Data communication

Date: 19 – 23 April 2021   **Week:** 8

Task I: Tutorial questions

1. What is a data bus, an address bus, and a control bus?

2. Explain the signal reflection problem.

3. What are the problems of parallel communication?

Task II: Practical exercises

In this lab, we practise some Java JUnit tests. We will be using the Java SDK installed on Week 4, running on the Linux terminal, or the Windows command line.

1. Download the following files on the course website. Make sure they are in the same directory.
   - *junit-4.12.jar*: the main JUnit testing package.
   - *hamcrest-core-13.jar*: the framework for doing object matchings.
   - *Calculator.java*: the Java program to be tested. It contains a function to add 2 numbers.

2. Create the following Java tester file "CalculatorTest.java".

```java
import static org.junit.Assert.*;
import org.junit.Test;

public class CalculatorTest
{
        @Test
        public void testAdd1()          // 1st test
        {
                Calculator calculator = new Calculator();       // create a new object to be tested
                double result = calculator.add(10, 50);         // try adding 50 to 10
                assertEquals(60, result, 0);    // assertEquals() is used to check the testing result
        }
        @Test
        public void testAdd2()          // 2nd test
        {
                Calculator calculator = new Calculator();
                double result = calculator.add(7.5, 1.5);
                assertEquals(9.0, result, 0);
        }
}
```

3. Compile all Java files. The command line argument "-cp" is used to specify the class path of the JUnit files.
   On Windows machines:
   javac -cp .;junit-4.12.jar;hamcrest-core-1.3.jar *.java

   On Linux machines:
   javac -cp .:junit-4.12.jar:hamcrest-core-1.3.jar *.java

   Note that semicolon is used as path separator on Windows, while colon is used on Linux.

4. Run the test.
   On Windows machines:
   java -cp .;junit-4.12.jar;hamcrest-core-1.3.jar org.junit.runner.JUnitCore CalculatorTest

   On Linux machines:
   java -cp .:junit-4.12.jar:hamcrest-core-1.3.jar org.junit.runner.JUnitCore CalculatorTest

   We should receive a confirmation that the 2 tests are successful, along with the running time.

Document your answers in the learning journal, including screenshots of the JUnit test results