JUNIT-5 AND MOCKITO ASSIGNMENT

1) Write a class called MinMaxFinder. Define a method in it called find MinMax() which accepts an int array and returns new array of size 2, wherein the 0th index will have the min value of the array and 1st index will have max value of the array. Perform Junit testing of the method find Min Max with as many test cases you can think of (min 3 test cases)

E.g.

MinMaxFinder.find Min Max(new int[]{56, 34, 7,3, 54, 3, 34, 34, 53}); should return a new array with min and max values {3, 56} at 0th and 1st index respectively

Solution:

MinMaxFinder.java

```
public class MaxMinFinder {
	public static int[] findMaxMin(int[] inputArr)
	{
		int[] minMaxValue = new int[2];
		int max = inputArr[0];
		int min = inputArr[0];

		for(int i = 1 ; i < inputArr.length ; i++)
		{
			if(inputArr[i] > max)		//for max value
				max=inputArr[i];
			if(inputArr[i] < min)		//for min value
				min=inputArr[i];
		}

		minMaxValue[0] = min;
		minMaxValue[1] = max;

		return minMaxValue; //returning array
	}
}
```

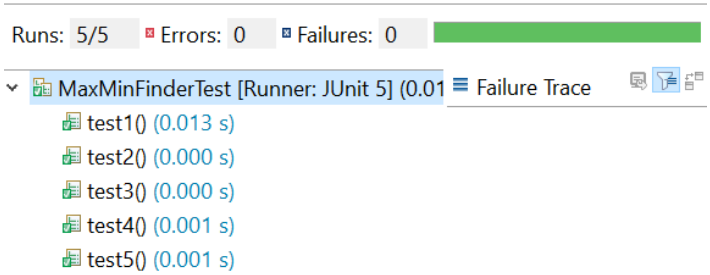
MinMaxFinderTest.java

```
import static org.junit.jupiter.api.Assertions.*;
import java.util.Arrays;
import org.junit.jupiter.api.Test;
class MaxMinFinderTest {
	int[] result  = new int[2];
	@Test
	void test1() {
		result = MaxMinFinder.findMaxMin(new int[] {1,3,56,26,32,755,0,4535,42,21});
		int[] expectedResult = {0,4535};
		assertEquals(Arrays.toString(expectedResult), Arrays.toString(result));
	}
	@Test
	void test2() {
		result = MaxMinFinder.findMaxMin(new int[] {0,0,0,0,0,0,0,0,0,0,0,0,0,0,0});
		int[] expectedResult = {0,0};
		assertEquals(Arrays.toString(expectedResult), Arrays.toString(result));
	}
	@Test
	void test3() {
		result = MaxMinFinder.findMaxMin(new int[] {1,3,4,5,6,723,563,121231,545,2,56,6});
		int[] expectedResult = {1,121231};
		assertEquals(Arrays.toString(expectedResult), Arrays.toString(result));
	}
	@Test
	void test4() {
		result = MaxMinFinder.findMaxMin(new int[] {0,324,234,23,521,55,555,55666,555,77});
		int[] expectedResult = {0,55666};
		assertEquals(Arrays.toString(expectedResult), Arrays.toString(result));
	}
```

```
        @Test
        void test5() {
                result = MaxMinFinder.findMaxMin(new int[] {333,33,333,333,333,3333,3333333,333,33});
                int[] expectedResult = {33,3333333};
                assertEquals(Arrays.toString(expectedResult), Arrays.toString(result));
        }
}
```

Output:

Testing output:



2) Modify the above method to return a single object representing min and max value of the pass array. Define new sets of Junit Test cases of this modified method.

Solution:

MinMax.java

```
package MinMaxFromArray;

public class MinMax {

	private int[] minMax = new int[2];

	public int[] getMinMax() {

		return minMax;

	}

	public void setMinMax(int min , int max) {

		this.minMax[0] = min;

		this.minMax[1] = max;

	}

}
```

