Testing in Future Space

Why you needn't Await for the Future[ScalaTest]

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Northeast Scala Symposium
March 4, 2016

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// Java's original Servlet API encouraged blocking
protected void doGet(HttpServletRequest req, HttpServletResponse resp);
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// Can block in Play if you don't care about what others think
def index = Action { request =>
  val futureInt = Future { intensiveComputation() }
  val result = Await.result(futureInt, 30 seconds) // blocks
   Ok("Got result: " + result)
}
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  val result = Await.result(futureInt, 30 seconds) // blocks
   Ok("Got result: " + result)
}


// Can return a future response to Play
def index = Action.async {
  val futureInt = Future { intensiveComputation() }
  futureInt.map(i => Ok("Got result: " + i))
}
```

```
// Good use case for blocking on futures is testing
test("This test blocks") {
  val futureInt = Future { intensiveComputation() }
  val result = Await.result(futureInt, 30 seconds) // blocks
   result should be (42)
}
```

Three Rules of Reactive Programming

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// framework, why can't we return a future assertion to
// a test framework?
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}
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Meet
Scala.js

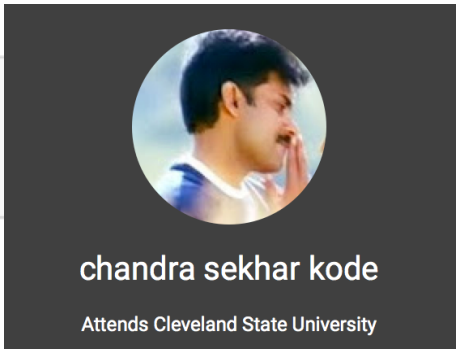
One Simple Fact of JavaScript

1. You can’t block!

chandu0101 on Jun 25 test

1 contributor

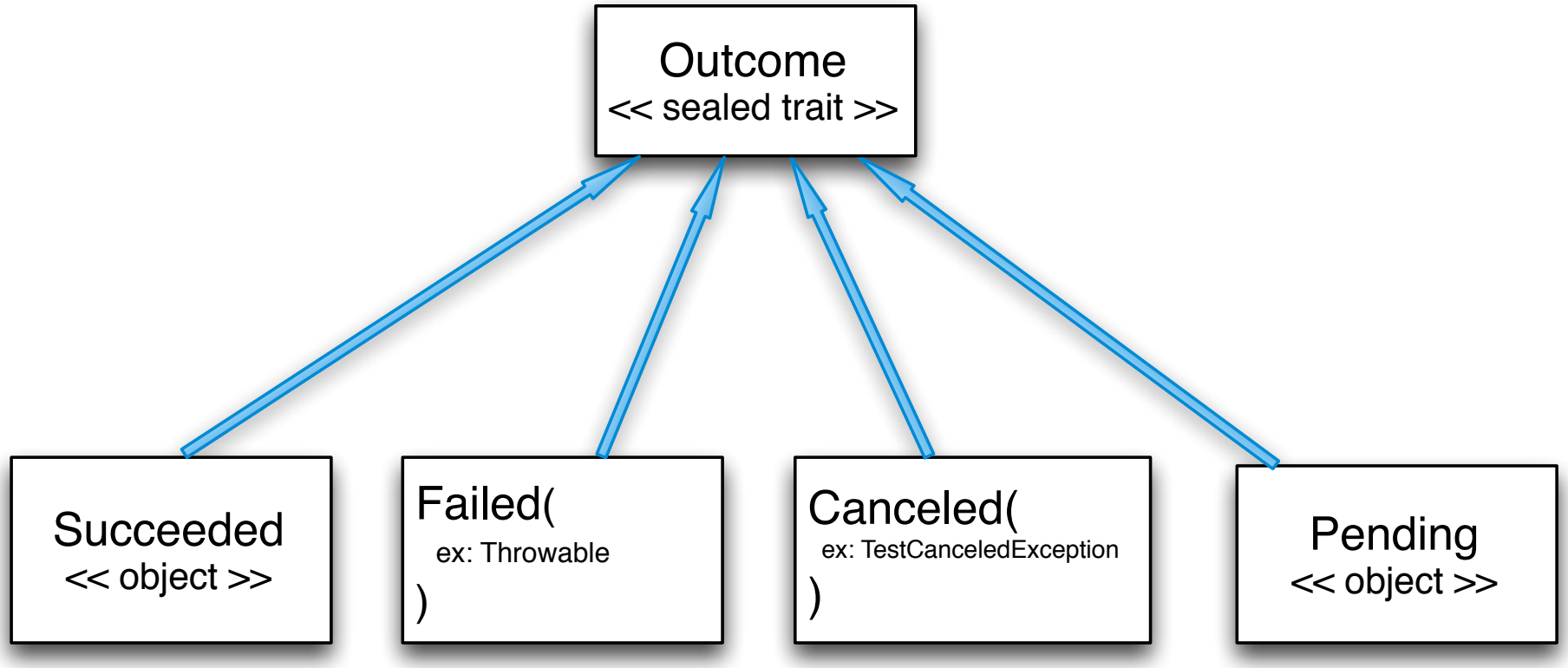
ScalaTest 3.0.0-M3

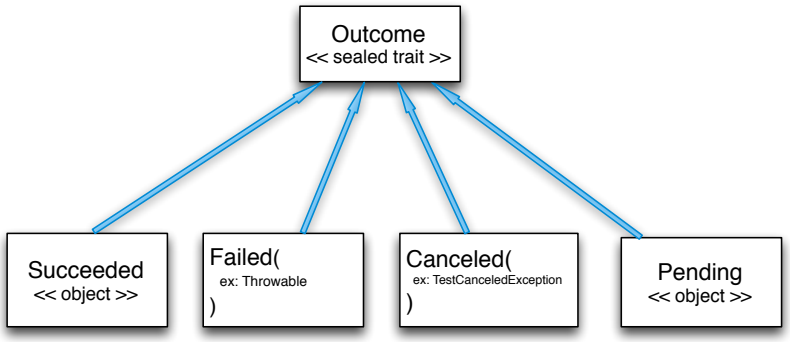


17 lines (10 sloc) | 354 Bytes

