Template Week 2 – Logic

Student number: 589020

Assignment 2.1: Parking lot

Which gates do you need?

2 AND gates.

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?

1 XOR gate

Complete this table

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

Assignment 2.3: Four NAND gates

Complete this table

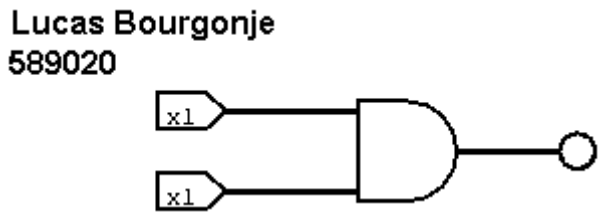
A	B	Q
0	0	0
1	0	1
0	1	1
1	1	0

How can the design be simplified?

By only using one XOR gate which does exactly the same as this circuit.

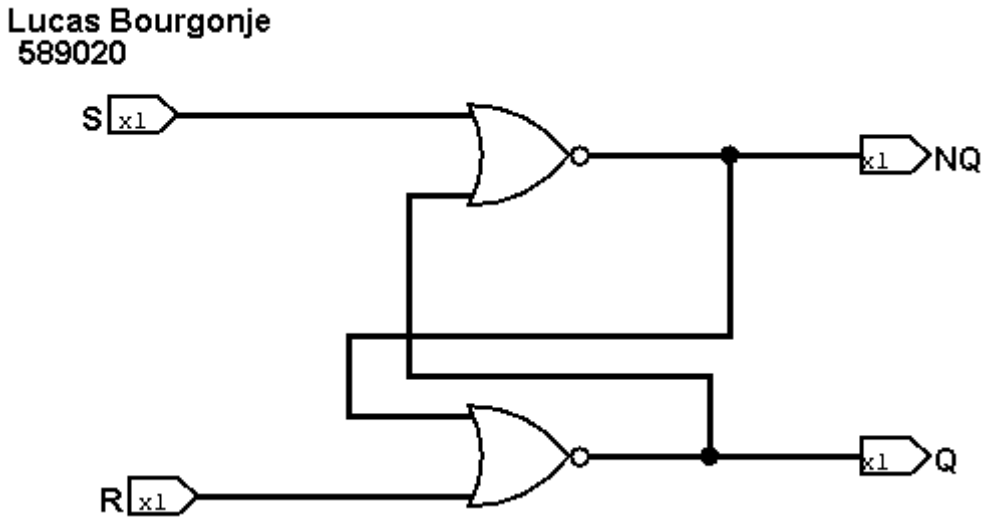
Assignment 2.4: Getting to know Logisim evolution

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



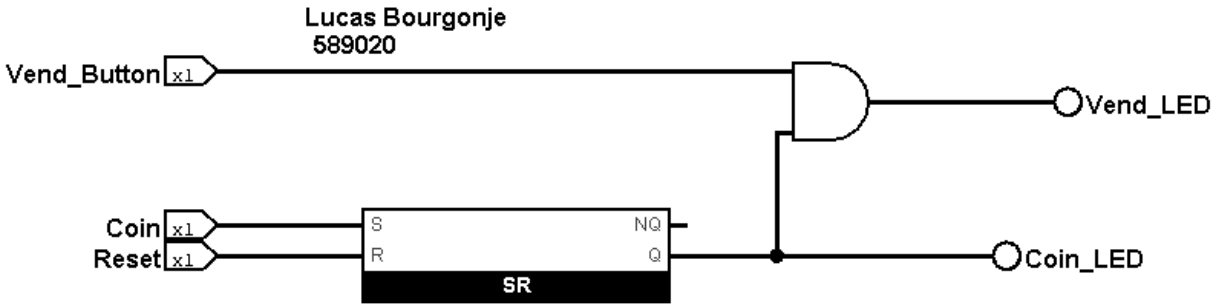
Assignment 2.5: SR Latch

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.

```
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");
 }
}
```

Assignment 2.8: Java Application Bit Calculations

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

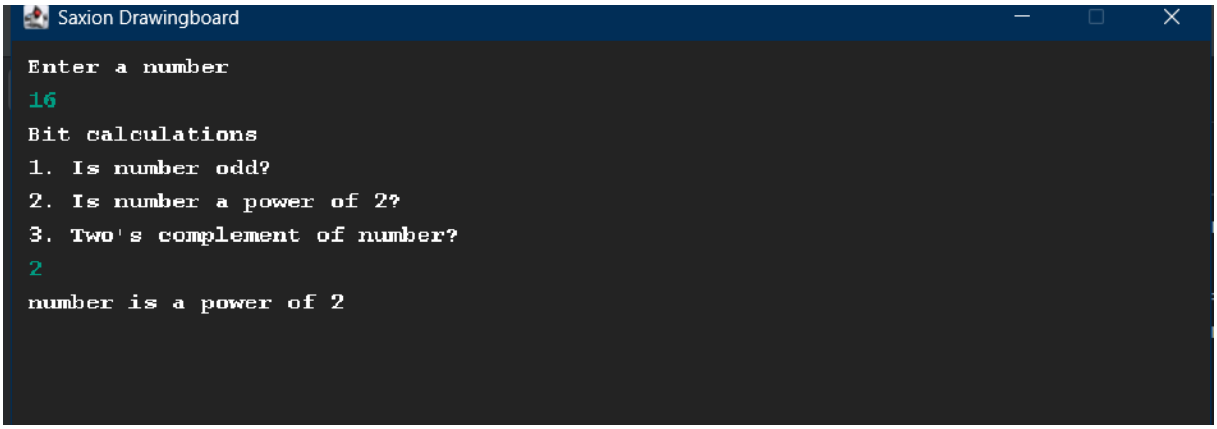
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?

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.



```
import nl.saxion.app.SaxionApp;

import java.awt.*;

public class Application implements Runnable { // There is a green button to the left of the word "public". Click here!

    public static void main(String[] args) {
        SaxionApp.start(new Application(), 750, 750);
    }

    public void run() {
        SaxionApp.printLine("Enter a number");
        int number = SaxionApp.readInt();
        SaxionApp.printLine("Bit calculations");
        SaxionApp.printLine("1. Is number odd?");
        SaxionApp.printLine("2. Is number a power of 2?");
        SaxionApp.printLine("3. Two's complement of number?");
        int input = SaxionApp.readInt();
        if (input == 1)
        {
            isNumberOdd(number);
        }
        else if (input == 2) {
            isNumberPowerOfTwo(number);
        }
        else if (input == 3) {
            twosComplementNumber(number);
        }
    }

    public void isNumberOdd(int number) {
        if((number & 1) == 1) SaxionApp.printLine("number is odd");
        else SaxionApp.printLine("number is even");
    }

    public void isNumberPowerOfTwo(int number) {
        if((number & (number - 1)) == 0) SaxionApp.printLine("number is a power of 2");
        else SaxionApp.printLine("number isn't a power of 2");
    }

    public void twosComplementNumber(int number) {
        number = (~number) + 1;
        SaxionApp.printLine("Number: " + number);
    }

}
```

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