FindMinMax.java

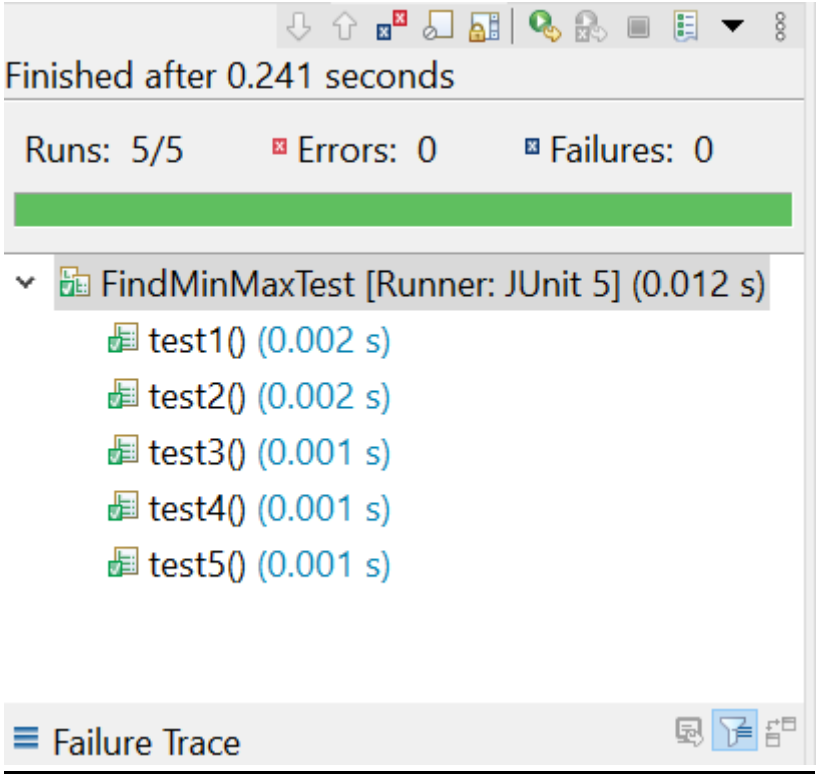
```
package MinMaxFromArray;

public class FindMinMax {

	public static MinMax maxMinInArray (  int[] inputArray  )

	{	MinMax obj = new MinMax();	//created a object to store min max from input array

		int min = inputArray[0];		//min

		int max = inputArray[0];		//max

		for(int i = 1 ; i < inputArray.length ; i++)

		{	if(  inputArray[i] > max )	//for max value

				max=inputArray[i];

			if(  inputArray[i] < min  )	//for min value

				min=inputArray[i];

		}

		obj.setMinMax(min,max);		// stored min max of array in the object

		return obj;			//returning the object

	 }

}
```

FindMinMaxTest.java

```
package MinMaxFromArray;
import static org.junit.jupiter.api.Assertions.*;
import java.util.Arrays;
import org.junit.jupiter.api.Test;
class FindMinMaxTest {
	MinMax testObject;
	@Test
	void test1() {
		testObject = FindMinMax.maxMinInArray(new int[] {1,3,56,26,32,755,0,4535,42,21});
		int[] expected = {0,4535};
		int[] actual = testObject.getMinMax();
		assertEquals(Arrays.toString(expected),Arrays.toString(actual));
	}
	@Test
	void test2() {
		testObject = FindMinMax.maxMinInArray(new int[] {12,46,78,123,7,2325,3232,7644,211235});
		int[] expected = {7,211235};
		int[] actual = testObject.getMinMax();
		assertEquals(Arrays.toString(expected),Arrays.toString(actual));
	}
	@Test
	void test3() {
		testObject = FindMinMax.maxMinInArray(new int[] {14,62,632,6344,776,2345,45232,4331});
		int[] expected = {14,45232};
		int[] actual = testObject.getMinMax();
		assertEquals(Arrays.toString(expected),Arrays.toString(actual));
	}
	@Test
	void test4() {
		testObject = FindMinMax.maxMinInArray(new int[] {1});
		int[] expected = {1,1};
		int[] actual = testObject.getMinMax();
		assertEquals(Arrays.toString(expected),Arrays.toString(actual));  }
```

```
        @Test
        void test5() {
                testObject = FindMinMax.maxMinInArray(new int[] {1234,12});
                int[] expected = {12,1234};
                int[] actual = testObject.getMinMax();
                assertEquals(Arrays.toString(expected),Arrays.toString(actual));
        }
}
```

Output:



3) Write a Bank Account class with method withdraw which accepts amount to be withdrawn from the account (amount to be deducted from the balance of the account). In case there are insufficient funds a InsufficientFundsExpcetion should be raised. After defining the method perform Junit testing to check whether the insufficientFundsException is raised when you try to withdraw amount that is over and above the account balance.

bankAccount.withdraw(20,000); should raise the Insufficient Funds Exception if the balance in the account is less than 20,000.

