Programming Assignment – Bit Manipulation Part III

Background

In previous assignments, the bit manipulations you performed resulted in the output of the system. However, this is not always the case. At times, the manipulated bits are used to perform additional operations. In this assignment, you will implement such a function.

Specification

Add the following two methods to the previous assignment:

S_1	000	001	010	011	100	101	110	111
0	101	010	001	110	011	100	111	000
1	001	100	110	010	000	111	101	011

S_2	000	001	010	011	100	101	110	111
0	100	000	110	101	111	001	011	010
1	101	011	000	111	110	010	001	100

1. Given the two tables above, S_1 and S_2, write two functions (one for each table) that receive a byte as an argument and return the value from within the respective table where:
    a. Only the 4 least significant bits of the argument are relevant
        e.g. XXXX1001
    b. The leftmost one bit of the 4 designates the desired row of the table (0 or 1)
    c. The rightmost three bits of the 4 designate the desired column of the table (0 through 7)

Use the following method definitions:

```
public static byte S1(byte _byte)
public static byte S2(byte _byte)
```

Examples of use are as follows (xxxx are ignored bits):

S1(xxxx1001) -> xxxx0100

S2(xxxx0111) -> xxxx0010

Use the following main method to demonstrate your code:

```
public static void main(String[] args) {
   System.out.println("S1\t\tS2");
   for (int i = 0; i < 2; ++i) {
      for (int j = 0; j < 8; ++j) {
         System.out.println(
         int2binary((byte)(((i << 3) | j) & 0x0F), 4) + ": " +
         int2binary(S1((byte)(((i << 3) | j) & 0x0F)), 3) + "\t" +
         int2binary(S2((byte)(((i << 3) | j) & 0x0F)), 3));
      }
   }
}
```

Deliverables

- Source code (.java) files
- Screen shot of your running program using the main function given (above)
- Reflective essay describing
    - Successes
    - Difficulties (if any) and how you addressed them
    - Lessons learned

If you do this assignment as a programming pair include both names and both reflections in a single document. Each person should submit the requested [identical] documents to Canvas under their own name.