

Angular Testing

... but faster!



Course overview

1. Angular Testing

1. Welcome
2. Why this talk?
3. Identifying what to test
4. Shallow rendering
5. Getting simpler
6. Getting faster

Angular Testing

... but faster

Sections in this chapter:

1. Welcome
2. Why this talk?
3. Identifying what to test
4. Shallow rendering
5. Getting simpler
6. Getting faster

1-1. Welcome

Stephen Lau

1-1-1

Background in driver and graphics programming for the mobile industry.

Have spent the last few years working at Edument.

Lots of travel to China as well as teaching and consulting in Sweden and Germany.



1-1-2



1-1-3

1-2. Why this talk?

Why This talk

1-2-1

- Currently consulting on an Angular project
 - Testing needed to be improved
 - Approximately 60 unit tests
 - Unit testing took > 3 min
 - Low velocity
- Difficult to find "good" examples

Today

1-2-2

- Currently > 950 tests
- Unit testing takes < 40 sec
- Average sprint velocity more than doubled! *

** Other improvements also made*

Lets look for some good tests!

1-2-3



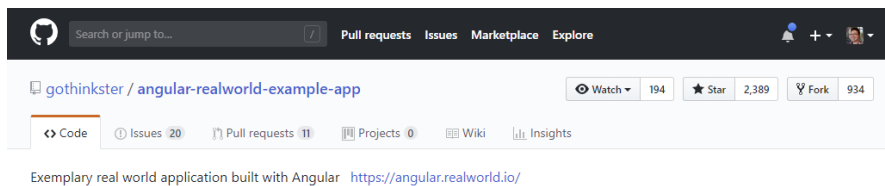
1-2-4

25 Amazing Angular Open Source Projects for the Past Year (v.2018)

For the past year, we've compared nearly 2,500 Angular open source projects to pick Top 25 (1% chance).

- *angular-realworld-example-app*
- *yatrum* - Travel guides (Ng 4.0.0)
- *echoes-player* - Media player for YouTube (Ng +6)
- *Angular.io*

