Template Week 2 – Logic

Student number: 591007

Assignment 2.1: Parking lot

Which gates do you need?

AND gate met 3 ingangspoorten.

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
0	1	1
1	0	1
1	1	0

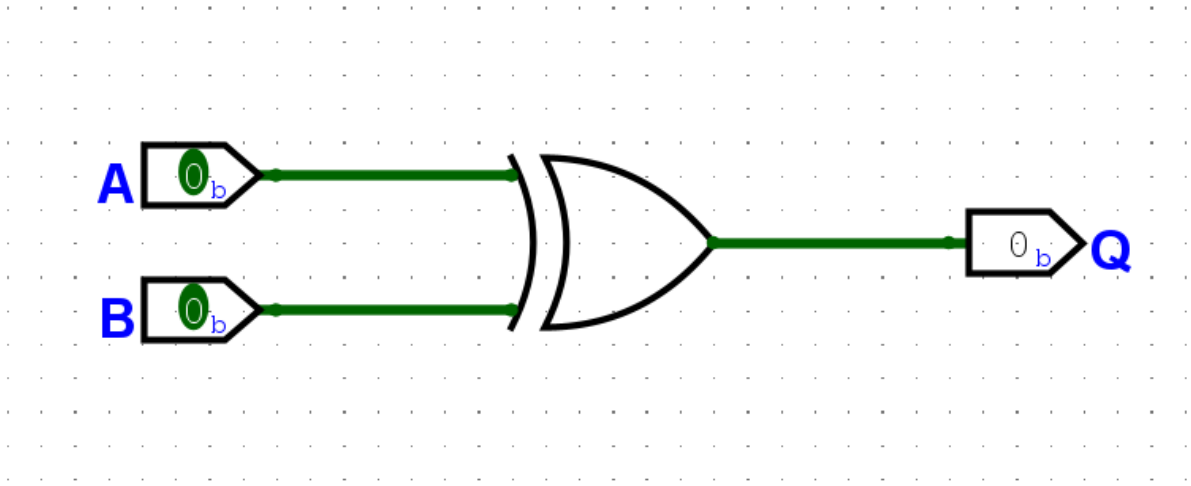
Assignment 2.3: Four NAND gates

Complete this table

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

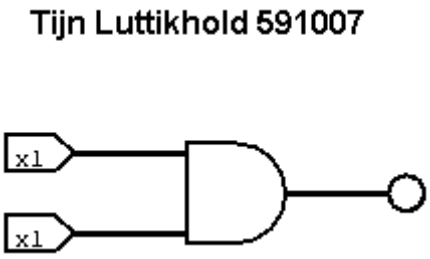
How can the design be simplified?

De 4 NAND gates kan je veranderen naar 1 XOR gate en dat blijft de truth table hetzelfde.



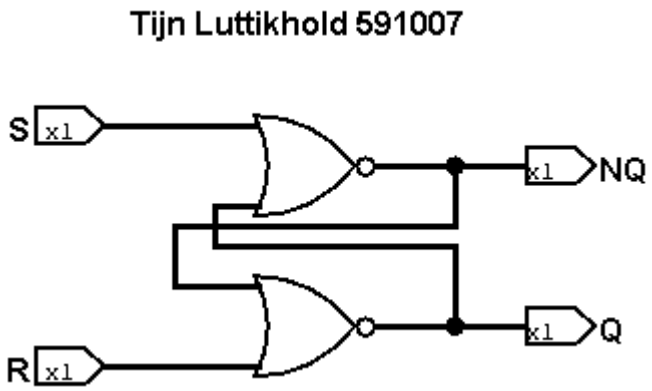
Assignment 2.4: Getting to know Logisim evolution

