Mockito for Beginner in 5 Steps

Mockito is the most popular mocking framework in Java.

Git Repository

- https://github.com/in28minutes/getting-started-in-5-steps/tree/master/mockito-in-5-steps

Pre-requisites

- Java & Eclipse - https://www.youtube.com/playlist?list=PLBBog2r6uMCSmMVTW_QmDLyASBvovyAO3
- JUnit - https://courses.in28minutes.com/p/junit-tutorial-for-beginners

IDE Configuration

Easier Static Imports

- Window > Preferences > Java > Editor > Content Assist > Favorites
    - org.junit.Assert
    - org.mockito.BDDMockito
    - org.mockito.Mockito
    - org.hamcrest.Matchers
    - org.hamcrest.CoreMatchers

Reference

- Visit Mockito Official Documentation - http://site.mockito.org/mockito/docs/current/org/mockito/Mockito.html

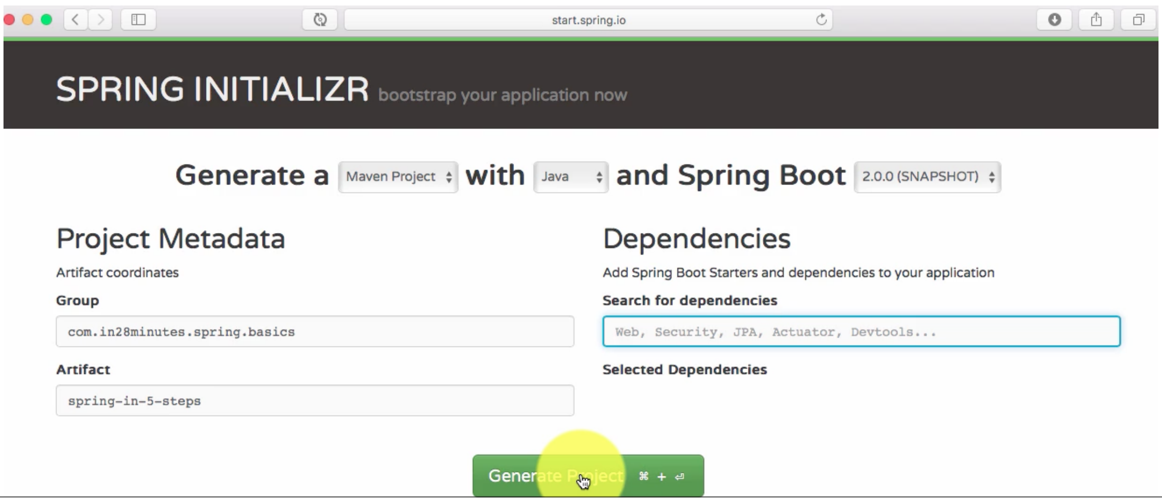
Overview

- Step 1 : Setting up an example using http://start.spring.io.
- Step 2 : Using a Stubs - Disadvantages
- Step 3 : Your first mock.
- Step 4 : Using Mockito Annotations - @Mock, @InjectMocks, @RunWith(MockitoJUnitRunner.class)
- Step 5 : Mocking List interface

Step 1 : Setting up an example using http://start.spring.io.

Creating a Spring Project with Spring Initializr is a cake walk.

> *Spring Initializr http://start.spring.io/ is great tool to bootstrap your Spring Boot projects.*



Generate a Maven Project with Java and Spring Boot 2.0.0 (SNAPSHOT)

Project Metadata

Artifact coordinates

Group: com.in28minutes.spring.basics

Artifact: spring-in-5-steps

Dependencies

Add Spring Boot Starters and dependencies to your application

Search for dependencies: Web, Security, JPA, Actuator, Devtools...

Selected Dependencies

As shown in the image above, following steps have to be done

- Launch Spring Initializr and choose the following
    - Choose `com.in28minutes.mockito` as Group
    - Choose `mockito-demo` as Artifact
    - Choose Dependency
        - Web
- Click Generate Project.
- Import the project into Eclipse.
- If you want to understand all the files that are part of this project, you can go here.

Let's also set up a simple business class with a dependency.

