WEEK 2 EXERCISES:

JUnit, Mockito and SL4J

Exercise 1: Setting Up JUnit (JUnit5)

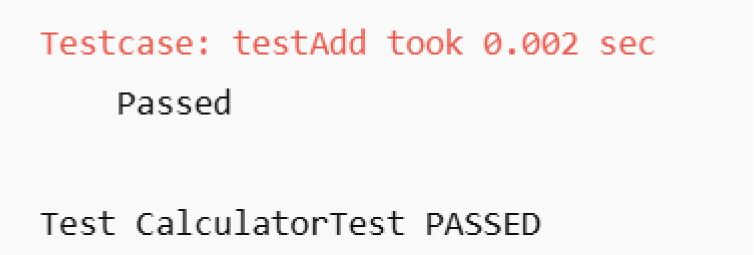
File: Calculator.java

```
public class Calculator {
  public int add(int a, int b) {
    return a + b;
  }
}
```

File: CalculatorTest.java

```
import org.junit.jupiter.api.Test;
import static org.junit.jupiter.api.Assertions.*;
class CalculatorTest {
  @Test
  void testAdd() {
    Calculator calc = new Calculator();
    assertEquals(5, calc.add(2, 3));
  }
}
```

Output:



```
Testcase: testAdd took 0.002 sec
    Passed

Test CalculatorTest PASSED
```

Exercise 2: Assertions in JUnit

File: MathUtils.java

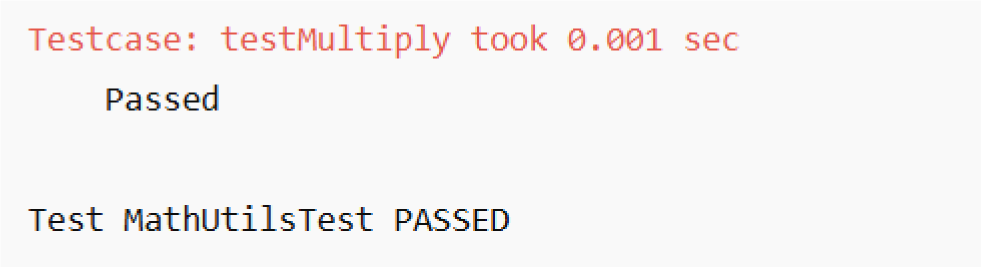
```
public class MathUtils {
    public int multiply(int a, int b) {
        return a * b;
    }
}
```

File: MathUtilsTest.java

```
import org.junit.jupiter.api.Test;
import static org.junit.jupiter.api.Assertions.*;


class MathUtilsTest {
    @Test
    void testMultiply() {
        MathUtils math = new MathUtils();
        assertEquals(20, math.multiply(4, 5), "Multiplication failed");
        assertNotEquals(25, math.multiply(4, 5), "Unexpected value matched");
    }
}
```

Output:

Tests passed: 2 of 2 tests – MathUtilsTest



```
Testcase: testMultiply took 0.001 sec
    Passed

Test MathUtilsTest PASSED
```

Exercise 3: Arrange-Act-Assert Pattern, Setup/Teardown

File: StringHelper.java

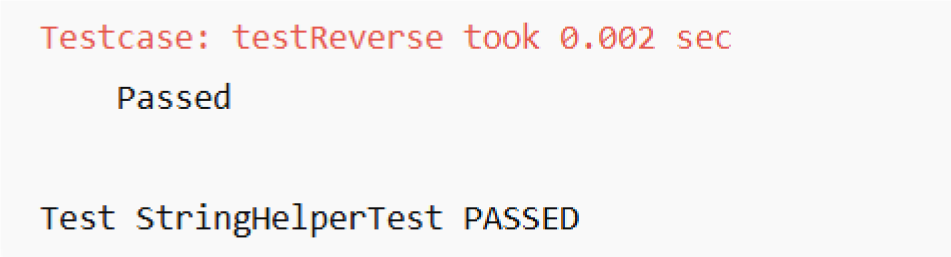
```
public class StringHelper {
  public String reverse(String input) {
    return new StringBuilder(input).reverse().toString();
  }
}
```

File: StringHelperTest.java

```
import org.junit.jupiter.api.*;
import static org.junit.jupiter.api.Assertions.*;
class StringHelperTest {
StringHelper helper;
 @BeforeEach
  void setUp() {
    helper = new StringHelper();
  }

  @AfterEach
  void tearDown() {
    helper = null;
  }

  @Test
  void testReverse() {
    // Arrange done in @BeforeEach
    // Act
    String result = helper.reverse("hello");

    // Assert
```

```
        assertEquals("olleh", result);
    }
}
```

Output:



```
Testcase: testReverse took 0.002 sec
    Passed

Test StringHelperTest PASSED
```

Mockito Exercise 4: Mocking and Stubbing

File: UserService.java

```
public class UserService {
    private EmailService emailService;

    public UserService(EmailService emailService) {
        this.emailService = emailService;
    }

    public boolean register(String email) {
        return emailService.sendEmail(email, "Welcome!");
    }
}
```