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



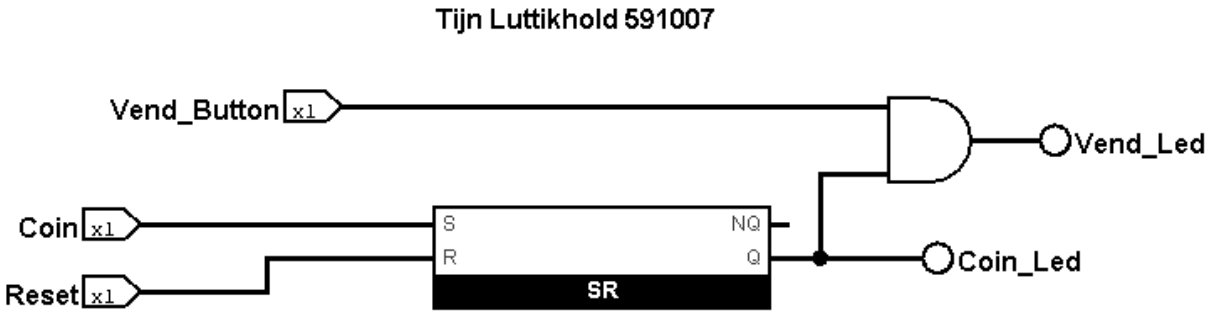
Assignment 2.5: SR Latch

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 = 4;
      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 java.util.Scanner;

public class Main {
    public static Scanner scanner = new Scanner(System.in);

    public static void main(String[] args) {
        while (true) {
            printMainMenu();

            int input = scanner.nextInt();

            switch (input) {
                case 1:
                    printOddNumber();
                    break;
                case 2:
                    printPowerOf2();
                    break;
                case 3:
                    printTwosComplement();
                    break;
                case 0:
                    return;
            }
        }
    }

    public static void printMainMenu() {
        System.out.println("Choose one of these options:");
        System.out.println("1.  Is number odd?");
        System.out.println("2.  Is number a power of 2?");
        System.out.println("3.  Two's complement of number?");
        System.out.println("0.  Exit program");
    }

    public static void printOddNumber() {
        System.out.println("Fill in the number you want to check: ");
```

```
        int number = scanner.nextInt();

        if ((number & 1) == 1) {
            System.out.println(number + " is odd");
        } else {
            System.out.println(number + " is even");
        }
    }

    public static void printPowerOf2() {
        System.out.println("Fill in the number you want to check: ");

        int number = scanner.nextInt();

        if ((number & (number - 1)) == 0) {
            System.out.println(number + " is a power of 2");
        } else {
            System.out.println(number + " isn’t a power of 2");
        }
    }

    public static void printTwosComplement() {
        System.out.println("Fill in the number you want to convert: ");

        int number = scanner.nextInt();

        int twosComplement = ~number + 1;

        System.out.println("Two's complement of " + number + " is " + twosComplement);
    }
}
```

```
Choose one of these options:
1.   Is number odd?
2.   Is number a power of 2?
3.   Two's complement of number?
0.   Exit program
1
Fill in the number you want to check:
3
3 is odd
Choose one of these options:
1.   Is number odd?
2.   Is number a power of 2?
3.   Two's complement of number?
0.   Exit program
1
Fill in the number you want to check:
2
2 is even
```

```
Choose one of these options:
1.   Is number odd?
2.   Is number a power of 2?
3.   Two's complement of number?
0.   Exit program
2
Fill in the number you want to check:
8
8 is a power of 2
Choose one of these options:
1.   Is number odd?
2.   Is number a power of 2?
3.   Two's complement of number?
0.   Exit program
2
Fill in the number you want to check:
9
9 isn't a power of 2
```

```
Choose one of these options:
1.   Is number odd?
2.   Is number a power of 2?
3.   Two's complement of number?
0.   Exit program
3
Fill in the number you want to convert:
4
Two's complement of 4 is -4
Choose one of these options:
1.   Is number odd?
2.   Is number a power of 2?
3.   Two's complement of number?
0.   Exit program
3
Fill in the number you want to convert:
99
Two's complement of 99 is -99
```

```
Choose one of these options:
1.   Is number odd?
2.   Is number a power of 2?
3.   Two's complement of number?
0.   Exit program
0

Process finished with exit code 0
```

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