

# Template Week 2 – Logic

Student number:

## Assignment 2.1: Parking lot

Which gates do you need?

2 EN 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
1	0	0	0
1	1	0	0
0	1	1	0
1	0	1	0
1	1	1	1

## Assignment 2.2: Android or iPhone

Which gates do you need?

Een OR 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

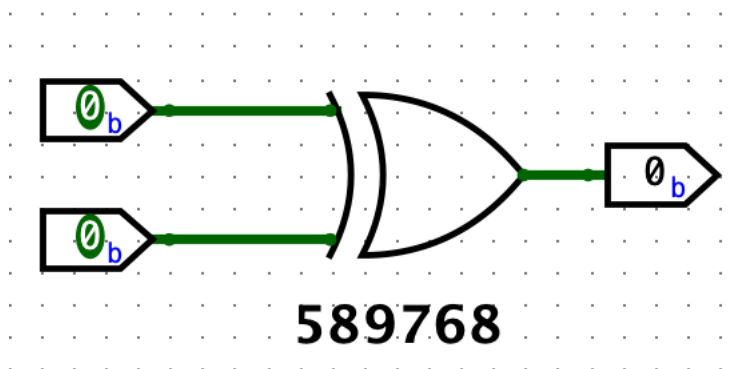
A	B	Q
1	0	1
0	1	1
0	0	0
1	1	0

How can the design be simplified?

Het design kan versimpelt worde door één XOR poort te gebruiken in dit design hoef je er maar één te gebruiken in plaats van.

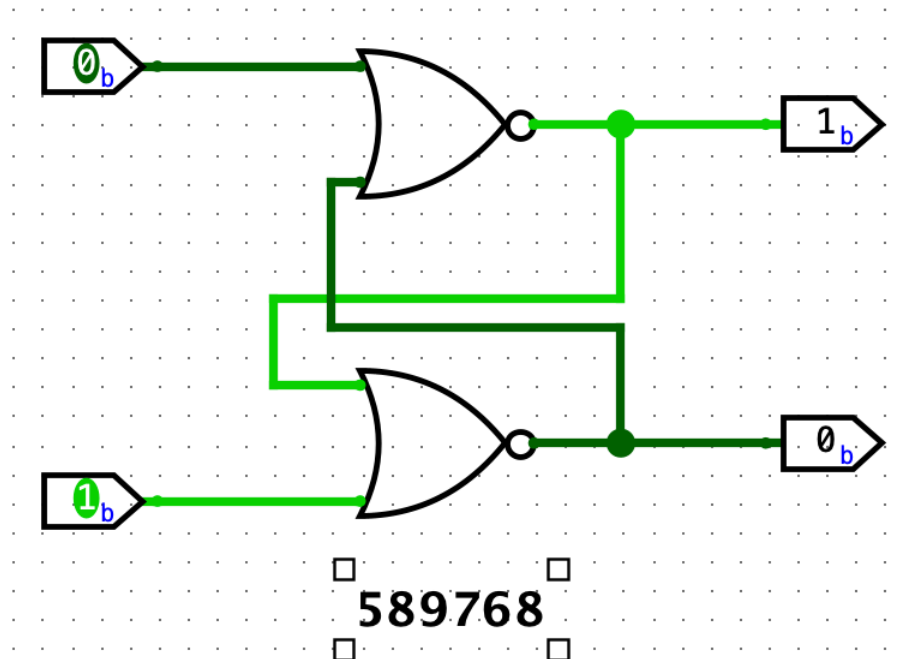
### Assignment 2.4: Getting to know Logisim evolution

