RICE®

Web Development

COMP 431 / COMP 531

Lecture 14: End-to-End Testing

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Frontend Recap

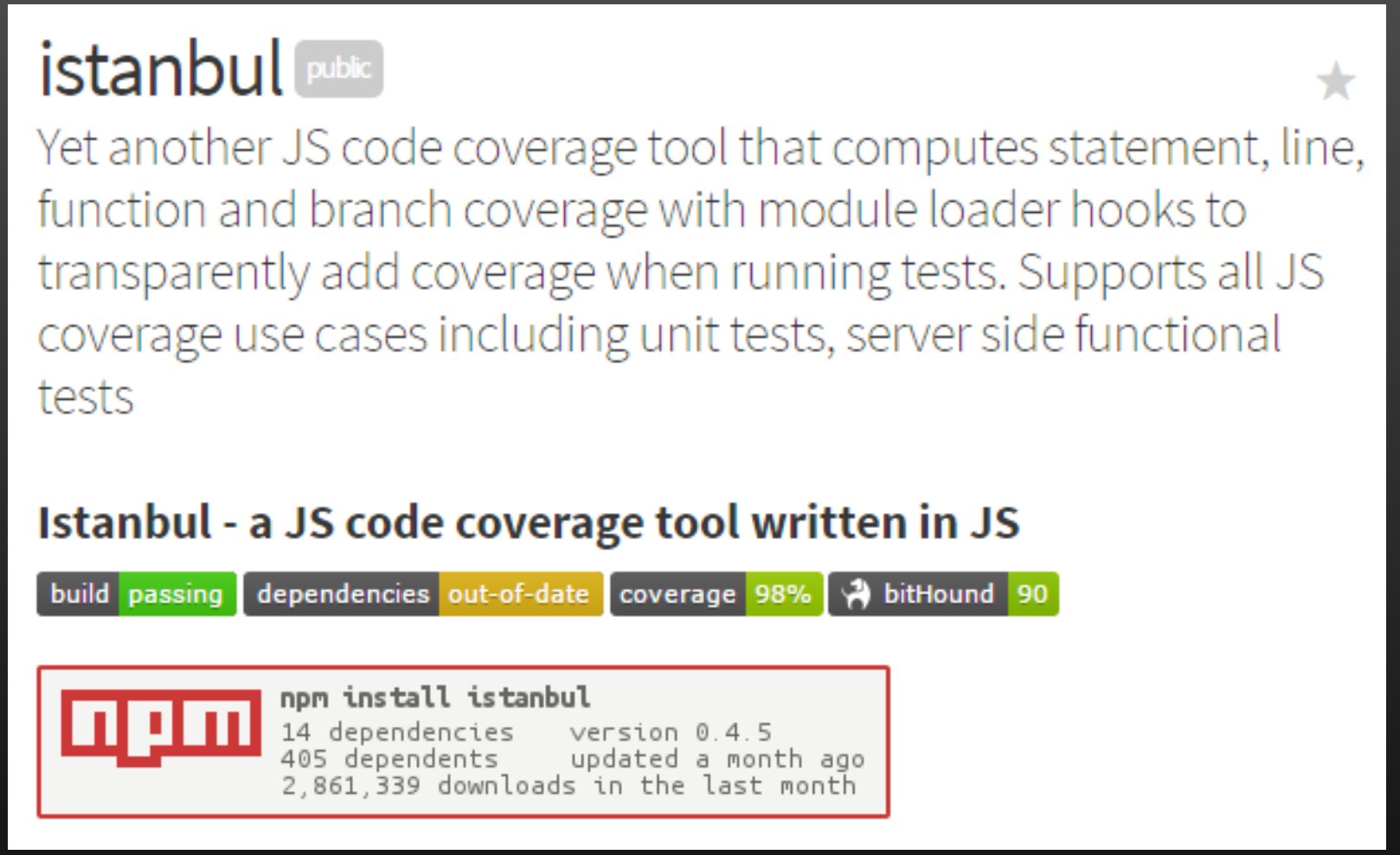
- HTML and HTML5, Storage, Canvas
- JavaScript and Scope
- Forms, CSS, Events
- jQuery, AJAX, and fetch
- Modern JS
- MVC, Angular, Testing

