

What Mr. Spock would possibly say about modern unit testing: pragmatic and emotional overview

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About me

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fond of Java, complete code, big data, data science, Groovy

About Spock

Spock

From Wikipedia, the free encyclopedia

This article is about the *Star Trek* character. For the pediatrician, see *Benjamin Spock*. For other uses, see *Spock (disambiguation)*.

Spock, commonly **Mr. Spock** (sometimes popularly referred to as: **Spock, son of Sarek**), is a fictional character in the *Star Trek* media franchise. Spock was first portrayed by Leonard Nimoy in the original *Star Trek* series, and also appears in the animated *Star Trek* series, a two-part episode of *Star Trek: The Next Generation*, eight of the *Star Trek* feature films, and numerous *Star Trek* novels, comics, and video games.^{[1][2]} In addition to this, numerous actors portrayed the various stages of Spock's rapid growth, due to the effects of the Genesis Planet, in the 1984 *Star Trek* film *Star Trek III: The Search for Spock*. In the 2009 film *Star Trek*, Nimoy reprised his role with *Zachary Quinto*, who depicted a younger version of the character, existing within an alternate timeline. Both reprised their roles in the 2013 sequel *Star Trek Into Darkness* and Quinto will reprise his role again in 2016 *Star Trek Beyond*.^[3]

Spock serves aboard the starship *Enterprise*, as science officer and *first officer*, and later as commanding officer of two iterations of the vessel. Spock's mixed *human-Vulcan* heritage serves as an important plot element in many of the character's appearances. Along with Captain James T. Kirk and Dr. Leonard "Bones" McCoy, he is one of the three central characters in the original *Star Trek* series and its films. After retiring from Starfleet, Spock serves as a Federation ambassador, contributing toward the easing of the strained relationship between the Federation and the *Klingon Empire*. In his later years, he serves as Federation ambassador to the *Romulan Star Empire* and becomes involved in the ill-fated attempt to save Romulus from a supernova.^[3]

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Spock



Leonard Nimoy as Spock (left) beside William Shatner as James T. Kirk

Species Half-Vulcan (paternal)
Half-Human (maternal)

Affiliation Starfleet
Vulcan Government

Posting USS *Enterprise*
Second officer/Science officer
Executive officer/Science officer
commanding officer
USS *Enterprise*-A
Executive officer/Science officer
Federation Ambassador-at-Large

Rank Lieutenant commander
Commander

disclaimer



“May the Force
be With You”

-Dr Who

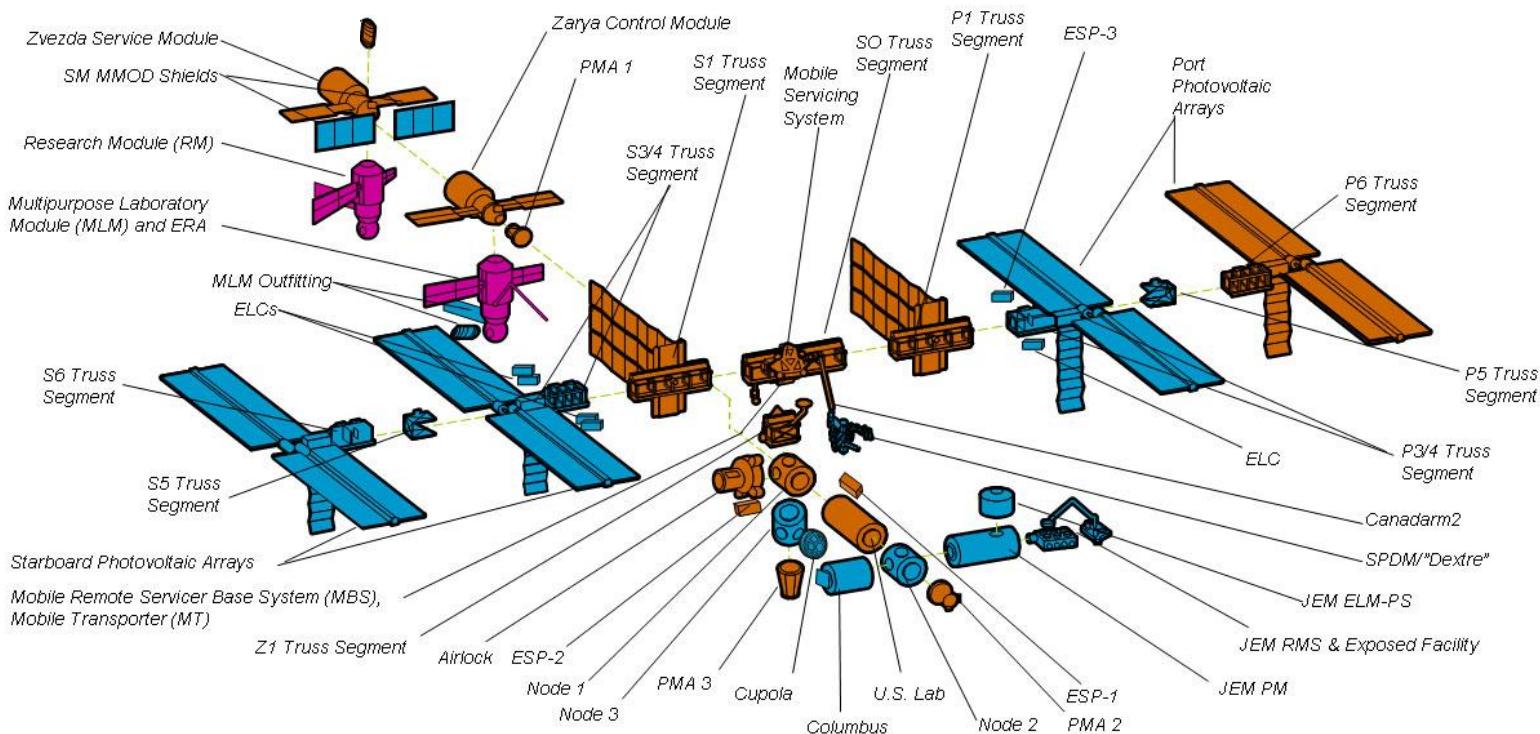
A close-up shot of the character Spock from the Star Trek franchise. He has his signature dark brown hair in a flat-top style and is wearing a light blue Starfleet uniform. His expression is one of intense anger or frustration, with his eyebrows raised and mouth open as if shouting. The background is a blurred interior of a ship.

What's the problem?



Better to test before going to production

Firstly, to unit-test



So what?



JUnit?



JUnit on steroids?



TestNG?

