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Web Development

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Testing JavaScript Applications

Test-Driven Development and Jasmine

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What is Testing

Testing is how developers receive feedback on their programs.

Testing can reduce the feedback loop so developers can work more effectively

- Helps catch bugs early in production
- Helps factor in edge cases
- Test at smallest units (classes and functions) for fastest feedback
- It’s easier to fix broke code while it’s fresh in your mind
- Tests are recyclable

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How is Testing Created

- Programmers write test scaffolding that grows as the program grows
- The programmatic tests invoke production code
- This is known as System Under Test “SUT”
- In this paradigm, We write code to test code.
- Testing-First Development dictates that code is only created if a test is failing. i.e. tests are created first and then production code is created to solve the test.

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Who Writes Tests

- Programmers writing code write their own tests while the code is fresh (or before the code is created)

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Types of Tests

- Unit Tests
  - Tests smallest units of functionality (functions and classes)
  - Can be achieved using testing frameworks such as Jasmine or by using the `assert` method.
- Integration Tests
  - Inspect how units integrate into larger sets of cooperating functions
- System Tests
  - AKA end-to-end tests
  - Specifies the required functionality of the entire system
  - Can be expensive to run because it tests an entire program

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When to Write Tests

- TDD: “Test-Driven Development” means development that is directed by tests.
- Test-First development refers to a development style that writes tests before production code.
    - Test-First is different than TDD because in TDD we can write code before tests.
- Write tests the same day as the code while it’s fresh in your mind

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How to Write Tests: The Test-First TDD Cycle

- Determine the next piece of functionality you need. Write a test for your new functionality. News Flash! The Test will fail!
- Now, implement the functionality in the simplest way possible. Functionality is in place when the test passes.
  - Test suites can be reused many times. Each step of development adds a small piece of functionality paired with a small test. Because tests are small they should run rapidly.
- Important: Refactor your working code to look “pretty” or “tidy” so it’s easy for a human to read and understand. Restructure the SUT with confidence that you won’t break your code because test suites validate your work.
- Goto Step 1 and repeat until all required functionality is in place.
- Known as the red-green-factor cycle.

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Tests as Documentation

- Tests can be used as useful documentation of how to use a class
- When fixing bugs, write tests first to help discover related flaws in codebase. This will ensure bugs don't reappear after being fixed.

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Testing Doesn’t Replace UI and QA Testing

- Testing code doesn’t exclude testing UIs.
- Ensure accessible UX by testing final product the same way a user would use it.

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What to Test

- Before writing the program define what is important in your application.
- Plan on writing tests for important requirements

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Writing Good Tests - Knowing Bad Testing

- Like anything else in programming, writing good tests requires practice
- You'll know a test may be bad if the test takes a long time to run or breaks very easily when new code is created.
- Tests that sometimes pass or fail are bad tests
- Good tests test one thing and only one thing
- If all your tests seem bad then the codebase probably needs to be refactored
- Good tests have easy to understand names, are maintainable & run quick
- Good tests are independent and test actual production code

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Behavior Driven Development with Jasmine

- BDD is very similar to TDD
- Begin by thinking about what your program requirements are
- Write a failing test
- Write code to make the test pass
- Refactor the passing code and test if necessary
- Repeat until all program requirements are met

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Behavior Driven Development with Jasmine

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Jasmine Files

Prepackaged files in Jasmine include:

- Lib: JS files that help test functions (It's the Jasmine library)
- Spec.js: Contains test cases required to test JS functions or files. We write tests first so this file needs to be updated first.
- ***.js: This is the standard JS file that will hold the functions that we will be testing using Spec.js and the Library.
- SpecRunner.html: Normal HTML file which renders output of unit tests.

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Download Jasmine

- Goto https://jasmine.github.io
- Select Releases Menu
- Select most recent version number
- Select “jasmine-standalone-#.#.#.zip and Save

Screenshots follow in the slides ahead-->

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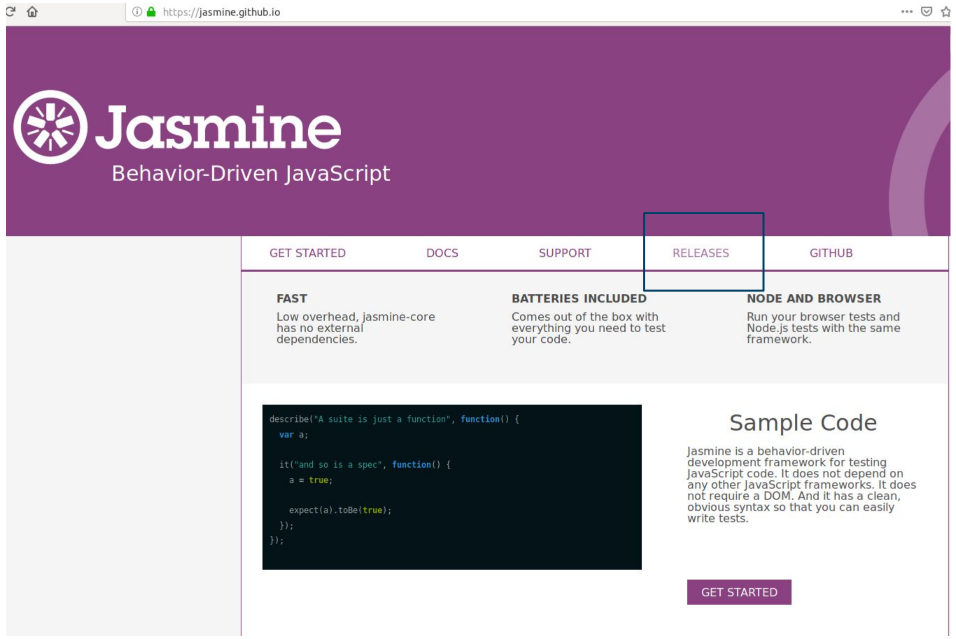
Download Jasmine

- Goto https://jasmine.github.io and select RELEASES



FAST
Low overhead, jasmine-core has no external dependencies.