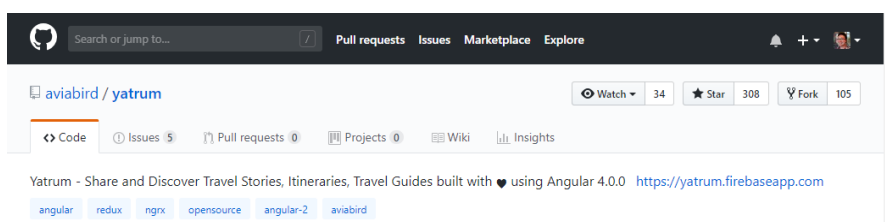
1-2-5



1-2-6



1-2-7



1-2-8

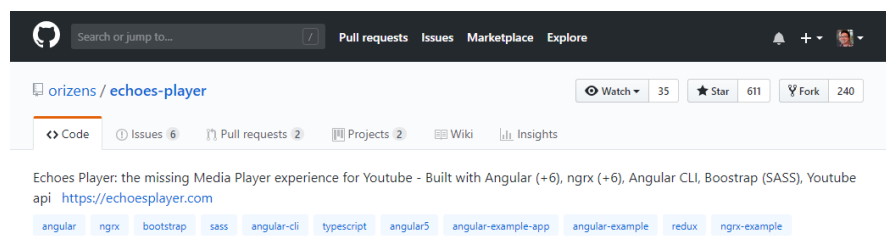
```

stephen@ubuntu-vm:~/code/ng-test-talk/yatrum$ npm test
> Yatrum@1.0.0 test /home/stephen/code/ng-test-talk/yatrum
> ng test

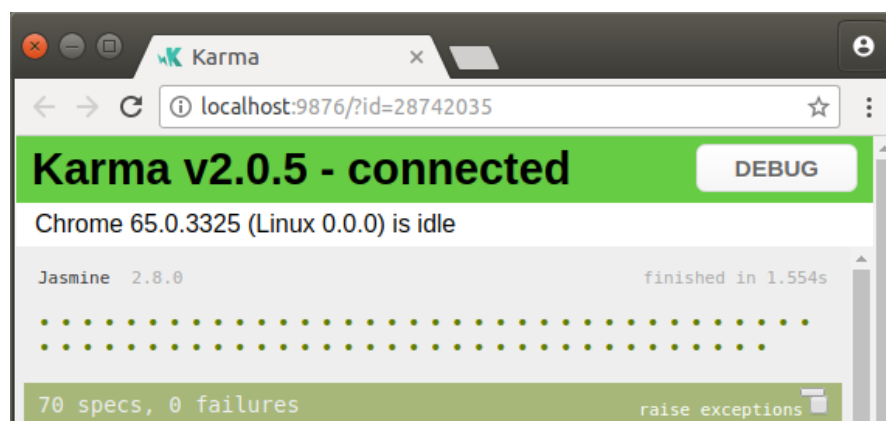
10 11 2018 13:01:04:286:ERROR [config]: Error in config file!
{ Error: Cannot find module 'karma-remap-istanbul'
  at Function.Module._resolveFilename (module.js:543:15)
  at Function.Module._load (module.js:470:25)
  at Module.require (module.js:593:17)
  at require (internal/module.js:11:18)
  at module.exports (/home/stephen/code/ng-test-talk/yatrum/karma.conf.js:11:7)
  at Object.parseConfig (/home/stephen/code/ng-test-talk/yatrum/node_modules/karma/lib/config.js:396:5)
  at new Server (/home/stephen/code/ng-test-talk/yatrum/node_modules/karma/lib/server.js:56:20)
  at Promise (/home/stephen/code/ng-test-talk/yatrum/node_modules/@angular/cli/tasks/test.js:45:33)
  at new Promise (<anonymous>)
  at Class.run (/home/stephen/code/ng-test-talk/yatrum/node_modules/@angular/cli/tasks/test.js:23:16)
  at Class.run (/home/stephen/code/ng-test-talk/yatrum/node_modules/@angular/cli/commands/test.js:122:25)
  at resolve (/home/stephen/code/ng-test-talk/yatrum/node_modules/@angular/cli/ember-cli/lib/models/command.js:261:20)
  at new Promise (<anonymous>)
  at Class.validateAndRun (/home/stephen/code/ng-test-talk/yatrum/node_modules/@angular/cli/ember-cli/lib/models/command.js:240:12)
  at Promise.resolve.then.then (/home/stephen/code/ng-test-talk/yatrum/node_modules/@angular/cli/ember-cli/lib/cli.js:140:24)
  at <anonymous> code: 'MODULE_NOT_FOUND' }
npm ERR! Test failed. See above for more details.
stephen@ubuntu-vm:~/code/ng-test-talk/yatrum$

```

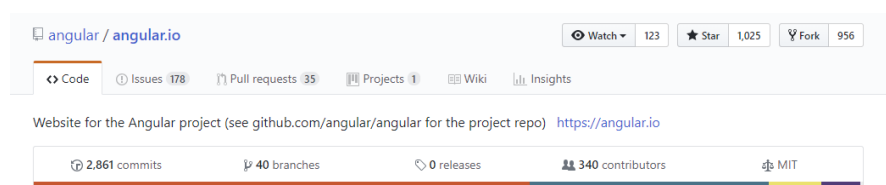
1-2-9



1-2-10



1-2-11



1-2-12

```

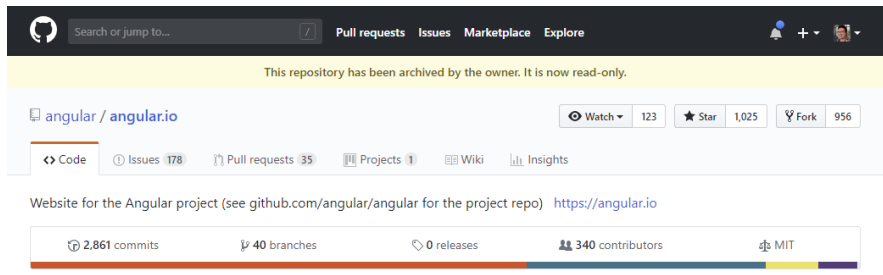
stephen@ubuntu-vm: ~/code/ng-test-talk/angular.io
File Edit View Search Terminal Tabs Help
stephen@ubuntu-v... x stephen@ubuntu-v... x stephen@ubuntu-v... x stephen@ubuntu-v... x stephen@ubuntu-v... x
stephen@ubuntu-vm:~/code/ng-test-talk/angular.io$ npm test

> angular.io@0.0.0 test /home/stephen/code/ng-test-talk/angular.io
> echo "Error: no test specified" && exit 1

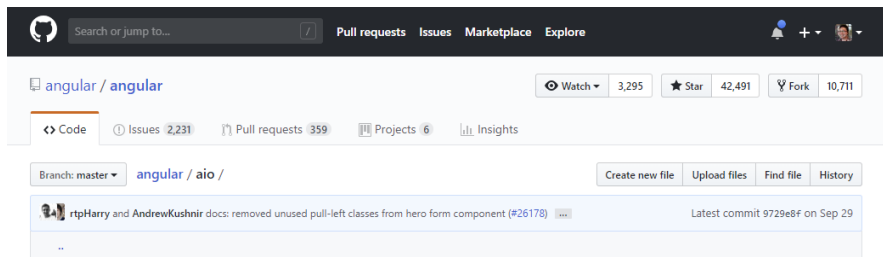
Error: no test specified
npm ERR! Test failed. See above for more details.
stephen@ubuntu-vm:~/code/ng-test-talk/angular.io$