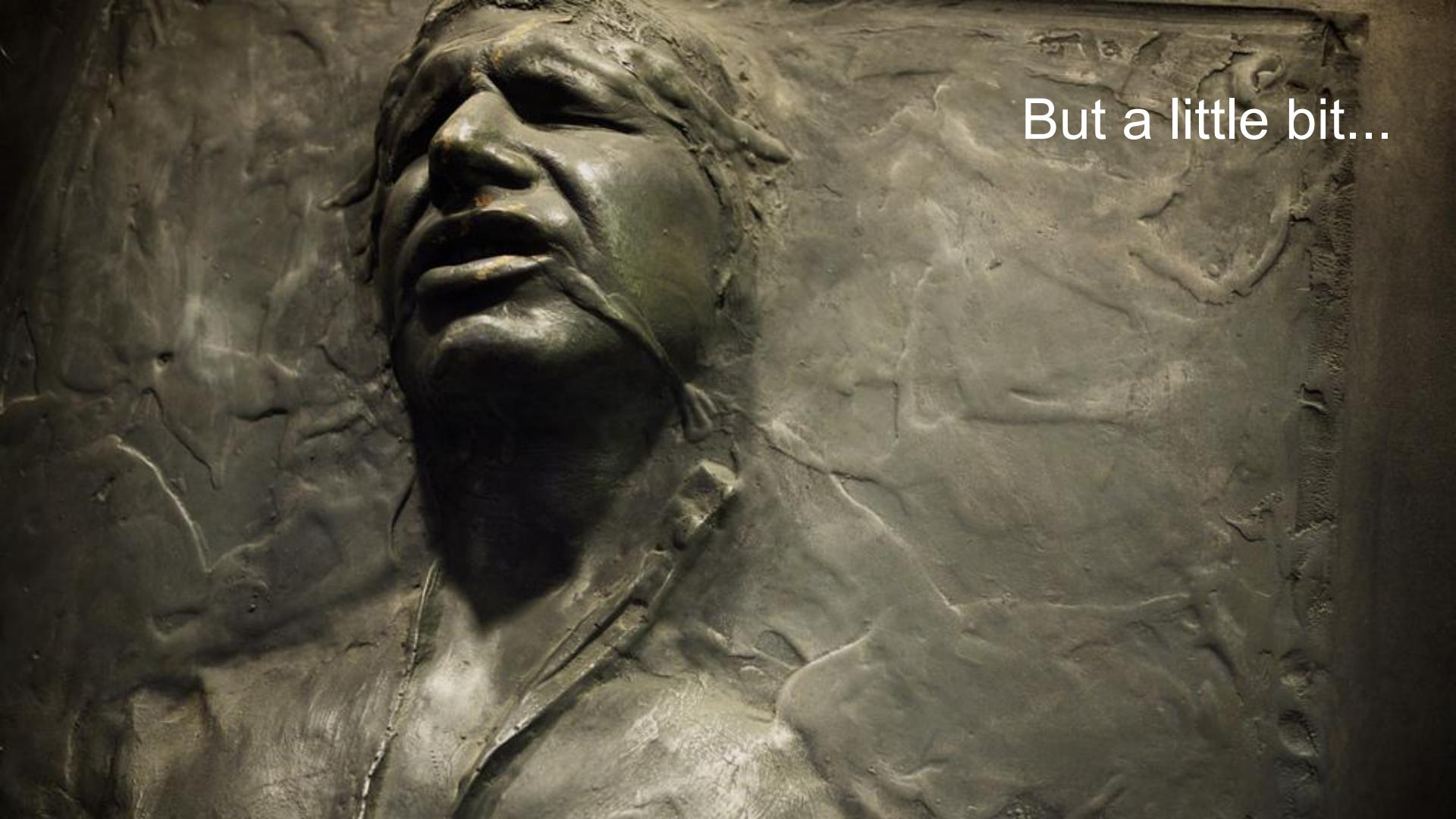


Nothing?



Well, JUnit is great

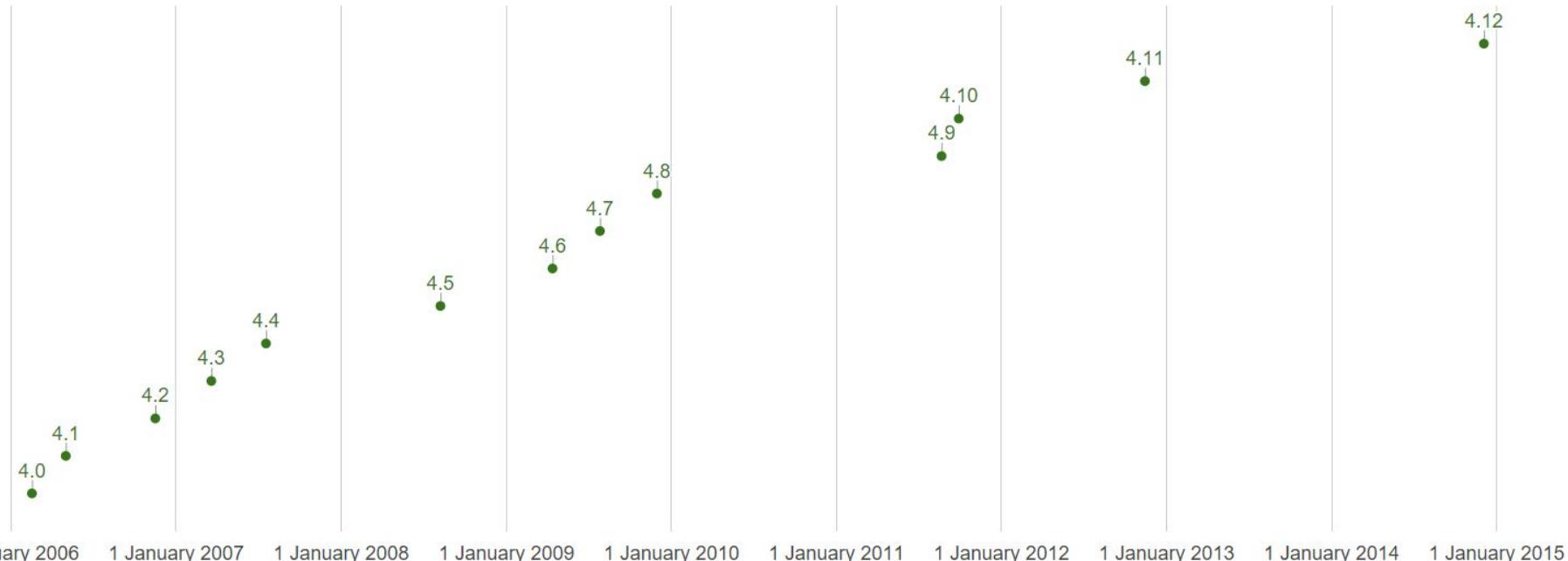




But a little bit...

...stable?

