Testing an API

```
module.exports = [
  { method: 'GET', path: '/api/candidates', config: CandidatesApi.find },
  { method: 'GET', path: '/api/candidates/{id}', config: CandidatesApi.findOne },
  { method: 'POST', path: '/api/candidates', config: CandidatesApi.create },
  { method: 'DELETE', path: '/api/candidates/{id}', config: CandidatesApi.deleteOne },
  { method: 'DELETE', path: '/api/candidates', config: CandidatesApi.deleteAll },

  { method: 'GET', path: '/api/users', config: UsersApi.find },
  { method: 'GET', path: '/api/users/{id}', config: UsersApi.findOne },
  { method: 'POST', path: '/api/users', config: UsersApi.create },
  { method: 'DELETE', path: '/api/users/{id}', config: UsersApi.deleteOne },
  { method: 'DELETE', path: '/api/users', config: UsersApi.deleteAll },
];
```

- User & Candidate APIs

Candidate Tests

- The tests we have written so far are somewhat verbose and repetitive.

- For tests to be effective, they must remain concise and easy to maintain and evolve.

```
suite('Candidate API tests', function () {

  test('get candidates', function () {

    const url = 'http://localhost:4000/api/candidates';
    var res = request('GET', url);
    const candidates = JSON.parse(res.getBody('utf8'));

    assert.equal(2, candidates.length);

    assert.equal(candidates[0].firstName, 'Lisa');
    assert.equal(candidates[0].lastName, 'Simpson');
    assert.equal(candidates[0].office, 'President');

    assert.equal(candidates[1].firstName, 'Donald');
    assert.equal(candidates[1].lastName, 'Simpson');
    assert.equal(candidates[1].office, 'President');

  });

  test('get one candidate', function () {

    const allCandidatesUrl = 'http://localhost:4000/api/candidates';
    var res = request('GET', allCandidatesUrl);
    const candidates = JSON.parse(res.getBody('utf8'));

    const oneCandidateUrl = allCandidatesUrl + '/' + candidates[0]._id;
    res = request('GET', oneCandidateUrl);
    const oneCandidate = JSON.parse(res.getBody('utf8'));

    assert.equal(oneCandidate.firstName, 'Lisa');
    assert.equal(oneCandidate.lastName, 'Simpson');
    assert.equal(oneCandidate.office, 'President');

  });

  test('create a candidate', function () {

    const candidatesUrl = 'http://localhost:4000/api/candidates';
    const newCandidate = {
      firstName: 'Barnie',
      lastName: 'Grumble',
      office: 'President',
    };

    const res = request('POST', candidatesUrl, { json: newCandidate });
    const returnedCandidate = JSON.parse(res.getBody('utf8'));

    assert.equal(returnedCandidate.firstName, 'Barnie');
    assert.equal(returnedCandidate.lastName, 'Grumble');
    assert.equal(returnedCandidate.office, 'President');

  });
});
```

Candidate Tests

- To facilitate this, we attempt to encapsulate both the http requests and the donation service access into a set of classes:
  - SyncHttpService: encapsulate http requests/ responses
  - DonationService: deliver a client-side api to the remote service
- These classes should simplify our tests and enable us to more easily devise more tests as the API evolves.

```
var request = require('sync-request');

class SyncHttpService {
  ...
}

module.exports = SyncHttpService;
```

```
const SyncHttpService = require('./sync-http-client');
const baseUrl = 'http://localhost:4000';

class DonationService
  ...
}

module.exports = DonationService;
```

SyncHttpService - Specification

- This class servers as a simple wrapper mourn the sync-request module

- Assumes certain defaults, implement get, post and delete operations against a baseUrl (the remote service)

```
var request = require('sync-request');

class SyncHttpService {

  constructor(baseUrl) {
    ...
  }

  get(url) {
    ...
  }

  post(url, obj) {
    ...
  }

  delete (url) {
    ...
  }
}

module.exports = SyncHttpService;
```