```
1  import org.scalatest.FunSuite
2  import org.scalatest.concurrent.ScalaFutures
3  import scala.concurrent.Future
4  import scala.scalajs.concurrent.JSExecutionContext.Implicits.runNow
5
6
7  class SampleServiceTest extends FunSuite with ScalaFutures {
8
9    test("getData") {
10
11     val x = SampleService.getData("")
12
13     assert(x.futureValue.contains("total_rows"))
14   }
15
16 }
```

ScalaTest 2.x

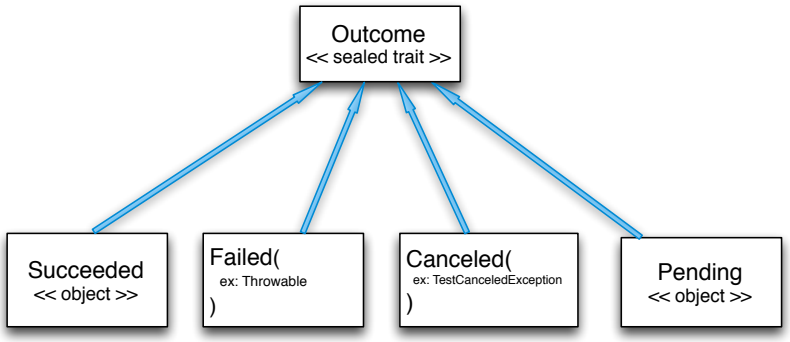




ScalaTest 2.x

```
// Currently in org.scalatest.Suite:
def withFixture(test: () => Outcome): Outcome = {
  test()
}

// Users can override in their own suites:
override def withFixture(test: () => Outcome): Outcome = {
  // Setup fixture
  try test()
  finally { /* cleanup fixture */ }
}
```



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def withFixture(test: () => Outcome): Outcome = {
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}

// Users can override in their own suites:
override def withFixture(test: () => Outcome): Outcome = {
  // Setup fixture
  try super.withFixture(test)
  finally { /* cleanup fixture */ }
}
```
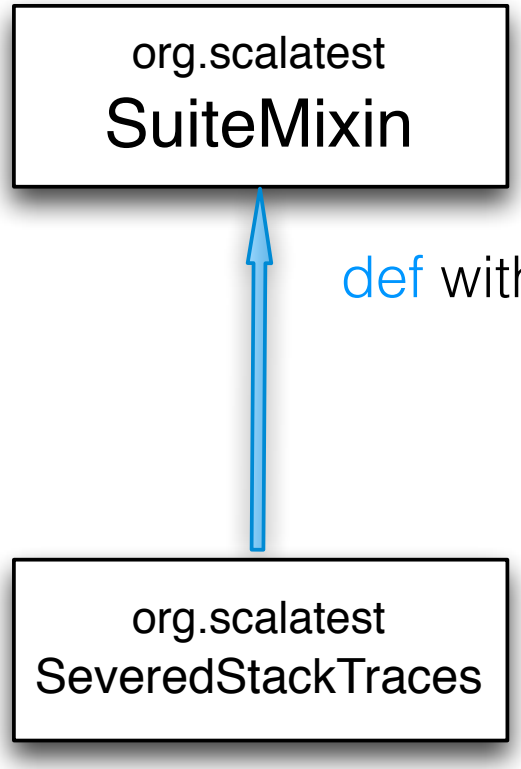