JUnit 4 versions release date



So why don't try Spock?



Why Groovy?

Groovy is the Java re-imagined

Have you ever think how Java 2.0 should look like?

Groovy has lots of features you even don't think about, but after first taste you won't be able to imagine development without them

Groovy is fully compatible with Java

Groovy has beautiful and highly expressive DSLs

Spock Why Groovy?

Spock JUnit
Groovy is the Java re-imagined

JUnit 5.0
Have you ever think how Java 2.0 should look like?

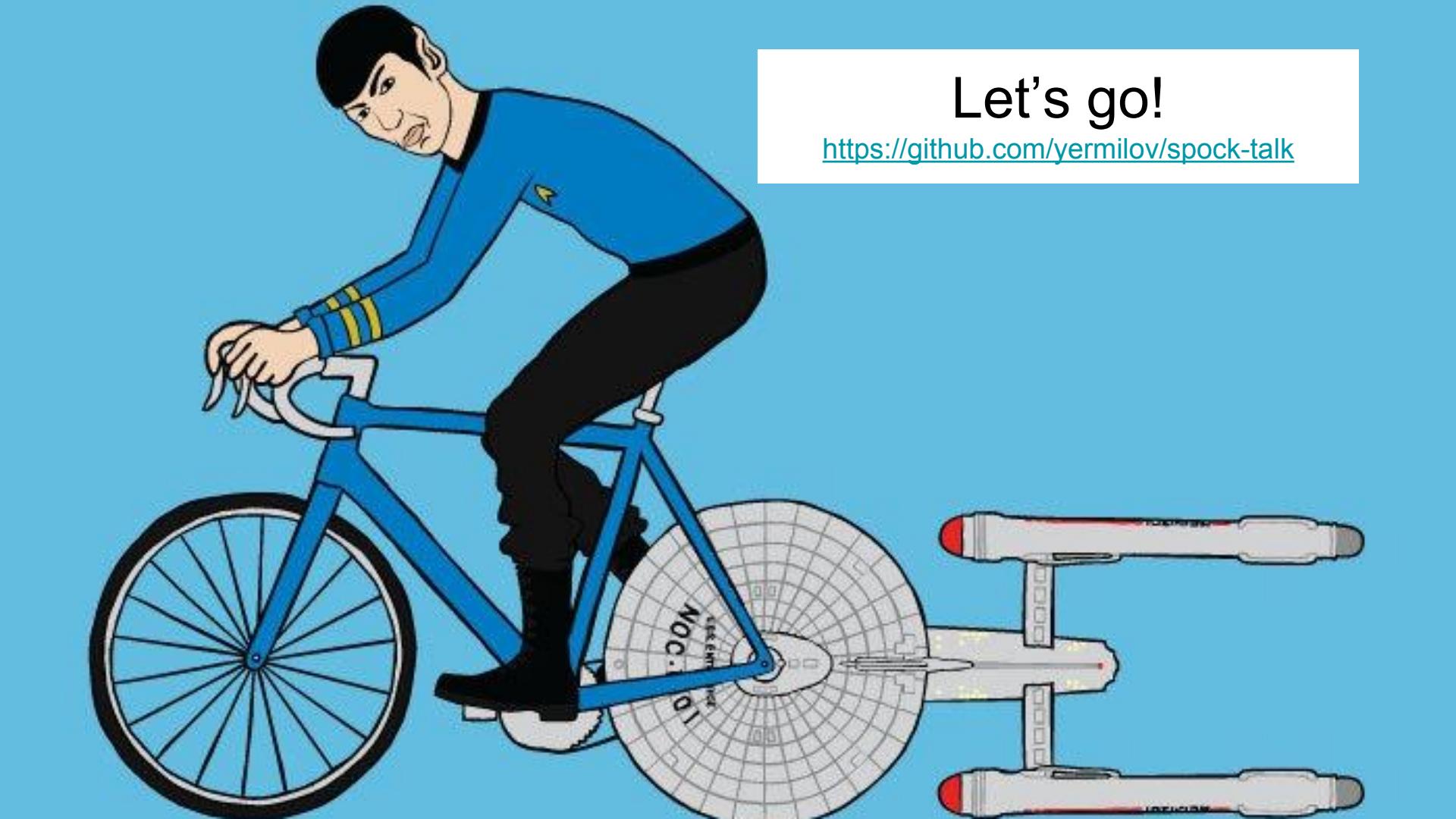
Spock
Groovy has lots of features you even don't think about, but after first taste you won't be able to imagine development without them

unit-testing
Spock
Groovy is fully compatible with Java

Spock
Groovy has beautiful and highly expressive DSLs

Spock is Enterprise ready





Let's go!

<https://github.com/yermilov/spock-talk>



Episode I: Every journey starts somewhere

Episode I: Every journey starts somewhere

```
@Test  
public void arrayList_length_ind() {  
    ArrayList<String> list = new ArrayList<>();  
    list.add("we");  
    list.add("all");  
    list.add("love");  
    list.add("junit");  
    assertEquals(list.size(), 4);  
}
```

Episode I: Every journey starts somewhere

```
@Test  
public void arrayList_length()  
    // setup  
    ArrayList<String> list = new ArrayList<String>();  
  
    // test  
    import org.junit.Test;  
    import static org.junit.Assert.assertThat;  
    import static org.junit.Assert.assertEquals;  
    import static org.junit.Assert.assertThat;  
  
    assertThat(list, hasSize(4));
```

Episode I: Every journey starts somewhere?

```
@Test  
public void arrayList_length  
    // setup  
    ArrayList<String> list = new ArrayList<String>();  
    list.add("one");  
    list.add("two");  
    list.add("three");  
    list.add("four");  
  
    // run  
    int size = list.size();  
  
    // verify  
    assertEquals(list.size(), 4);  
}
```

Episode I: Every journey starts somewhere

```
@Test  
public void arrayList_1()  
{  
    // setup  
    ArrayList<String> list = new ArrayList<String>();  
    list.add("one");  
    list.add("two");  
    list.add("three");  
    list.add("four");  
  
    // verify  
    assertEquals(4, list.size());  
}
```

Every journey starts somewhere

```
class N04S EasyStart extends Specification {  
  
    def 'ArrayList.size() test, but much spockier'() {  
        setup:  
            ArrayList<String> list = new ArrayList<>()  
  
        when:  
            list.add('we')  
            list.add('will')  
            list.add('love')  
            list.add('spock')  
  
        then:  
            list.size() == 4  
    }  
}
```

Episode II: Assertions



Episode II: Assertions

then:

```
assertThat(list, hasSize(3));
```

java.lang.AssertionError:

Expected: a collection with size <3>

but: collection size was <4>

then:

```
list.size() == 3
```

Condition not satisfied:

```
list.size() == 3
```

```
| | |
```

```
| 4 false
```

```
[we, will, love, spock]
```

