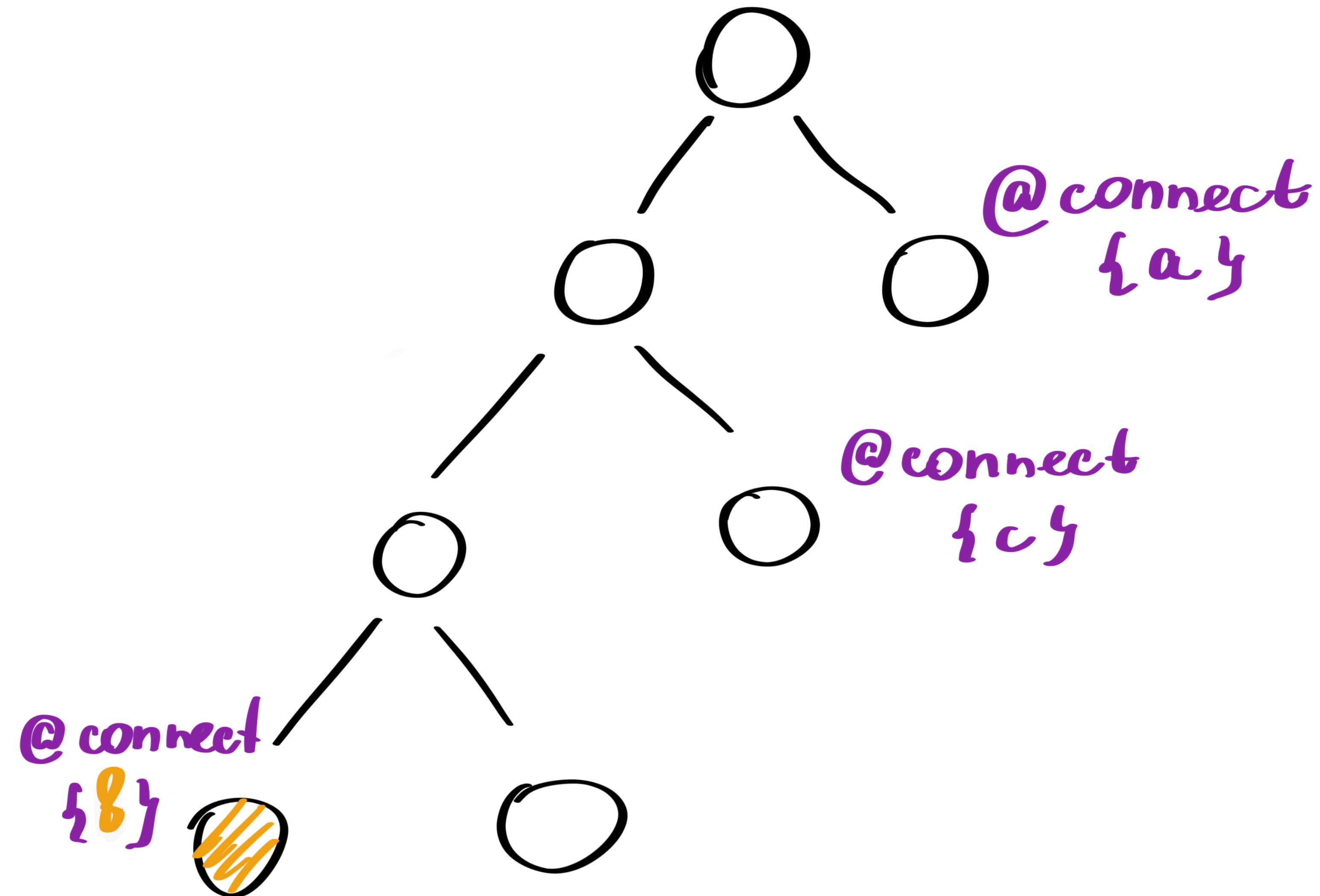


@connect  
 $\{a, b, c\}$









# Selectors memoization

## Component.js

```
import { getTagsAggregation } from 'state/tags/selectors';

function mapStateToProps(state) {
  return {
    tagsAggregation: getTagsAggregation(state),
  };
}
```

50 выбрано

**jarobez**  
livejournal.com 28 февраля 2017 г., 23:27

Десятки тысяч лондонских таксистов могут потерять работу

Онлайн-сервис такси **Uber** заявил, что введение обязательного теста на вирусы для водителей может лишить работы 33 тысячи.

4

● Отзывы / О водителях X ● Тема / Письменный тест X

(+) (+) (-)

**Andriy Antonyuk** 5 тыс.  
facebook.com 28 февраля 2017 г., 23:26 Украина

Во Вьетнаме могут запретить работу сервиса по заказу такси в Украине

Новости, аналитика, публикации в прессе о такси, О такси за рубежом, ХАНОЙ, 14 февраля. /Корр. ТАСС Юрий Денисович/. Популярная во всем мире интернет-служба вызова такси **Uber** ("Убер"), которая напрямую соединяет водителей и клиентов, может прекратить свою деятельность во Вьетнаме, поскольку вопросы...  
[http://taxoport.com/index.php?option=com\\_content&...](http://taxoport.com/index.php?option=com_content&...)