- SomeBusinessImpl depends on DataService for the data
- findTheGreatestFromAllData has some business logic to find the greatest

```
package com.in28minutes.mockito.mockitodemo;

public class SomeBusinessImpl {
	private DataService dataService;

	public SomeBusinessImpl(DataService dataService) {
		super();
		this.dataService = dataService;
	}

	int findTheGreatestFromAllData() {
		int[] data = dataService.retrieveAllData();
		int greatest = Integer.MIN_VALUE;

		for (int value : data) {
			if (value > greatest) {
				greatest = value;
			}
		}
		return greatest;
	}
}
```

```
package com.in28minutes.mockito.mockitodemo;

public interface DataService {
	int[] retrieveAllData();
}
```

Step 2 : Using a Stubs - Disadvantages

Let's use a stub to write a unit test for SomeBusinessImpl.

```
package com.in28minutes.mockito.mockitodemo;

import static org.junit.Assert.assertEquals;

import org.junit.Test;

public class SomeBusinessStubTest {
	@Test
	public void testFindTheGreatestFromAllData() {
		SomeBusinessImpl businessImpl = new SomeBusinessImpl(new DataServiceStub());
		int result = businessImpl.findTheGreatestFromAllData();
		assertEquals(24, result);

	}

}

class DataServiceStub implements DataService {
	@Override
	public int[] retrieveAllData() {
		return new int[] { 24, 6, 15 };
	}
}
```

Problems with Stub

- How do I get DataServiceStub to return different data for different scenaris?
- Everytime DataService interface is updated with new methods, the DataServiceStub implementations should be updated.

Step 3 : Your first mock.

```
package com.in28minutes.mockito.mockitodemo;

import static org.junit.Assert.assertEquals;
import static org.mockito.Mockito.mock;
```

```java
import static org.mockito.Mockito.when;

import org.junit.Test;

public class SomeBusinessMockTest {

	@Test
	public void testFindTheGreatestFromAllData() {
		DataService dataServiceMock = mock(DataService.class);
		when(dataServiceMock.retrieveAllData()).thenReturn(new int[] { 24, 15, 3 });
		SomeBusinessImpl businessImpl = new SomeBusinessImpl(dataServiceMock);
		int result = businessImpl.findTheGreatestFromAllData();
		assertEquals(24, result);
	}

	@Test
	public void testFindTheGreatestFromAllData_ForOneValue() {
		DataService dataServiceMock = mock(DataService.class);
		when(dataServiceMock.retrieveAllData()).thenReturn(new int[] { 15 });
		SomeBusinessImpl businessImpl = new SomeBusinessImpl(dataServiceMock);
		int result = businessImpl.findTheGreatestFromAllData();
		assertEquals(15, result);
	}

}
```

Notes

- `DataService dataServiceMock = mock(DataService.class)` - We are using the mock method to create a mock.
- `when(dataServiceMock.retrieveAllData()).thenReturn(new int[] { 24, 15, 3 })` - stubbing the mock to return specific data

Step 4 : Using Mockito Annotations - @Mock, @InjectMocks, @RunWith(MockitoJUnitRunner.class)

```java
package com.in28minutes.mockito.mockitodemo;

import static org.junit.Assert.assertEquals;
import static org.mockito.Mockito.when;

import org.junit.Test;
import org.junit.runner.RunWith;
import org.mockito.InjectMocks;
import org.mockito.Mock;
import org.mockito.junit.MockitoJUnitRunner;

@RunWith(MockitoJUnitRunner.class)
public class SomeBusinessMockAnnotationsTest {

	@Mock
	DataService dataServiceMock;

	@InjectMocks
	SomeBusinessImpl businessImpl;

	@Test
	public void testFindTheGreatestFromAllData() {
		when(dataServiceMock.retrieveAllData()).thenReturn(new int[] { 24, 15, 3 });
		assertEquals(24, businessImpl.findTheGreatestFromAllData());
	}

	@Test
	public void testFindTheGreatestFromAllData_ForOneValue() {
		when(dataServiceMock.retrieveAllData()).thenReturn(new int[] { 15 });
		assertEquals(15, businessImpl.findTheGreatestFromAllData());
	}

	@Test
	public void testFindTheGreatestFromAllData_NoValues() {
		when(dataServiceMock.retrieveAllData()).thenReturn(new int[] {});
		assertEquals(Integer.MIN_VALUE, businessImpl.findTheGreatestFromAllData());
	}
}
```

Notes

- `@Mock DataService dataServiceMock;` - Create a mock for DataService.
- `@InjectMocks SomeBusinessImpl businessImpl;` - Inject the mocks as dependencies into businessImpl.
- `@RunWith(MockitoJUnitRunner.class)` - The JUnit Runner which causes all the initialization magic with @Mock and @InjectMocks to happen before the tests are run.

