Template Week 2 – Logic

Student number: 587889

Assignment 2.1: Parking lot

Which gates do you need?

OR

Complete this table

Parking lot 1	Parking lot 2	Parking lot 3	Result (full)
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

Assignment 2.2: Android or iPhone

Which gates do you need?

OR

Complete this table

Android phone	iPhone	Result (Phone in possession)
0	0	0
0	1	1
1	0	1
1	1	1

Assignment 2.3: Four NAND gates

Complete this table

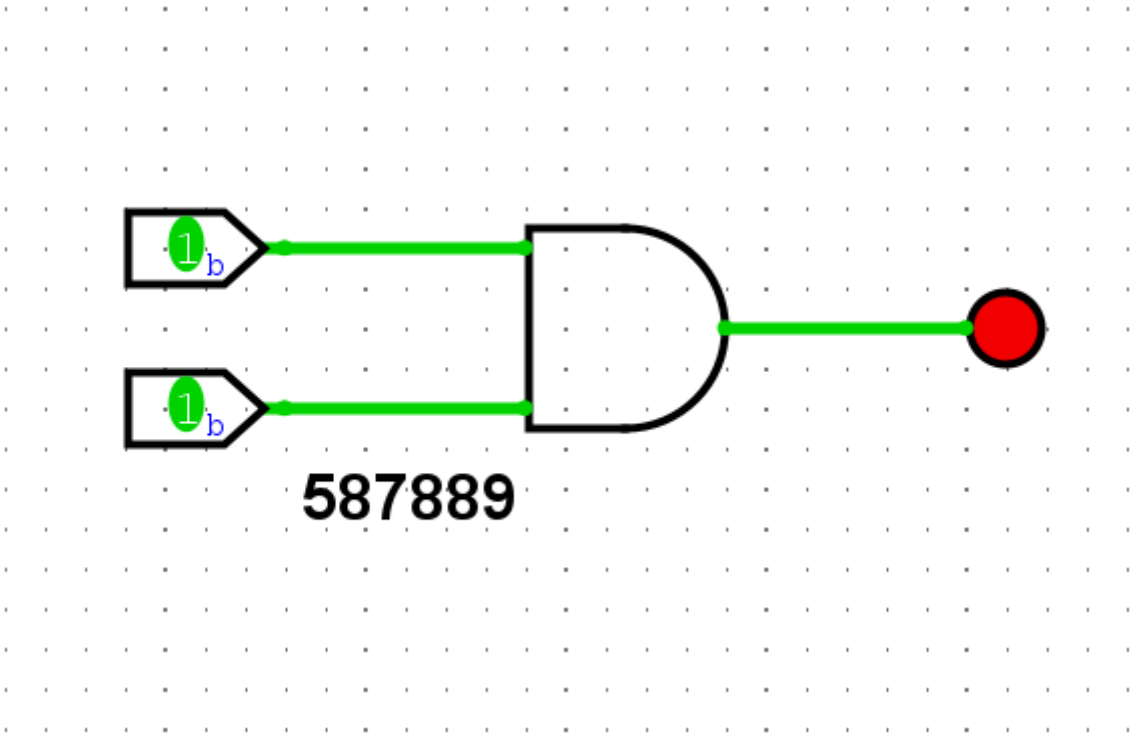
A	B	Q
0	0	1
0	1	1
1	0	1
1	1	0

How can the design be simplified?