2 1 10

● Отзывы / О водителях X ● Тема / Запрет во Вьетнаме X Добавить тег

(+) (+) (-)

Поиск

О

- Отзывы / О водителях
- Отзывы / О машинах
- Отзывы / О приложении
- Отзывы / О службе поддержки
- Отзывы / Обслуживание
- Отзывы / Цена
- Сравнение с конкурентами / Gett
- Сравнение с конкурентами / Tax...
- Сравнение с конкурентами / Uk...
- Сравнение с конкурентами / Ян...

Отмена Применить

зыка для водителей

Объединить дубл

Поиск

водитель

uber

такси

убер

поездка

машина

заказ

который

мочь

один

свой

сервис

хороший

компания

работать

будет

раз

узкий

через



## selectors.js

```
export const getTagsAggregation = (state) => {
  // some dark magic

  return tags;
}
```

## Component.js

```
import { getTagsAggregation } from 'state/tags/selectors';

function mapStateToProps(state) {
  console.time('getTagsAggregation');
  const tagsAggregation = getTagsAggregation(state);
  console.timeEnd('getTagsAggregation');

  return {
    tagsAggregation,
  };
}
```

37ms

## selectors.js

```
import { createSelector } from 'reselect';

export const getTagsAggregation = createSelector(
  getMentions,
  (mentions) => {
    // some dark magic

    return tags;
  },
);
```

getTagsAggregation: 37ms  
getTagsAggregation: 0.051ms  
getTagsAggregation: 0.062ms  
getTagsAggregation: 0.0857ms  
getTagsAggregation: 0.0583ms  
getTagsAggregation: 0.0559ms  
getTagsAggregation: 0.054ms  
getTagsAggregation: 0.062ms  
getTagsAggregation: 0.0781ms  
getTagsAggregation: 0.0601ms  
getTagsAggregation: 0.0559ms  
getTagsAggregation: 0.0762ms  
getTagsAggregation: 0.976ms  
getTagsAggregation: 0.0559ms

0ms !

# Use component's state

# Redux ignore

# Redux ignore

reducers.js

```
import { ignoreActions, filterActions } from 'redux-ignore';

ignoreActions(reducer, [ARRAY_OF_ACTIONS])
ignoreActions(reducer, (action) => !action.valid)

filterActions(reducer, [ARRAY_OF_ACTIONS])
filterActions(reducer, (action) => action.valid)
```

# Redux log slow reducers

reducers.js

```
import logSlowReducers from 'redux-log-slow-reducers';
import { createStore, combineReducers } from 'redux';

const loggingReducers = logSlowReducers(reducers);

const store = createStore(combineReducers(loggingReducers));
```

