

Write Good Tests with Mocha

before() Hooks

In a test file, the function `before()` will be executed first, regardless of its placement in the code block. `before()` is often used to set up code, like variables and values, for other function calls to use in their execution.

```
before(() => {  
  path = './message.txt';  
});
```

beforeEach() Hooks

In a test file, the function `beforeEach()` will be executed before each test. `beforeEach()` is often used to set up or reset code, like variables and values, for other function calls to use in their execution.

```
beforeEach(() => {  
  testCounter++;  
});
```

after() Hooks

In a test file, the function `after()` will be executed last, regardless of its placement in the code block. `after()` is often used to print out results from the tests that were run in the suite or to reset variables and values.

```
after(() => {  
  console.log("number of tests: " + testCounter);  
});
```

afterEach() Hooks

In a test file, the function `afterEach()` will be executed after each test. `afterEach()` is often used to print out results from a particular test that was run in the suite or to reset variables and values.

```
afterEach(() => {  
  path = './message.txt';  
});
```

Test Frameworks

Test frameworks are used to organize and automate tests that provide useful feedback when errors occur.

describe() functions

In Mocha, the `describe()` function is used to group tests. It accepts a string to describe the group of tests and a callback function which contains `it()` tests. Calls to `describe()` are commonly nested to resemble the structure of the code being tested.

```
describe('group of tests', () => {  
  //Write it functions here  
  
});
```

it() functions

In Mocha, the `it()` function is used to execute individual tests. It accepts a string to describe the test and a callback function to execute assertions. Calls to `it()` are commonly nested within `describe()` blocks.

```
describe('+', () => {  
  it('returns the sum of its arguments', () => {  
    // Write assertions here  
  
  });  
});
```

The assert Library

The `assert` library is used to make assertions. It contains numerous functions that enable the tester to write easily readable assertions and throw `AssertionError`s within a test.

```
describe('+', () => {  
  it('returns the sum of its arguments', () => {  
    // Write assertion here  
    assert.ok(3 + 4 === 7)  
  
  });  
});
```

assert.ok()

The `assert.ok()` function is be used to evaluate a boolean expression within a test. If the expression evaluates to `false`, an `AssertionError` is thrown.

Setup Phase

In testing, the Setup phase is where objects, variables, and set conditions that tests depend on are created.

Exercise Phase

In testing, the Exercise phase is where the functionality under test is executed.

```
describe('+', () => {  
  it('returns the sum of its arguments', () => {  
    // Write assertion here  
    assert.ok(3 + 4 === 7)  
  });  
});
```

```
describe('.pop', () => {  
  it('returns the last element in the array [3phase]', ()  
=> {  
    // Setup  
    const knightString = 'knight';  
    const jediPath = ['padawan', knightString];  
    // Exercise  
    const popped = jediPath.pop();  
    // Verify  
    assert.ok(popped === knightString);  
  });  
});
```

```
describe('.pop', () => {  
  it('returns the last element in the array [3phase]', ()  
=> {  
    // Setup  
    const knightString = 'knight';
```

```
const jediPath = ['padawan', knightString];
// Exercise
const popped = jediPath.pop();
// Verify
assert.ok(popped === knightString);
});
});
```

Verify Phase

In testing, the Verify phase is where expectations are checked against the result of the exercise phase. `assert` would be used here.

```
describe('.pop', () => {
  it('returns the last element in the array [3phase]', ()
=> {
    // Setup
    const knightString = 'knight';
    const jediPath = ['padawan', knightString];
    // Exercise
    const popped = jediPath.pop();
    // Verify
    assert.ok(popped === knightString);
  });
});
```

Teardown Phase

In testing, the Teardown phase is where the environment is reset before the next test runs. The teardown phase ensures that a test is isolated from other tests.

```
it('creates a new file with a string of text', () => {
  // Setup
  path = './message.txt';
  str = '';

  // Exercise: write to file
  fs.appendFileSync(path, str);
```

```
// Verify: compare file contents to string
const contents = fs.readFileSync(path);
assert.equal(contents.toString(), str);

// Teardown: restore file
fs.unlinkSync(path);
});
```

Tests in Isolation

A project's tests should run in isolation from one another. One test shouldn't affect another. Tests should be able to run in any order.

assert.equal()

`assert.equal()` verifies a loose equality (`==`) comparison. Using `assert.equal()` is more expressive, it's more clear that it's verifying equality than `assert.ok()`.

```
const landAnimals = ['giraffe', 'squirrel'];
const waterAnimals = ['shark', 'stingray'];

landAnimals.push('frog');
waterAnimals.push('frog');

assert.equal(landAnimals[2], waterAnimals[2]);
```

assert.strictEqual()

`assert.strictEqual()` verifies a strict equality (`===`) comparison.

```
const a = 3;
const b = '3';
assert.equal(a, b);
assert.strictEqual(a, b);
```

assert.deepEqual()

assert.deepEqual() compares values within two objects. It will compare the values using loose (==) equality.

```
const a = {relation: 'twin', age: '17'};  
const b = {relation: 'twin', age: '17'};  
  
assert.deepEqual(a, b);
```

Why Test?

Testing can catch and identify issues with your implementation code before you deploy it to users

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