SyncHttpService - Implementation

- For get and post, If return code < 300, assume we have JSON payload

```
var request = require('sync-request');

class SyncHttpService {

  constructor(baseUrl) {
    this.baseUrl = baseUrl;
  }

  get(url) {
    var returnedObj = null;
    var res = request('GET', this.baseUrl + url);
    if (res.statusCode < 300) {
      returnedObj = JSON.parse(res.getBody('utf8'));
    }

    return returnedObj;
  }

  post(url, obj) {
    var returnedObj = null;
    var res = request('POST', this.baseUrl + url, { json: obj });
    if (res.statusCode < 300) {
      returnedObj = JSON.parse(res.getBody('utf8'));
    }

    return returnedObj;
  }

  delete (url) {
    var res = request('DELETE', this.baseUrl + url);
    return res.statusCode;
  }
}

module.exports = SyncHttpService;
```

DonationService

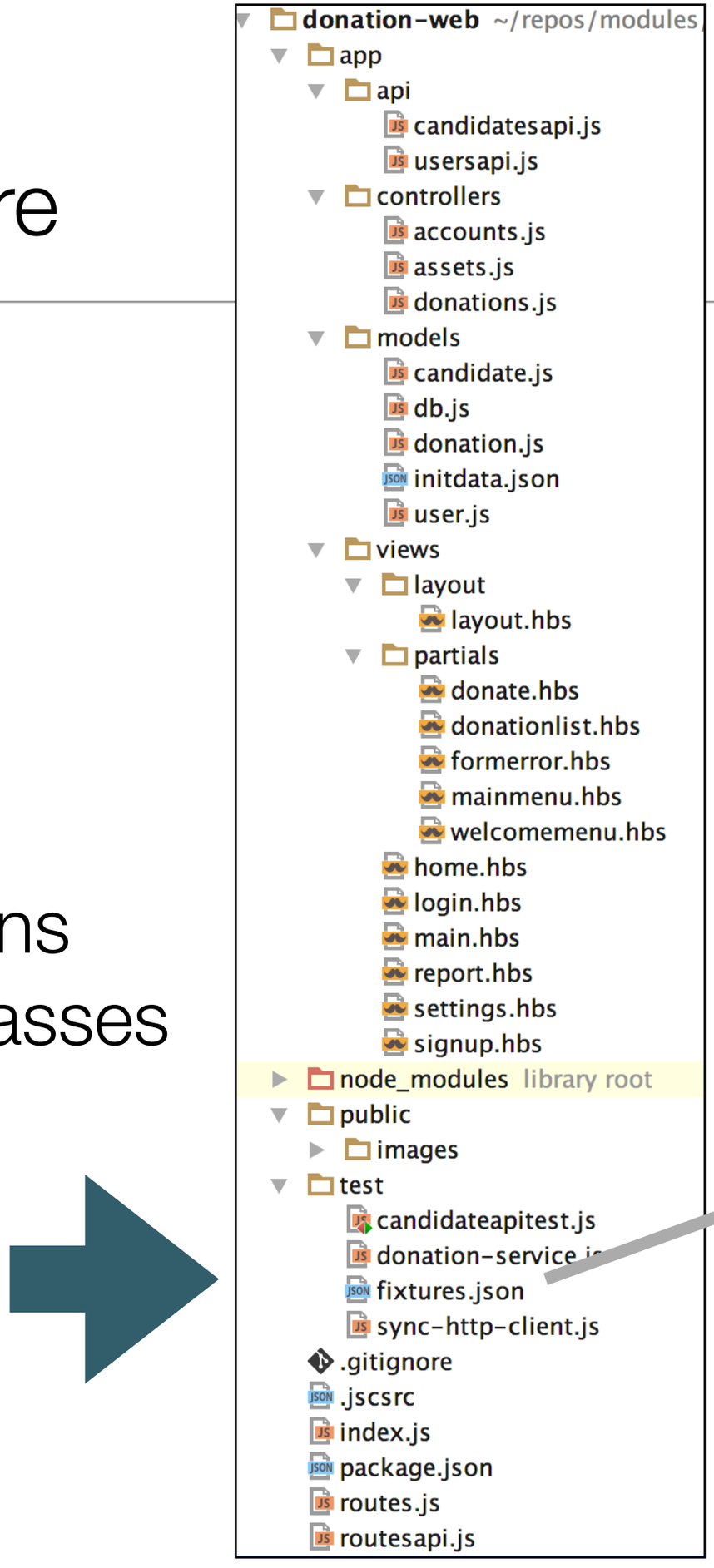
- Use the HttpSyncService to deliver higher level API to test client code.

