week11_Junit_testing

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Question A.5 (10 marks)
Suppose you have the following Calculator class which you want to test.

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

Fill up the following test class to complete the testing for the above Calculator class. Additional requirements are: - (**10 marks**)
- Use 4* 5 = 20 as the test case
- The test should run 5 times
- Make use of all imported classes.

```
import static org.junit.jupiter.api.Assertions;
import org.junit.jupiter.api.BeforeEach;
import org.junit.jupiter.api.DisplayName;
import org.junit.jupiter.api.RepeatedTest;
import org.junit.jupiter.api.Test;

class CalculatorTest {
    ...
        void setUp() {
            ...
        }
        void testMultiply() {
            ...
        }
    }
}
```
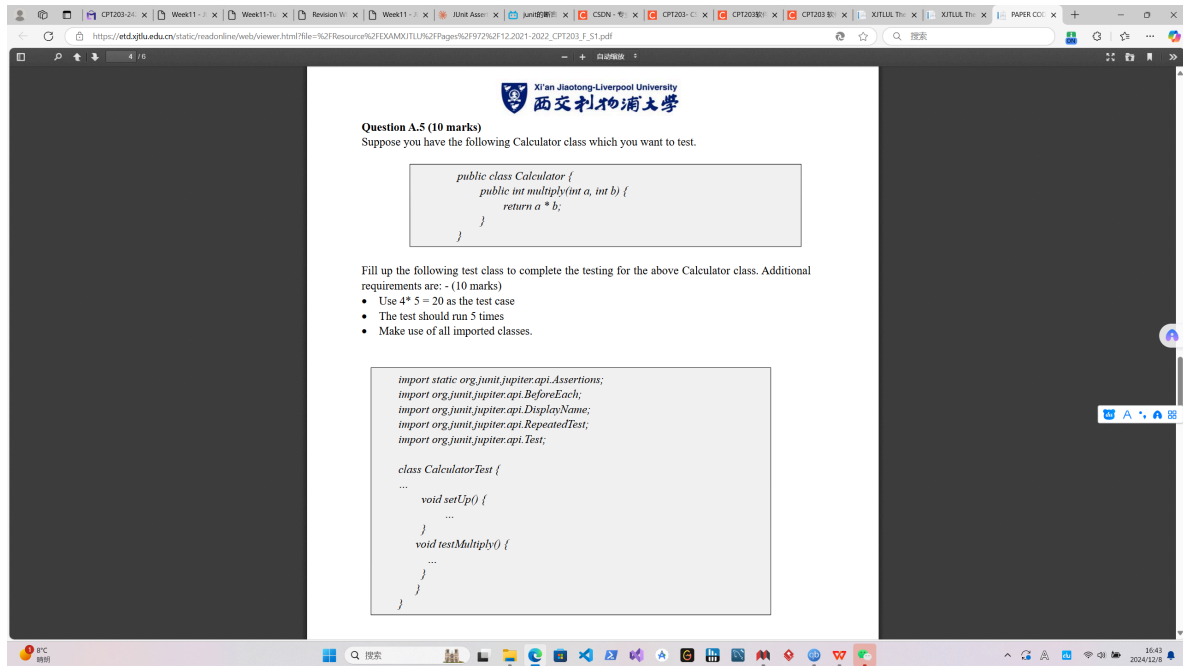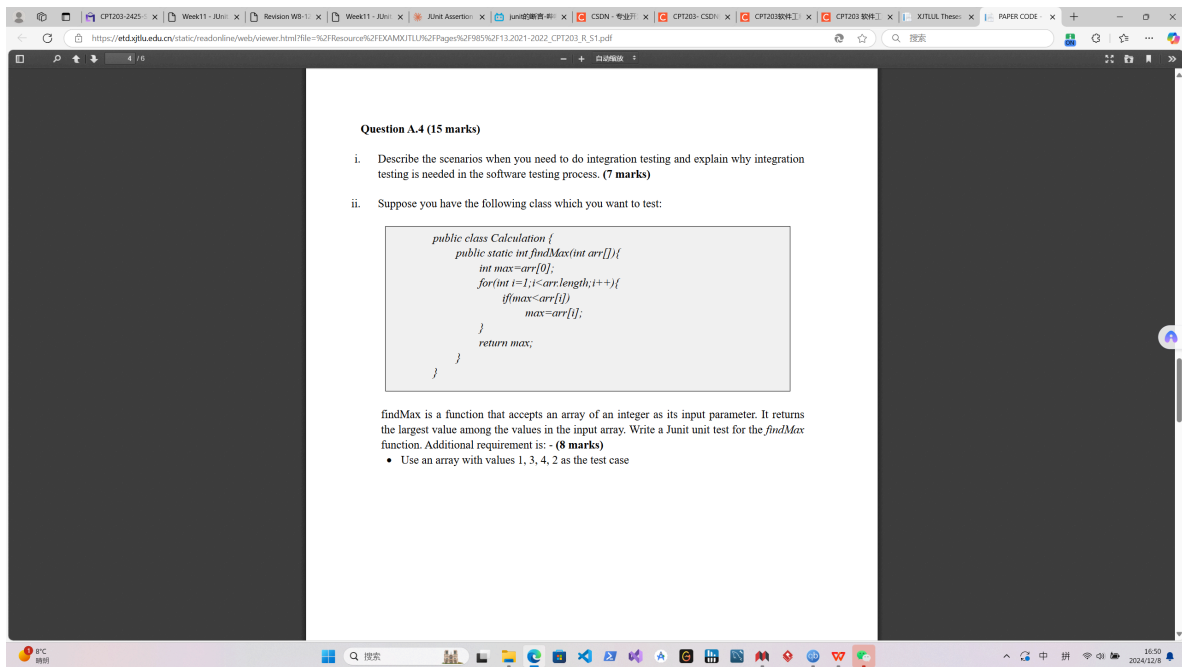
Calculator calculator = new Calculator()