Een AND gate gebruiken

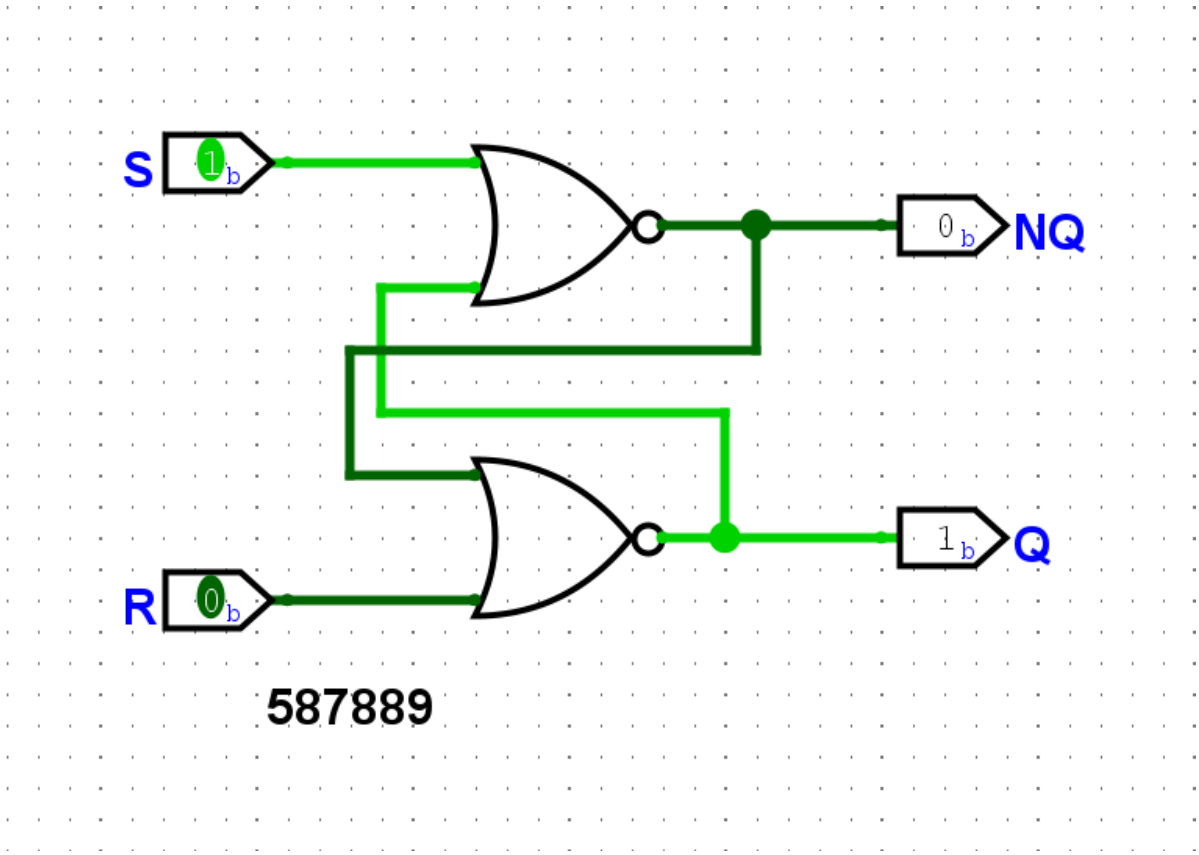
Assignment 2.4: Getting to know Logisim evolution

Screenshot of the design with your name and student number in it:



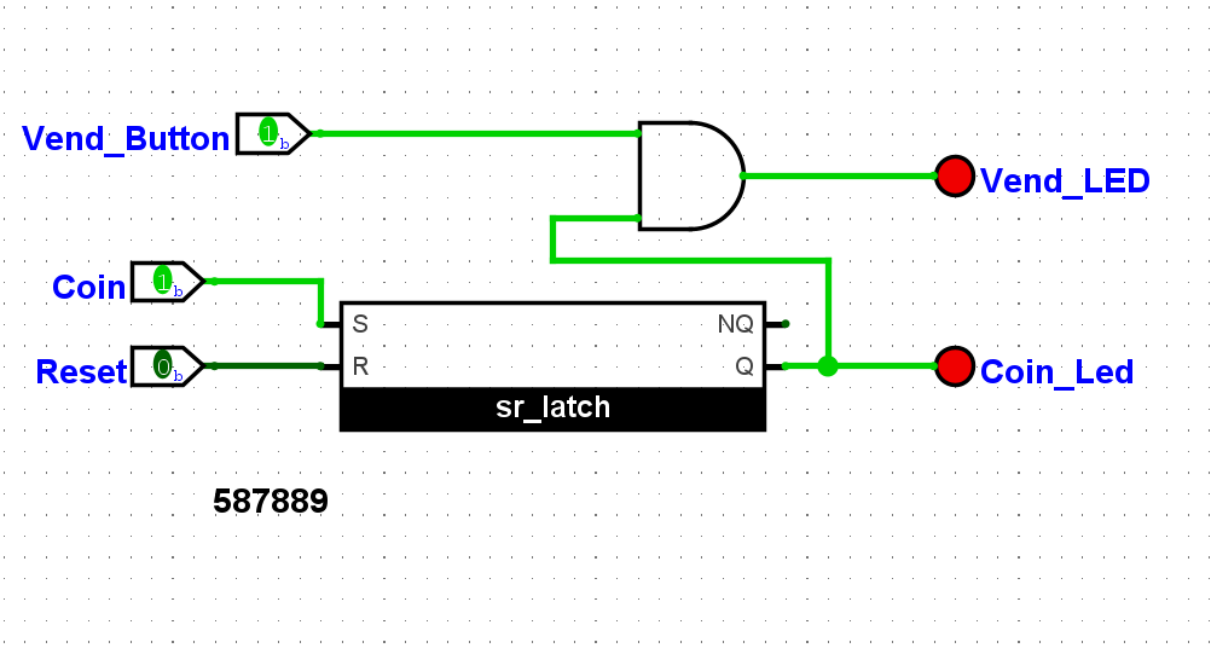
Assignment 2.5: SR Latch

Screenshot SR Latch in Logisim with your name and student number:



Assignment 2.6: Vending Machine

Screenshot Vending Machine in Logisim with your name and student number:



Assignment 2.7: Bitwise operators

Complete the java source code for bitwise operators. Put the source code here.

#1

```java
public class Main {
    public static void main(String[] args) {
        int number = 5;

        if((number & 1) == 1)
            System.out.println("number is odd");
        else
            System.out.println("number is even");
    } // Wout | 587889
}
```

#2

```java
public class Main {
    public static void main(String[] args) {
        int number = 8;

        if(number > 0 && (number & (number -1)) == 0)
            System.out.println("number is a power of 2");
        else  // Wout | 587889
            System.out.println("number isn't a power of 2");
    }
}
```

#3

```java
public class Main {
    public static void main(String[] args) {
        final int READ = 4;
        final int WRITE = 2;
        final int EXECUTE = 1;

        int userPermissions = 7;

        if ((userPermissions & READ) != 0)
            System.out.println("User has read permissions");
        else // 587889
            System.out.println("User can't read. No permissions.");
    }

}
```

What are the file permissions on the file verse in the above picture? Write the answer as an octal value.

RW = 4 +2 = 6

R = 4

R = 4

Mijn antwoord: 644

#4

```java
public class Main {
    public static void main(String[] args) {
        final int READ = 4;
        final int WRITE = 2;
        final int EXECUTE = 1;

        int userPermissions = 0;

        userPermissions = userPermissions | READ | EXECUTE; // 587889

        System.out.println("User permissions: "+userPermissions);

    }
}
```

#5

```java
public class Main {
    public static void main(String[] args) {
        final int READ = 4;
        final int WRITE = 2;
        final int EXECUTE = 1;

        int userPermissions = 6; // 587889
        userPermissions = userPermissions ^ WRITE;
        System.out.println("User permissions: "+userPermissions);

    }
}
```

#6

```java
public class Main {
    public static void main(String[] args) {
        int number = 5;
        number = ~number + 1; // 587889
        System.out.println("Number: "+number);

    }
}
```

#7

```java
public class Application {

    public static void main(String[] args) {

        int number = 10;

        System.out.println("Decimal integer: " + number);

        String binary = Integer.toBinaryString(number);
        String octal = Integer.toOctalString(number);
        String hexadecimal = Integer.toHexString(number);
        // 587889
        System.out.println("Binary representation: " + binary);
        System.out.println("Octal representation: " + octal);
        System.out.println("Hexadecimal representation: " + hexadecimal);
    }
}
```

Assignment 2.8: Java Application Bit Calculations

Create a java program that accepts user input and presents a menu with options.