<https://github.com/michaelcontento/redux-log-slow-reducers>

# Batch updates

- ▶ redux-batched-actions
- ▶ redux-batched-subscribe
- ▶ redux-batch



# UX SIDE

# Waiting

---





*time of waiting*

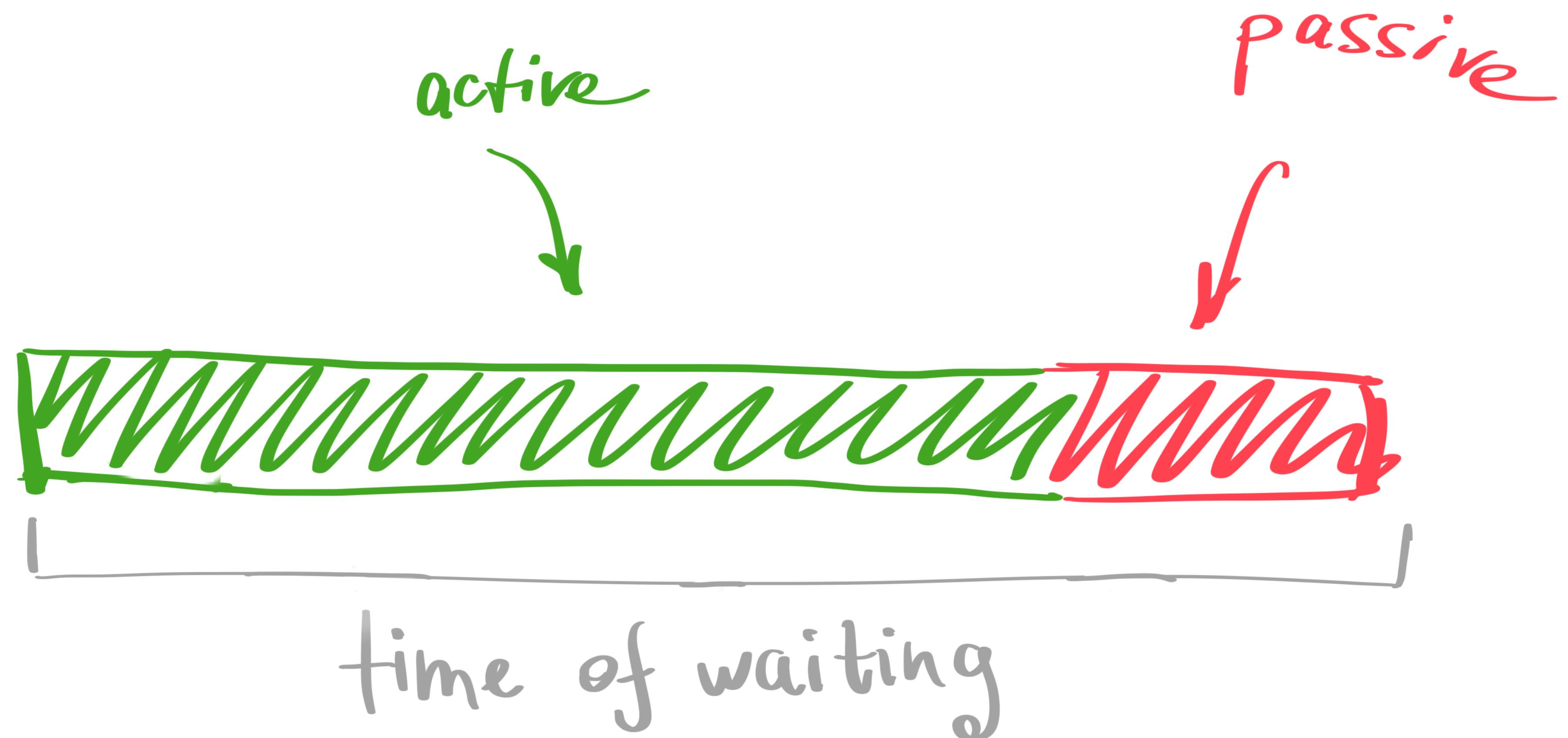
*active*



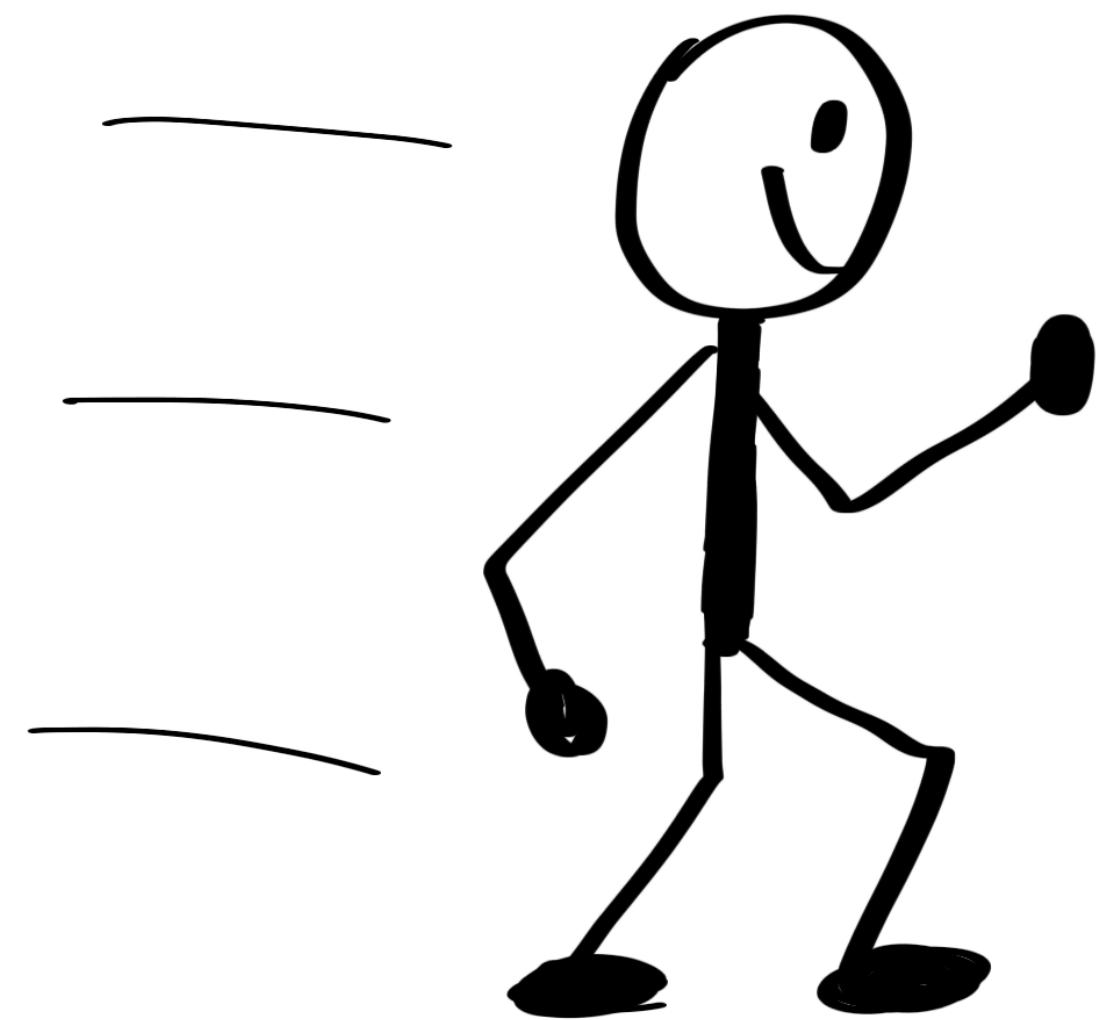
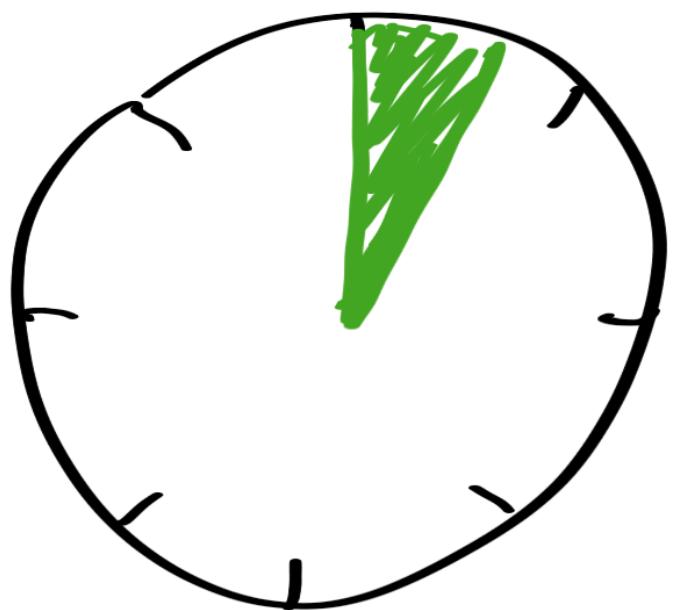
*passive*