Episode II: Assertions

then:

```
expect list, hasSize(3)
```

Condition not satisfied:

```
expect list, hasSize(3)
```

```
|       |
```

```
false  [we, will, love, spock]
```

Expected: a collection with size <3>

but: collection size was <4>

```
.
```

Episode II: Assertions

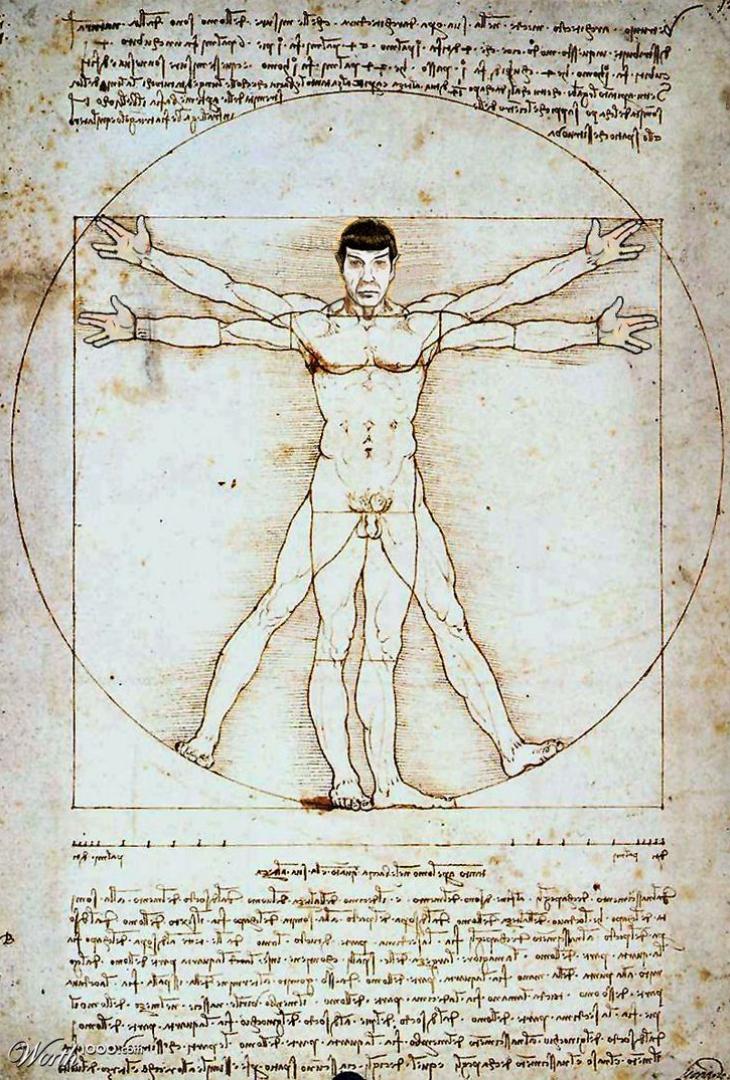
Condition not satisfied:

```
list.findAll({ it.length() < 5 }).groupBy({ it[0] }).find({ k, v -> v.size() > 1 }).value == list.findAll({ it.length() < 5 }).drop(1)
|   |
|   [we, will, love]           |                   |                           |   |   |   |   |
|   [we, will, love, spock]    |       w=[we, will]     [we, will, love]           [will, love]
[we, will, love, spock]      [w:[we, will], l:[love]]  |   |   [we, will, love, spock]
                           |   false
                           [we, will]
```

Episode II: Assertions

```
@Test
void 'ArrayList.size()'() {
    // setup
    ArrayList<String> list =
        assumeThat(list,
            // run
            list +
                // failed
                assert list.findAll({ it.length() < 5 }) == list.drop(2)
                    | [we, will, love]
                    | [we, will, love, spock]
                    | [we, will, love, spock]
                    | [love, will, love, spock]
                    | [love, spock]
                    | false
        );
    list.findAll({ it.length() < 5 }) == list.drop(2)
}
```

Episode III: Idiomatic Spock



Episode III: Idiomatic Spock

```
@Title('ArrayList tests')
@Narrative('''
As Java developer
(that trust nothing)
I want to be sure ArrayList works
''')
class N07S_IdiomaticSpock extends Specification {

    @Subject
    ArrayList<String> list

    @Issue('https://github.com/yermilov/spock-talk/issues/1')
    def 'ArrayList.size()'() {
        setup: 'new ArrayList instance'
        list = new ArrayList<>()

        expect: 'that newly created ArrayList instance is empty'
        list.empty

        when: 'add value to list'
        list.add 'we'

        and: 'add one more value to list'
        list.add 'will'

        then: 'array list size should be 2'
        list.size() == 2
    }
}
```

Episode III: Idiomatic Spock

ArrayList tests
As Java developer
(that trust nothing)
I want to be sure ArrayList works

Features:

- ArrayList.size()

ArrayList.size()

Issues:

- <https://github.com/yermilov/spock-talk/issues/1>

Given: new ArrayList instance

Expect: that newly created ArrayList instance is empty

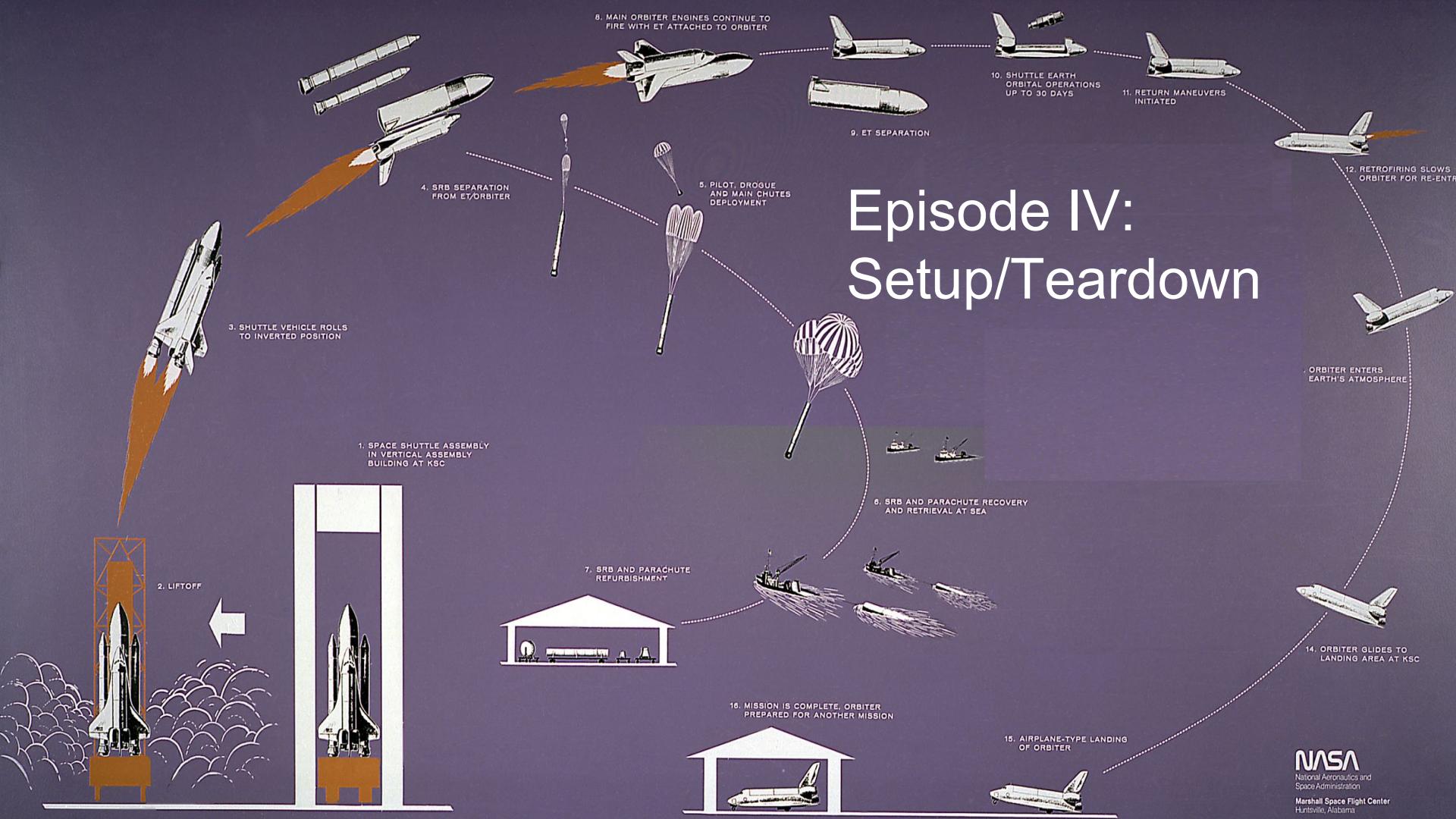
When: add value to list

And: add one more value to list

Then: array list size should be 2

When: add two more values into list

Episode IV: Setup/Teardown



NASA

National Aeronautics and
Space Administration

Marshall Space Flight Center

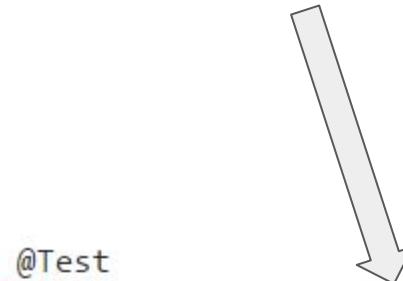
Huntsville, Alabama

Episode IV: Setup/Teardown

```
static Sql sql  
  
@BeforeClass  
public static void createTable()  
    sql = Sql.newInstance("jdbc:h  
    sql.execute("create table tes  
}  
  
@AfterClass  
public static void dropTable() {  
    sql.execute("drop table testing_tool")  
    sql.close()  
}
```



```
@Before  
public void insertBasicData() {  
    sql.execute("insert into testing_tool valu  
}  
  
@After  
public void cleanTable() {  
    sql.execute("delete from testi  
}
```

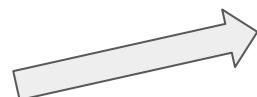


```
@Test  
public void toolCount() {  
    // run  
    def actual = sql.firstRow("select count  
    // verify  
    assertThat(actual.toolCount, is(3L))  
}
```



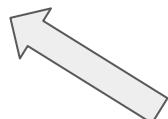
Episode IV: Setup/Teardown

```
static Sql sql  
  
@BeforeClass  
public static void createTable()  
    sql = Sql.newInstance("jdbc:h  
    sql.execute("create table tes  
}  
  
@AfterClass  
public static void dropTable()  
    sql.execute("drop table testing_tool")  
    sql.close()  
}
```



```
@BeforeMethod  
public void insertBasicData() {  
    sql.execute("insert into testing_tool values  
}  
}
```

```
@AfterMethod  
public void cleanTable() {  
    sql.execute("delete from testing  
}  
}
```



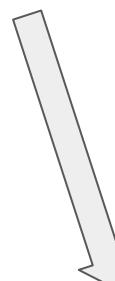
```
@Test  
public void toolCount() {  
    // run  
    def actual = sql.firstRow("select co  
    // verify  
    assertEquals(actual.toolCount, 3L)  
}
```

Episode IV: Setup/Tear down

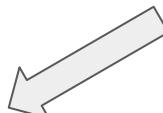
```
static Sql sql  
  
@BeforeAll  
public static void createTable() {  
    sql = Sql.newInstance("jdbc:h2:mem:  
    sql.execute("create table testing  
}  
}
```



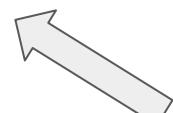
```
@BeforeEach  
public void insertBasicData() {  
    sql.execute("insert into testing_tool values  
}  
}
```



```
@AfterEach  
public void cleanTable() {  
    sql.execute("delete from testing_tool")  
}
```



```
@AfterAll  
public static void dropTable() {  
    sql.execute("drop table testing_tool")  
    sql.close()  
}
```



```
@Test  
public void toolCount() {  
    // run  
    def actual = sql.firstRow("select count(*) as toolCount  
    from testing_tool")  
    // verify  
    assertEquals(3L, actual.toolCount)  
}
```

Episode IV: Setup/Teardown

```
static Sql sql

def setupSpec() {
    sql = Sql.newInstance("jdbc:
    sql.execute("create table te
}

def cleanupSpec() {
    sql.execute("drop table testing_tool")
    sql.close()
}

def setup() {
    sql.execute("insert into testing_tool values
}

def cleanup() {
    sql.execute("delete from tes
}

def 'tool count'() {
    when: 'we count number of unit t
    def actual = sql.firstRow("selec
        then: 'it should be 3'
        actual.toolCount == 3
    }
}
```

```
graph TD; A[setupSpec()] --> B[setup]; C[cleanupSpec()] --> D[cleanup]; E[when: 'we count number of unit t] --> F[actual.toolCount == 3]; G[then: 'it should be 3'] --> D;
```