ScalaTest 2.x

```
def withFixture(test: () => Outcome): Outcome
```

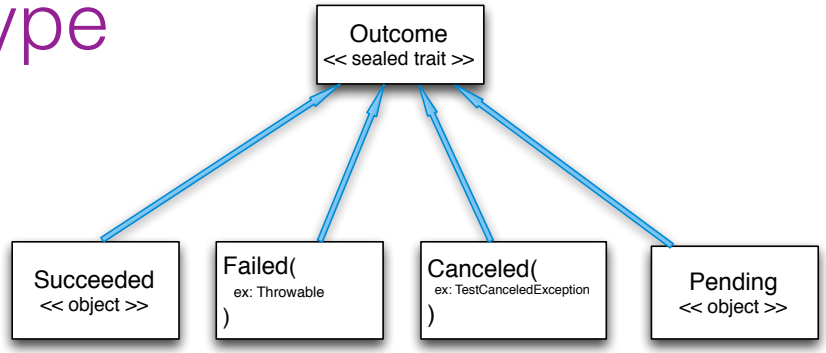
```
// Users can make SuiteMixin traits that override withFixture:
trait SeveredStackTraces extends SuiteMixin { this: Suite =>

 abstract override def withFixture(test: NoArgTest): Outcome = {
    super.withFixture(test) match {
      case Exceptional(e: StackDepth) => Exceptional(e.severedAtStackDepth)
      case o => o
    }
  }
}
```

ScalaTest 2.x Summary

- Users can define withFixture methods.
- can compose withFixture(() => Outcome) methods by stacking traits.
- *According to the types, the test has already completed once the test function returns.*

ScalaTest 3.0.x

```
type Assertion = Succeeded.type
```



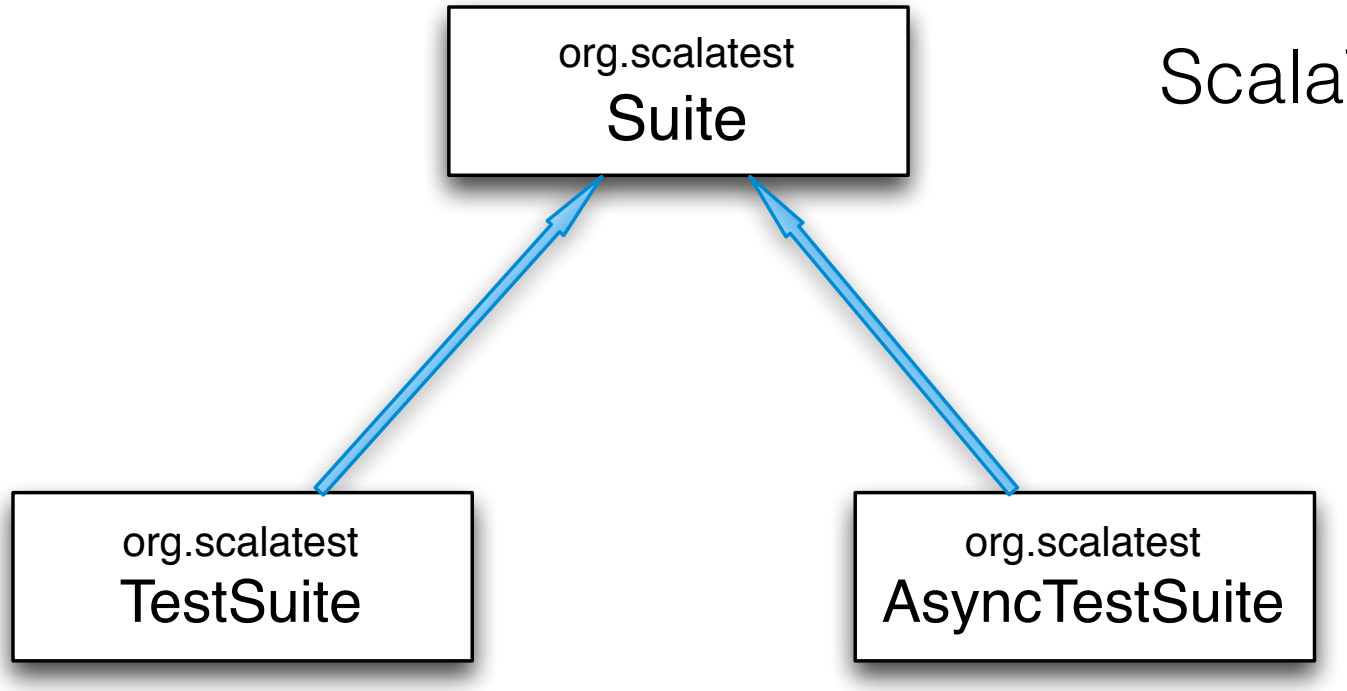

```
scala> val x = 1
x: Int = 1

scala> assert(x == 1)
res3: org.scalatest.Assertion = Succeeded

scala> assert(x == 2)
org.scalatest.exceptions.TestFailedException: 1 did not equal 2
  …

scala> x should equal (1)
res5: org.scalatest.Assertion = Succeeded

scala> x should equal (2)
org.scalatest.exceptions.TestFailedException: 1 did not equal 2
  …
```

```
class SampleServiceSuite extends AsyncFunSuite {

  test("getData") {

    val future = SeedService.getData("")

    future map { sd => assert(sd.contains(“total_rows")) }
  }
}

// Note: Result type of test is Future[Assertion],
// though we also provide an implicit conversion from
// Assertion to Future[Assertion]
```

```
def withFixture(test: () => Outcome): Outcome = {
  test()
}
```

