Setting Up Junit

```
eclipse-workspace - JUnitExample/src/test/java/com/example/CalculatorTest.java - Eclipse IDE
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1 | + Φ + Φ Φ Φ + 1 | 1 + 1 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 3 | 1 | 3 | 4 | 1 | 3 | 1 | 3 | 4 | 1 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 
Project Explorer ×

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State of the project Explo
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        - - E C
                                                                                                                                                                                                7 public class CalculatorTest {
                public void testAdd() {
   Calculator c=new Calculator();
   int res=c.add(2,3);
   assertEquals(5,res);
                > @ src/main/resources
                > # com.example
              >  src/test/resources
                                                                                                                                                                                                                         }
@Test
public void testAdd1() {
   Calculator c=new (calculator();
   int res=c.add(-13,-3);
   assertEquals(-16,res);
                > NRE System Library [JavaSE-1.8]
                > Maven Dependencies
              > 🗁 src
              > 🗁 target
                        pom.xml
                                                                                                                                                                                                                                public void testAdd2() {
   Calculator c=new Calculator();
   int res=c.add(-13,3);

✓ 

LoggingExampleApp

                ∨ 🥮 src/main/java

✓ 

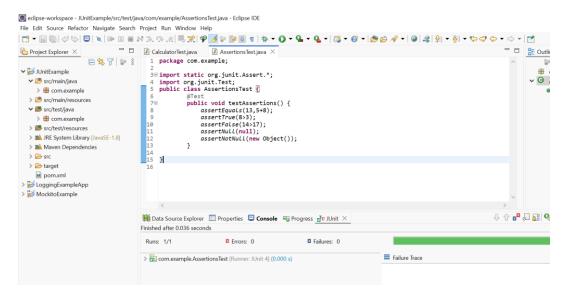
⊕ com.example

                                    > 🗓 LoggingExample.java
                                                                                                                                                                              🛍 Data Source Explorer 🔲 Properties 📮 Console 🤜 Progress 🗗 JUnit 🗡
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            > @ src/main/resources
                       src/test/java
                >  src/test/resources
                                                                                                                                                                                   Runs: 3/3

☑ Errors: 0

                                                                                                                                                                                                                                                                                                                                                                                                                                 Failures: 0
                > M JRE System Library [JavaSE-1.8]
                                                                                                                                                                                 > Es com.example.CalculatorTest [Runner: JUnit 4] (0.001 s)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Failure Trace
              > Maven Dependencies
             > 🗁 target
```

Assertions in JUnit



Arrange-Act-Assert (AAA)

```
hantic Ania real.homil() /
> 🛋 JRE System Library [JavaSE-1.8]
 > 🛋 Maven Dependencies
                                           System.out.println("Teardown : Calculator
 > 🗁 src
 > 🗁 target
                                🛍 Data Source Explorer 🔳 Properties 💂 Console 🗡 😽 Progress 🖠
   pom.xml
                                > 🔀 LoggingExampleApp
                                Setup : Calculator created
> H MockitoExample
                                Teardown : Calculator cleaned up
                                Setup : Calculator created
                                Teardown : Calculator cleaned up
                                Setup : Calculator created
                                Teardown : Calculator cleaned up
```



Mocking and Stubbing

eclipse-workspace - MockitoExample/src/test/java/com/example/MyServiceTest.java - Eclipse IDE

```
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Project Explorer X

Calculator Testjava

Calculator Testjava

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                                 □ □ ② CalculatorTest,java ② AssertionsTest,java ② CalculatorTestWithSetupAAA,java ③ MyServiceTest,java ×
 > 🔛 JUnitExample
                                              2 simport static org.mockito.Mockito.*;
4 import org.junit.jupiter.api.Test;
5 import org.mockito.Mockito;
6 import static org.junit.jupiter.api.Assertions.assertEquals;
                                                                                                                                                                                      ~ @ N
  ≥ ► LoggingExampleApp

✓ 

MockitoExample

▼ 

⊕ com.example

        >   ExternalApi.iava
                                            public class MyServiceTest {

### (#Test public void testExternalApi() {

### ExternalApi mockApi = Mockito.mock(ExternalApi.class);

### when(mockApi.getData()).thenReturn("Mock Data");

### MyService service = new MyService(mockApi);

### String nesult - service fatchData().
         >  MyService.java
   > @ src/main/resources

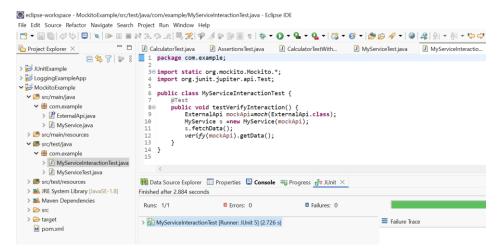
✓ 

⊕ com.example

         >  src/test/resources
                                           🛍 Data Source Explorer 🔲 Properties 🖳 Console 🧠 Progress 🚜 JUnit 🗵

↓ ↑ □ □ □ □ □ □ □
   > M JRE System Library [JavaSE-1.8] Finished after 1.805 seconds
   > 🚵 Maven Dependencies
                                          Runs: 1/1
                                                                         Errors: 0
                                                                                                      ■ Failures: 0
   > 🗁 src
   > 🗁 target
                                          > MyServiceTest [Runner: JUnit 5] (1.663 s)
                                                                                                                                  Failure Trace
     lmx.moq
```

Verifying Interactions



Logging Error Messages and Warning Levels