Solution:

BankAccount.java

```
package BankAccount;
public class BankAccount {
	private double balance = 20000;
	public double withdraw(double amount) throws InsufficientFundsExpcetion
	{
		if(amount > balance)
		{
		throw new InsufficientFundsExpcetion();
		}
		else {
			balance-=amount;
		}
		return balance;
	}
}
```

InsufficientFundsException.java

```
package BankAccount;

public class InsufficientFundsExpcetion extends Exception{
	InsufficientFundsExpcetion() {
	}
}
```

BankAccountTest.java

```
package BankAccount;
import org.junit.jupiter.api.Test;
class BankAccountTest {
	BankAccount account = new BankAccount();
	@Test
	void test1() throws InsufficientFundsExpcetion{
		account.withdraw(12000);
	}
	@Test
	void test2() throws InsufficientFundsExpcetion{
		account.withdraw(30000);
	}
	@Test
	void test3() throws InsufficientFundsExpcetion{
		account.withdraw(1000);
	}
	@Test
	void test4() throws InsufficientFundsExpcetion{
		account.withdraw(10000);
	}
	@Test
	void test5() throws InsufficientFundsExpcetion{
		account.withdraw(21000);
	}
	@Test
	void test6() throws InsufficientFundsExpcetion{
		account.withdraw(19000);
	}
}
```

Output:

Finished after 0.106 seconds

Runs: 6/6 Errors: 2 Failures: 0

BankAccountTest [Runner: JUnit 5] (0.002 s)

- test1() (0.001 s)
- test2() (0.000 s)
- test3() (0.000 s)
- test4() (0.000 s)
- test5() (0.001 s)
- test6() (0.000 s)

Failure Trace

```
BankAccount.InsufficientFundsExpcetion
at BankAccount.BankAccount.withdraw(BankAccount.java:11)
at BankAccount.BankAccountTest.test5(BankAccountTest.java:34)
at java.base/java.util.ArrayList.forEach(ArrayList.java:1511)
at java.base/java.util.ArrayList.forEach(ArrayList.java:1511)
```

4) Write a Junit Testing to show the use of Lifecycle hooks annotation such as @BeforeAll, @BeforeEach @AfterEach and @AfterAll

Solution:

Created a class with some basic methods.

DatabaseApplication.java

```
package JunitHooks;

public class DatabaseApplication {

	public void addData() {

		System.out.println("added some data");

	}

	public void fetchData() {

		System.out.println("fetched some data");

	}

	public void updateData() {

		System.out.println("updated some data");

	}

	public void deleteData() {

		System.out.println("deleted some data");

	}

}
```

DatabaseApplicationTest.java

```
package JunitHooks;
import org.junit.jupiter.api.AfterAll;
import org.junit.jupiter.api.AfterEach;
import org.junit.jupiter.api.BeforeAll;
import org.junit.jupiter.api.BeforeEach;
import org.junit.jupiter.api.DisplayName;
import org.junit.jupiter.api.Nested;
import org.junit.jupiter.api.Test;

class DatabaseApplicationTest {
	DatabaseApplication dbApp ;
	@BeforeAll
	static void beforeAllinit(){
		System.out.println("Started the Database Server");
	}
	@BeforeEach
	void createInstance()
	{
		dbApp =  new DatabaseApplication();
		System.out.println("Database Instance Created");
	}
	@AfterEach
	void commitChanges()
	{
		System.out.println("Changes Commited");
	}
	@AfterAll
	static void turnoffServer(){
		System.out.println("Database Server has been closed");
	}
```

```
    @Nested
    class dbAppTests{
        @Test
        @DisplayName("Checking addData Method - Test1")
        void addTest()
        {
            dbApp.addData();
        }
        @Test
        @DisplayName("Checking fetchData Method - Test2")
        void fetchTest()
        {
            dbApp.fetchData();
        }
        @Test
        @DisplayName("Checking updateData Method - Test3")
        void updateTest()
        {
            dbApp.updateData();
        }
        @Test
        @DisplayName("Checking DeleteData Method - Test4")
        void deleteTest()
        {
            dbApp.deleteData();
        }
    }
}
```

Output:

Testing Output:

Finished after 0.104 seconds

Runs: 4/4 Errors: 0 Failures: 0

- DatabaseApplicationTest [Runner: JUnit 5] (0.000 s)
  - dbAppTests (0.000 s)
    - Checking fetchData Method - Test2 (0.000 s)
    - Checking addData Method - Test1 (0.000 s)
    - Checking updateData Method - Test3 (0.000 s)
    - Checking DeleteData Method - Test4 (0.000 s)

Failure Trace

Console Output:

```
Started the Database Server
Database Instance Created
fetched some data
Changes Commited
Database Instance Created
added some data
Changes Commited
Database Instance Created
updated some data
Changes Commited
Database Instance Created
deleted some data
Changes Commited
Database Server has been closed
```