```

1-2-13



1-2-14



1-2-15



1-2-16

Demo

1-2-17

Karma

1-3. Identifying what to test

Today we'll focus on:

1-3-1

- Component unit tests

We'll leave these alone:

1-3-2

- Service unit tests
- Integration tests
- E2E tests
- Manual testing

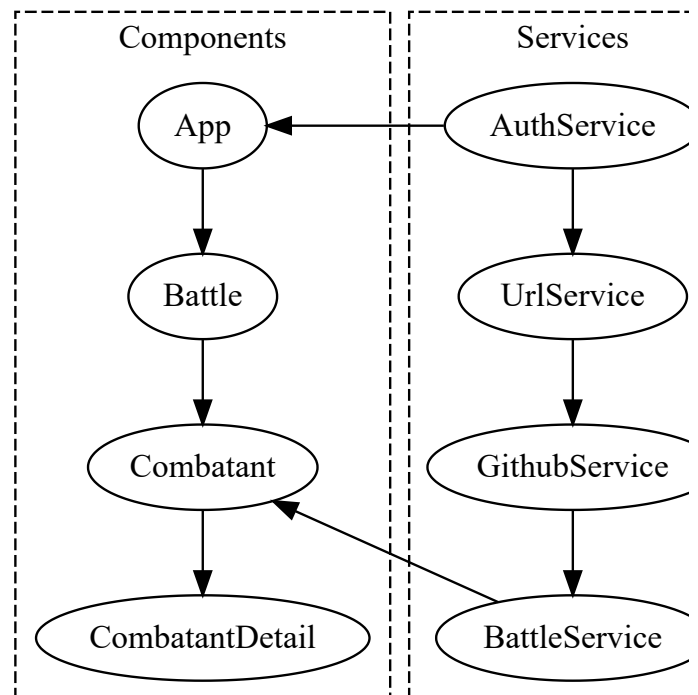
```
it('should instantiate ok', () => {
  expect(instance).to.exist;
});
```

A simpler example:

<http://githubbattle.netlify.com/>

```
return forkJoin(user$, repo$).pipe(map( ([user,list]) => {
  const cheat = user.login === 'toshi38';
  if(cheat) {
    console.log("This user is Stephen! Entering cheating mode!")
  }
});
```

```
<App>
  <Battle>
    <Combatant>
      <CombatantDetail>
    </Combatant>
    <Combatant>
      <CombatantDetail>
    </Combatant>
  </Battle>
</App>
```



Components are our units!

Test the API

Avoid Fingerprinting

Battle component

Our current list

1-3-10

- Uses child components correctly
 - **Inputs []**
 - **Outputs ()**
 - **In/Out [()]**

Combatant component

1-3-11

New Additions:

1-3-12

- Component API
 - **Output @Output**
- Dependencies
 - **Found in constructor()**
- Template Logic
 - **Conditional rendering...** etc

Our Testing List

1-3-13

Child Components:

- Inputs []
- Outputs ()
- In/Out [()]
- @ViewChild
- local variable #

Template Logic

Dependencies:

- Check constructor()

Inputs/Outputs:

- @Input()
- @Output()

How to test:

1-3-14

[A.io - Component interaction](#)

