

Declarative APIs, Imperative World

By Tilde Ann Thurium



@annthurium

DECLARATIVE APIS,

IMPERATIVE WORLD

BY TILDE ANN THURIUM (THEY/THEM)

- ~ **DECLARATIVE PROGRAMMING 101**
- ~ **DECLARATIVE / IMPERATIVE INTEGRATIONS**
- ~ **HISTORICAL CONTEXT & THE FUTURE**

WTF EVEN IS

DECLARATIVE PROGRAMMING?

DECLARATIVE PROGRAMMING IS:

PROGRAMMING THAT IS DONE
WITH DECLARATIONS, RATHER
THAN STATEMENTS



shakes fist

EXPRESSES THE LOGIC OF A
COMPUTATION WITHOUT
DESCRIBING ITS CONTROL FLOW

I'm LoSt



DECLARATIVE PROGRAMMING IS

**ABOUT WHAT YOU DO, NOT
HOW YOU DO IT**



IMAGE VIA WIKIMEDIA CREATIVE COMMONS

← from Navy Pier, 600 E Grand Ave, Chicago, IL 60611
to Millennium Park, 201 E Randolph St, Chicago, IL 60...

26 min (1.3 miles)

via Lakefront Trail
Mostly flat

⚠ Use caution—walking directions may not always reflect
real-world conditions

Navy Pier
600 E Grand Ave, Chicago, IL 60611

- ↑ Head south on N Dearborn St
177 ft
- ➡ Turn right toward Lakefront Trail
0.1 mi
- ➡ Turn right onto Lakefront Trail
📍 Take the stairs
0.1 mi
- ⬅ Turn left to stay on Lakefront Trail
0.8 mi
- ➡ Turn right onto E Monroe St
0.2 mi
- ➡ Turn right
36 ft
- ⬅ Turn left

IMPERATIVE AF



**THE ADDRESS TO MILLENNIUM
PARK IS 201 E RANDOLPH ST,
CHICAGO, IL 60602**

ALL DECLARATIVE APPROACHES

**HAVE AN UNDERLYING
IMPERATIVE IMPLEMENTATION**

**5 DECLARATIVE PARADIGMS
YOU WON'T BELIEVE
YOU'RE ALREADY USING**

ADVANTAGES

Identify your work

Please describe your work

An image



Please tell us where we can see your work on your own website

Please provide URLs where your work appears on your own website. e.g. <http://mysite.com/products/1>. If you do not have a website, please provide a detailed description of your work.

Remove item

Add another one

Identify the material you want removed

Identify the allegedly infringing material on Pinterest

<https://www.pinterest.com/pin/12345/>

Please provide the full URL to each individual Pin or web result you would like removed, e.g. <https://www.pinterest.com/pin/12345/>. Limit: 100 per request.

☐

Remove all

[More info...](#)

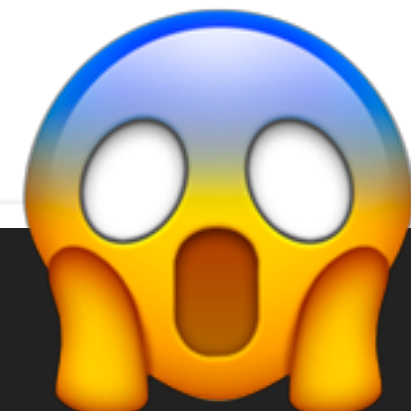
☐

Strike

[More info...](#)

Remove item

Add another one



list of awesome people

Type a name and hit enter

[HTTPS://CODEPEN.IO/ANNTHURIUM/PEN/00GWMR](https://codepen.io/annthuriuM/pen/00GWMR)

```
addPerson(person) {  
  // state logic  
  const id = String(Date.now())  
  this.state = this.state.concat({ person, id })  
  
  // UI logic  
  this.updateHelp()  
  
  const li = document.createElement('li')  
  const span = document.createElement('span')  
  const del = document.createElement('a')  
  span.innerText = person  
  del.innerText = 'delete'  
  del.setAttribute('data-delete-id', id)  
  
  this.ul.appendChild(li)  
  li.appendChild(del)  
  li.appendChild(span)  
  this.items[id] = li  
}
```

```
render() {  
  return (  
    <div>  
      <form>  
        <input />  
      </form>  
      <p className="help">Type a name and hit enter</p>  
      <ul>  
        {this.state.names.map(name => (  
          <li key={name.id}>  
            <a data-delete-id={name.id}>delete</a>  
            <span>{name.name}</span>  
          </li>  
        )  
      )  
    </ul>  
  </div>  
  );  
}
```

```
addPerson(name) {  
  const id = String(Date.now())  
  this.setState({  
    names: this.state.names.concat({ name, id })  
  })  
}  
  
removePerson(id) {  
  this.setState({  
    names: this.state.names.filter(name => name.id !== id)  
  })  
}  
}
```

DECLARATIVE PROGRAMMING: THE BAD PARTS



ABSTRACTION IS A FORM OF DECADENCE

Jenny Holzer

```
render() {  
  return (  
    <div>  
      <form>  
        <input />  
      </form>  
      <p className="help">Type a name and hit enter</p>  
      <ul>  
        {this.state.names.map(name => (  
          <li key={name.id}>  
            <a data-delete-id={name.id}>delete</a>  
            <span>{name.name}</span>  
          </li>  
        ))}  
      </ul>  
    </div>  
  );  
}
```

INTEGRATION

IMPERATIVE API TYPES:

VIDEO



IMPERATIVE API TYPES:

MAPPING / GIS

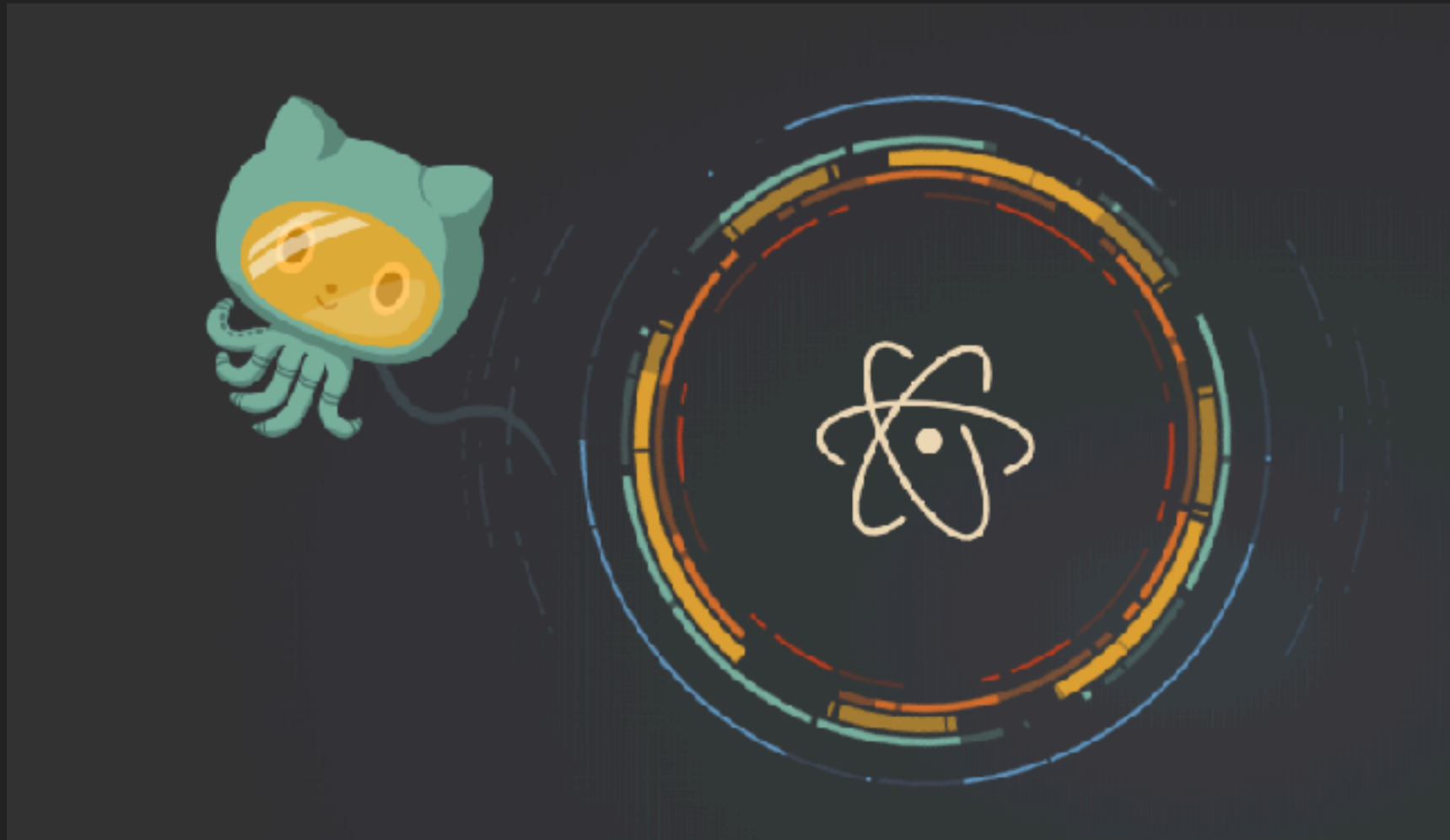


IMPERATIVE API TYPES:

ANIMATION



three.js



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#collaboration #collaborative-editing #pair-programming ...



atom

697,683



524



Install

scroll-through-time

Two fingers scroll moves through time instead of s...