BATTERIES INCLUDED
Comes out of the box with everything you need to test your code.

NODE AND BROWSER
Run your browser tests and Node.js tests with the same framework.

```
describe("A suite is just a function", function() {
  var a;

  it("and so is a spec", function() {
    a = true;

    expect(a).toBe(true);
  });
});
```

Sample Code

Jasmine is a behavior-driven development framework for testing JavaScript code. It does not depend on any other JavaScript frameworks. It does not require a DOM. And it has a clean, obvious syntax so that you can easily write tests.

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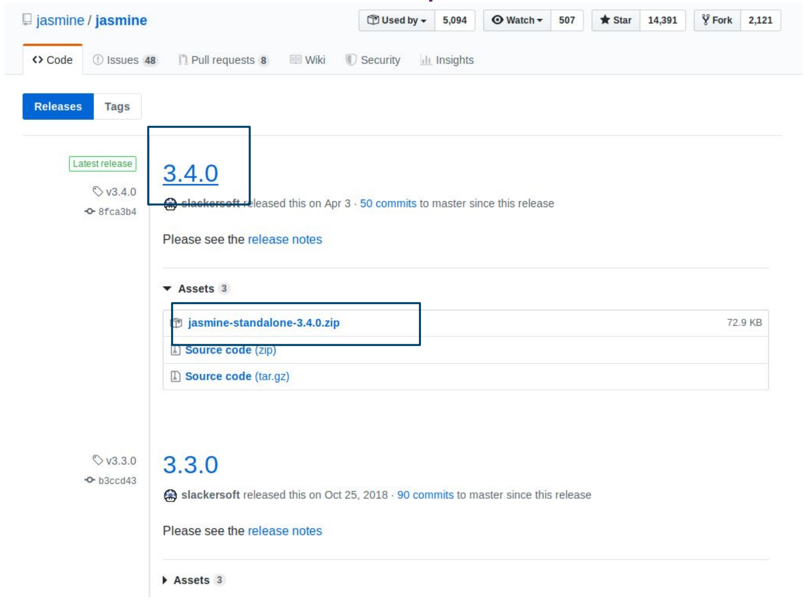
Download Jasmine

- Select most recent version number
- Select “jasmine-standalone-#.#.#.zip and Save



jasmine / jasmine

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Latest release
v3.4.0
8fca3b4

3.4.0

slackersoft released this on Apr 3 · 50 commits to master since this release

Please see the release notes

Assets 3

jasmine-standalone-3.4.0.zip	72.9 KB
Source code (zip)	
Source code (tar.gz)	

v3.3.0
b3ccd43

3.3.0

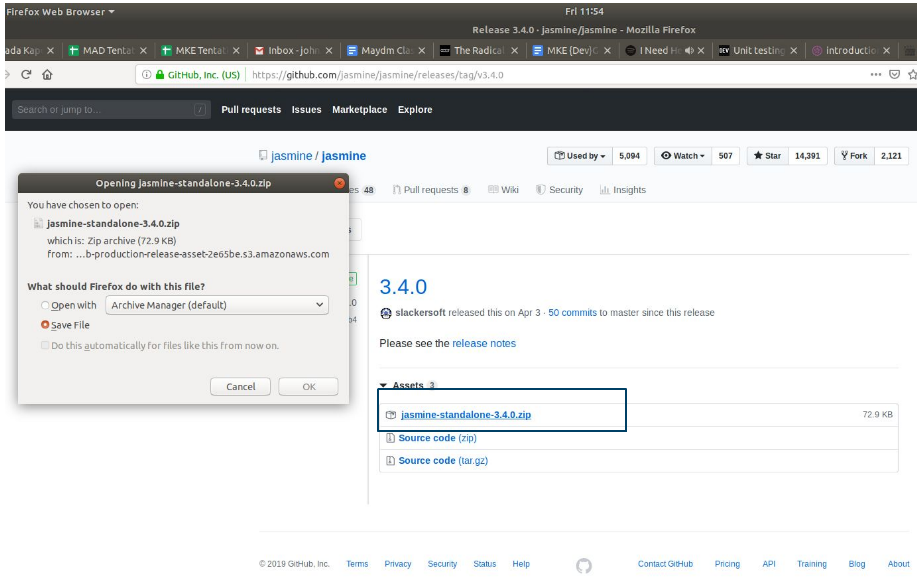
slackersoft released this on Oct 25, 2018 · 90 commits to master since this release

Please see the release notes

Assets 3

Download Jasmine

- Select “jasmine-standalone-#.#.#.zip and Save



Opening jasmine-standalone-3.4.0.zip

You have chosen to open:

jasmine-standalone-3.4.0.zip

which is: Zip archive (72.9 KB)
from: …b-production-release-asset-2e65be.s3.amazonaws.com

What should Firefox do with this file?

Open with Archive Manager (default)

[✓ Save File]

Do this automatically for files like this from now on.

3.4.0

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Building with Jasmine

- The next step would be to extract or move the contents of the Zip into your development folder.
- However, in this case, go to the program's repository and find the "Testing" directory. Clone the "calculator" directory into your Documents folder on your local drive.
- For the rest of this module, work through the TutorialsPoint Jasmine Tutorial at https://www.tutorialspoint.com/jasminejs/jasminejs_building_blocks_of_test.htm
- Find this link in the testing directory in the classes' repository.

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Reflection

- You learned how to test programs using BDD today.

Why do developers use testing frameworks?

What are advantages of employing TDD? When could testing be a disadvantage?

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