- Test code can now be rewritten to use this class - simplifying the code and eliminating some repetition.

```
const SyncHttpService = require('./sync-http-client');
const baseUrl = 'http://localhost:4000';

class DonationService {

  constructor(baseUrl) {
    this.httpService = new SyncHttpService(baseUrl);
  }

  getCandidates() {
    return this.httpService.get('/api/candidates');
  }

  getCandidate(id) {
    return this.httpService.get('/api/candidates/' + id);
  }

  createCandidate(newCandidate) {
    return this.httpService.post('/api/candidates', newCandidate);
  }

  deleteAllCandidates() {
    return this.httpService.delete('/api/candidates');
  }

  deleteOneCandidate(id) {
    return this.httpService.delete('/api/candidates/' + id);
  }

  getUsers() {
    return this.httpService.get('/api/users');
  }

  getUser(id) {
    return this.httpService.get('/api/users/' + id);
  }

  createUser(newUser) {
    return this.httpService.post('/api/users', newUser);
  }
}

module.exports = DonationService;
```

Project Structure

- Test folder contains these wrapper classes + our unit tests



fixtures.json

```
{
  "candidates": [
    {
      "firstName": "Lisa",
      "lastName": "Simpson",
      "office": "President"
    },
    {
      "firstName": "Donald",
      "lastName": "Simpson",
      "office": "President"
    }
  ],
  "newCandidate":
  {
    "firstName": "Barnie",
    "lastName": "Grumble",
    "office": "President"
  }
}
```

test data

create a candidate test

```
'use strict';

const assert = require('chai').assert;
const DonationService = require('./donation-service');
const fixtures = require('./fixtures.json');

suite('Candidate API tests', function () {

  let candidates = fixtures.candidates;
  let newCandidate = fixtures.newCandidate;

  const donationService = new DonationService('http://localhost:4000');

  test('create a candidate', function () {
    const returnedCandidate = donationService.createCandidate(newCandidate);
    assert.equal(returnedCandidate.firstName, newCandidate.firstName);
    assert.equal(returnedCandidate.lastName, newCandidate.lastName);
    assert.equal(returnedCandidate.office, newCandidate.office);
    assert.isDefined(returnedCandidate._id);
  });
});
```

```
{
  "candidates": [
    {
      "firstName": "Lisa",
      "lastName": "Simpson",
      "office": "President"
    },
    {
      "firstName": "Donald",
      "lastName": "Simpson",
      "office": "President"
    }
  ],
  "newCandidate":
  {
    "firstName": "Barnie",
    "lastName": "Grumble",
    "office": "President"
  }
}
```

create a candidate test

```
test('create a candidate', function () {
    const returnedCandidate = donationService.createCandidate(newCandidate);
    assert.equal(returnedCandidate.firstName, newCandidate.firstName);
    assert.equal(returnedCandidate.lastName, newCandidate.lastName);
    assert.equal(returnedCandidate.office, newCandidate.office);
    assert.isDefined(returnedCandidate._id);
  });
});
```

```
{
  "candidates": [
    {
      "firstName": "Lisa",
      "lastName": "Simpson",
      "office": "President"
    },
    {
      "firstName": "Donald",
      "lastName": "Simpson",
      "office": "President"
    }
  ],
  "newCandidate":
  {
    "firstName": "Barnie",
    "lastName": "Grumble",
    "office": "President"
  }
}
```

- Test is now simplified, and easier to understand
- All access to the API is via donationService object