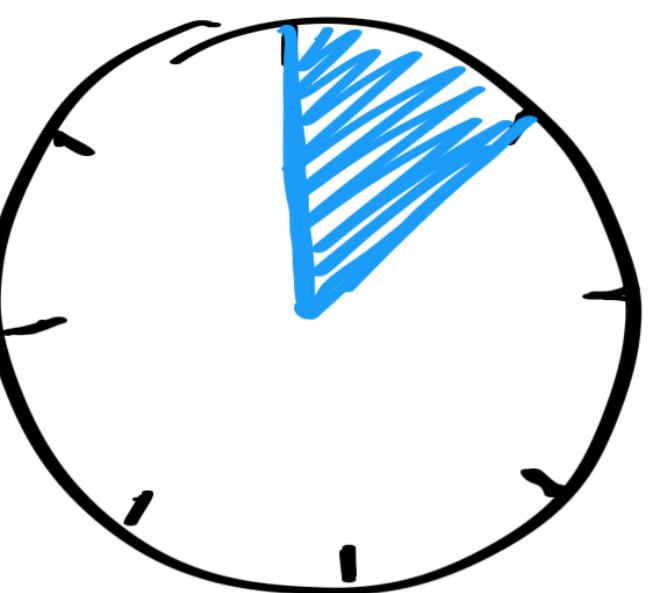
*time of waiting*



Active



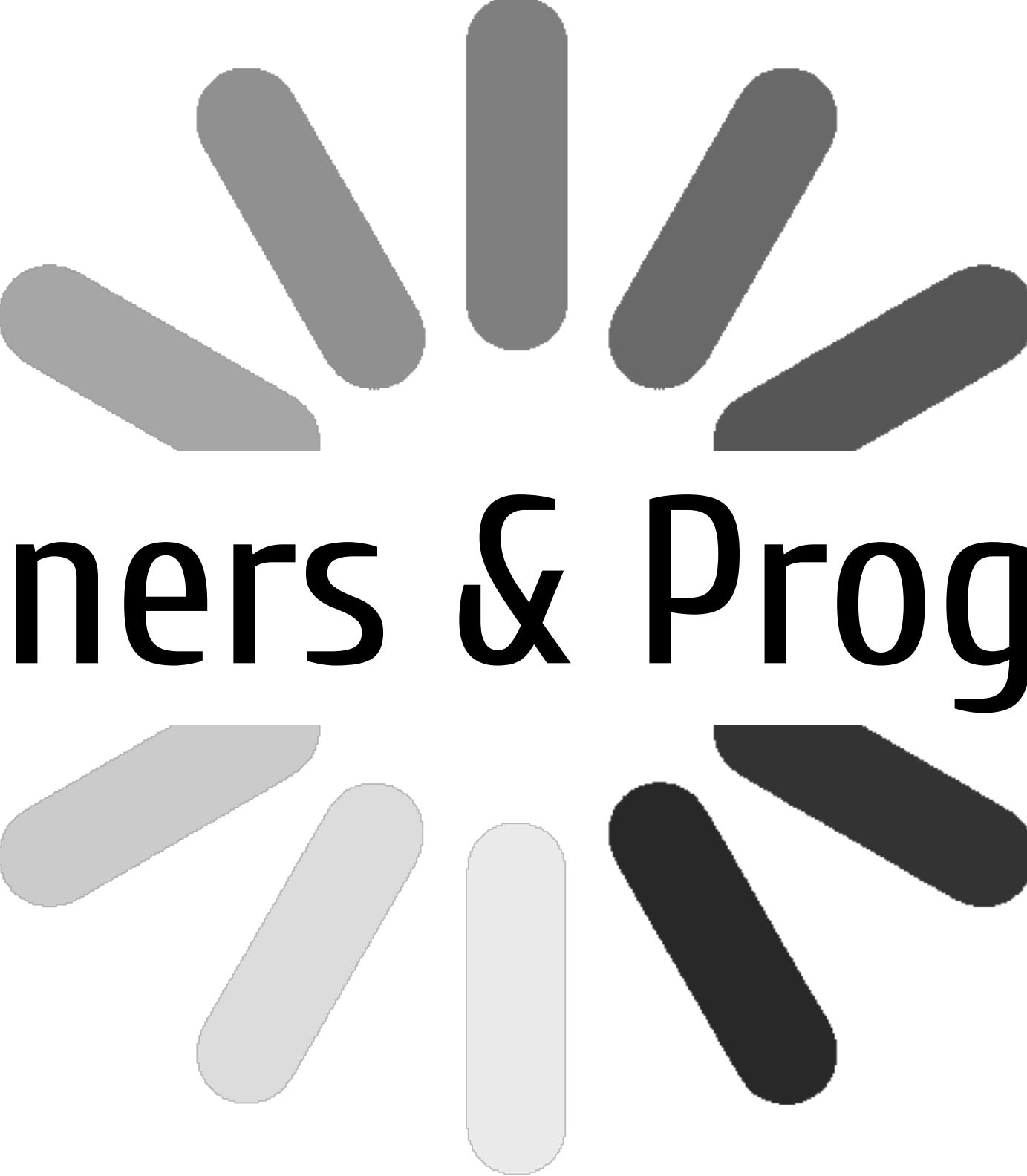
Passive



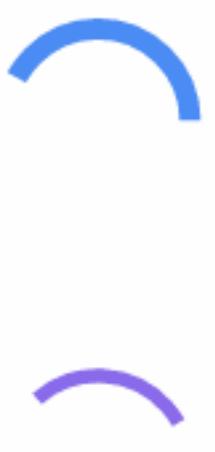
# Just noticeable difference

[https://en.wikipedia.org/wiki/Just-noticeable\\_difference](https://en.wikipedia.org/wiki/Just-noticeable_difference)

20%



**Spinners & Progress**



...