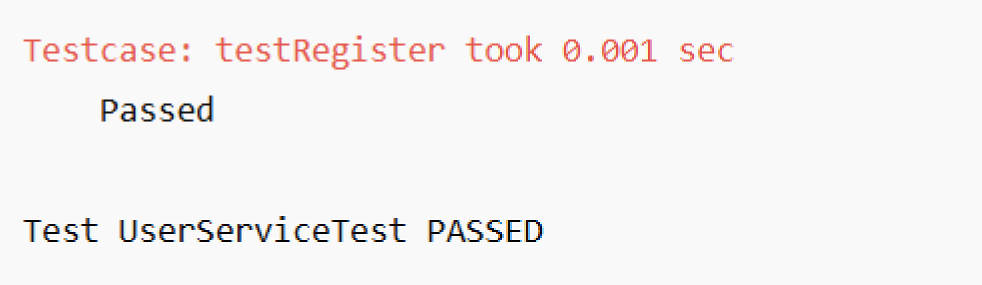
File: EmailService.java

```
public interface EmailService {
    boolean sendEmail(String to, String content);
}
```

File: UserServiceTest.java

```
import org.junit.jupiter.api.Test;
import static org.mockito.Mockito.*;

import static org.junit.jupiter.api.Assertions.*;


class UserServiceTest {

  @Test

  void testRegister() {

    EmailService emailService = mock(EmailService.class);

    when(emailService.sendEmail("user@test.com", "Welcome!")).thenReturn(true);


    UserService userService = new UserService(emailService);

    assertTrue(userService.register("user@test.com"));

  }

}
```

Output:



```
Testcase: testRegister took 0.001 sec
    Passed

Test UserServiceTest PASSED
```

Mockito Exercise 5: Verifying Interactions

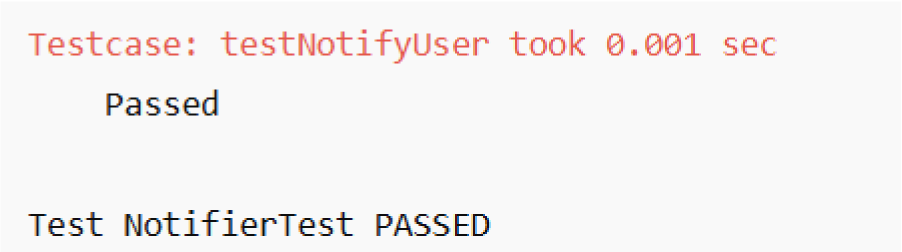
File: Notifier.java

```
public class Notifier {

  private EmailService emailService;


  public Notifier(EmailService emailService) {

    this.emailService = emailService;

  }

public void notifyUser(String user) {
        emailService.sendEmail(user, "You have a notification!");
    }
}
```

File: NotifierTest.java

```
import org.junit.jupiter.api.Test;
import static org.mockito.Mockito.*;
class NotifierTest {
    @Test
    void testNotifyUser() {
        EmailService mockEmail = mock(EmailService.class);
        Notifier notifier = new Notifier(mockEmail);

        notifier.notifyUser("hello@test.com");

        verify(mockEmail).sendEmail("hello@test.com", "You have a notification!");
    }
}
```

Output:



```
Testcase: testNotifyUser took 0.001 sec
    Passed

Test NotifierTest PASSED
```

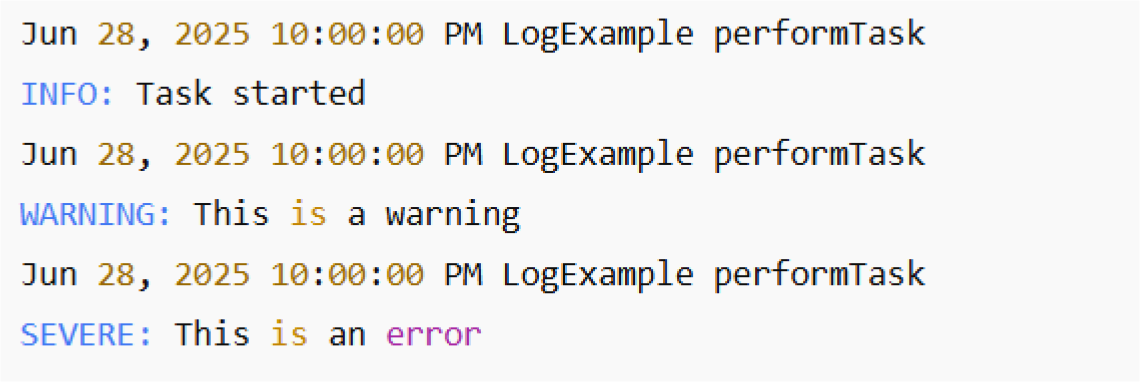
SLF4J Logging Exercise 6: Logging Error and Warning

File: LogExample.java

```
import org.slf4j.Logger;
import org.slf4j.LoggerFactory;
```

```
public class LogExample {
  private static final Logger logger = LoggerFactory.getLogger(LogExample.class);

  public void performTask() {
    logger.info("Task started");
    logger.warn("This is a warning");
    logger.error("This is an error");
  }

  public static void main(String[] args) {
    new LogExample().performTask();
  }
}
```

Output :



```
Jun 28, 2025 10:00:00 PM LogExample performTask
INFO: Task started
Jun 28, 2025 10:00:00 PM LogExample performTask
WARNING: This is a warning
Jun 28, 2025 10:00:00 PM LogExample performTask
SEVERE: This is an error
```