Episode IV: Setup/Tear down

```
@Shared @AutoCleanup sql

def 'JUnit5 is in game!'() {
    setup: 'add JUnit 5 to the list of unit testing tools'
    sql.execute("insert into testing_tool values (4, 'junit'

    when: 'we count number of JUnits'
    def actual = sql.firstRow("select count(*) as toolCount

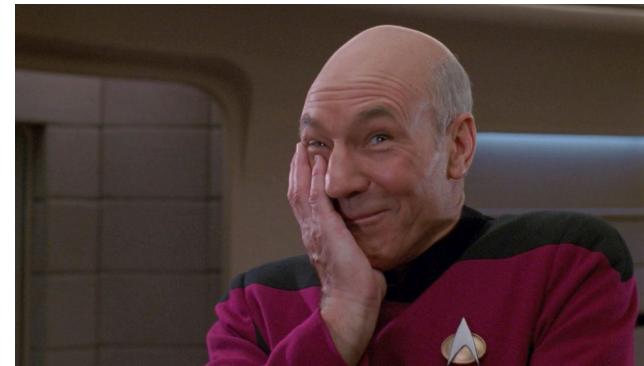
    then: 'it should be 2'
    actual.toolCount == 2

    cleanup: 'remove JUnit 5 from the list of unit testing t
    sql.execute("delete from testing_tool where id = 4")
}
```

Episode IV: Setup/Teardown

```
// run
def actual = sql.firstRow("select count(*) as too

// verify
actual.toolCount == 2
} finally {
    try {
        // cleanup
        sql.execute("delete from testing_tool where i
    } finally {
        sql.close()
    }
}
```



Episode IV: @Shared or static?



A wide-angle shot from the Star Wars prequel trilogy. It depicts a massive hangar bay filled with thousands of Stormtroopers standing in formation. A massive Imperial transport ship, the Venator-class Star Destroyer, is docked in the center. The hangar bay ceiling is dark and metallic, with structural beams and pipes visible. The sky outside shows a sunset or sunrise over a desert-like landscape. The overall atmosphere is one of a massive military operation.

Episode V: Data driven test

Episode V: Data driven test

```
def 'is coin flip good enough for determine if integer is prime'() {  
    when: 'we flip a coin'  
    boolean coinFlip = new Random().nextBoolean()  
  
    then: 'it will be great if coin flip predict if number is prime'  
    coinFlip == Primes.isPrime(number)  
  
    where: 'data is random'  
    number << (1..28).collect({ new Random().nextInt(1000) }).findAll({ it >= 2 }).sort()  
}
```

Episode V: Data driven test

is coin flip good enough for determine if integer is prime

[Return](#)

When: we flip a coin

Then: it will be great if coin flip predict if number is prime

Where: data is random

number	
353	FAIL
361	OK
451	OK
617	OK
706	FAIL

Examples: 3/5 passed

The following problems occurred:

- [353]
 - Condition not satisfied:

```
coinFlip == Primes.isPrime(number)
|           |           |           |
false      false      true       353
```

- [706]
 - Condition not satisfied:

```
coinFlip == Primes.isPrime(number)
```

Episode V: Data driven test

```
@Unroll
def 'calculate runner speed and location after some time for #description'() {
    expect: 'that runner speed is equal to expected'
    initialSpeed + acceleration * time == expectedSpeed

    and: 'runner location is equal to expected'
    initialLocation + time * (initialSpeed + acceleration / 2 * time) == expectedLocation

    where: 'there are set of precalculated data for different situations'
    initialLocation | initialSpeed | acceleration | time || expectedLocation | expectedSpeed || description
    0              | 6            | 0           | 10   || 60          | 6             || 'steady run from starting point'
    5              | 0            | 3           | 3    || 17          | 9             || 'starting from standing with acceleration'
    -50             | 10           | -1          | 10   || 0            | 0             || 'constant deceleration'
}
```

Episode V: Data driven test

calculate runner speed and location after some time for steady run from starting point

[Return](#)

Expect: that runner speed is equal to expected

And: runner location is equal to expected

Where: there are set of precalculated data for different situations

calculate runner speed and location after some time for starting from standing with acceleration

[Return](#)

Expect: that runner speed is equal to expected

And: runner location is equal to expected

Where: there are set of precalculated data for different situations

The following problems occurred:

- Condition not satisfied:

```
initialLocation + time * (initialSpeed + acceleration / 2 * time) == expectedLocation
|           |   |           |   |           |   |           |   |
5           3   0           3   1.5   3   17
             18.5 13.5          4.5      false
```

calculate runner speed and location after some time for constant deceleration

[Return](#)

Expect: that runner speed is equal to expected

And: runner location is equal to expected

Where: there are set of precalculated data for different situations

Episode V: Data driven test

```
@RunWith(Parameterized.class)
public class N16J_DataTables {

    @Parameterized.Parameters(name = "calculate runner speed and location after
    public static Collection<Object[]> data() {
        return Arrays.asList(new Object[][] {
            { 0.0,   6.0,  0.0,  10.0, 60.0, 6.0, "steady run from starting point" },
            { 5.0,   0.0,  3.0,  3.0,  17.0, 9.0, "starting from standing with a
            { -50.0, 10.0, -1.0, 10.0, 0.0,  0.0, "constant deceleration" }
        });
    }

    @Parameterized.Parameter(value = 0)
    public double initialLocation;

    @Parameterized.Parameter(value = 1)
    public double initialSpeed;

    @Parameterized.Parameter(value = 2)
    public double acceleration;
```

Episode V: Data driven test

Test	Duration	Result
location[calculate runner speed and location after some time for constant deceleration]	0s	passed
location[calculate runner speed and location after some time for starting from standing with acceleration]	0s	failed
location[calculate runner speed and location after some time for steady run from starting point]	0s	passed
speed[calculate runner speed and location after some time for constant deceleration]	0s	passed
speed[calculate runner speed and location after some time for starting from standing with acceleration]	0s	passed
speed[calculate runner speed and location after some time for steady run from starting point]	0s	passed

Episode V: Data driven test

```
@DataProvider(name = "data")
public static Object[][] data() {
    return new Object[][] {
        { 0.0, 6.0, 0.0, 10.0, 60.0, 6.0 },
        { 5.0, 0.0, 3.0, 3.0, 17.0, 9.0 },
        { -50.0, 10.0, -1.0, 10.0, 0.0, 0.0 }
    };
}

@Test(dataProvider = "data")
public void speed(double initialLocation, double initialSpeed, double
    double speed = initialSpeed + acceleration * time;
    assertEquals(speed, expectedSpeed);
}
```

Episode V: Data driven test

Test	Duration	Result
location[0](0.0, 6.0, 0.0, 10.0, 60.0, 6.0)	0s	passed
location[1](5.0, 0.0, 3.0, 3.0, 17.0, 9.0)	0.001s	failed
location[2](-50.0, 10.0, -1.0, 10.0, 0.0, 0.0)	0s	passed
speed[0](0.0, 6.0, 0.0, 10.0, 60.0, 6.0)	0s	passed
speed[1](5.0, 0.0, 3.0, 3.0, 17.0, 9.0)	0s	passed
speed[2](-50.0, 10.0, -1.0, 10.0, 0.0, 0.0)	0s	passed

A dramatic scene from Star Trek: Discovery. A large, metallic starship, the U.S.S. Discovery, is shown from a low angle, angled upwards towards the viewer. The ship's hull is covered in a grid pattern and features several circular portholes. On the side of the hull, the letters "DISCOVERY" and "U.S.S." are visible in red. The ship is surrounded by a dense field of small, glowing particles or debris, some of which appear to be burning. In the background, a planet with a blue and white atmosphere is visible, showing clouds and a horizon line. The overall lighting is dramatic, with strong highlights and shadows on the ship's hull.