#scroll #time #space #xkcd



mathieuduto 49,105



125



Install

hydrogen

Run code interactively, inspect data, and plot. All t...

#execute #run #jupyter #ipython #julia



nteract

974,777



609



Install

hey-pane

Atom Plugin to enlarge the active pane, either with...

#pane #focus #origami #zoom #autozoom



timomeh

86,935



125



Install

Commit preview

lib/controllers/commit-detail-controller.js

<> Jump To File

Unstage File

@@ -57,6 +57,7 @@ export default class CommitDetailController e... Unstage Hunk

```
57 57     multiFilePatch={commit.getMultiFileDiff()}
58 58     autoHeight={true}
59 59     {...this.props}
60 60     disableStageUnstage={true}
61 61   />
62 62   </div>
62 63   );
```

lib/views/file-patch-header-view.js

<> Jump To File

Unstage File

@@ -26,6 +26,7 @@ export default class FilePatchHeaderView exte... Unstage Hunk

```
26 26     toggleFile: PropTypes.func.isRequired,
27 27
28 28     itemType: PropTypes.oneOf([ChangedFileItem, CommitPreviewItem,
    *    CommitDetailItem]).isRequired,
29 29     disableStageUnstage: PropTypes.bool,
29 30   };
30 31
31 32   constructor(props) {
```

lib/views/hunk-header-view.js

<> Jump To File

Unstage File

@@ -32,7 +32,7 @@ export default class HunkHeaderView extends R... Unstage Hunk

32 32

Commit preview

Git

GitHub

Unstaged Changes



Stage All

- lib/controllers/multi-file-patch-controller.js
- lib/views/file-patch-header-view.js
- lib/views/hunk-header-view.js
- lib/views/multi-file-patch-view.js

Staged Changes



Unstage All

- lib/controllers/commit-detail-controller.js
- lib/views/file-patch-header-view.js
- lib/views/hunk-header-view.js

Hide All Staged Changes

Commit message



Commit to pr-1807/atom/ku-commit-item

72

- stop propagation after undoing last commit
- match sha better
- visually show selected state

Undo

3d

3d

3d

JavaScript



pr-1807/atom/ku-comm



Pull 2



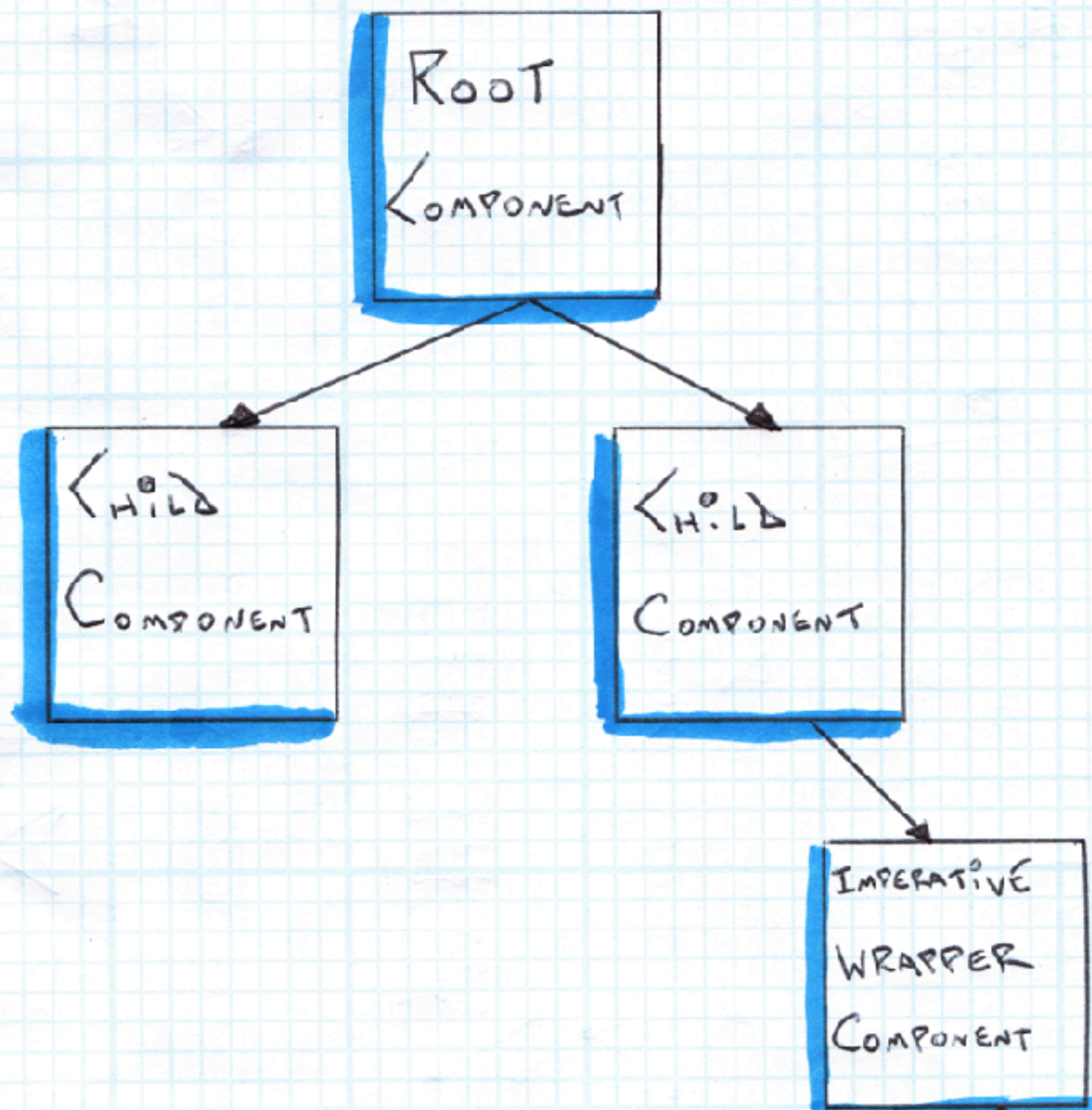
GitHub



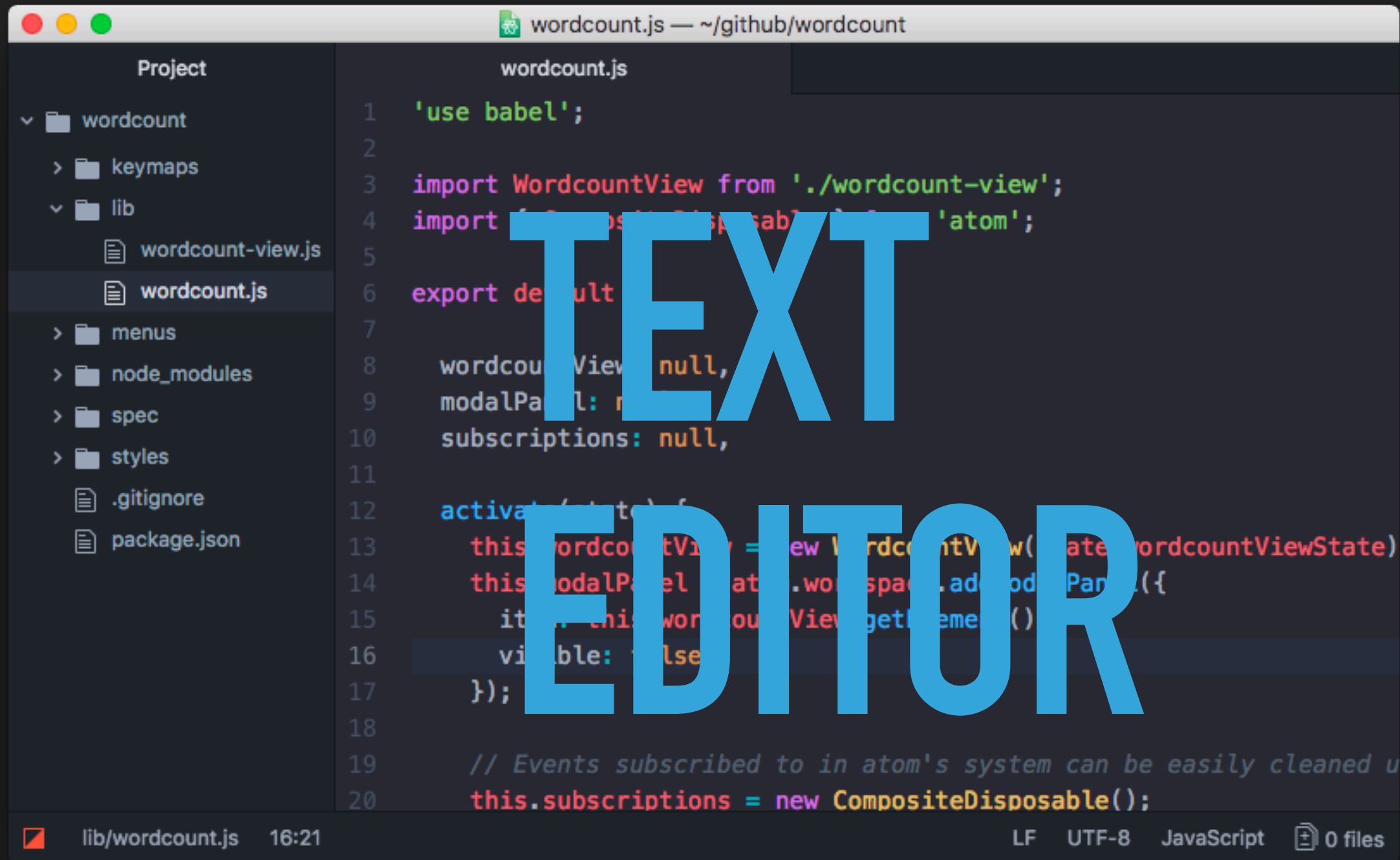
Git (5)

TOP DOWN OR BOTTOM UP:

WHERE TO START?