@repeatedtest(5)

void testMultiply{

assertEqual(

20, calculator.multiply(4,5),'The simple multip can work'

)

}

QA:Integration testing is always used when we finish the basic unit testing, and the reason can be list as follows:

1, avoid conflict between classes
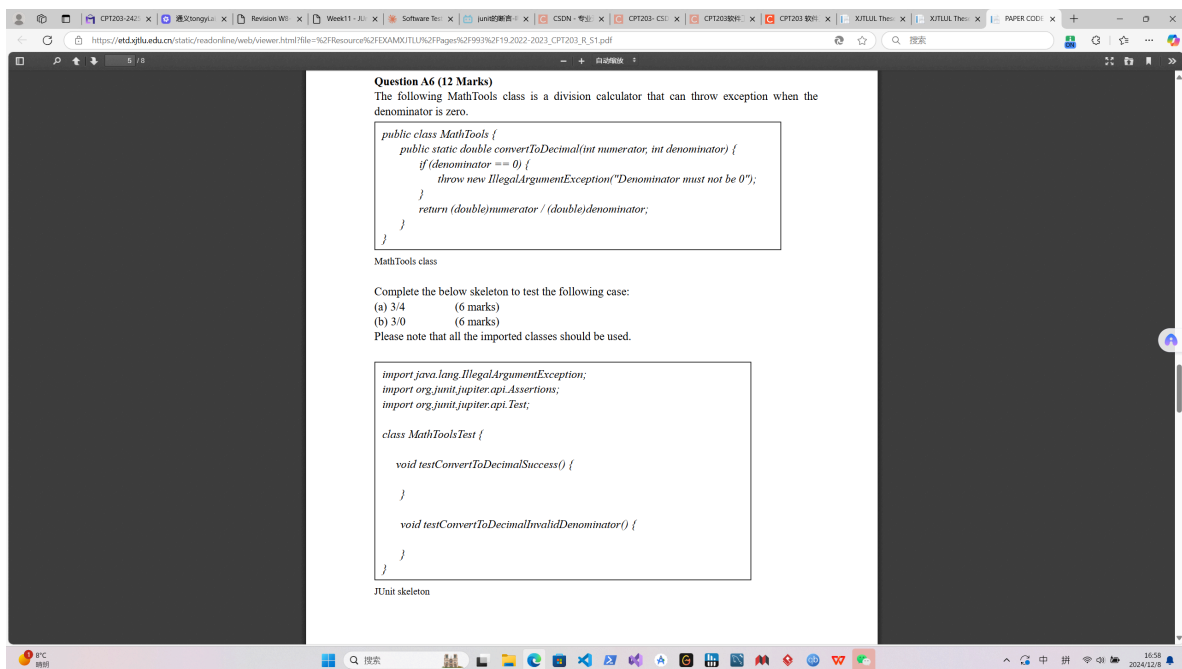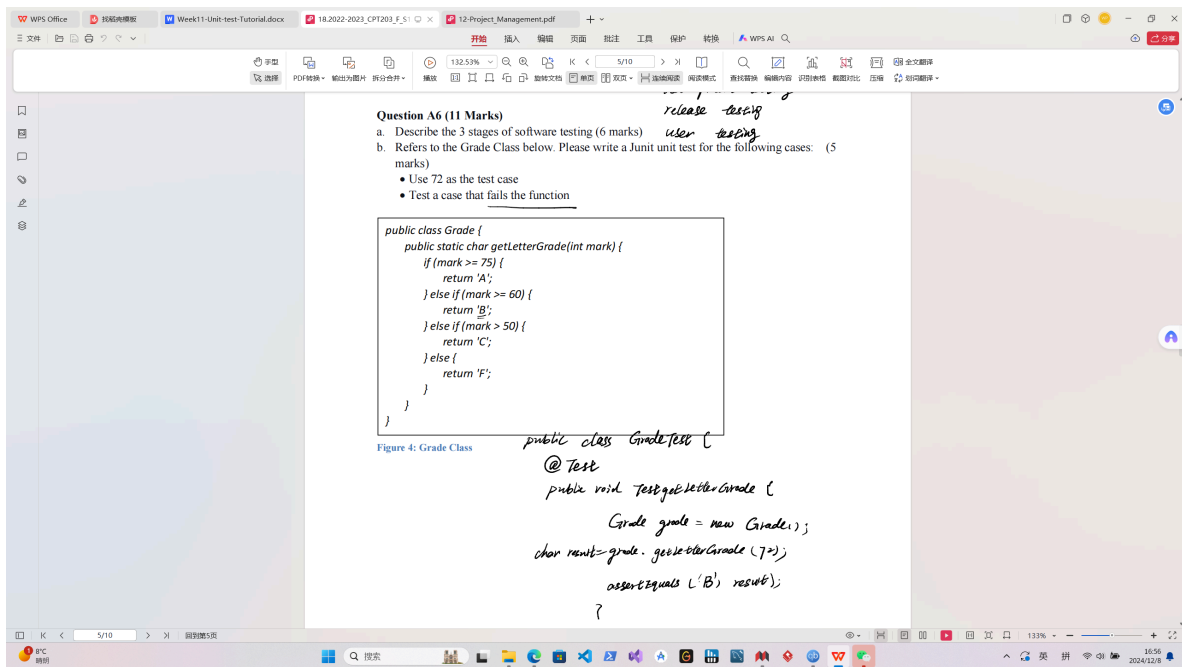
2, make sure each classes could co-work with others