Episode VI: Exceptions

Episode VI: Exceptions

```
def 'empty ArrayList has no 17th element'() {
    given: 'empty array list'
        def arrayList = new ArrayList<Integer>()

    when: 'we try to retrieve element with index #17'
        arrayList.get(17)

    then: 'exception is thrown with expected message'
        IndexOutOfBoundsException exception = thrown()
        exception.message == 'Index: 17, Size: 0'
}
```

Episode VI: Exceptions

```
def 'large ArrayList has 17th element'() {
    given: 'list of 28 prime numbers'
    def arrayList = new ArrayList<Integer>()
    28.times { arrayList << Primes.nextPrime(arrayList.empty ? 1 : arrayList[-1]) }

    when: 'we try to retrieve element with index #17'
    arrayList.get(17)

    then: 'no exception is thrown'
    notThrown(IndexOutOfBoundsException)
}
```

Episode VI: Exceptions

```
@Test(expected = IndexOutOfBoundsException.class)
public void exception_oldWay() {
    // setup
    ArrayList<Integer> arrayList = new ArrayList<>();
    // run
    arrayList.get(17);
}
```

Episode VI: Exceptions

```
@Test
public void noException_oldWay() {
    // setup
    ArrayList<Integer> arrayList = new ArrayList<>();

    // run
    arrayList.size();

    // verify no exception is thrown
}
```

Episode VI: Exceptions

```
@Test
public void noException_uglyWay() {
    // setup
    ArrayList<Integer> arrayList = new ArrayList<>();

    // run
    try {
        arrayList.size();
    } catch (Exception exception) {
        // verify no exception is thrown
        fail("Expected no exception to be thrown");
    }
}
```

Episode VI: Exceptions

```
@Test
public void exceptionAndMessage_oldWay() {
    // setup
    ArrayList<Integer> arrayList = new ArrayList<>();

    // run
    try {
        arrayList.get(17);
        fail("Expected an IndexOutOfBoundsException to be thrown");
    } catch (IndexOutOfBoundsException exception) {
        // verify
        assertThat(exception.getMessage(), is("Index: 17, Size: 0"));
    }
}
```

Episode VI: Exceptions

```
@Rule  
public ExpectedException thrown = ExpectedException.none();  
  
@Test  
public void exception_modernWay() {  
    // setup  
    ArrayList<Integer> arrayList = new ArrayList<>();  
  
    // expect  
    thrown.expect(IndexOutOfBoundsException.class);  
    thrown.expectMessage(is("Index: 17, Size: 0"));  
  
    // run  
    arrayList.get(17);  
}
```

Episode VI: Exceptions

```
@Test(expectedExceptions = IndexOutOfBoundsException.class, expectedExceptionsMessageRegExp = "Index: 17, Size: 0")
public void exception() {
    // setup
    ArrayList<Integer> arrayList = new ArrayList<>();
    // run
    arrayList.get(17);
}
```

Episode VI: Exceptions

```
@Test
public void exception() {
    // setup
    ArrayList<Integer> arrayList = new ArrayList<>();

    // run & verify
    Throwable thrown = expectThrows(IndexOutOfBoundsException.class, () -> { arrayList.get(17); });
    assertEquals("Index: 17, Size: 0", thrown.getMessage());
}
```

A photograph of three LEGO Star Trek minifigures standing in front of a blurred city skyline. The figure on the left has black hair and wears a blue uniform with a black collar and a 'K' insignia. The figure in the center has blonde hair and wears a yellow uniform with a black collar and a 'K' insignia, holding a grey tricorder device. The figure on the right has dark brown hair and wears a black uniform. All figures have a serious or determined expression.

Episode VII: Mocks, Stubs, Spies

Episode VII: Mocks, Stubs, Spies

```
Random random = Stub()  
random.nextInt(26) >> 0
```

```
Random random = mock(Random.class);  
doReturn(0).when(random).nextInt(26);
```

```
Random random = Stub()  
random.nextInt(_) >>> [ 0, 1, 2, 3, 4 ]
```

```
Random random = mock(Random.class);  
doReturn(0).doReturn(1).doReturn(2).doReturn(3).doReturn(4).when(random).nextInt(26);
```

Episode VII: Mocks, Stubs, Spies

```
Random random = Stub()  
random.nextInt(_) >> { throw new RuntimeException() }
```

```
Random random = mock(Random.class);  
doThrow(new RuntimeException()).when(random).nextInt(26);
```

```
Random random = Stub()  
random.nextInt(_) >> { int max -> max - 1 }
```

```
Random random = mock(Random.class);  
doAnswer(inv -> (int) inv.getArguments()[0] - 1).when(random).nextInt(26);
```

Episode VII: Mocks, Stubs, Spies

```
5 * random.nextInt(_)
```

```
verify(random, times(5)).nextInt(anyInt());
```

```
then: 'first random generator'
```

```
1 * random.nextInt(10)
```

```
then: 'then random generator'
```

```
(8.._) * random.nextInt(_)
```

```
then: 'random generator is ne
```

```
0 * random._
```

```
InOrder inOrder = inOrder(random);
inOrder.verify(random, times(1)).nextInt(10);
inOrder.verify(random, atLeast(8)).nextInt(26);
inOrder.verifyNoMoreInteractions();
```

Episode VII: Mocks, Stubs, Spies

```
1 * passwordGenerator.generate(!null)  
1 * passwordGenerator.generate(_ as Integer)  
1 * passwordGenerator.generate({ it >= 8 && it < 18 })
```

```
ArgumentCaptor<Integer> argument = ArgumentCaptor.forClass(Integer.class);  
verify(passwordGenerator).generate(argument.capture());  
assertThat(argument.getValue(), is(greaterThanOrEqualTo(8)));  
assertThat(argument.getValue(), is(lessThan(18)));
```