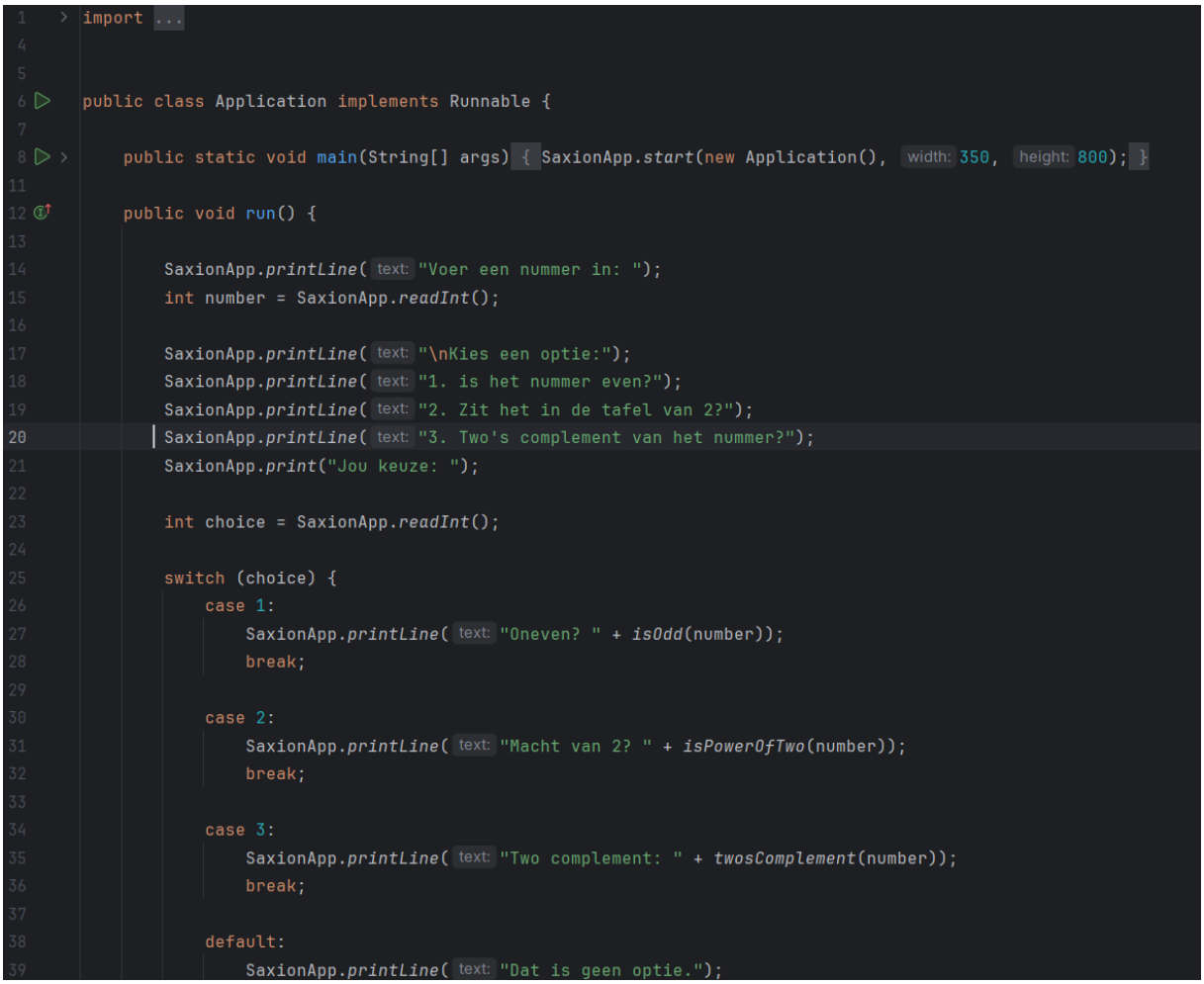
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?

Implement the methods by using the bitwise operators you have just learned.

Organize your source code in a readable manner with the use of control flow and methods.

Keep this application because you need to expand it in week 6 for calculating network segments.

Paste source code here, with a screenshot of a working application.



```java
import ...


public class Application implements Runnable {

    public static void main(String[] args) { SaxionApp.start(new Application(), width: 350, height: 800); }

    public void run() {

        SaxionApp.printLine( text: "Voer een nummer in: ");
        int number = SaxionApp.readInt();

        SaxionApp.printLine( text: "\nKies een optie:");
        SaxionApp.printLine( text: "1. is het nummer even?");
        SaxionApp.printLine( text: "2. Zit het in de tafel van 2?");
        SaxionApp.printLine( text: "3. Two's complement van het nummer?");
        SaxionApp.print("Jou keuze: ");

        int choice = SaxionApp.readInt();

        switch (choice) {
            case 1:
                SaxionApp.printLine( text: "Oneven? " + isOdd(number));
                break;

            case 2:
                SaxionApp.printLine( text: "Macht van 2? " + isPowerOfTwo(number));
                break;

            case 3:
                SaxionApp.printLine( text: "Two complement: " + twosComplement(number));
                break;

            default:
                SaxionApp.printLine( text: "Dat is geen optie.");
```

```
33
34              case 3:
35                  SaxionApp.printLine( text: "Two complement: " + twosComplement(number));
36                  break;
37
38              default:
39                  SaxionApp.printLine( text: "Dat is geen optie.");
40          }
41
42      }
43      // 587889
44      // Kijk of het getal even is
45      public static boolean isOdd(int n) {  1 usage
46          return (n & 1) == 1;
47      }
48
49      // Check of het getal met de tafel van 2 is
50      public static boolean isPowerOfTwo(int n) {  1 usage
51          return n > 0 && (n & (n - 1)) == 0;
52      }
53
54      // Bereken het two complement van het getal
55      public static int twosComplement(int n) {  1 usage
56          return ~n + 1;
57      }
58
59  }
60
```

Ready? Then save this file and export it as a pdf file with the name: **week2.pdf**