QB: Calculation calculator=new Calculator()

@test

public testfindMax{

  assertEqual(4,calculator.findMax(1,3,4,2),"It works well")

}

Question A6 (11 Marks)

a. Describe the 3 stages of software testing (6 marks)
b. Refers to the Grade Class below. Please write a Junit unit test for the following cases: (5 marks)
   - Use 72 as the test case
   - Test a case that fails the function

```java
public class Grade {
    public static char getLetterGrade(int mark) {
        if (mark >= 75) {
            return 'A';
        } else if (mark >= 60) {
            return 'B';
        } else if (mark > 50) {
            return 'C';
        } else {
            return 'F';
        }
    }
}
```

Figure 4: Grade Class

release testing
user testing

```
public class GradeTest {
    @Test
    public void testgetLetterGrade {
        Grade grade = new Grade();
        char result = grade.getLetterGrade(72);
        assertEquals('B', result);
    }
}
```

Question A6 (12 Marks)

The following MathTools class is a division calculator that can throw exception when the denominator is zero.

```java
public class MathTools {
    public static double convertToDecimal(int numerator, int denominator) {
        if (denominator == 0) {
            throw new IllegalArgumentException("Denominator must not be 0");
        }
        return (double)numerator / (double)denominator;
    }
}
```

MathTools class

Complete the below skeleton to test the following case:
(a) 3/4   (6 marks)
(b) 3/0   (6 marks)
Please note that all the imported classes should be used.

```java
import java.lang.IllegalArgumentException;
import org.junit.jupiter.api.Assertions;
import org.junit.jupiter.api.Test;

class MathToolsTest {

    void testConvertToDecimalSuccess() {

    }

    void testConvertToDecimalInvalidDenominator() {

    }
}
```

JUnit skeleton

Mathtools mathtool=new Mathtools()

@test

Void testCovertToDecimalsSuccess(){

assertEqual(0.75,mathtool.covertToDecimal(3,4),"Success")

}

@test

```
Void testCovertToDecimalsInvalidDenominator(){

assertThrows(IllegalArgumentException.class,()->mathtool..covertToDecimal(3,0))

}
```