Exercise 1: Parameterized Tests:

ExternalApi.java:

```
public interface ExternalApi {
    String getData();
}
```

MyService.java:

```
public class MyService {
    private final ExternalApi externalApi;
    public MyService(ExternalApi externalApi) {
        this.externalApi = externalApi;
    }
    public String fetchData() {
        return externalApi.getData();
    }
}
```

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: 0.311 s -- in EvenChe
ckerTest
[INFO] Running AdditionTest
[INFO] Tests run: 2, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.024 s -- in Addition
Test
[INFO] Running MultiplicationTest
[INFO] Tests run: 2, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.004 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: 0.006 s -- in OrderedT
ests
[INFO] Running ExceptionThrowerTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.010 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:  5.123 s
[INFO] Finished at: 2025-06-29T12:40:30Z
[INFO] ------------------------------------------------------------------------
~/workspace$
```

Exercise 2: Verifying Interactions:

ExternalApi.java:

```
A public interface ExternalApi {
    String getData();
}
```

MyServiceTest.java:

```
a import static org.mockito.Mockito.*;
import org.junit.jupiter.api.Test;
public class MyServiceTest {
    @Test
    public void testVerifyInteraction() {
        ExternalApi mockApi = mock(ExternalApi.class);
        MyService service = new MyService(mockApi);
        service.fetchData();
        verify(mockApi).getData();
    }
}
```

MyService.java:

```
public class MyService {
    private final ExternalApi api;
    public MyService(ExternalApi api) {
        this.api = api;
    }
    public String fetchData() {
        return api.getData();
    }
}
```

Output:

```
[INFO]
[INFO] -------------------------------------------------------
[INFO]  T E S T S
[INFO] -------------------------------------------------------
[INFO] Running MyServiceTest
OpenJDK 64-Bit Server VM warning: Sharing is only supported for boot loader classes because b
ootstrap classpath has been appended
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 2.305 s -- in MyServic
eTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  7.656 s
[INFO] Finished at: 2025-06-29T12:52:45Z
[INFO] ------------------------------------------------------------------------
~/workspace$
```

Exercise 3: Argument Matching:

ExternalApi.java:

```
public interface ExternalApi {
    void sendData(String data);
}
```

MyService.java:

```
public class MyService {
    private final ExternalApi api;
    public MyService(ExternalApi api) {
        this.api = api;
    }
    public void processAndSend() {
        api.sendData("Hello World");
    }
}
```

MyServiceTest.java:

```
import static org.mockito.Mockito.*;
import static org.mockito.ArgumentMatchers.*;
import org.junit.jupiter.api.Test;
public class MyServiceTest {
    @Test
    public void testArgumentMatching() {
        ExternalApi mockApi = mock(ExternalApi.class);
        MyService service = new MyService(mockApi);
        service.processAndSend();
        verify(mockApi).sendData(eq("Hello World"));
    }
}
```

Output:

```
[INFO]
[INFO] -------------------------------------------------------
[INFO]  T E S T S
[INFO] -------------------------------------------------------
[INFO] Running MyServiceTest
OpenJDK 64-Bit Server VM warning: Sharing is only supported for boot loader classes because b
ootstrap classpath has been appended
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 2.080 s -- in MyServic
eTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  5.693 s
[INFO] Finished at: 2025-06-29T12:58:49Z
[INFO] ------------------------------------------------------------------------
~/workspace$
```

Exercise 4: Handling Void Methods:

ExternalApi.java:

```
public interface ExternalApi {
    void sendData(String data);
}
```

MyService.java:

```
public class MyService {
    private final ExternalApi api;
    public MyService(ExternalApi api) {
        this.api = api;
    }
    public void process() {
        api.sendData("Important Data");
    }
}
```

MyServiceTest.java:

```
import static org.mockito.Mockito.*;
import org.junit.jupiter.api.Test;
public class MyServiceTest {
    @Test
    public void testVoidMethod() {
        ExternalApi mockApi = mock(ExternalApi.class);
    doNothing().when(mockApi).sendData(anyString());
        MyService service = new MyService(mockApi);
        service.process();
        verify(mockApi).sendData(eq("Important Data"));
    }
}
```

Output:

```
[INFO] -------------------------------------------------------
[INFO]  T E S T S
[INFO] -------------------------------------------------------
[INFO] Running MyServiceTest
OpenJDK 64-Bit Server VM warning: Sharing is only supported for boot loader classes because b
ootstrap classpath has been appended
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 2.022 s -- in MyServic
eTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  5.597 s
[INFO] Finished at: 2025-06-29T13:02:26Z
[INFO] ------------------------------------------------------------------------
~/workspace$
```

Exercise 5: Mocking and Stubbing with Multiple Returns:

ExternalApi.java:

```
public interface ExternalApi {
    String getData();
}
```

MyService.java:

```
public class MyService {
    private final ExternalApi api;
    public MyService(ExternalApi api) {
        this.api = api;
    }
    public String[] fetchTwice() {
        String first = api.getData();
        String second = api.getData();
        return new String[]{first, second};
    }
}
```

MyServiceTest.java:

```
import static org.mockito.Mockito.*;
import org.junit.jupiter.api.Test;
import static org.junit.jupiter.api.Assertions.*;
public class MyServiceTest {
    @Test
    public void testMultipleReturns() {
        ExternalApi mockApi = mock(ExternalApi.class);
        when(mockApi.getData())
            .thenReturn("First Call")
            .thenReturn("Second Call");
        MyService service = new MyService(mockApi);
        String[] results = service.fetchTwice();
```

```
        assertEquals("First Call", results[0]);
        assertEquals("Second Call", results[1]);
        verify(mockApi, times(2)).getData();
    }
}
```

Output:

```
[INFO]
[INFO] -------------------------------------------------------
[INFO]  T E S T S
[INFO] -------------------------------------------------------
[INFO] Running MyServiceTest
OpenJDK 64-Bit Server VM warning: Sharing is only supported for boot loader classes because b
ootstrap classpath has been appended
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 2.194 s -- in MyServic
eTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  5.992 s
[INFO] Finished at: 2025-06-29T13:08:40Z
[INFO] ------------------------------------------------------------------------
~/workspace$
```

Exercise 6: Verifying Interaction Order:

ExternalApi.java:

```
public interface ExternalApi {
    String getData();
}
```

MyService.java:

```
public class MyService {
    private final ExternalApi api;
    public MyService(ExternalApi api) {
        this.api = api;
    }
    public String[] fetchTwice() {
        String first = api.getData();
        String second = api.getData();
        return new String[]{first, second};
    }
}
```

MyServiceTest.java:

```
import static org.mockito.Mockito.*;
import org.junit.jupiter.api.Test;
import static org.junit.jupiter.api.Assertions.*;
public class MyServiceTest {
    @Test
    public void testVoidMethodThrowsException() {
        ExternalApi mockApi = mock(ExternalApi.class);
        doThrow(new RuntimeException("Send failed!"))
            .when(mockApi)
            .sendData(anyString());
        MyService service = new MyService(mockApi);
        RuntimeException thrown = assertThrows(
```

```
            RuntimeException.class,
            () -> service.process()
        );
        assertEquals("Send failed!", thrown.getMessage());
        verify(mockApi).sendData(eq("Important Data"));
    }
}
```

Output:

```
[INFO]
[INFO] -------------------------------------------------------
[INFO]  T E S T S
[INFO] -------------------------------------------------------
[INFO] Running MyServiceTest
OpenJDK 64-Bit Server VM warning: Sharing is only supported for boot loader classes because b
ootstrap classpath has been appended
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 1.898 s -- in MyServic
eTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  5.568 s
[INFO] Finished at: 2025-06-29T13:18:02Z
[INFO] ------------------------------------------------------------------------
~/workspace$
```

Exercise 7: Handling Void Methods with Exceptions:

ExternalApi.java:

```
public interface ExternalApi {
    void sendData(String data);
}
```

MyService.java:

```
public class MyService {
    private final ExternalApi api;
    public MyService(ExternalApi api) {
        this.api = api;
    }
    public void process() {
        api.sendData("Important Data");
    }
}
```

MyServiceTest.java:

```
import static org.mockito.Mockito.*;
import org.junit.jupiter.api.Test;
import static org.junit.jupiter.api.Assertions.*;
public class MyServiceTest {
    @Test
    public void testVoidMethodThrowsException() {
        ExternalApi mockApi = mock(ExternalApi.class);
        doThrow(new RuntimeException("Send failed!"))
            .when(mockApi)
            .sendData(anyString());
        MyService service = new MyService(mockApi);
        RuntimeException thrown = assertThrows(
            RuntimeException.class,
            () -> service.process()
        );
```

```
        assertEquals("Send failed!", thrown.getMessage());
        verify(mockApi).sendData(eq("Important Data"));
    }
}
```

Output:

```
[INFO]
[INFO] -------------------------------------------------------
[INFO]  T E S T S
[INFO] -------------------------------------------------------
[INFO] Running MyServiceTest
OpenJDK 64-Bit Server VM warning: Sharing is only supported for boot loader classes because b
ootstrap classpath has been appended
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 2.080 s -- in MyServic
eTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  5.783 s
[INFO] Finished at: 2025-06-29T13:24:18Z
[INFO] ------------------------------------------------------------------------
~/workspace$
```