<1s

1-4s

>4s



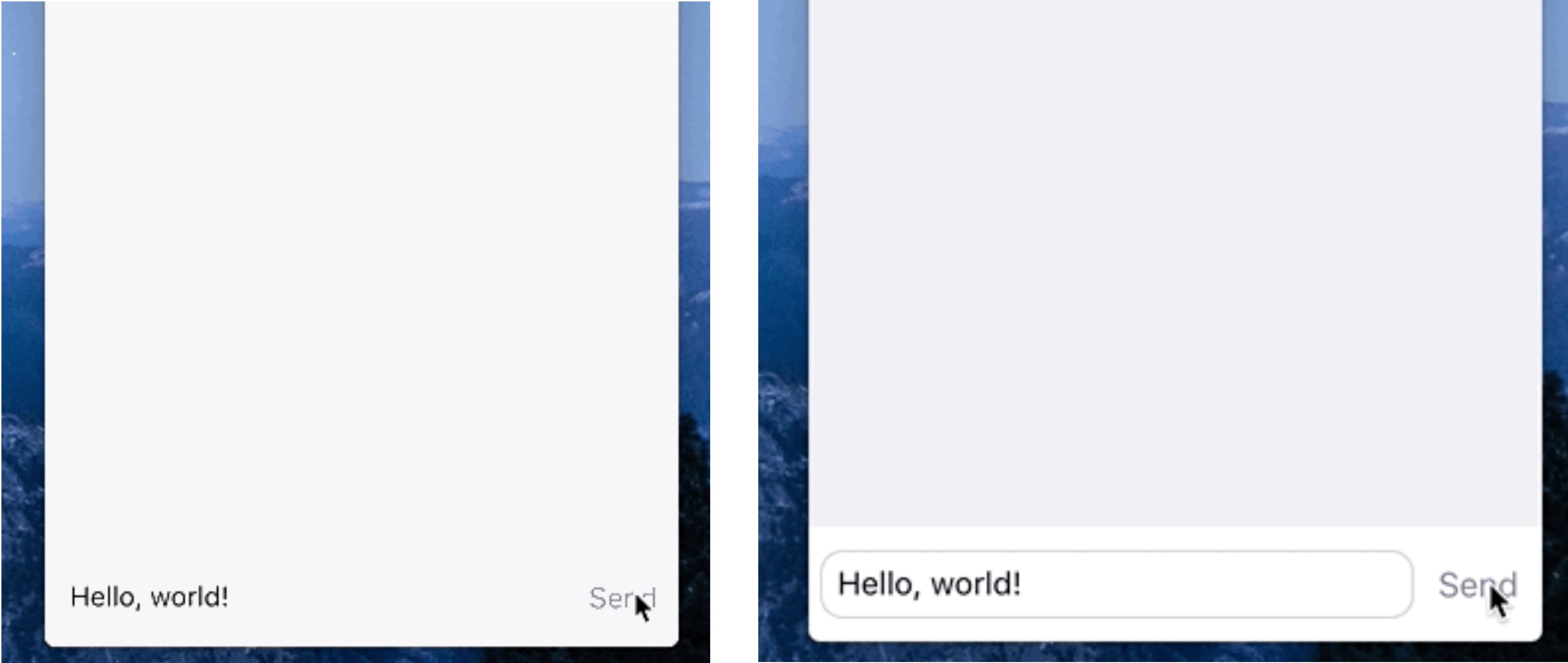
Nothing

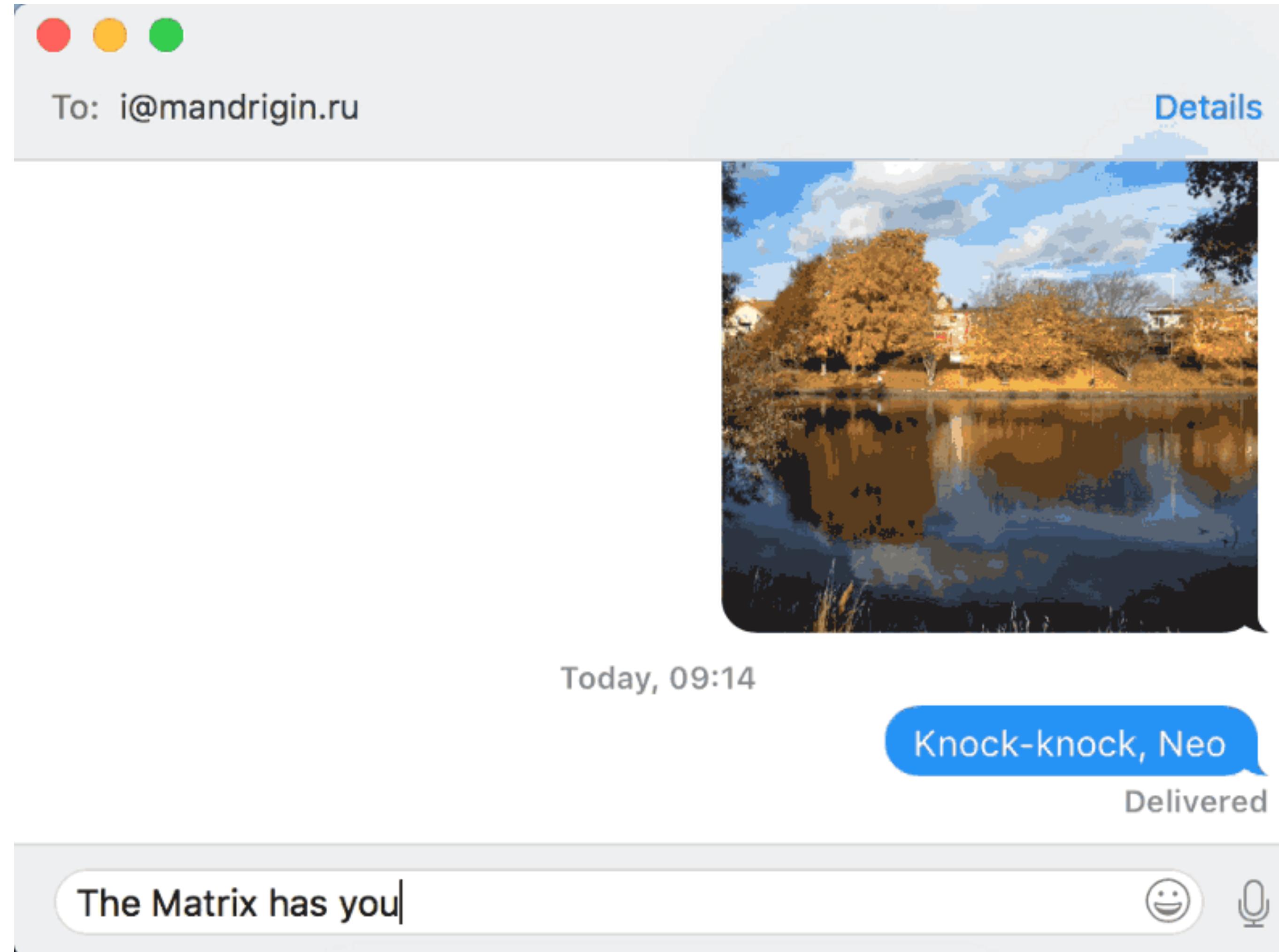
Spinner

Progress bar

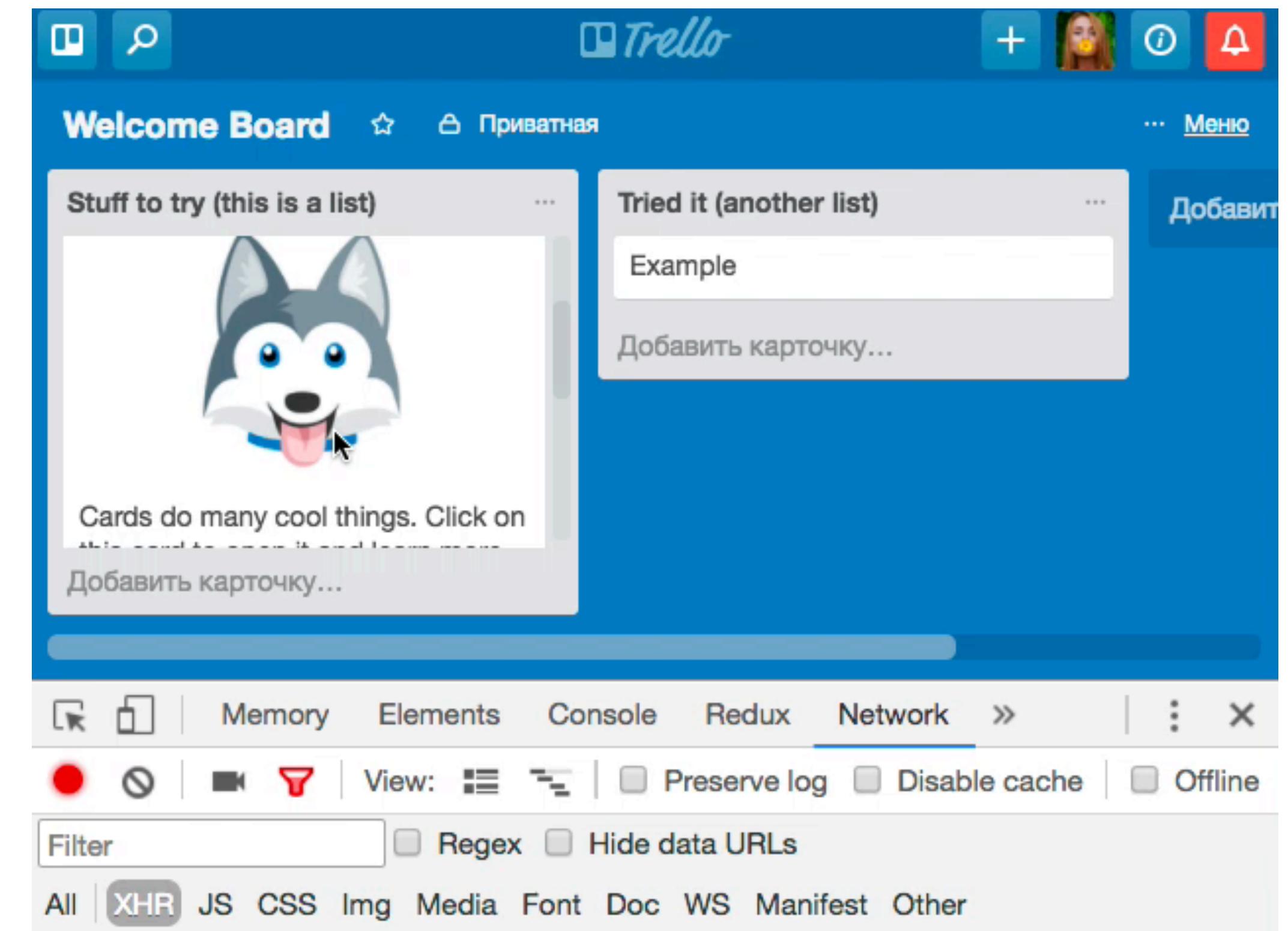
# OPTIMISTIC UPDATES







<https://uxplanet.org/optimistic-1000-34d9eefe4c05>



# Virtual Scrolling



Without virtualization



With virtualization



<https://bvaughn.github.io/react-virtualized>

**react virtualized**

## COMPONENTS ▾ WIZARD ▶ SOURCE □ DOCUMENTATION \* ISSUES

COLLECTION GRID LIST MASONRY TABLE

ARROWKEYSTEPPER AUTOSIZER CELLMEASURER COLUMNSIZER INFINITELOADER MULTIGRID SCROLLSYNC WINDOWSCROLLER

**List**

The list below is windowed (or "virtualized") meaning that only the visible rows are rendered. Adjust its configurable properties below to see how it reacts.

<input type="checkbox"/> Use dynamic row heights? <input type="checkbox"/> Show scrolling placeholder?	Num rows 1000	Scroll to Index...	List height 300	Row height 50	Overscan 10
--	------------------	-----------------------	--------------------	------------------	----------------

Initial Row	Content
L	Liliana Cacho This is row 31
A	Angel Couchman This is row 32
Y	Yvonne Adam This is row 33
J	Jonas Curci This is row 34
T	Tran Cesar This is row 35
B	Buddy Panos This is row 36