Episode VII: Mocks, Stubs, Spies

```
def 'something terrifying'() {
    when: 'mocking goes to far'
    Mock(Random)

    then: '''that guy who ends up maintaining
            your code will be a violent psychopath
            who knows where you live'''
        (_..._) * _.(_) >> _
}
```



Episode VIII: Time travel

Episode VIII: Time travel

```
sql.firstRow("select count(*) as toolCount from testing_tool").toolCount ==  
    old(sql.firstRow("select count(*) as toolCount from testing_tool").toolCount) + 1  
  
// run  
def old = sql.firstRow("select count(*) as toolCount from testing_tool").toolCount  
sql.execute("insert into testing_tool values (4, 'junit', '5')")  
def actual = sql.firstRow("select count(*) as toolCount from testing_tool").toolCount  
  
// verify  
assertThat(actual, is(old + 1))
```

Episode VIII: Time travel

```
@Timeout(value = 2, unit = TimeUnit.SECONDS)
def 'infinite loop'() {
    setup: 'array list'
    def arrayList = new ArrayList<String>()

    expect: 'we will add to it values forever'
    while (true) { arrayList.add('spock forever!') }
}
```

Episode VIII: Time travel

```
@Test(timeout = 2000)
public void infiniteLoop() {
    // setup
    ArrayList<String> arrayList = new ArrayList<>();

    // run
    while (true) { arrayList.add("junit forever!"); }
}
```

Episode VIII: Time travel

```
@Test(timeout = 2000)
public void infiniteLoop() {
    // setup
    ArrayList<String> arrayList = new ArrayList<>();

    // run
    while (true) { arrayList.add("testng forever!"); }
}
```

Episode VIII: Time travel

```
def conditions = new PollingConditions(timeout: 30)

def 'find next prime after 1728 eventually'() {
    setup: 'holder for answer'
    Integer actual = null

    when: 'async start calculating next prime after 1728'
    asyncNextPrime( 1728, { answer -> actual = answer } )

    then: 'eventually answer will be found'
    conditions.eventually {
        assert actual == 1733
    }
}
```

Episode VIII: Time travel

```
def conditions = new PollingConditions(timeout: 30)

def 'find next prime after 2817 within 3 seconds'() {
    setup: 'holder for answer'
    Integer actual = null

    when: 'async start calculating next prime after 1728'
    asyncNextPrime( 2817, { answer -> actual = answer } )

    then: 'within 3 seconds answer will be found'
    conditions.within(3) {
        assert actual == 2819
    }
}
```

Episode VIII: Time travel

```
def conditions = new AsyncConditions()

def 'find next prime after 2817 within 3 seconds'() {
    when: 'async start calculating next prime after 1728'
    asyncNextPrime( 1728, { answer ->
        conditions.evaluate { assert answer == 1733 }
    } )
    then: 'within 3 seconds answer will be found'
    conditions.await(3)
}
```

Episode VIII: Time travel

```
@Test(timeout = 10000)
public void findNextPrimeEventually() throws ExecutionException, InterruptedException {
    // run
    Future<Integer> actual = asyncNextPrime(1728);

    // verify
    while (!actual.isDone()) {
        if (actual.isDone()) {
            assertThat(actual.get(), is(1733));
        }
    }
}
```



Episode IX: Test control

Episode IX: Test control

```
@Ignore('will fix it before commit')
def 'this test is always ignored'() {
    // TODO FIXME test is failing
    expect: 'that 2+2=5'
    2 + 2 == 5
}
```

Episode IX: Test control

```
@IgnoreIf({ os.windows || sys['pretend.os'] == 'windows' })
def 'this test is ignored on Windows'() {
    expect: 'that we are not on Windows'
    !System.properties['os.name'].toString().toLowerCase().contains('windows')
}
```

Episode IX: Test control

```
@Requires({ jvm.java8 && env['JAVA_HOME'] != null })
def 'this test requires JAVA_HOME set and Java 8 installed'() {
    expect: 'that we are on Java 8'
    'java -version'.execute().errorStream.text.contains('java version "1.8.0_73"')
}
```

Episode IX: Test control

```
@IgnoreIf({ new Random().nextBoolean() })
def 'this test is SOMETIMES ignored'() {
    when: 'i hate my job'
    Integer.metaClass.plus = { Integer other ->
        return 5
    }

    then: 'i can make them pay'
    2 + 2 == 5
}
```

Episode IX: Test control

```
@IgnoreRest
def 'this test makes all other test ignored'() {
    expect: 'a miracle'
    2 + 2 == 5
}
```

Episode IX: Test control

```
@Requires({ N40S_ConditionalRuns_Part2.isGoogleSearchAvailable() })
def 'this test runs only if Google Search is available'() {
    setup: 'http connection service'
    def http = new HTTPBuilder('https://google.com')

    when: 'we search for the best java unit testing framework'
    def response = http.get(path : '/search', query : [q:'best java unit testing framework'])

    then: 'answer mentions spock'
    response.toString().toLowerCase().contains 'spock'
}
```

Episode IX: Test control

```
@Ignore("will fix it before commit")
@Test
public void alwaysIgnored() {
    // TODO FIXME test is failing
    assertThat(2+2, is(5));
}

@Test
public void ignoredOnWindows() {
    assumeThat(System.getProperty("os.name").toLowerCase(), is(not(containsString("windows"))));
```

Episode IX: Test control

```
@Test(enabled = false)
public void alwaysIgnored() {
    // TODO FIXME test is failing
    assertEquals(2+2, 5);
}
```

Episode IX: Test control

```
@Disabled("will fix it before commit")
@Test
public void alwaysIgnored() {
    // TODO FIXME test is failing
    assertEquals(5, 2+2);
}

@Test
public void ignoredOnWindows() {
    assumeTrue(System.getProperty("os.name").toLowerCase().contains("windows"));
    // ...
}
```



Episode X: Encore

Episode X: Encore

```
@Stepwise
class N41S_SystemProperties extends Specification {

    @RestoreSystemProperties
    def 'set spock version'() {
        expect: 'that spock.version is not set'
        System.getProperty('spock.version') == null

        when: 'spock version is set'
        System.setProperty('spock.version', '1.0')

        then: 'we can retrieve its value back'
        System.getProperty('spock.version') == '1.0'
    }

    def 'check spock version is not set'() {
        expect: 'that spock.version is not set'
        System.getProperty('spock.version') == null
    }
}
```



What's next?

<http://spockframework.github.io/spock/docs/1.0/index.html>

<http://meetspock.appspot.com/>

<https://github.com/spockframework>

Just use it in your projects and enjoy!

A portrait of Mr. Spock from Star Trek, wearing his iconic blue Starfleet uniform with gold piping and a Delta insignia. He has his characteristic Vulcan ponytail and is making a hand gesture with his right hand, palm facing forward. His expression is neutral to slightly stern.

Thanks!