IMPERATIVE API



```
constructor(props) {  
  super(props);  
  this.subs = new CompositeDisposable();  
}  
  
componentDidMount() {  
  const editor = new TextEditor(this.props);  
  this.subs.add(  
    editor.onDidChangeCursorPosition(this.props.onChangeCursorPosition),  
  );  
});  
}
```

```
constructor(props) {  
  super(props);  
  this.subs = new CompositeDisposable();  
}  
  
componentDidMount() {  
  const editor = new TextEditor(this.props);  
  this.subs.add(  
    editor.onDidChangeCursorPosition(this.props.onChangeCursorPosition),  
  );  
});  
}
```

comment-decorations-controller.js

```
161 for (const editor of this.state.openEditors) {
162   if (threadDataByPath.has(editor.getPath())) {
163     haveThreads.push(editor);
164   }
165 }
166 return haveThreads;
167 }
168
169 // Determine if we already have this PR checked out.
170 // todo: if this is similar enough to pr-checkout-controller,
171 // extract a single
172 // helper function to do this check.
173 isCheckedOutPullRequest(branches, remotes, pullRequest) {
174   // determine if pullRequest.headRepository is null
175   // this can happen if a repository has been deleted.
176   if (!pullRequest.headRepository) {
177     return false;
178   }
179
180   const {repository} = pullRequest;
181
182   const headPush = branches.getHeadBranch().getPush();
183   const headRemote = remotes.withName(headPush.getRemoteName());
184
185   // (detect checkout from pull/### refspec)
```

GitHub

Reviews #1995

Reviews for atom/github#1995



Checked out



annthurium commented

5m

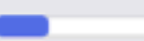
Looking good, y'all! We're getting close to done with this thing and that's really exciting. Left a few comments about things that have been bugging me, but I did not do a comprehensive code review.



1

▼ Comments

Resolved 2 of 6



▶ azure-pipelines.yml outdated

3d

▶ lib/decorations-controller.js 4

3d

▶ lib/reviews/review-view.js 29

12m

▶ lib/controllers/issue-list-meta-controller.js 21

9m

▼ lib/controllers/comment-decorations-controller.js 170

↔ Jump To File

📄 Open Diff

```
constructor(props) {  
  super(props);  
  
  this.subscriptions = new CompositeDisposable();  
  this.domNode = document.createElement('div');  
  
  // "left" => "Left"  
  const location = this.props.location.substr(0, 1).toUpperCase() +  
    this.props.location.substr(1);  
  const methodName = `add${location}Panel`;   
  this.panel = this.props.workspace[methodName](options);  
}  
  
render() {  
  return ReactDOM.createPortal(  
    this.props.children,  
    this.domNode,  
  );  
}
```

```
shouldComponentUpdate(newProps) {  
  return this.props.visible !== newProps.visible;  
}  
  
componentDidUpdate() {  
  this.panel[this.props.visible ? 'show' : 'hide']();  
}
```



**ComponentWillReceiveProps()
IS NOT YOUR FRIEND**

```
componentWillUnmount() {  
  this.subscriptions.dispose();  
  if (this.panel) {  
    this.panel.destroy();  
  }  
}
```

PERFORMANCE OPTIMIZATION:

CLEAN UP YOUR SHIT

FOCUS



MANAGEMENT

```
constructor(props) {  
  super(props);  
  this.textInput = React.createRef();  
}  
  
render() {  
  return (  
    <div>  
      <input  
        type="text"  
        ref={this.textInput} />  
  
      <input  
        type="button"  
        value="Focus the text input"  
        onClick={() => this.textInput.current.focus()}  
      />  
    </div>  
  );  
}
```

```
constructor(props) {  
  super(props);  
  this.textInput = React.createRef();  
}  
  
render() {  
  return (  
    <div>  
      <input  
        type="text"  
        ref={this.textInput} />  
  
      <input  
        type="button"  
        value="Focus the text input"  
        onClick={() => this.textInput.current.focus()}  
      />  
    </div>  
  );  
}
```

```
constructor(props) {  
  super(props);  
  this.textInput = React.createRef();  
}  
  
render() {  
  return (  
    <div>  
      <input  
        type="text"  
        ref={this.textInput} />  
  
      <input  
        type="button"  
        value="Focus the text input"  
        onClick={() => this.textInput.current.focus()}  
      />  
    </div>  
  );  
}
```

```
class Parent extends React.Component {  
  constructor() {  
    this.theRef = new RefHolder();  
  }  
  
  render() {  
    return (  
      <div ref={this.theRef.setter}>  
        <Child theRef={this.theRef} />  
      </div>  
    );  
  }  
}
```

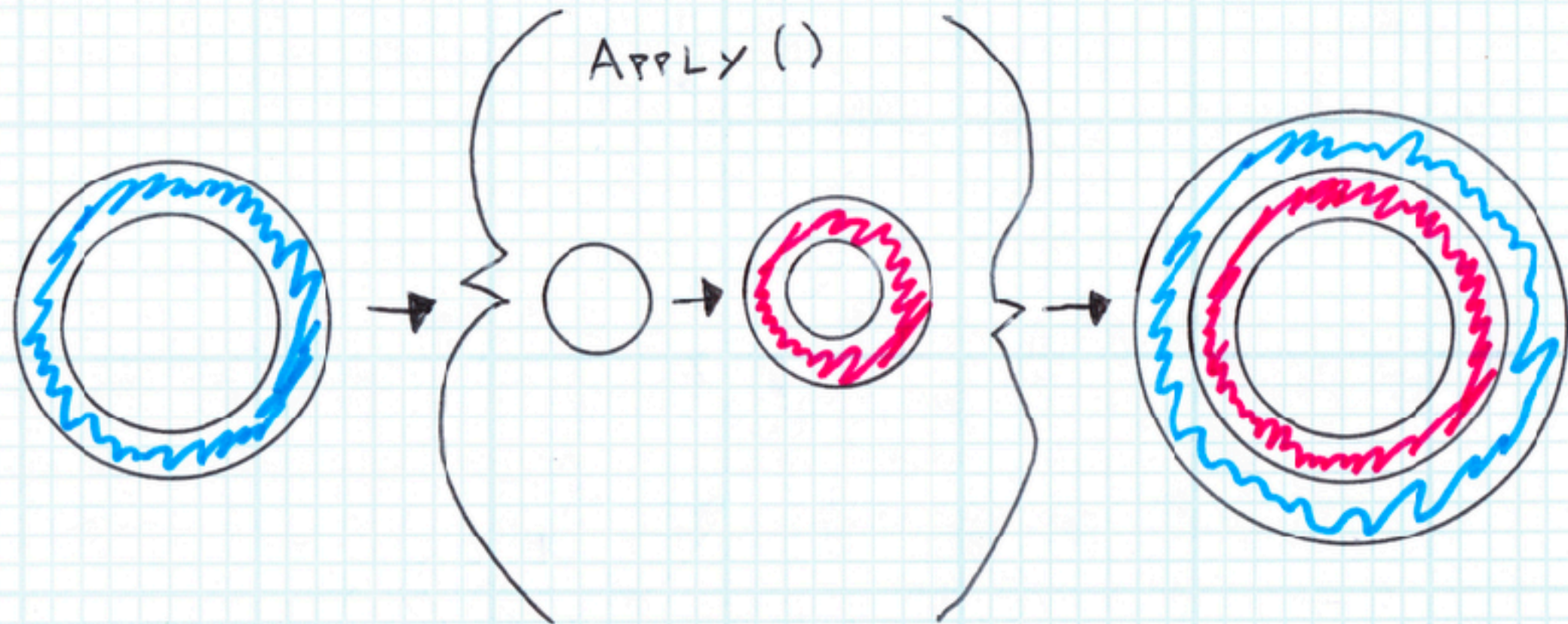
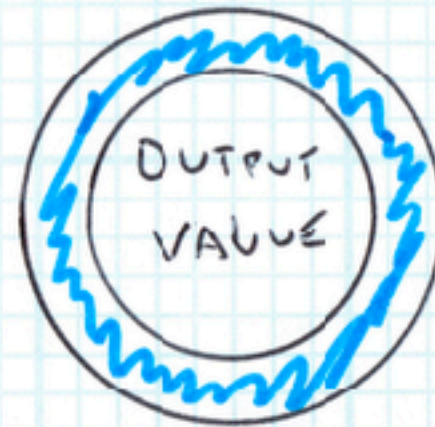
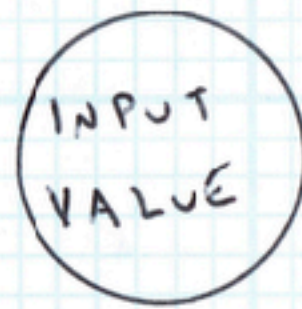
```
class Parent extends React.Component {  
  constructor() {  
    this.theRef = new RefHolder();  
  }  
  
  render() {  
    return (  
      <div ref={this.theRef.setter}>  
        <Child theRef={this.theRef} />  
      </div>  
    );  
  }  
}
```

```
class Child extends React.Component {  
  componentDidMount() {  
    this.props.theRef.observe(domNode => this.register(domNode));  
  }  
  
  register(domNode) {  
    console.log('Hey look I have a real DOM node', domNode);  
  }  
}
```



