ASYNC TESTING

Wait for it…

BY THE END OF THIS LECTURE...

- What is the issue presented by asynchronicity in tests?
- What are two ways to handle async in tests?

A SYNCHRONOUS TEST

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  it('works on integers', function() {
    expect(add(1, 2)).to.equal(3);
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If `add(1, 2)` **does not output 3, the** `expect` **statement throws an error and the test fails.**

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How does this work again? 🤔

If `add(1, 2)` does not output 3, the `expect` statement throws an error and the test fails.

If we reach the end of the function without throwing an error, the test passes.

ASYNCHRONOUS TEST?

```
describe('fs.readFile', function() {
  it('reads file contents', function() {
    fs.readFile('file1.txt', function(err, data) {
      if (err) throw err;
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What's wrong with this? 🤔

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If we reach the end of this function without throwing, the test passes.

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If we reach the end of this function without throwing, the test passes…

… but this function with the assertion *never even runs* before that function completes!

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describe('fs.readFile', function() {
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```

This spec will *always pass!* 🎉

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ASYNCHRONOUS TEST?

How do I tell Mocha that this test isn't "done" at this point

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ASYNCHRONOUS TEST?

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but instead, at…

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describe('fs.readFile', function() {
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      if (err) throw err;
      expect(data.toString()).to.equal('Hello!');
    });
  });
});
```

… this point…

… or this point?

APPROACH 1: THE "DONE" CALLBACK

ASYNCHRONOUS TEST

```
describe('fs.readFile', function() {
  it('reads file contents', function(done) {
    fs.readFile('file1.txt', function(err, data) {
      if (err) done(err);
      expect(data.toString()).to.equal('Hello');
      done();
    });
  });
});
```

Any block that needs to do async stuff may be defined with a done **callback.**

ASYNCHRONOUS TEST

```
describe('fs.readFile', function() {
  it('reads file contents', function(done) {
    fs.readFile('file1.txt', function(err, data) {
      if (err) done(err);
      expect(data.toString()).to.equal('Hello');
      done();
    });
  });
});
```

Any block that needs to do async stuff may be defined with a done **callback.**

In this case, Mocha will not consider the spec complete until you invoke done

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    fs.readFile('file1.txt', function(err, data) {
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});
```

Invoking done **with an argument signifies to Mocha that something went wrong (like** next **in Express)**

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      done();
    });
  });
});
```

Invoking done **with an argument signifies to Mocha that something went wrong (like** next **in Express)**

Otherwise, the test is done **once expectations are made.**

APPROACH 2: RETURN YOUR PROMISES

RETURN A PROMISE

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- **Manually managing all the places to call** done **is a bit cumbersome**
- **Fear not! Mocha supports promises!**
- **If you return a promise in an it (or before/after/etc.) block, Mocha will know to wait for async operations to complete**

RETURN A PROMISE

```
describe('promisifiedReadFile', function() {
  it('reads file contents', function() {
    return readFileAsync('file1.txt')
    .then(data => {
      expect(data.toString()).to.equal('Hello!');
    });
  });
});
```

RETURN A PROMISE

```
describe('promisifiedReadFile', function() {
  it('reads file contents', async function() {
    const data = await readFileAsync('file1.txt')
    expect(data.toString()).to.equal('Hello!');
  });
});
```

RETURN A PROMISE

```
describe('promisifiedReadFile', function() {
  it('reads file contents', async function() {
    const data = await readFileAsync('file1.txt')
    expect(data.toString()).to.equal('Hello!');
  });
});
```

⚠️🚨 *Notice that there is no try…catch block!* 🚨⚠️

RETURN A PROMISE

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describe('promisifiedReadFile', function() {
  it('reads file contents', async function() {
    const data = await readFileAsync('file1.txt')
    expect(data.toString()).to.equal('Hello!');
  });
});
```

⚠️🚨 *Notice that there is no try…catch block!* 🚨⚠️

If expect throws, catch would capture - and mostly likely resolve - that error. This is *not* what we want. Leave it, mocha will handle it!

RECAP

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- **What is the issue presented by asynchronicity in tests?**
  - Async callbacks will not execute until after the functions in the it blocks complete execution. The spec will have already “passed” by the time we reach expectations inside an async callback.

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- **What is the issue presented by asynchronicity in tests?**
  - Async callbacks will not execute until after the functions in the it blocks complete execution. The spec will have already “passed” by the time we reach expectations inside an async callback.
- **What are two ways to handle async in tests?**
  - The done callback (must call done when appropriate)
  - Returning your promise (less trouble)
  - Never both (mocha will be confused!)