This won't work for async styles, because:

- *According to the types, the test has already completed once the test function returns.*



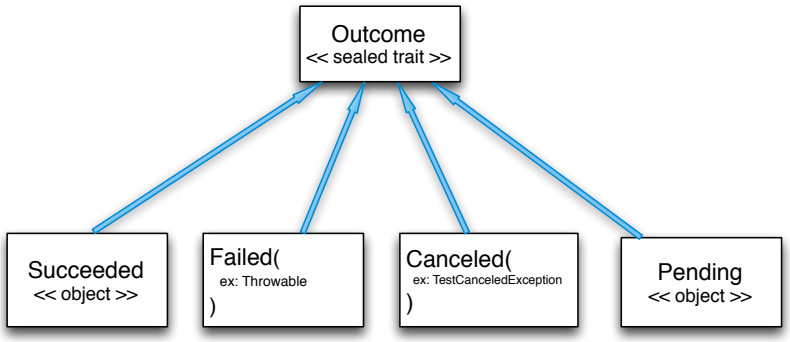
ScalaTest 3.0.x

```
// Now in org.scalatest.TestSuite:
def withFixture(test: () => Outcome): Outcome = {
  test()
}
```

```
// In org.scalatest.AsyncTestSuite:
def withFixture(test: () => FutureOutcome): FutureOutcome = {
  test()
}
```

ScalaTest 3.0.x

```
// SuiteMixin traits that overrode withFixture will need to be changed:
trait SeveredStackTraces extends TestSuiteMixin { this: TestSuite =>

 abstract override def withFixture(test: NoArgTest): Outcome = {
    super.withFixture(test) match {
      case Exceptional(e: StackDepth) => Exceptional(e.severedAtStackDepth)
      case o => o
    }
  }
}
```



ScalaTest 3.0.x

```
// In org.scalatest.AsyncTestSuite:
def withFixture(test: () => FutureOutcome): FutureOutcome = {
  test()
}
```

```
// Users can override in their own async suites:
override def withFixture(test: () => FutureOutcome): FutureOutcome = {
  // Setup fixture
  complete {
    super.withFixture(test)
  } lastly {
   // cleanup fixture
  }
}
```

Added assertThrows in 3.0

```
// Has result type StringIndexOutOfBoundsException
intercept[StringIndexOutOfBoundsException] {
  "hi".charAt(3)
}

// Has result type Assertion
assertThrows[StringIndexOutOfBoundsException] {
  "hi".charAt(3)
}
```

```
// Wouldn't work
future map { sd => assertThrows[Exception] { … } }

// Wouldn't work
assertThrows[Exception] {
  future
}
```

Added recoverTo methods in AsyncSuite in 3.0.x

```
// Has result type Future[IllegalStateException]
recoverToExceptionIf[IllegalStateException] {
  emptyStackActor ? Peek
}

// Has result type Future[Assertion]
recoverToSucceededIf[IllegalStateException] {
  emptyStackActor ? Peek
}
```

Lots more to the story

- Tests execute one after another
- Default SerialExecutionContext
- We tried to make async consistent with sync
- Before & After work
- ParallelTestExecution works, even on Scala.js!
- Plan to release 3.0 final for ScalaDays NYC

ScalaTest Stickers!