Quiz 2
Due **Thursday** 10/19

Homework Assignment 5
(Front-End App)
Due Thursday 10/26

HW 5 Front-End Web Application

- TDD = *Write tests first!*
- Implement:
  - User login / logout – routing from landing to main to profile views
    - Error message for invalid users
  - Status headline update (persistent)
  - ~~Filter the posts by author/body (not id)~~ [already done]
  - Add a post (persistent)
  - Comment on a post
  - Update profile page to match registered logged in user (not hardcoded)



- Instruments code
- Generates coverage report

Two Approaches

Istanbul with mocha

- ES6 requires isparta

Karma with mocha

- Karma is a test runner
- Launches a browser

- isparta is no longer supported

npm scripts

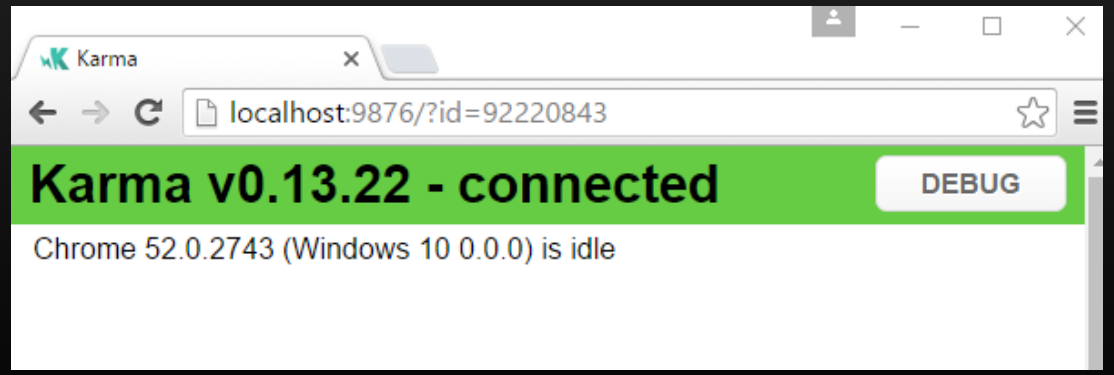
```
"karma": "karma start --single-run",
"karma:watch": "karma start",
```

- Karma is a test runner used to run tests in a browser environment

`npm run karma`

```
27 09 2015 21:44:21.127:WARN [karma]: No captured browser, open http://localhost:9876/
27 09 2015 21:44:21.158:INFO [karma]: Karma v0.13.10 server started at http://localhost:9876/
27 09 2015 21:44:21.221:INFO [launcher]: Starting browser Chrome
27 09 2015 21:44:29.937:INFO [Chrome 45.0.2454 (Windows 8.1 0.0.0)]: Connected on socket Z_nU9i_rt8KCs7
QCAAAA with id 86007040
Chrome 45.0.2454 (Windows 8.1 0.0.0): Executed 5 of 5 SUCCESS (0.164 secs / 0.121 secs)
```

- Opened a (captured) Browser
- Use the browser to execute code
  - Runs all the tests
- Collected results from the browser
- Presents the test results in the terminal



```
1  //********************//
2  // Karma Test Runner //
3  //********************//
4
5  var babelrc = JSON.parse(require('fs').readFileSync('.babelrc').toString())
6
7  // We use webpack to resolve import/require statements
8  var webpackConfig = require('./webpack.config.js')
9  webpackConfig.entry = {}
10 // inline the source map instead of a separate file
11 webpackConfig.devtool = 'inline-source-map'
12 // instrumentation for coverage
13 if (!webpackConfig.module.preLoaders) webpackConfig.module.preLoaders = []
14 webpackConfig.module.preLoaders.push({
15     test: /\.jsx?$/,
16     include: /src/,
17     exclude: /(node_modules)/,
18     loader: 'babel-istanbul',
19     query: {
20         cacheDirectory: true
21 }})
22 webpackConfig.resolve = {
23     alias: {
24         'isomorphic-fetch': 'mock-fetch',
25     }
26 }
27 webpackConfig.externals = {
```

karma.conf.js

```
}
webpackConfig.externals = {
    'jsdom': 'window',
    'mockery': 'window',
}

module.exports = function(config) {
    config.set({
        autoWatch: true,
        singleRun: false,
        browsers: ['Chrome'],
        frameworks: ['mocha'],
        logLevel: config.LOG_INFO,
        files: [ 'tests.webpack.js' ],
        preprocessors: {
            'tests.webpack.js': ['webpack', 'sourcemap']
        },
        webpack: webpackConfig,
        webpackMiddleware: { noInfo: true },
        coverageReporter: {
          reporters: [
            { type: 'html', subdir: 'html' },
            { type: 'lcovonly', subdir: '.' },
          ],
        },
        reporters: ['progress', 'coverage'],
    })
```

karma.conf.js

/

50.56% Statements 45/89 **75%** Branches 12/16 **41.38%** Functions 12/29 **45.68%** Lines 37/81 **1 branch** Ignored

