**CSCE 747 - Unit Testing Activity**

**Name(s):**

You are testing the following method:

**public double max(double a, double b);**

Devise four executable test cases for this method in the JUnit notation. See the attached handout for a refresher on the notation.

**jUnit Basics**

**(You may keep this handout)**

JUnit is a Java-based toolkit for writing executable tests.

* Choose a target from the code base.

public class Calculator {  
 public int evaluate (String expression) {  
 int sum = 0;  
 for (String summand: expression.split("\\+"))  
 sum += Integer.valueOf(summand);  
 return sum;  
 }  
}

* Write a “testing class” containing a series of unit tests centered around testing that target.
  + Each test is denoted **@test**

import static org.junit.jupiter.api.Assertions.assertEquals;  
import org.junit.jupiter.api.Test;  
  
public class CalculatorTest {  
 @Test  
 public void evaluatesExpression() {  
 Calculator calculator = new Calculator();  
 int sum = calculator.evaluate("1+2+3");  
 assertEquals(6, sum);

calculator = null;  
 }  
}

@Test

public void test<MethodName><TestingContext>() {

//Define Inputs

try{ //Try to get output.

}catch(Exception error){

**fail**("Why did it fail?");

}

//Compare expected and actual values through assertions or through if statements/fails

}

* @BeforeEach annotation defines a common test initialization method:

@BeforeEach

public void setUp() throws Exception

{

this.registration = new Registration();

this.registration.setUser(“ggay”);

}

* @After annotation defines a common test tear down method:

@AfterEach

public void tearDown() throws Exception

{

this.registration.logout();

this.registration = null;

}

* @BeforeAll defines initialization to take place before any tests are run.

@BeforeAll  
 public static void setUpClass() {

myManagedResource = new   
 ManagedResource();  
 }

* @AfterAll defines tear down after all tests are done.

@AfterAll  
 public static void tearDownClass() throws IOException {  
 myManagedResource.close();  
 myManagedResource = null;  
 }

* Assertions are a "language" of testing - constraints that you place on the output.
  + assertEquals, assertArrayEquals
    - Compares two items for equality.
    - For user-defined classes, relies on .equals method.
      * Compare field-by-field
      * assertEquals(studentA.getName(), studentB.getName())   
        rather than assertEquals(studentA, studentB)   
          
        @Test  
        public void testAssertEquals() {  
         assertEquals("failure - strings are not equal", "text", "text");

}

* + assertArrayEquals compares arrays of items.  
     @Test  
     public void testAssertArrayEquals() {  
     byte[] expected = "trial".getBytes();  
     byte[] actual = "trial".getBytes();  
     assertArrayEquals("failure - byte arrays   
     not same", expected, actual);  
     }
  + assertFalse, assertTrue
    - Take in a string and a boolean expression.
    - Evaluates the expression and issues pass/fail based on outcome.
    - Used to check conformance of solution to expected properties.  
      @Test  
      public void testAssertFalse() {  
       assertFalse("failure - should be false", (getGrade(studentA, “CSCE747”).equals(“A”));  
      }  
      @Test

public void testAssertTrue() {

assertTrue("failure - should be true", (getOwed(studentA) > 0));  
}

* + assertNull, assertNotNull
    - Take in an object and checks whether it is null/not null.
    - Can be used to help diagnose and void null pointer exceptions.   
      @Test  
      public void testAssertNotNull() {  
       assertNotNull("should not be null", new Object());  
      }  
        
      @Test

public void testAssertNull() {  
 assertNull("should be null", null);  
}

* + assertSame,assertNotSame
    - Checks whether two objects are clones.
    - Are these variables aliases for the same object?
      * assertEquals uses .equals().
      * assertSame uses ==  
        @Test  
        public void testAssertNotSame() {  
         assertNotSame("should not be same Object", studentA, new Object());  
        }  
          
        @Test  
        public void testAssertSame() {  
         Student studentB = studentA;  
         assertSame("should be same", studentA, studentB);  
        }