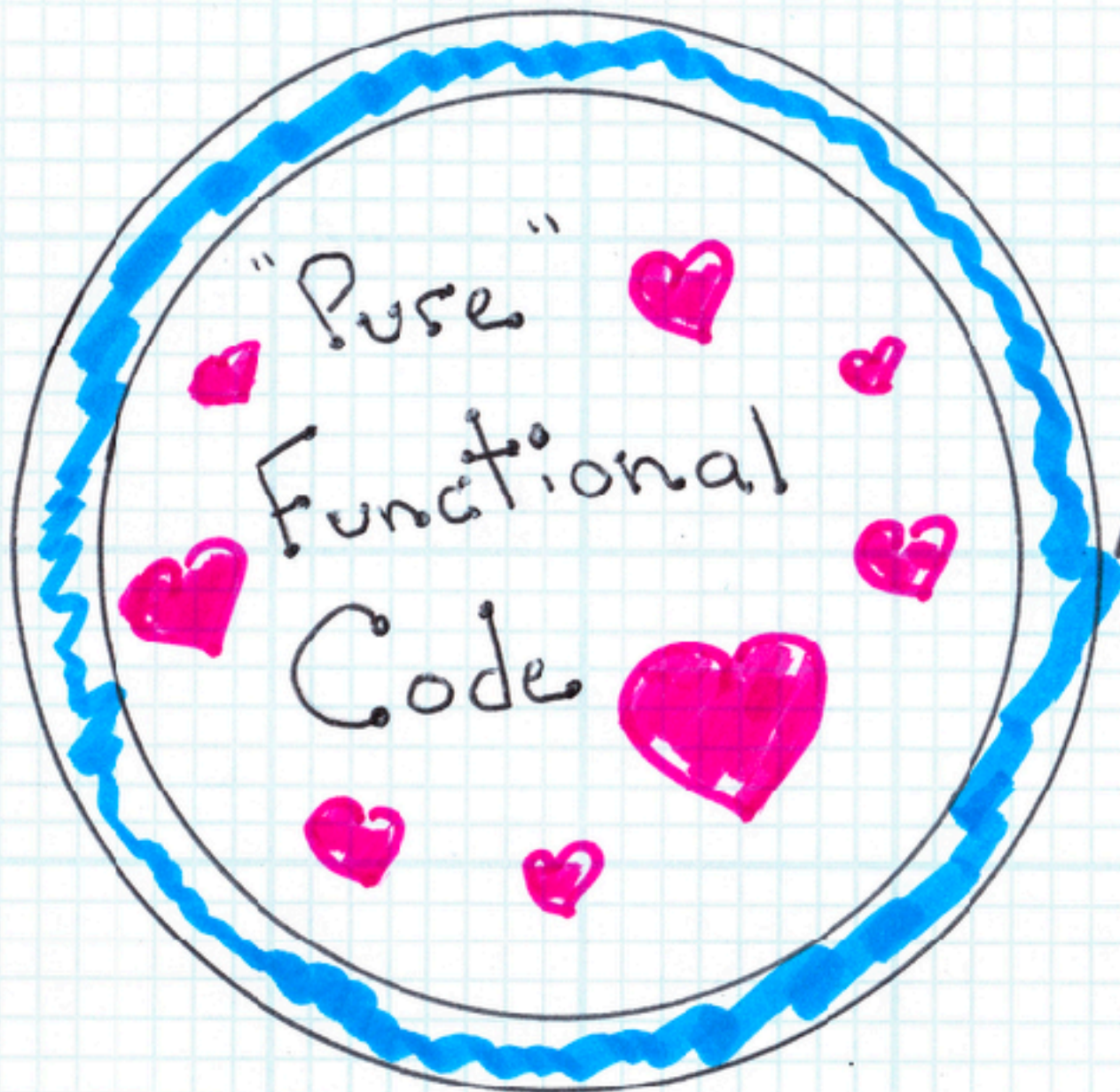
MONADS:

BASICALLY BURRITOS TBH



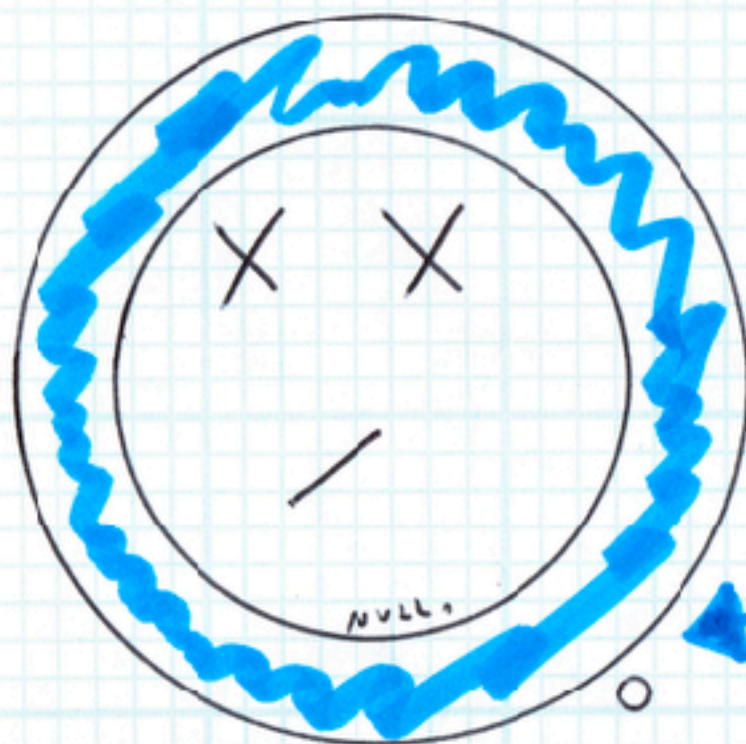
SIDE EFFECTS ARE BAD

AND YOU SHOULD FEEL BAD



SIDE
EFFECTS

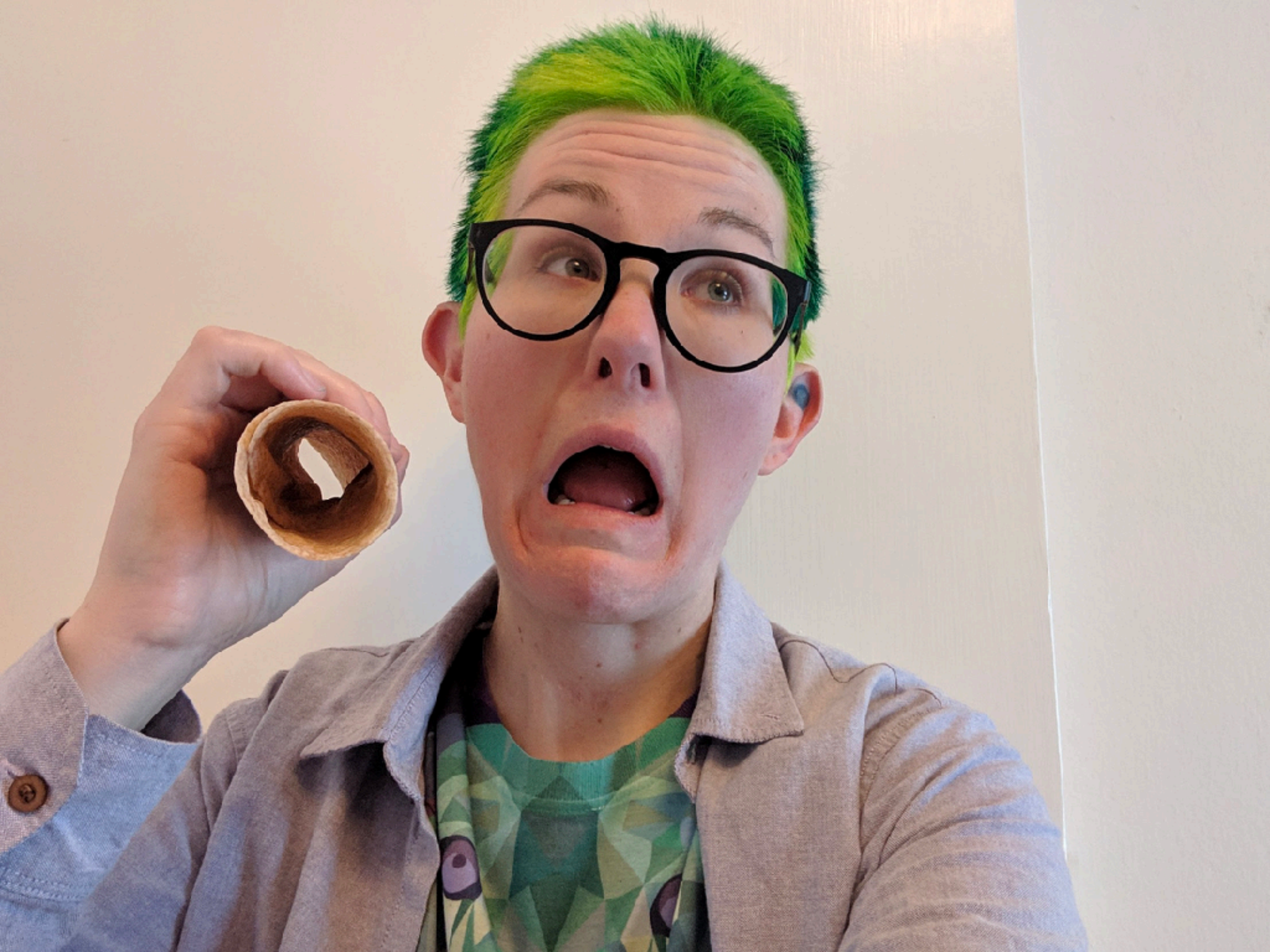
LIFE IS FULL
OF POSSIBILITIES

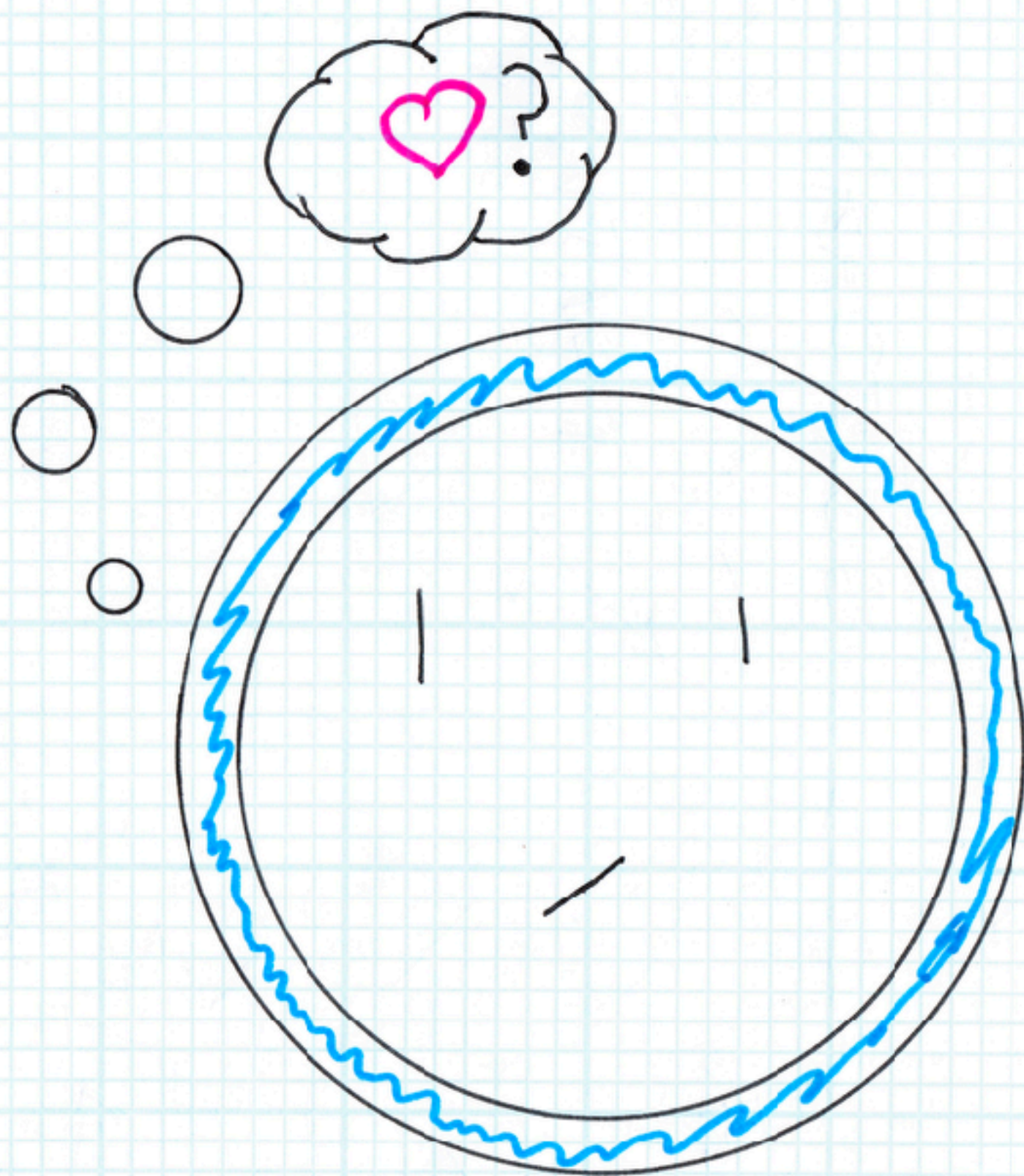


MAYBE
MONADS



I AM
EMPTY
INSIDE





I JUST MET YOU, 'THIS' IS CRAZY

HERE'S MY NAN, SO CALL(ME) MAYBE

PROMISES:

BASICALLY JUST MONADS TBH

focus

Core: **Focus** Next

Core: **Focus** Previous

Window: **Focus** Next Pane

⌘K ⌘N

Window: **Focus** Pane Below

⌘K ⌘↓

Window: **Focus** Pane Above

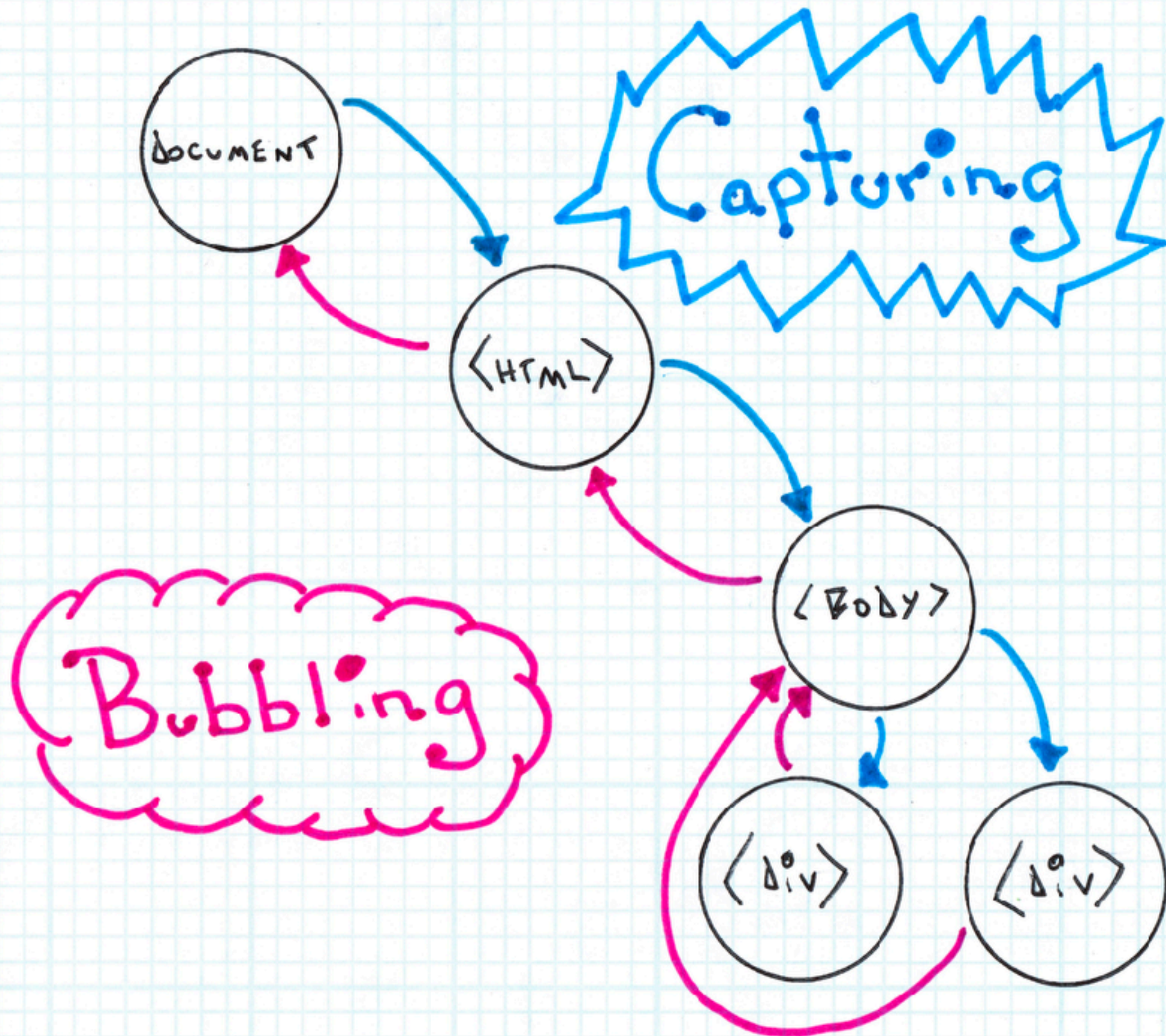
⌘K ⌘↑

Tree View: Toggle **Focus**

^0

Window: **Focus** Pane On Left

⌘K ⌘←



```
export class Command extends React.Component {  
  static propTypes = {  
    registry: PropTypes.object,  
    target: PropTypes.oneOfType([  
      PropTypes.string,  
      DOMNodePropType,  
      RefHolderPropType,  
    ]),  
    command: PropTypes.string.isRequired,  
    callback: PropTypes.func.isRequired,  
  }  
}
```