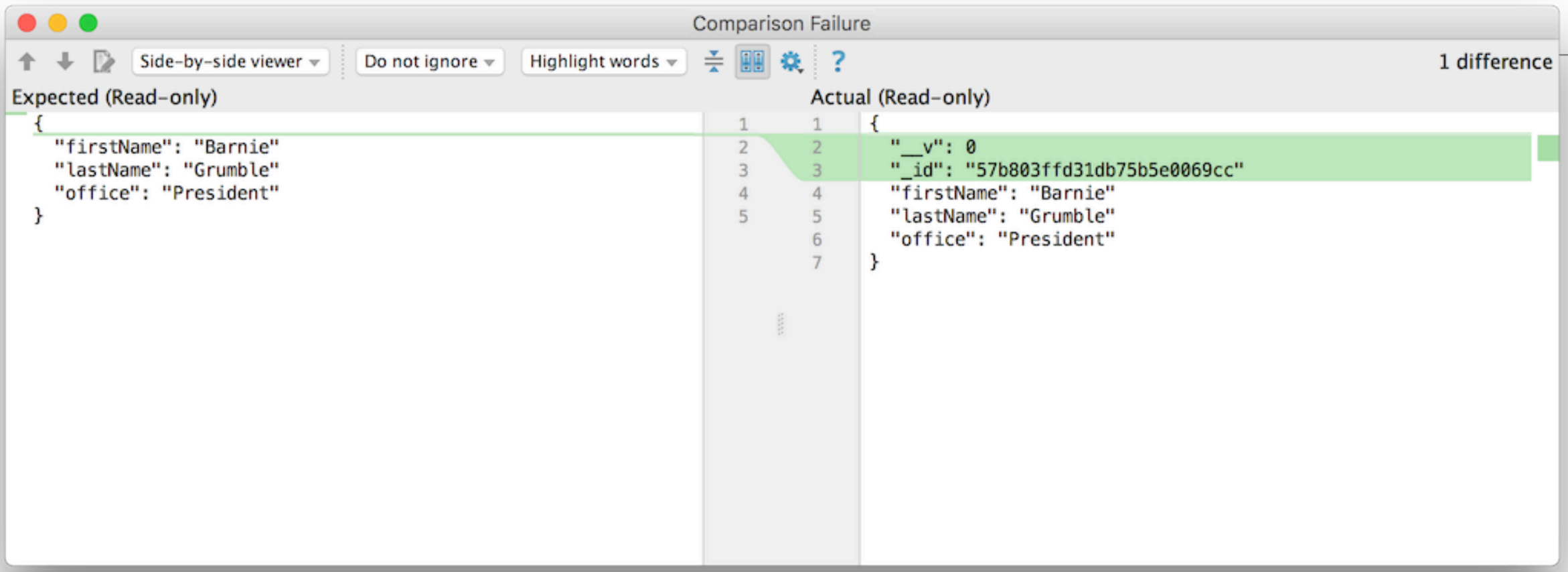
```
test('create a candidate', function () {
  const returnedCandidate = donationService.createCandidate(newCandidate);
  assert.equal(returnedCandidate.firstName, newCandidate.firstName);
  assert.equal(returnedCandidate.lastName, newCandidate.lastName);
  assert.equal(returnedCandidate.office, newCandidate.office);
  assert.isDefined(returnedCandidate._id);
});
```

- Simplified Test?

```
test('create a candidate', function () {
  const returnedCandidate = donationService.createCandidate(newCandidate);
  assert.equal(returnedCandidate, newCandidate);
  assert.isDefined(returnedCandidate._id);
});
```

- Will is pass?

```
assert.equal(returnedCandidate, newCandidate);
```



- Returned object contains additional fields
- Equals will fail

loadash

- All purpose ‘swiss army knife’ of utilities for Javascript

Lo

Lodash

A modern JavaScript utility library delivering modularity, performance & extras.

Documentation FP Guide

```
_.defaults({ 'a': 1 }, { 'a': 3, 'b': 2 });
// → { 'a': 1, 'b': 2 }
_.partition([1, 2, 3, 4], n => n % 2);
// → [[1, 3], [2, 4]]
```

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Download

Core build (~4kB gzipped)
Full build (~23kB gzipped)
CDN copies

Lodash is released under the MIT license & supports modern environments.
Review the build differences & pick one that’s right for you.

