

Exercise 1: Parameterized Tests:

EvenChecker.java:

```
public class EvenChecker {  
    public boolean isEven(int number) {  
        return number % 2 == 0;  
    }  
}
```

EvenCheckerTest.java:

```
import org.junit.jupiter.params.ParameterizedTest;  
import org.junit.jupiter.params.provider.ValueSource;  
import static org.junit.jupiter.api.Assertions.*;  
  
public class EvenCheckerTest {  
    private final EvenChecker evenChecker = new EvenChecker();  
  
    @ParameterizedTest  
    @ValueSource(ints = {2, 4, 6, 8, 10, 12})  
    void testIsEven_WithEvenNumbers(int number) {  
        assertTrue(evenChecker.isEven(number));  
    }  
  
    @ParameterizedTest  
    @ValueSource(ints = {1, 3, 5, 7, 9, 11})  
    void testIsEven_WithOddNumbers(int number) {  
        assertFalse(evenChecker.isEven(number));  
    }  
}
```

Output:

```
[INFO]
[INFO] -----
[INFO]  T E S T S
[INFO] -----
[INFO] Running EvenCheckerTest
[INFO] Tests run: 12, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.292 s -- in EvenChe
ckerTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 12, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 7.026 s
[INFO] Finished at: 2025-06-29T12:14:13Z
[INFO] -----
~/workspace$
```

Exercise 2: Test Suites and Categories:

AdditionTest.java:

```
a import org.junit.jupiter.api.Test;
import static org.junit.jupiter.api.Assertions.*;
public class AdditionTest {
    @Test
    void testAddPositive() {
        assertEquals(8, 4 + 4);
    }
    @Test
    void testAddNegative() {
        assertEquals(-8, -4 + -4);
    }
}
```

MultiplicationTest.java:

```
a import org.junit.jupiter.api.Test;
import static org.junit.jupiter.api.Assertions.*;
public class MultiplicationTest {
    @Test
    void testMultiplyPositive() {
        assertEquals(16, 4 * 4);
    }
    @Test
    void testMultiplyByZero() {
        assertEquals(0, 8 * 0);
    }
}
```

AllTests.java:

```
import org.junit.platform.suite.api.SelectClasses;
```

```

import org.junit.platform.suite.api.Suite;

public class AllTests {

}

@Suite
@SelectClasses({
    AdditionTest.class,
    MultiplicationTest.class
})

```

Output:

```

[INFO] --- maven-resources-plugin:2.6:testResources (default-testResources) @ myartifacid ---
[WARNING] Using platform encoding (UTF-8 actually) to copy filtered resources, i.e. build is
platform dependent!
[INFO] skip non existing resourceDirectory /home/runner/workspace/src/test/resources
[INFO] --- maven-compiler-plugin:3.8.1:testCompile (default-testCompile) @ myartifacid ---
[INFO] Nothing to compile - all classes are up to date
[INFO] --- maven-surefire-plugin:3.2.5:test (default-test) @ myartifacid ---
[INFO] Using auto detected provider org.apache.maven.surefire.junitplatform.JUnitPlatformProv
ider
[INFO]
[INFO] -----
[INFO]  T E S T S
[INFO] -----
[INFO] Running EvenCheckerTest
[INFO] Tests run: 12, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.464 s -- in EvenChe
ckerTest
[INFO] Running AdditionTest
[INFO] Tests run: 2, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.003 s -- in Addition
Test
[INFO] Running MultiplicationTest
[INFO] Tests run: 2, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.002 s -- in Multipli
cationTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 16, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 3.887 s
[INFO] Finished at: 2025-06-29T12:22:22Z
[INFO]
~/workspace$ █

```

Exercise 3: Test Execution Order:

OrderedTests.java:

```
import org.junit.jupiter.api.MethodOrderer.OrderAnnotation;
import org.junit.jupiter.api.Order;
import org.junit.jupiter.api.Test;
import org.junit.jupiter.api.TestMethodOrder;
import static org.junit.jupiter.api.Assertions.*;
@TestMethodOrder(OrderAnnotation.class)
public class OrderedTests {
    @Test
    @Order(3)
    void testC() {
        System.out.println("Running testC()");
        assertTrue(3 < 4);
    }
    @Test
    @Order(1)
    void testA() {
        System.out.println("Running testA()");
        assertEquals(2 + 2, 4);
    }
    @Test
    @Order(2)
    void testB() {
        System.out.println("Running testB()");
        assertFalse(5 < 3);
    }
}
```

}

Output:

```
[INFO] Running OrderedTests
Running testA()
Running testB()
Running testC()
[INFO] Tests run: 3, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.007 s -- in OrderedT
ests
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 19, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 5.295 s
[INFO] Finished at: 2025-06-29T12:28:05Z
[INFO] -----
~/workspace$
```

Exercise 4: Exception Testing:

ExceptionThrower.java:

```
public class ExceptionThrower {  
    public void throwException() {  
        throw new IllegalArgumentException("This is an expected exception.");  
    }  
}
```

ExceptionThrowerTest.java:

```
import org.junit.jupiter.api.Test;  
import static org.junit.jupiter.api.Assertions.*;  
  
public class ExceptionThrowerTest {  
    @Test  
    void testThrowException() {  
        ExceptionThrower thrower = new ExceptionThrower();  
        IllegalArgumentException exception = assertThrows(  
            IllegalArgumentException.class,  
            () -> thrower.throwException()  
        );  
        assertEquals("This is an expected exception.", exception.getMessage());  
    }  
}
```

Output:

```
[INFO]
[INFO] -----
[INFO]  T E S T S
[INFO] -----
[INFO] Running EvenCheckerTest
[INFO] Tests run: 12, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.297 s -- in EvenCheckerTest
[INFO] Running AdditionTest
[INFO] Tests run: 2, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.004 s -- in AdditionTest
[INFO] Running MultiplicationTest
[INFO] Tests run: 2, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.076 s -- in MultiplicationTest
[INFO] Running OrderedTests
Running testA()
Running testB()
Running testC()
[INFO] Tests run: 3, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.007 s -- in OrderedTests
[INFO] Running ExceptionThrowerTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.085 s -- in ExceptionThrowerTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 20, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 5.143 s
[INFO] Finished at: 2025-06-29T12:31:05Z
[INFO] -----
```


Exercise 5: Timeout and Performance Testing:

PerformanceTester.java:

```
public class PerformanceTester {  
    public void performTask() {  
        try {  
            Thread.sleep(300);  
        } catch (InterruptedException e) {  
            Thread.currentThread().interrupt();  
        }  
    }  
}
```

PerformanceTesterTest.java:

```
import org.junit.jupiter.api.Test;  
import static org.junit.jupiter.api.Assertions.*;  
import java.time.Duration;  
public class PerformanceTesterTest {  
    @Test  
    void testPerformTaskCompletesWithinTimeout() {  
        PerformanceTester tester = new PerformanceTester();  
        assertTimeout(  
            Duration.ofMillis(500),  
            tester::performTask  
        );  
    }  
}
```

Output:

```
[INFO]
[INFO] -----
[INFO]  T E S T S
[INFO] -----
[INFO] Running EvenCheckerTest
[INFO] Tests run: 12, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.329 s -- in EvenChe
ckerTest
[INFO] Running AdditionTest
[INFO] Tests run: 2, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.007 s -- in Addition
Test
[INFO] Running MultiplicationTest
[INFO] Tests run: 2, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.066 s -- in Multipli
cationTest
[INFO] Running OrderedTests
Running testA()
Running testB()
Running testC()
[INFO] Tests run: 3, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.005 s -- in OrderedT
ests
[INFO] Running ExceptionThrowerTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.004 s -- in Exceptio
nThrowerTest
[INFO] Running PerformanceTesterTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.305 s -- in Performa
nceTesterTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 21, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 5.449 s
[INFO] Finished at: 2025-06-29T12:34:22Z
[INFO] -----
```