ETOOMANYPROPS



```
constructor(props) {  
  super(props);  
  this.refRoot = new RefHolder();  
  this.refView = new RefHolder();  
  this.lastFocus = GitTabView.focus.STAGING;  
}  
  
componentDidMount() {  
  this.refRoot.map(  
    root => root.addEventListener('focusin', this.rememberLastFocus));  
}  
  
rememberLastFocus(event) {  
  this.lastFocus = this.refView.map(  
    view => view.getFocus(event.target)).getOr(null) || GitTabView.focus.STAGING;  
}
```

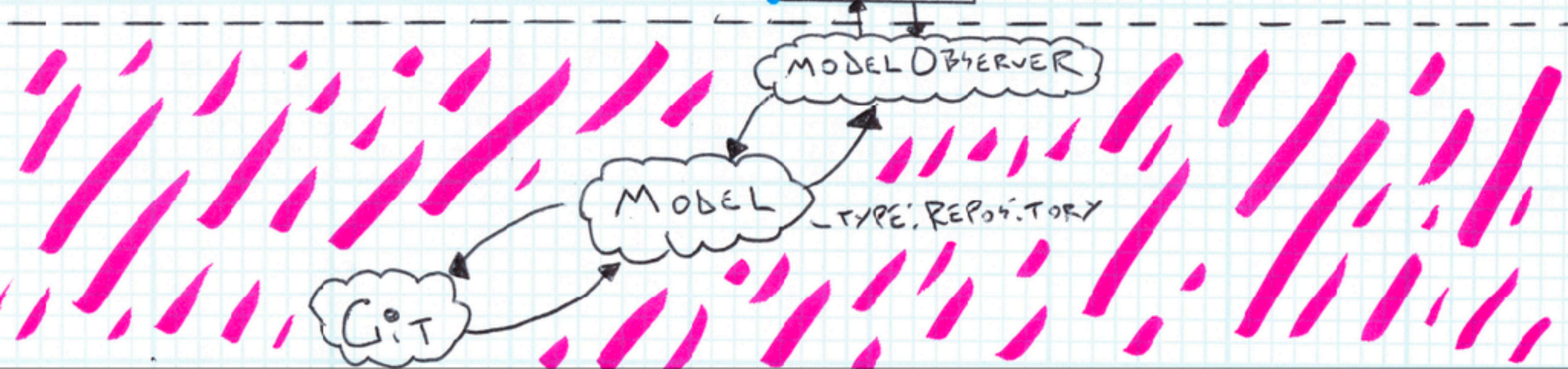
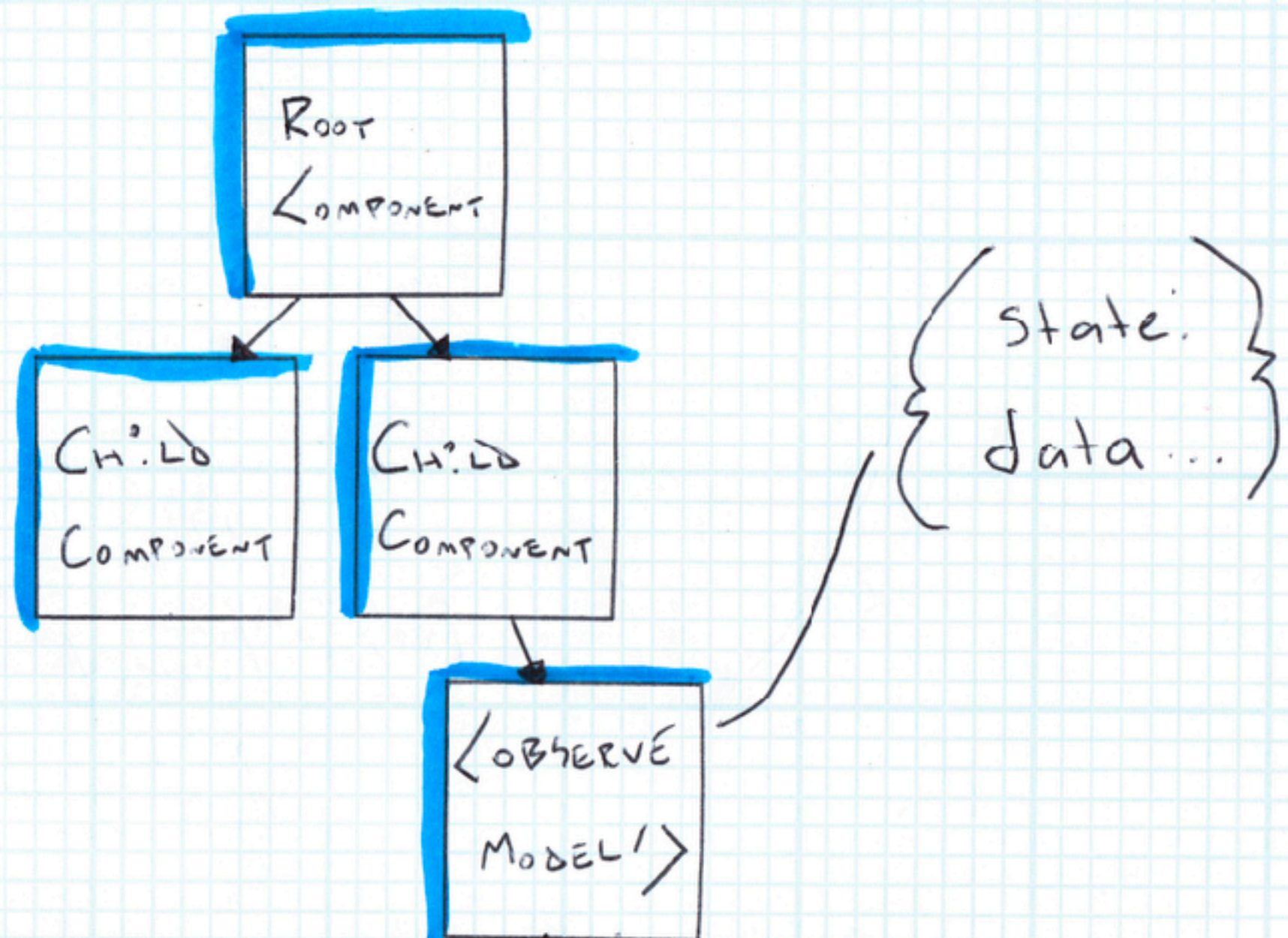
```
constructor(props) {  
  super(props);  
  this.refRoot = new RefHolder();  
  this.refView = new RefHolder();  
  this.lastFocus = GitTabView.focus.STAGING;  
}  
  
componentDidMount() {  
  this.refRoot.map(  
    root => root.addEventListener('focusin', this.rememberLastFocus));  
  }  
  
rememberLastFocus(event) {  
  this.lastFocus = this.refView.map(  
    view => view.getFocus(event.target)).getOr(null) || GitTabView.focus.STAGING;  
  }  
}
```

```
export default class GitTabView extends React.Component {  
  
  static focus = {  
    STAGING: Symbol('staging'),  
  };  
  
  rememberFocus(event) {  
    return this.props.refRoot.contains(event.target) ?  
      StagingView.focus.STAGING : null;  
  }  
  
  setFocus(focus) {  
    if (focus === StagingView.focus.STAGING) {  
      this.props.refRoot.focus();  
      return true;  
    }  
  
    return false;  
  }  
}
```

```
export default class GitTabView extends React.Component {  
  
  static focus = {  
    STAGING: Symbol('staging'),  
  };  
  
  rememberFocus(event) {  
    return this.props.refRoot.contains(event.target) ?  
      StagingView.focus.STAGING : null;  
  }  
  
  setFocus(focus) {  
    if (focus === StagingView.focus.STAGING) {  
      this.props.refRoot.focus();  
      return true;  
    }  
  
    return false;  
  }  
}
```

```
function focusTracer (event) {  
  console.log( 'window.focus =', event.target )  
}  
  
atom.commands.add( 'atom-workspace', {  
  'me:trace-focus': () =>  
    window.addEventListener( 'focusin', focusTracer ),  
  'me:untrace-focus': () =>  
    window.removeEventListener( 'focusin', focusTracer ),  
})
```

GIT READY



```
render() {  
  return (  
    <ObserveModel  
      model={this.props.localRepository}  
      fetchData={this.fetchRepositoryData}>  
      {this.renderWithLocalRepositoryData}  
    </ObserveModel>);  
}  
  
renderWithLocalRepositoryData = repoData => {  
  if (!repoData) {  
    return <LoadingSpinner />  
  }  
  ...  
}
```

```
render() {  
  return (  
    <ObserveModel  
      model={this.props.localRepository}  
      fetchData={this.fetchRepositoryData}>  
      {this.renderWithLocalRepositoryData}  
    </ObserveModel>);  
}
```

```
renderWithLocalRepositoryData = repoData => {  
  if (!repoData) {  
    return <LoadingSpinner />  
  }  
  ...  
}
```

HISTORICAL CONTEXT & THE FUTURE

IF DECLARATIVE UI STUFF IS SO GREAT,

**WHY WEREN'T WE USING IT
BEFORE?**

**THE WEB DIDN'T USED
TO BE SO COMPLEX**

1-48 of 632 results for "citrus reamer"

Amazon Prime



Department

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Avg. Customer Review

★★★★★ & Up

★★★★★ & Up

★★★★★ & Up

★★★★★ & Up

Brand

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and Measuring Cup

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Kasmoire Citrus Orange Squeezer
Manual Hand Juicer Lime Press
Anti-Slip Reamer with Strainer and
Container, Yellow, 5.1 x 3.9 inch

★★★★★ ~ 69

Amazon's Choice



OXO Good Grips Wooden Reamer

★★★★★ ~ 1,693

\$5.99 \$6.99

prime Get it as soon as Tomorrow,
Apr 24Zak Designs 0204-9035 Citrus
Melamine Reamer, Kiwi, 3.5" by 3.5"

★★★★★ ~ 148

\$5.99

prime Get it as soon as Thu, Apr 25



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HOW DO WE LEARN

FROM THE PAST?