File	Statements		Branches		Functions		Lines	
src/	50.56%	45/89	75%	12/16	41.38%	12/29	45.68%	37/81

all files src/

50.56% Statements 45/89 **75%** Branches 12/16 **41.38%** Functions 12/29 **45.68%** Lines 37/81 **1 branch** Ignored

File	Statements		Branches		Functions		Lines	
dummy.js	85.71%	36/42	66.67%	8/12	73.33%	11/15	83.33%	30/36
dummy.spec.js	17.07%	7/41	100%	4/4	8.33%	1/12	12.82%	5/39
index.js	33.33%	2/6	100%	0/0	0%	0/2	33.33%	2/6

all files / src/ dummy.js

85.71% Statements 36/42 **66.67%** Branches 8/12 **73.33%** Functions 11/15 **83.33%** Lines 30/36

```
1  1×  const url = 'https://webdev-dummy.herokuapp.com'
2
3  1×  const resource = (method, endpoint, payload) => {
4  3×    const options =  {
5          method,
6          credentials: 'include',
7          headers: {
8            'Content-Type': 'application/json'
9          }
10       }
11 3×    if (payload) options.body = JSON.stringify(payload)
12
13 3×    return fetch(`${url}/${endpoint}`, options)
14         .then(r => {
15 3×       E if (r.status === 200) {
16 3×         return (r.headers.get('Content-Type').indexOf('json') > 0 ? r.json() : r.text())
17         } else {
18           // useful for debugging, but remove in production
19           console.error(`${method} ${endpoint} ${r.statusText}`)
20           throw new Error(r.statusText)
21         }
22       })
23 }
```

End-to-End Testing

- Karma launched Chrome
- Karma can launch other browsers too!
  - and run all in parallel
- But Karma executes “unit tests”

- Integration, or End-to-End tests, require a full browsing experience

  We want a real browser and drive that browser, imitating a user

You'll need to download the ***chromedriver***

The driver needs to be in your path to execute.

```
npm install -g webdriver-manager
webdriver-manager update --chrome –standalone
which chromedriver

npm run build
npm start &
npm run e2e
```

```
Test Dummy Server Example Page
  ✓ should log in as the test user (899ms)
  ✓ Update the headline and verify the change (14002ms)

shutdown
  ✓ now (339ms)


3 passing (25s)
```

End-to-End Test Report

```
 npm run e2e:xunit

> starter@1.0.0 e2e:xunit
> npm run e2e:base -- --reporter xunit > e2e/results.xml


 cat e2e/results.xml

> starter@1.0.0 e2e:base
> mocha --opts e2e/mocha.opts e2e/*.spec.js "--reporter" "xunit"

<testsuite name="Mocha Tests" tests="3" failures="0" errors="0" skipped="0" timestamp="Sun
631">
<testcase classname="Test Dummy Server Example Page" name="should log in as the test user"
<testcase classname="Test Dummy Server Example Page" name="Update the headline and verify
<testcase classname="shutdown" name="now" time="0.514"/>
</testsuite>
```

Headless Browsing

"A **headless browser** is a web browser without a graphical user interface" – Wikipedia

What did we just do with Selenium?

We controlled a browser programmatically!

… why do we need the GUI?

Karma and Selenium are set to use Chrome but we can have them use PhantomJS for headless testing instead.

Headless Browsing with Casper

```
npm install -g casperjs@1.1.0-beta3
```


```
var casper = require('casper').create({
    viewportSize: {width: 1024, height: 768}
})

casper.start('https://www.google.com', function() {
    this.echo(this.getTitle())
})

casper.run()
```

```
# casperjs ./haunt.js
Google
```

Assignments: *a look ahead…*

HW5: Frontend (due 10/26)

- Functional Angular
- Unit tests with Coverage
- Login / Logout
- Articles and search
- Status headline
- Followers

HW6: Draft Backend (11/9)

- Finalize Frontend
  - Upload images
  - Edit profile
  - **End-to-End Tests**
- Draft Backend
  - Connect to server