Installation

In a browser:

```
<script src="lodash.js"></script>
```

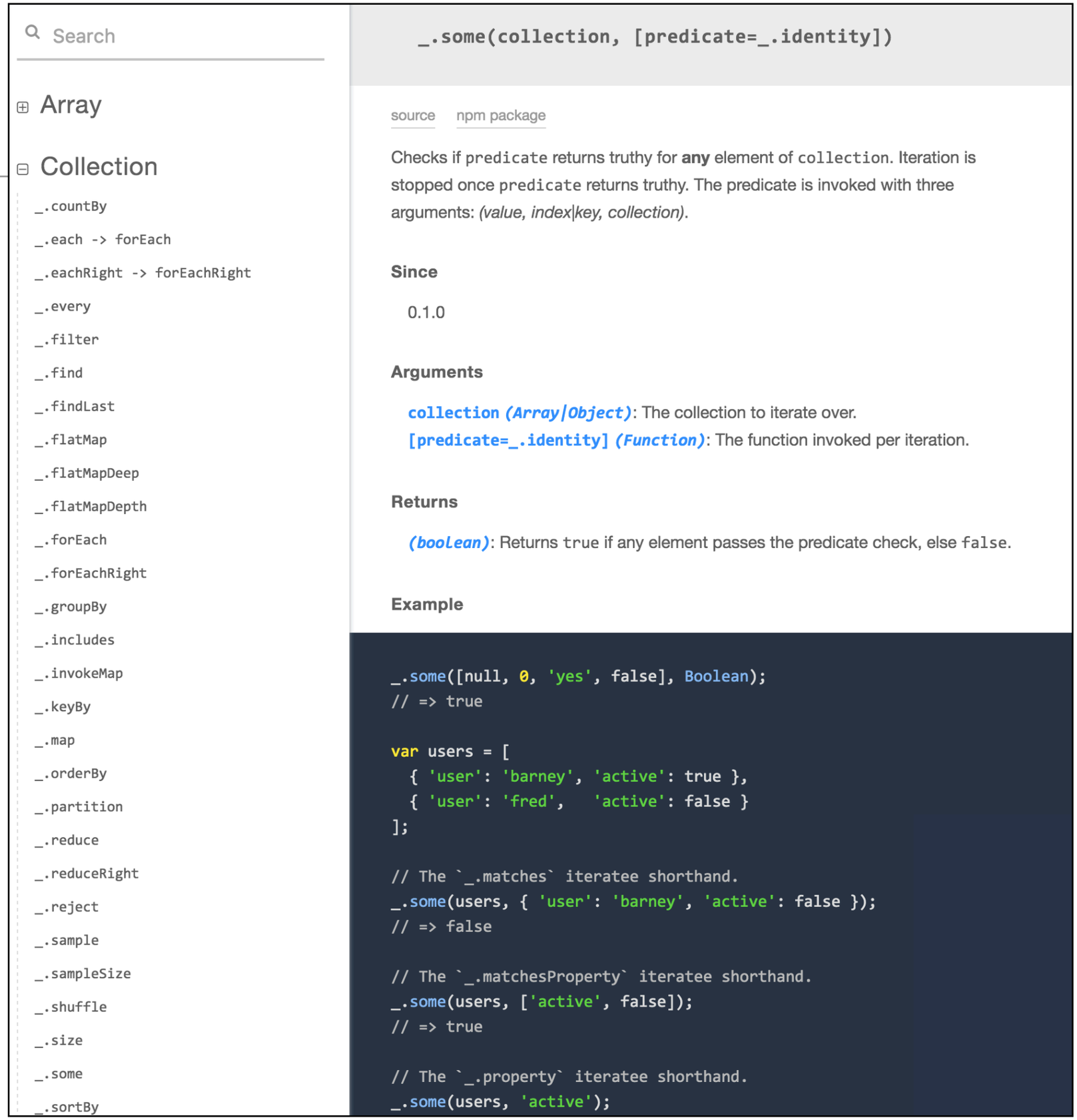
Using npm:

```
$ npm i -g npm
$ npm i --save lodash
```

In Node.js:

```
// Load the full build.
var _ = require('lodash');
// Load the core build.
var _ = require('lodash/core');
// Load the FP build for immutable auto-curried iteratee-first data-last methods.
var fp = require('lodash/fp');
```