AGEISM IS REAL



**“YOUNG PEOPLE
ARE JUST
SMARTER.”**

Mark Zuckerberg

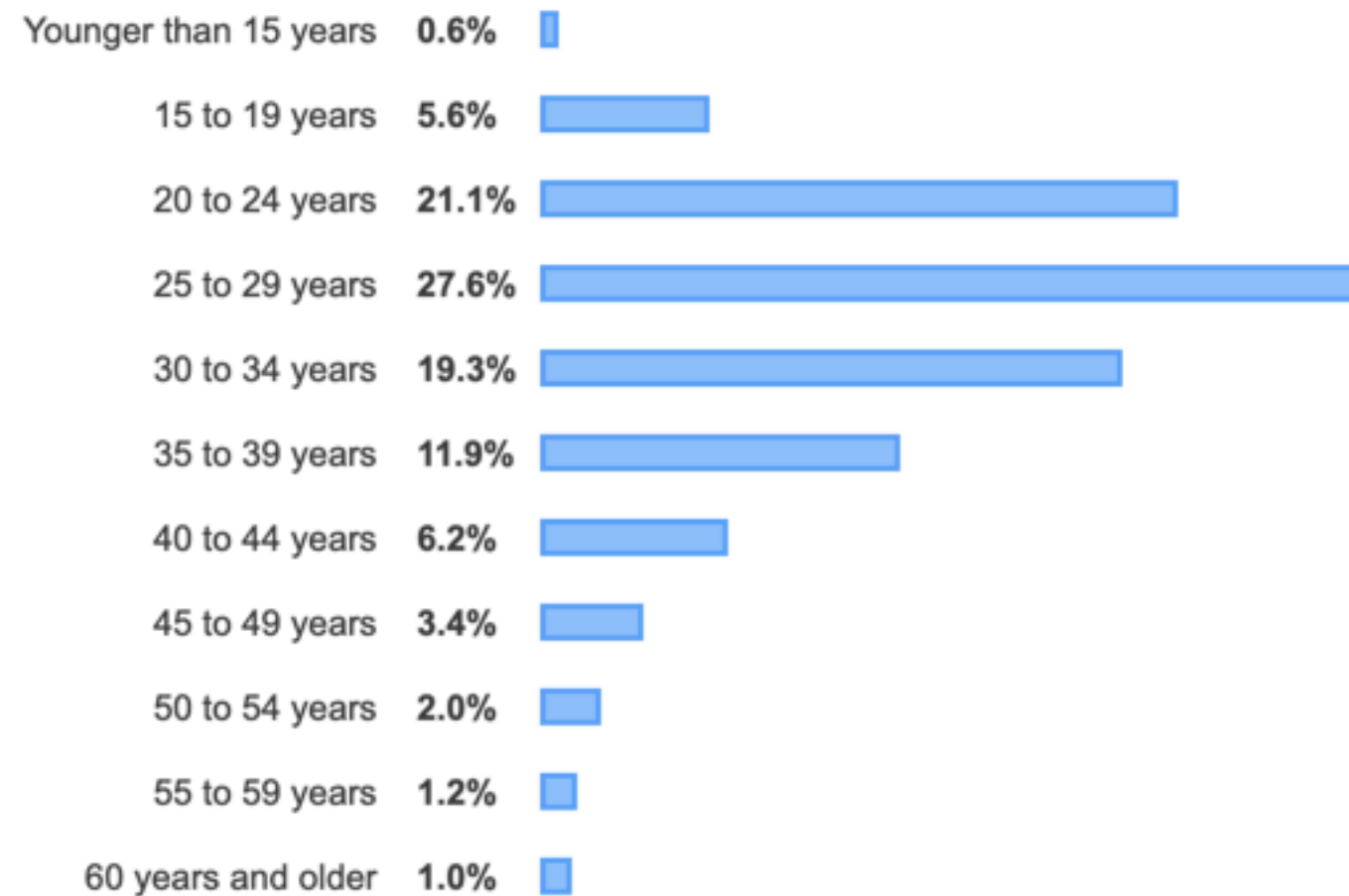
SV'S 150 BIGGEST COMPANIES

**HAVE MORE AGE BIAS ACCUSATIONS
THAN RACIAL OR GENDER**

Age

All Respondents

Professional Developers



79,210 responses

About three-fourths of professional developers who took our survey are younger than 35.

YOU ARE GOING TO DIE SOMEDAY

**MAKE PEACE WITH THAT
REALITY**

TIME

CAN
Google
SOLVE
DEATH?

The search giant is launching a venture to extend the human life span.

That would be crazy—if it weren't Google

By Harry McCracken and Lev Grossman

11915-0161 12472

**STOP BEING SO OBSESSED
WITH SHINY NEW
FRAMEWORKS**

**USE OBJECTIVE
HIRING CRITERIA**

**CHANGE YOUR
LANGUAGE**

**ASK OLDER WORKERS
WHAT YOU CAN DO TO BE
SUPPORTIVE**



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@oponiak

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Aim for the same emotional presentation & takeaway in individual meetings.

Don't be that supervisor who leans forward, smiles at & laughs w/young staff, leans back, goes somber & acts reflective w/ older staff.

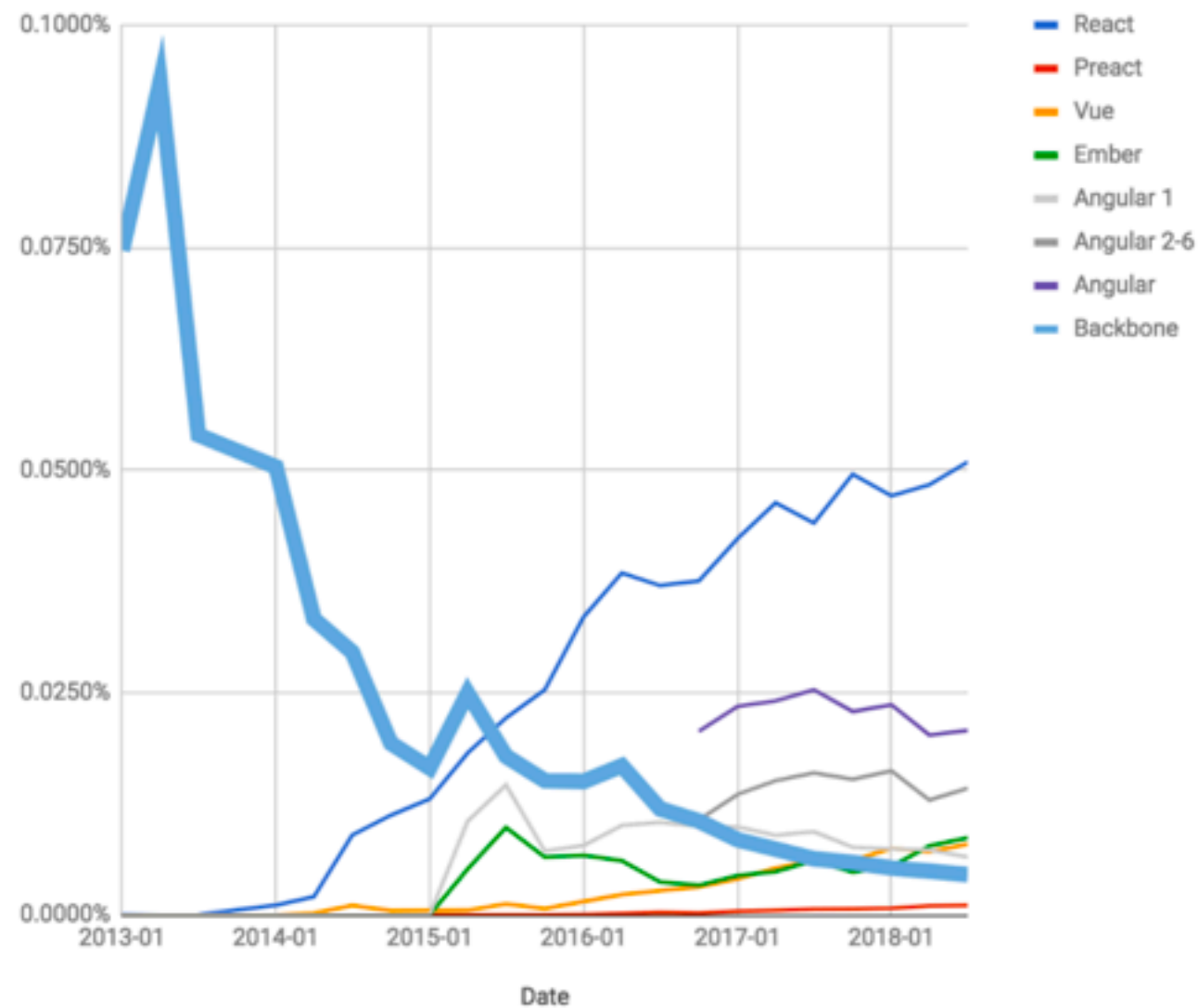
We notice it.