Step 5 : Mocking List interface

Mocking a method. Mock returns the same value on multiple calls.

```java
@Test
public void testSize() {
	List listMock = mock(List.class);
```

```
        when(listMock.size()).thenReturn(10);
        assertEquals(10, listMock.size());
        assertEquals(10, listMock.size());
}
```

Setting the mock to return 10 on first call and 20 on the second call.

```
@Test
public void testSize_multipleReturns() {
        List listMock = mock(List.class);
        when(listMock.size()).thenReturn(10).thenReturn(20);
        assertEquals(10, listMock.size());
        assertEquals(20, listMock.size());
        assertEquals(20, listMock.size());
}
```

Customizing the mock based on a specific parameter value.

```
@Test
public void testGet_SpecificParameter() {
        List listMock = mock(List.class);
        when(listMock.get(0)).thenReturn("SomeString");
        assertEquals("SomeString", listMock.get(0));
        assertEquals(null, listMock.get(1));
}
```

Using a generic argument - Mockito.anyInt()

```
@Test
public void testGet_GenericParameter() {
        List listMock = mock(List.class);
        when(listMock.get(Mockito.anyInt())).thenReturn("SomeString");
        assertEquals("SomeString", listMock.get(0));
        assertEquals("SomeString", listMock.get(1));
}
```

Complete Code Example

/pom.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
        <modelVersion>4.0.0</modelVersion>

        <groupId>com.in28minutes.mockito</groupId>
        <artifactId>mockito-demo</artifactId>
        <version>0.0.1-SNAPSHOT</version>
        <packaging>jar</packaging>

        <name>mockito-demo</name>
        <description>Demo project for Spring Boot</description>

        <parent>
                <groupId>org.springframework.boot</groupId>
                <artifactId>spring-boot-starter-parent</artifactId>
                <version>2.0.0.RELEASE</version>
                <relativePath/> <!-- lookup parent from repository -->
        </parent>

        <properties>
                <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
                <project.reporting.outputEncoding>UTF-8</project.reporting.outputEncoding>
                <java.version>1.8</java.version>
        </properties>

        <dependencies>
                <dependency>
                        <groupId>org.springframework.boot</groupId>
                        <artifactId>spring-boot-starter</artifactId>
                </dependency>

                <dependency>
                        <groupId>org.springframework.boot</groupId>
                        <artifactId>spring-boot-starter-test</artifactId>
                        <scope>test</scope>
                </dependency>
        </dependencies>

        <build>
                <plugins>
                        <plugin>
                                <groupId>org.springframework.boot</groupId>
                                <artifactId>spring-boot-maven-plugin</artifactId>
                        </plugin>
                </plugins>
        </build>
```

```
	<repositories>
		<repository>
			<id>spring-snapshots</id>
			<name>Spring Snapshots</name>
			<url>https://repo.spring.io/snapshot</url>
			<snapshots>
				<enabled>true</enabled>
			</snapshots>
		</repository>
		<repository>
			<id>spring-milestones</id>
			<name>Spring Milestones</name>
			<url>https://repo.spring.io/milestone</url>
			<snapshots>
				<enabled>false</enabled>
			</snapshots>
		</repository>
	</repositories>

	<pluginRepositories>
		<pluginRepository>
			<id>spring-snapshots</id>
			<name>Spring Snapshots</name>
			<url>https://repo.spring.io/snapshot</url>
			<snapshots>
				<enabled>true</enabled>
			</snapshots>
		</pluginRepository>
		<pluginRepository>
			<id>spring-milestones</id>
			<name>Spring Milestones</name>
			<url>https://repo.spring.io/milestone</url>
			<snapshots>
				<enabled>false</enabled>
			</snapshots>
		</pluginRepository>
	</pluginRepositories>


</project>
```

/src/main/java/com/in28minutes/mockito/mockitodemo/DataService.java

```
package com.in28minutes.mockito.mockitodemo;

public interface DataService {
	int[] retrieveAllData();
}
```

/src/main/java/com/in28minutes/mockito/mockitodemo/MockitoDemoApplication.java

```
package com.in28minutes.mockito.mockitodemo;

import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;

@SpringBootApplication
public class MockitoDemoApplication {

	public static void main(String[] args) {
		SpringApplication.run(MockitoDemoApplication.class, args);
	}
}
```

/src/main/java/com/in28minutes/mockito/mockitodemo/SomeBusinessImpl.java

```
package com.in28minutes.mockito.mockitodemo;

public class SomeBusinessImpl {
	private DataService dataService;

	public SomeBusinessImpl(DataService dataService) {
		super();
		this.dataService = dataService;
	}

	int findTheGreatestFromAllData() {
		int[] data = dataService.retrieveAllData();
		int greatest = Integer.MIN_VALUE;

		for (int value : data) {
				if (value > greatest) {
					greatest = value;
				}
			}
			return greatest;
		}
	}
```

/src/main/resources/application.properties

/src/test/java/com/in28minutes/mockito/mockitodemo/ListTest.java

```
package com.in28minutes.mockito.mockitodemo;

import static org.junit.Assert.assertEquals;
import static org.mockito.Mockito.mock;
import static org.mockito.Mockito.when;

import java.util.List;

import org.junit.Test;
import org.mockito.Mockito;

public class ListTest {

	@Test
	public void testSize() {
		List listMock = mock(List.class);
		when(listMock.size()).thenReturn(10);
		assertEquals(10, listMock.size());
		assertEquals(10, listMock.size());
	}