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



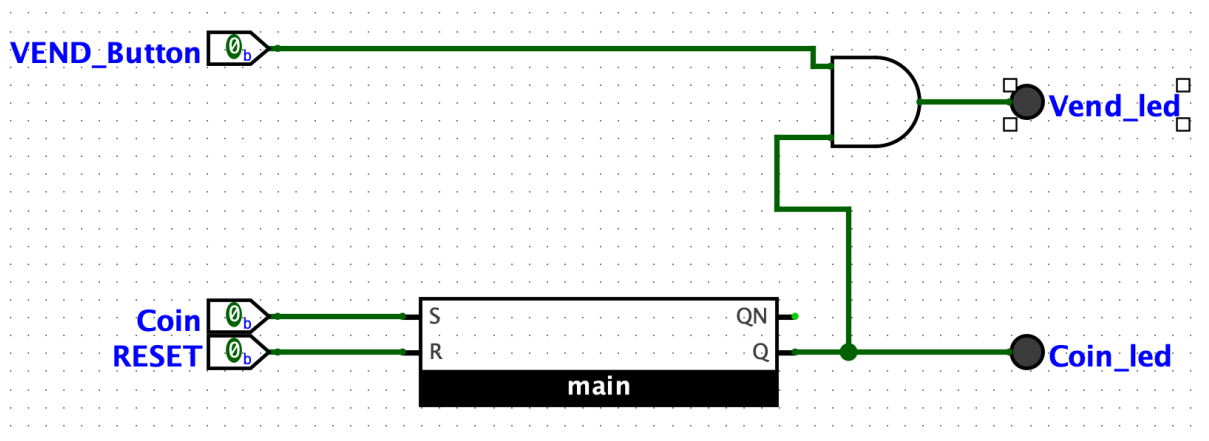
### Assignment 2.5: SR Latch

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 = 7;  
  
        if (number > 0 && (number & (number - 1)) == 0)  
            System.out.println("number is a power of 2");  
        else  
            System.out.println("number isn't a power of 2");  
    }  
}
```

## 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.

The screenshot shows an IDE with the following components:

- Project View:** Shows a project named 'untitled2' with a 'src' folder containing 'BitCalculations.class' and 'Main'.
- Source Code:** The file 'BitCalculations.java' is open, showing the following code:

```
1 import java.util.Scanner;
2
3 public class BitCalculations {
4     public static void main(String[] args) {
5         Scanner scanner = new Scanner(System.in);
6         int choice;
7
8         do {
9             System.out.println("=== Bit Calculations Menu ===");
10            System.out.println("1. Is number odd?");
11            System.out.println("2. Is number a power of 2?");
12            System.out.println("3. Two's complement of number?");
13            System.out.println("4. Exit");
14            System.out.print("Enter your choice: ");
15            choice = scanner.nextInt();
16
17            if (choice >= 1 && choice <= 3) {
18                System.out.print("Enter a number: ");
19                int number = scanner.nextInt();
20            }
21        } while (choice != 4);
22    }
23 }
```
- Run Console:** Shows the output of the program:

```
=== Bit Calculations Menu ===
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Exit
Enter your choice: 3
Enter a number: 2
Two's complement of 2 is -2
```
- Performance Monitor:** Shows CPU and Heap Memory usage.

```

import java.util.Scanner;

public class BitCalculations {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int choice;

        do {
            System.out.println("=== Bit Calculations Menu ===");
            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("4. Exit");
            System.out.print("Enter your choice: ");
            choice = scanner.nextInt();

            if (choice >= 1 && choice <= 3) {
                System.out.print("Enter a number: ");
                int number = scanner.nextInt();

                if (choice == 1) {
                    if ((number & 1) == 1)
                        System.out.println(number + " is odd");
                    else
                        System.out.println(number + " is even");
                } else if (choice == 2) {
                    if (number > 0 && (number & (number - 1)) == 0)
                        System.out.println(number + " is a power of 2");
                    else
                        System.out.println(number + " isn't a power of 2");
                } else if (choice == 3) {
                    int result = ~number + 1;
                    System.out.println("Two's complement of " + number + "
is " + result);
                }
            }
        } while (choice != 4);

        System.out.println("doei!");
        scanner.close();
    }
}

```

Ready? Then save this file and export it as a pdf file with the name: [week2.pdf](#)