2:37 PM - 19 Apr 2019

CONCLUSIONS

Front end frameworks

Major FE frameworks, share of registry

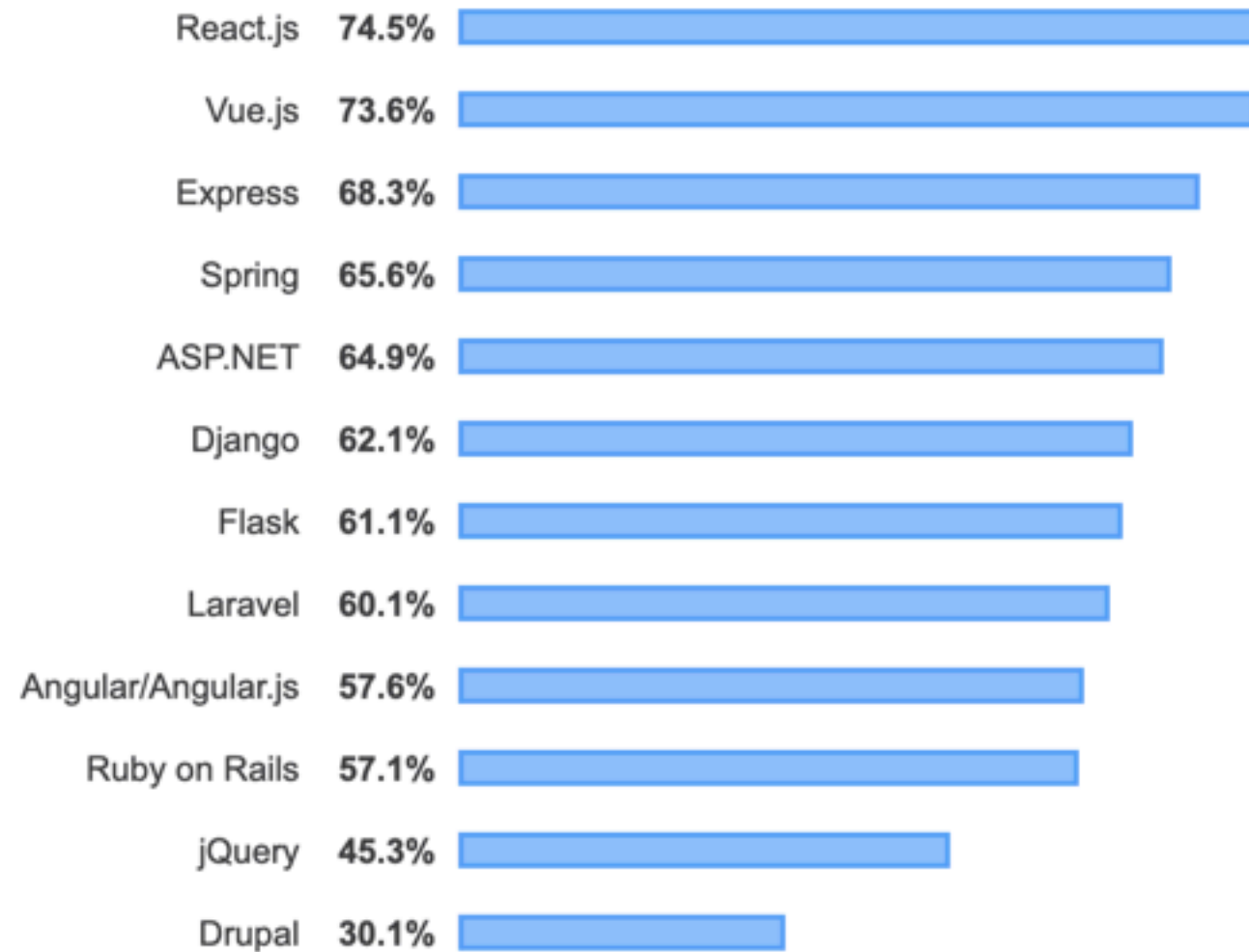


Most Loved, Dreaded, and Wanted Web Frameworks

Loved

Dreaded

Wanted



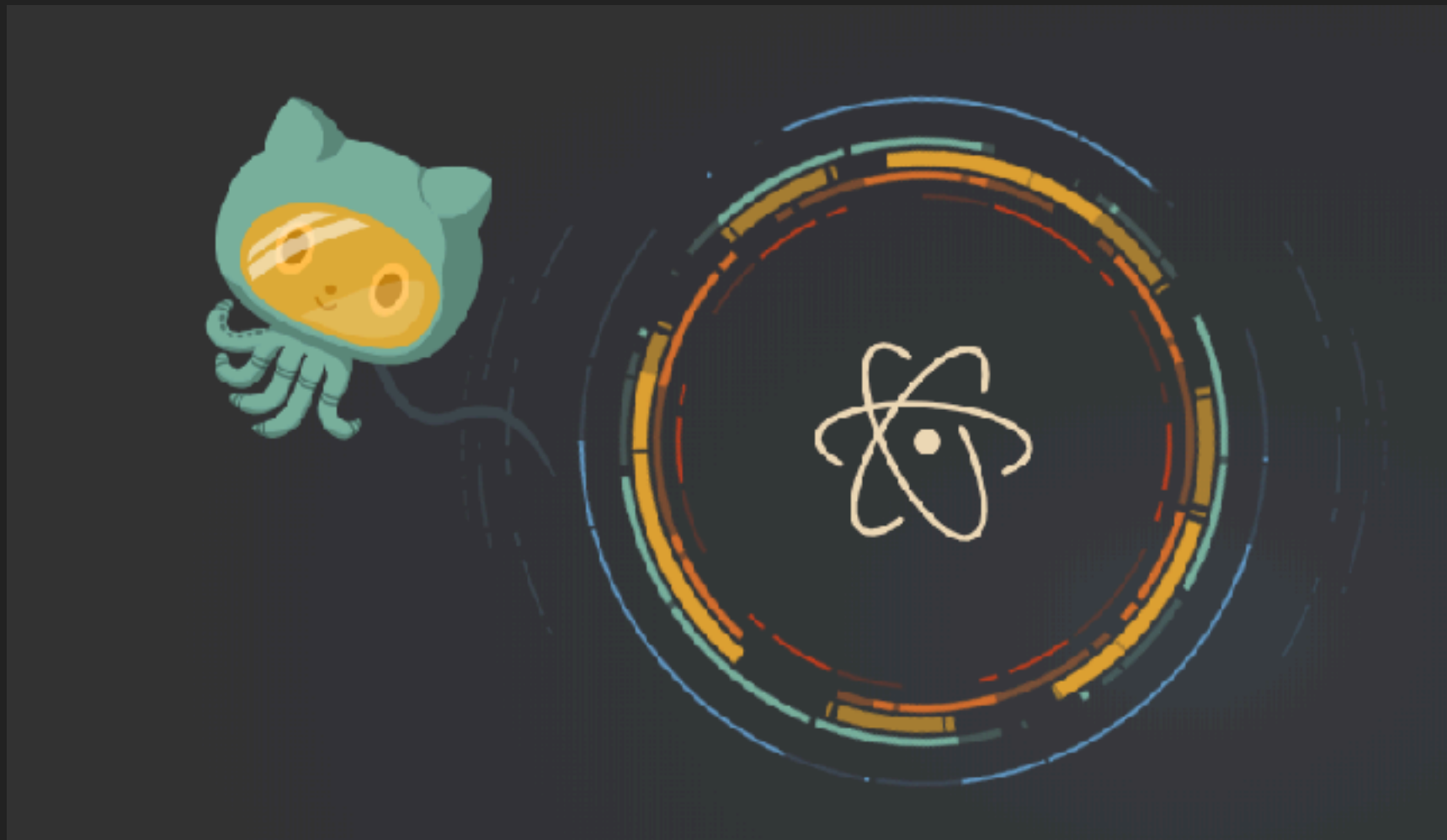
% of developers who are developing with the language or technology and have expressed interest in continuing to develop with it

THERE IS NO ONE SIZE FITS ALL PLAN

**FOR MODELING THE STATE OF
YOUR IMPERATIVE APPLICATION**

YOUR CODE DOES NOT NEED TO BE

PERFECTLY DECLARATIVE



[HTTPS://GITHUB.COM/ATOM/GITHUB](https://github.com/atom/github)

WOOHOO SOURCE CODE

**LET'S BUILD BETTER
FUTURES, TOGETHER**



THANK YOU!!

@ANNTHURIUM 

goto;
chicago



Please

**Remember to
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Thank you!

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