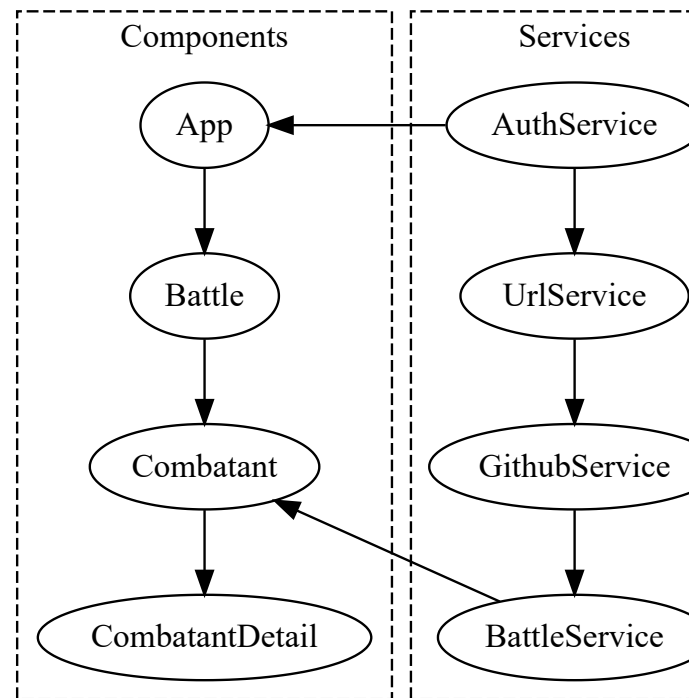
[A.io - Testing](#)

1-4. Shallow rendering

```

<App>
  <Battle>
    <Combatant>
      <CombatantDetail>
    </Combatant>
    <Combatant>
      <CombatantDetail>
    </Combatant>
  </Battle>
</App>

```



Battle Component Spec

1-4-2

```

@Component({
  selector: 'combatant',
  template: ''
})
class FakeCombatant {
  @Output() stars = new EventEmitter<number>()
}

const testModuleConfig = {
  imports: [CommonModule],
  declarations: [BattleComponent, FakeCombatant]
}

```

Emitting Output

1-4-3

```

//Find
let combatant1: FakeCombatant = debugElement
    .query(By.css('.qa-combatant'))
    .componentInstance;

combatant1.stars.emit(456);

```

Locating elements

1-4-4

```
//Find
let combatant1: FakeCombatant = debugElement
    .query(By.css('.qa-combatant'))
    .componentInstance;

expect(nativeElement.querySelector('.qa-battle')).to.exist;
```

- *Don't put styles on classes starting with qa-*
- *Don't find elements with classes used for styling*

No Errors

1-4-5

```
const testModuleConfig = {
  imports: [CommonModule],
  declarations: [AppComponent],
  schemas: [NO_ERRORS_SCHEMA], //Prevent errors about unknown component
  providers: [{provide: AuthService, useValue: fakeAuthService}]
}

describe('When logged in', () => {
  it('should render a battle component', () => {
    expect(nativeElement.querySelector('.qa-battle')).to.exist;
  });
});
```

ng-mocks

1-4-6

ng-mocks
7.1.1 • Public • Published 7 days ago

Readme 0 Dependencies 2 Dependents 23 Versions

build passing npm package 7.1.1

ngMocks

Helper function for creating angular mocks for test.

Why use this?

install
> npm i ng-mocks

747 weekly downloads

version 7.1.1 license MIT

ng-mocks Battle Component Spec

```
import { MockComponent, MockedComponent } from 'ng-mocks';

const testModuleConfig = {
  imports: [CommonModule],
  declarations: [BattleComponent, MockComponent(CombatantComponent)]
}

//Find
let combatant1: MockedComponent<CombatantComponent> = debugElement
  .query(By.css('.qa-combatant'))
  .componentInstance;

combatant1.stars.emit(456);
```

Mocking Services

```
const fakeBattleServiceObservable = {
  subscribe: sinon.stub()
};

const fakeBattleService = {
  battleInfoForUser: sinon.stub().returns(fakeBattleServiceObservable)
};

const testModuleConfig = {
  imports: [FormsModule, CommonModule],
  declarations: [
    CombatantComponent, MockComponent(CombatantDetailComponent)
  ],
  providers: [{provide: BattleService, useValue: fakeBattleService}]
}
```

1-5. Getting simpler

Karma has a **browser** dependency.

Nostradamus Prophecy Machine

[npm Enterprise](#)
[Features](#)
[Pricing](#)
[Docs](#)
[Support](#)

Search

puppeteer

1.10.0 • Public • Published a day ago

Readme

8 Dependencies

1,152 Dependents

434 Versions

Puppeteer

build passing

build passing

CI passing

npm v1.10.0

API | FAQ | Contributing | Troubleshooting

Puppeteer is a Node library which provides a high-level API to control Chrome or Chromium over the [DevTools Protocol](#).