	@Test
	public void testSize_multipleReturns() {
		List listMock = mock(List.class);
		when(listMock.size()).thenReturn(10).thenReturn(20);
		assertEquals(10, listMock.size());
		assertEquals(20, listMock.size());
		assertEquals(20, listMock.size());
	}

	@Test
	public void testGet_SpecificParameter() {
		List listMock = mock(List.class);
		when(listMock.get(0)).thenReturn("SomeString");
		assertEquals("SomeString", listMock.get(0));
		assertEquals(null, listMock.get(1));
	}

	@Test
	public void testGet_GenericParameter() {
		List listMock = mock(List.class);
		when(listMock.get(Mockito.anyInt())).thenReturn("SomeString");
		assertEquals("SomeString", listMock.get(0));
		assertEquals("SomeString", listMock.get(1));
	}
}
```

/src/test/java/com/in28minutes/mockito/mockitodemo/MockitoDemoApplicationTests.ja

```
package com.in28minutes.mockito.mockitodemo;

import org.junit.Test;
import org.junit.runner.RunWith;
import org.springframework.boot.test.context.SpringBootTest;
import org.springframework.test.context.junit4.SpringRunner;

@RunWith(SpringRunner.class)
@SpringBootTest
public class MockitoDemoApplicationTests {

	@Test
	public void contextLoads() {
	}

}
```

/src/test/java/com/in28minutes/mockito/mockitodemo/SomeBusinessMockAnnotationsT

```java
package com.in28minutes.mockito.mockitodemo;

import static org.junit.Assert.assertEquals;
import static org.mockito.Mockito.when;

import org.junit.Test;
import org.junit.runner.RunWith;
import org.mockito.InjectMocks;
import org.mockito.Mock;
import org.mockito.junit.MockitoJUnitRunner;

@RunWith(MockitoJUnitRunner.class)
public class SomeBusinessMockAnnotationsTest {

	@Mock
	DataService dataServiceMock;

	@InjectMocks
	SomeBusinessImpl businessImpl;

	@Test
	public void testFindTheGreatestFromAllData() {
		when(dataServiceMock.retrieveAllData()).thenReturn(new int[] { 24, 15, 3 });
		assertEquals(24, businessImpl.findTheGreatestFromAllData());
	}

	@Test
	public void testFindTheGreatestFromAllData_ForOneValue() {
		when(dataServiceMock.retrieveAllData()).thenReturn(new int[] { 15 });
		assertEquals(15, businessImpl.findTheGreatestFromAllData());
	}

	@Test
	public void testFindTheGreatestFromAllData_NoValues() {
		when(dataServiceMock.retrieveAllData()).thenReturn(new int[] {});
		assertEquals(Integer.MIN_VALUE, businessImpl.findTheGreatestFromAllData());
	}
}
```

/src/test/java/com/in28minutes/mockito/mockitodemo/SomeBusinessMockTest.java

```java
package com.in28minutes.mockito.mockitodemo;

import static org.junit.Assert.assertEquals;
import static org.mockito.Mockito.mock;
import static org.mockito.Mockito.when;

import org.junit.Test;

public class SomeBusinessMockTest {

	@Test
	public void testFindTheGreatestFromAllData() {
		DataService dataServiceMock = mock(DataService.class);
		when(dataServiceMock.retrieveAllData()).thenReturn(new int[] { 24, 15, 3 });
		SomeBusinessImpl businessImpl = new SomeBusinessImpl(dataServiceMock);
		int result = businessImpl.findTheGreatestFromAllData();
		assertEquals(24, result);
	}

	@Test
	public void testFindTheGreatestFromAllData_ForOneValue() {
		DataService dataServiceMock = mock(DataService.class);
		when(dataServiceMock.retrieveAllData()).thenReturn(new int[] { 15 });
		SomeBusinessImpl businessImpl = new SomeBusinessImpl(dataServiceMock);
		int result = businessImpl.findTheGreatestFromAllData();
		assertEquals(15, result);
	}

}
```

/src/test/java/com/in28minutes/mockito/mockitodemo/SomeBusinessStubTest.java

```java
package com.in28minutes.mockito.mockitodemo;

import static org.junit.Assert.assertEquals;

import org.junit.Test;

public class SomeBusinessStubTest {
	@Test
	public void testFindTheGreatestFromAllData() {
		SomeBusinessImpl businessImpl = new SomeBusinessImpl(new DataServiceStub());
```

```
                int result = businessImpl.findTheGreatestFromAllData();
                assertEquals(24, result);

        }

}

class DataServiceStub implements DataService {
        @Override
        public int[] retrieveAllData() {
                return new int[] { 24, 6, 15 };
        }
}
```

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