Memory Elements Console Redux Network Perf Performance Sources Application Security

```

<div class="ZxdAYjKjNUKvcSJrt_qw/u">
  >h1 class="1EbXmA97gGby7FPn2K1zcn">...
  ><div class="2Ej-dP_8UlvuezqmVKT7oj">...</div>
  ><div class="2Ej-dP_8UlvuezqmVKT7oj">...</div>
  ><div class="L2ufGvVL5v1YrRTRAax5R">...</div>
  ><div style="position: relative;">
    ><div style="overflow: visible; width: 0px;">
      ><div aria-label="grid" class="ReactVirtualized__Grid ReactVirtualized__List _3lRjWEBCK8aoVtLqQEeqwX" role="grid" tabindex="0" style="box-sizing: border-box; direction: ltr; height: 300px; position: relative; width: 883px; will-change: transform; overflow-x: hidden; overflow-y: auto;">... $0
        ><div class="ReactVirtualized__Grid__innerScrollContainer" style="width: auto; height: 5000px; max-width: 883px; max-height: 5000px; overflow: hidden; position: relative;">
          ><div class="3WpDhuXmgMhGpHig_N00jk" style="height: 50px; left: 0px; position: absolute; top: 100px; width: 100%;">...</div>
          ><div class="3WpDhuXmgMhGpHig_N00jk" style="height: 50px; left: 0px; position: absolute; top: 1050px; width: 100%;">...</div>
          ><div class="3WpDhuXmgMhGpHig_N00jk" style="height: 50px; left: 0px; position: absolute; top: 1100px; width: 100%;">...</div>
          ><div class="3WpDhuXmgMhGpHig_N00jk" style="height: 50px; left: 0px; position: absolute; top: 1150px; width: 100%;">...</div>
          ><div class="3WpDhuXmgMhGpHig_N00jk" style="height: 50px; left: 0px; position: absolute; top: 1200px; width: 100%;">...</div>
          ><div class="3WpDhuXmgMhGpHig_N00jk" style="height: 50px; left: 0px; position: absolute; top: 1250px; width: 100%;">...</div>
          ><div class="3WpDhuXmgMhGpHig_N00jk" style="height: 50px; left: 0px; position: absolute; top: 1300px; width: 100%;">...</div>
          ><div class="3WpDhuXmgMhGpHig_N00jk" style="height: 50px; left: 0px; position: absolute; top: 1350px; width: 100%;">...</div>
          ><div class="3WpDhuXmgMhGpHig_N00jk" style="height: 50px; left: 0px; position: absolute; top: 1400px; width: 100%;">...</div>
          ><div class="3WpDhuXmgMhGpHig_N00jk" style="height: 50px; left: 0px; position: absolute; top: 1450px; width: 100%;">...</div>
          ><div class="3WpDhuXmgMhGpHig_N00jk" style="height: 50px; left: 0px; position: absolute; top: 1500px; width: 100%;">...</div>
          ><div class="3WpDhuXmgMhGpHig_N00jk" style="height: 50px; left: 0px; position: absolute; top: 1550px; width: 100%;">...</div>
          ><div class="3WpDhuXmgMhGpHig_N00jk" style="height: 50px; left: 0px; position: absolute; top: 1600px; width: 100%;">...</div>
          ><div class="3WpDhuXmgMhGpHig_N00jk" style="height: 50px; left: 0px; position: absolute; top: 1650px; width: 100%;">...</div>
          ><div class="3WpDhuXmgMhGpHig_N00jk" style="height: 50px; left: 0px; position: absolute; top: 1700px; width: 100%;">...</div>
          ><div class="3WpDhuXmgMhGpHig_N00jk" style="height: 50px; left: 0px; position: absolute; top: 1750px; width: 100%;">...</div>
          ><div class="3WpDhuXmgMhGpHig_N00jk" style="height: 50px; left: 0px; position: absolute; top: 1800px; width: 100%;">...</div>
          ><div class="3WpDhuXmgMhGpHig_N00jk" style="height: 50px; left: 0px; position: absolute; top: 1850px; width: 100%;">...</div>
        </div>
      </div>
    </div>
  </div>
</div>
<div class="resize-triggers">...</div>
</div>

```

... #root div div div div div div div div ReactVirtualized\_\_Grid.ReactVirtualized\_\_List.\_3lRjWEBCK8aoVtLqQEeqwX

# Pre-rendering



---



\* Знаете ли вы, что можно задать настройки загрузки по умолчанию?

[Задать настройки по умолчанию](#)



### Выберите файлы для загрузки

...или перетащите их мышью

Открытый доступ ▾

### СПРАВКА И РЕКОМЕНДАЦИИ

Загружая видео на YouTube, вы принимаете [условия использования](#) и [принципы сообщества](#).

Следите за тем, чтобы ваш контент не нарушал авторских прав и других прав собственности. [Подробнее...](#)

[Как добавить видео](#)

| [Устранение неполадок](#)

| [На мобильном устройстве](#)

### ИМПОРТ ВИДЕО



Импортировать видео  
из Google Фото

[Импортировать](#)

### ПРЯМЫЕ ТРАНСЛЯЦИИ



Проводите прямые  
трансляции, чтобы  
наладить общение с  
поклонниками

[Начать](#)

### СОЗДАНИЕ ВИДЕО



Слайд-шоу

[Создать слайд-шоу](#)



Видеоредактор

[Изменить](#)

# Caching



Reload this page

Write a story



# Reading list

Saved (59) Archived (337)

Search your saved stories

## The “I’m new to design” starter pack

Insights for anyone thinking about moving into design.

Sara Clayton in [uxdesign.cc](#) · May 14 · 6 min read

Archive · Remove



## UX Principles for Better Content

We've all been creators of content at some point of our lives: our first diary, school essays, text messages, work emails, and social posts...

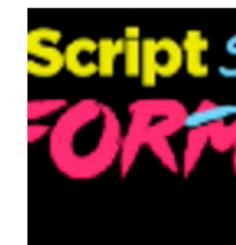
Lucia Z.Wang in [UX Planet](#) · May 18 · 5 min read

Archive · Remove



## JavaScript Start-up Performance

As web developers, we know how easy it is to end up with web page bloat. But loading a webpage is much more than shipping bytes down the...





**FIN.**

Twitter:

@krambertech

Github:

@krambertech