Puppeteer runs **headless** by default, but can be configured to run full (non-headless) Chrome or Chromium.

What can I do?

Install

> npm i puppeteer

± weekly downloads

120,192

version

1.10.0

license

Apache-2.0

open issues

277

pull requests

6

Installation

To use Puppeteer in your project, run:

```
npm i puppeteer
# or "yarn add puppeteer"
```

Note: When you install Puppeteer, it downloads a recent version of Chromium (~170MB Mac, ~282MB Linux, ~280MB Win) that is guaranteed to work with the API. To skip the download, see [Environment variables](#).

1-5-2

1-5-3

```
diff --git a/aio/package.json b/aio/package.json
index 885efc4..4c1ee2c 100644
--- a/aio/package.json
+++ b/aio/package.json
@@ -143,6 +143,7 @@
   "protractor": "^5.2.0",
+  "puppeteer": "^1.10.0",
   "rehype": "^6.0.0",
diff --git a/aio/src/karma.conf.js b/aio/src/karma.conf.js
index 0d2fed3..4f90298 100644
--- a/aio/src/karma.conf.js
+++ b/aio/src/karma.conf.js
@@ -1,6 +1,9 @@
// https://karma-runner.github.io/1.0/config/configuration-file.html
+process.env.CHROME_BIN = require('puppeteer').executablePath();
module.exports = function (config) {
  config.set({
@@ -25,14 +28,8 @@ module.exports = function (config) {
    autoWatch: true,
    browsers: ['CustomChrome'],
+   browsers: ['ChromeHeadless'],
    singleRun: false,
```

1-5-4

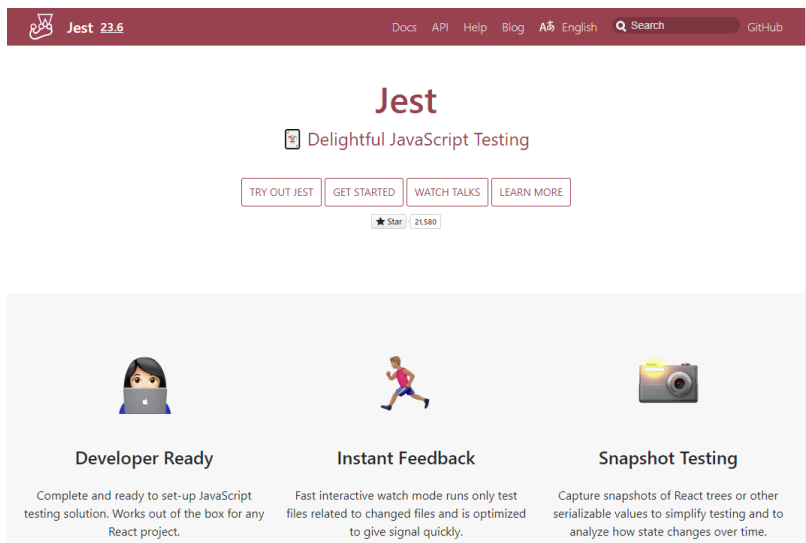
Demo

Puppeteer

1-5-5

1-6. Getting faster

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Install Jest

1-6-2

```
yarn add --dev jest jest-preset-angular @types/jest
```

jest.config.js

1-6-3

```
module.exports = {
  preset: "jest-preset-angular",
  roots: ['src'],
  setupFilesAfterEnv: ["<rootDir>/src/setupJest.ts"],
  moduleNameMapper: {
    'testing/(.*)': '<rootDir>/src/testing/$1'
  }
};
```

setupJest.ts

1-6-4

```
import 'jest-preset-angular';
import './jestGlobalMocks';
```

jestGlobalMocks.ts

```
global['CSS'] = null;

const mock = () => {
  //...
};

Object.defineProperty(window, 'localStorage', {value: mock()});
Object.defineProperty(window, 'sessionStorage', {value: mock()});
Object.defineProperty(document, 'doctype', {
  value: '<!DOCTYPE html>'
});
//...
```