- useful utility methods, particularly for manipulating arrays & collections



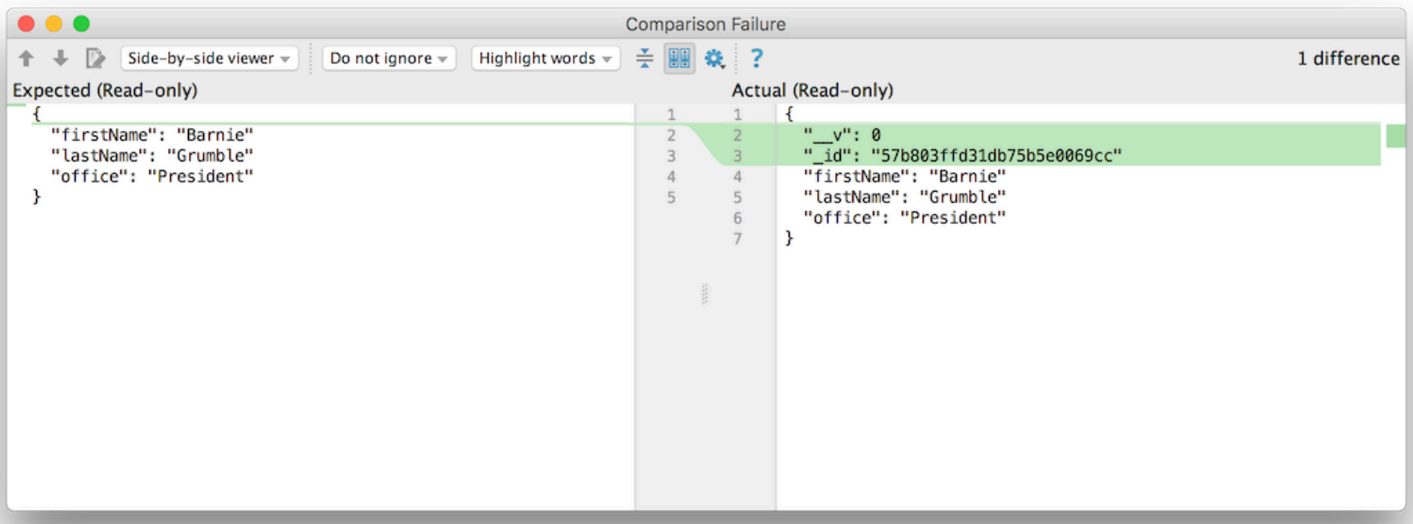
First we install lodash:

```
npm install lodash -save
```

Require is at the top of our test:

```
const _ = require('lodash');
```

```
test('create a candidate', function () {
  const returnedCandidate = donationService.createCandidate(newCandidate);
  assert(_.some([returnedCandidate], newCandidate),
                                    'returnedCandidate must be a superset of newCandidate');
  assert.isDefined(returnedCandidate._id);
});
```



- assert true if returnedCandidate is a superset of candidate

- Called before and after each test.
- Ensures each test has a ‘blank slate’ to work with

Comprehensive Candidate Tests

```
suite('Candidate API tests', function () {

  let candidates = fixtures.candidates;
  let newCandidate = fixtures.newCandidate;

  const donationService = new DonationService('http://localhost:4000');

  beforeEach(function () {
    donationService.deleteAllCandidates();
  });

  afterEach(function () {
    donationService.deleteAllCandidates();
  });

  test('create a candidate', function () {
    const returnedCandidate = donationService.createCandidate(newCandidate);
    assert(_.some([returnedCandidate], newCandidate),
                          'returnedCandidate must be a superset of newCandidate');
    assert.isDefined(returnedCandidate._id);
  });

  test('get candidate', function () {
    const c1 = donationService.createCandidate(newCandidate);
    const c2 = donationService.getCandidate(c1._id);
    assert.deepEqual(c1, c2);
  });

  test('get invalid candidate', function () {
    const c1 = donationService.getCandidate('1234');
    assert.isNull(c1);
    const c2 = donationService.getCandidate('012345678901234567890123');
    assert.isNull(c2);
  });

  test('delete a candidate', function () {
    const c = donationService.createCandidate(newCandidate);
    assert(donationService.getCandidate(c._id) != null);
    donationService.deleteOneCandidate(c._id);
    assert(donationService.getCandidate(c._id) == null);
  });
```