Demo

1-6-6

Jest

Before (Jasmine):

```
jasmine.createSpy('blah')
`spyOn(something, 'blah')
.and.returnValue()
.and.callFake(()=>{})
jasmine.createSpyObj('blah', ['prop']) blah = {prop: jest.fn()}
jasmine.any
jasmine.objectContaining
spy.calls.mostRecent().args[1]
```

After (Jest):

```
jest.fn()
jest.spyOn(something, 'blah')*
.mockReturnValue()
.mockImplementation(()=>{})
expect.any
expect.objectContaining
spy.mock.calls[spy.mock.calls.length - 1][1]
```

1-6-7

Traps

1-6-8

- `jest.spyOn()` doesn't replace function
- Differences in mock call accessing
- js-dom scroll support
- js-dom custom element support
- Replacing spy(s) in jest does not reset them

A splitting issue

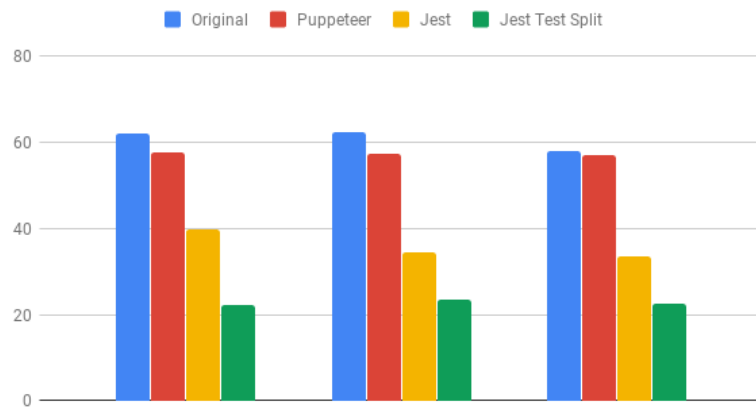
1-6-9

```
PASS src/app/layout/top-menu/top-menu.component.spec.ts
PASS src/app/layout/nav-menu/nav-menu.component.spec.ts
PASS src/app/app.component.spec.ts (43.662s)

Test Suites: 45 passed, 45 total
Tests: 607 passed, 607 total
Snapshots: 0 total
Time: 46.218s

real    0m51.469s
user    0m0.000s
sys     0m0.046s
```

Mac 8 Cores



Disadvantages

1-6-11

- Harder to find examples
- May need to extend jsdom
- No one will visit your page with jsdom

1-6-12



`jest-preset-angular`

Thank You!

1-6-13



External links

- 1-3-9 Battle component : <https://github.com/edumentab/example-angular-githubbattle/blob/93b63b05a9cc5c8685feadcc5faee045a06cb341/src/components/battle.ts#L10>
- 1-3-11 Combatant component : <https://github.com/edumentab/example-angular-githubbattle/blob/93b63b05a9cc5c8685feadcc5faee045a06cb341/src/components/combatant.ts#L18>
- 1-3-14 A.io - Component interaction : <https://angular.io/guide/component-interaction>
- 1-3-14 A.io - Testing : <https://angular.io/guide/testing>
- 1-4-2 Battle Component Spec : <https://github.com/edumentab/example-angular-githubbattle/blob/manual/src/specs/component.battle.spec.ts>
- 1-4-3 Emitting Output : <https://github.com/edumentab/example-angular-githubbattle/blob/7525b918cedebd7388991802074ec2dbda03ab5b/src/specs/component.battle.spec.ts#L64-L77>
- 1-4-5 No Errors : https://github.com/edumentab/example-angular-githubbattle/blob/no_error_schema/src/specs/component.app.spec.ts
- 1-4-6 ng-mocks : <https://www.npmjs.com/package/ng-mocks>
- 1-4-7 ng-mocks Battle Component Spec : <https://github.com/edumentab/example-angular-githubbattle/blob/627264db396054d4fe17d25787eecd590d5a6052/src/specs/component.battle.spec.ts#L12>
- 1-4-8 Mocking Services : <https://github.com/edumentab/example-angular-githubbattle/blob/c453449869a3ff02718766277b0652f0356b99be/src/specs/component.combatant.spec.ts#L15-L21>
- 1-6-1 jestjs.io: <https://jestjs.io/>
- 1-6-5 jestGlobalMocks.ts : <https://github.com/thymikee/jest-preset-angular/blob/abfb339cbe1e4e76bc68de66c9cfadc7d5da3588/example/src/jestGlobalMocks.ts#L1>
- 1-6-12 jest-preset-angular: <https://github.com/thymikee/jest-preset-angular>