# Template Week 2 – Logic

Student number:

582122

**Assignment 2.1: Parking lot**

Which gates do you need?

**-I will need an AND gate because the whole parking lot is only full when all individual lots are full at the same time.**

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

**Assignment 2.2: Android or iPhone**

Which gates do you need?

**XOR**

| 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**

| A | B | Q |
|---|---|---|
| 0 | 0 | 1 |

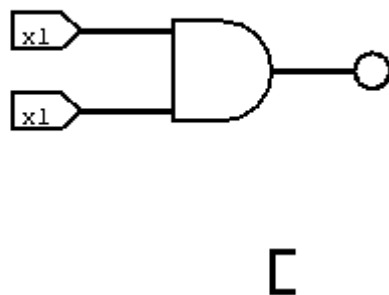| 0 | 1 | 1 |
|---|---|---|
| 1 | 0 | 1 |
| 1 | 1 | 0 |

How can the design be simplified?

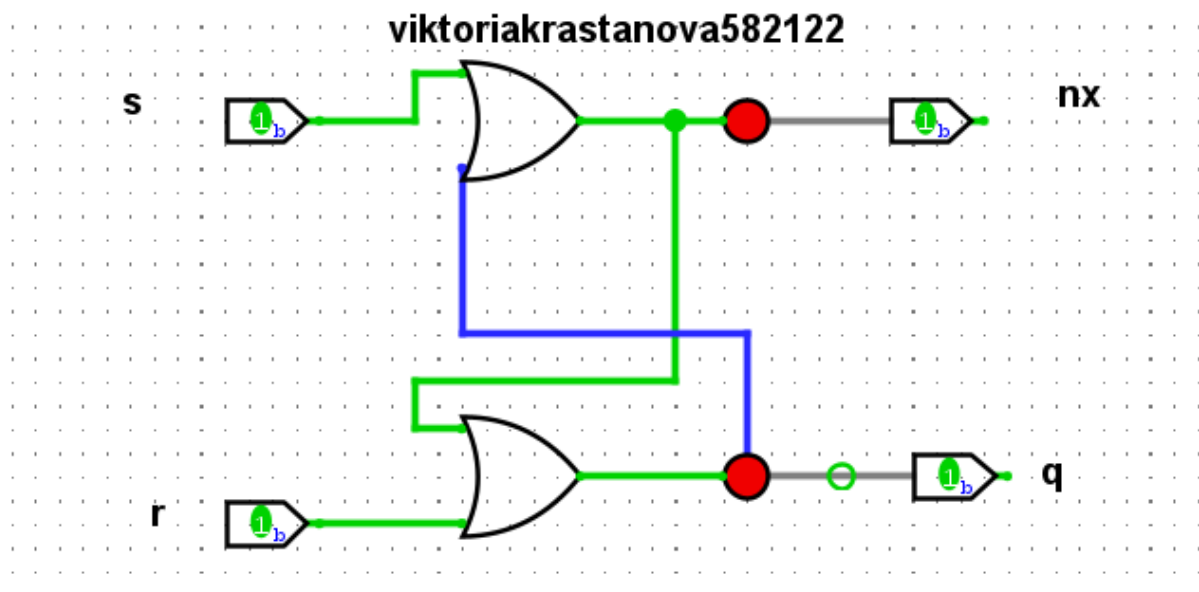## Assignment 2.4: Getting to know Logisim evolution

Screenshot of the design with your name and student number in it:
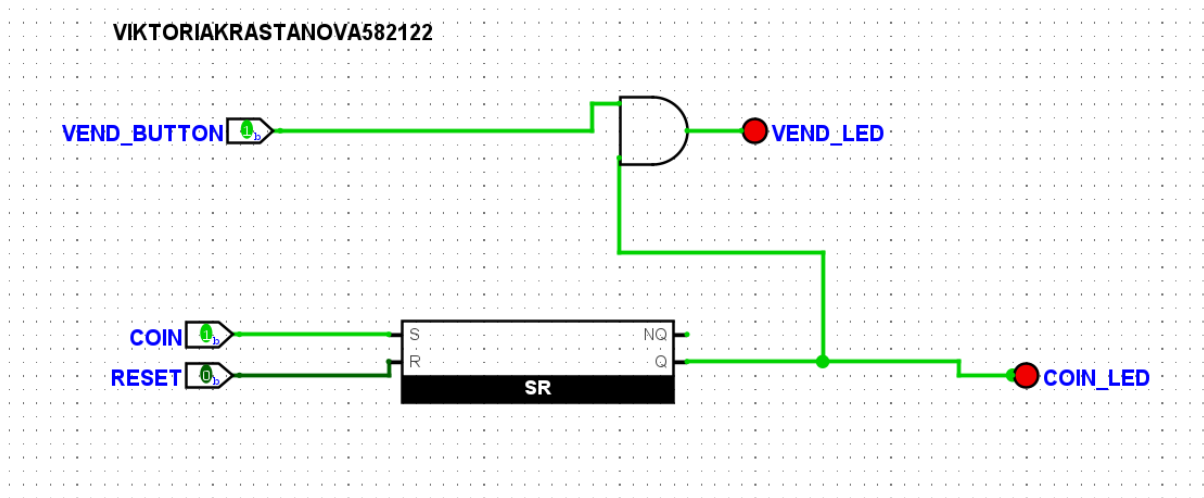
viktoriaKrastanova582122



## 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:

**VIKTORIAKRASTANOVA582122**

VEND_BUTTON → ... → VEND_LED

COIN → S ... NQ
RESET → R ... Q → COIN_LED
SR

**Assignment 2.7: Bitwise operators**

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

```java
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        System.out.println("1. Check if number is odd");
        System.out.println("2. Check if number is a power of 2");
        System.out.println("3. Check two's complement of a number");
        System.out.println("Choose an operation: ");

        Scanner scanner = new Scanner(System.in);
        int choice = scanner.nextInt();
        int num;

        switch (choice) {
            case 1:
                System.out.println("Choose a number: ");
                num = scanner.nextInt();
                numIsOdd(num);
                break;

            case 2:
                System.out.println("Choose a number: ");
                num = scanner.nextInt();
                numIsPowerOf2(num);
```

```java
            break;

        case 3:
            System.out.println("Choose a number: ");
            num = scanner.nextInt();
            twosComplement(num);
            break;
        }
    }

    public static void numIsOdd(int num) {
        if (num % 2 == 0) {
            System.out.println("The number " + num + " is not odd!");
        } else {
            System.out.println("The number " + num + " is odd!");
        }
    }

    public static void numIsPowerOf2(int num) {
        if ((num & num - 1) == 0) {
            System.out.println("The number " + num + " is a power of 2!");
        } else {
            System.out.println("The number " + num + " is not a power of 2!");
        }
    }

    public static void twosComplement(int num) {
        num = ~num;
        System.out.println("This is the negative version of your number: " + (num + 1));
        num = ~num;
        System.out.println("And now it's back to a positive: " + num);
    }
}
```

**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.

```
1. Check if number is odd
2. Check if number is a power of 2
3. Check two's complement of a number
Choose an operation:
3
Choose a number:
651
This is the negative version of your number: -651
And now it's back to a positive: 651

Process finished with exit code 0
```

```
1. Check if number is odd
2. Check if number is a power of 2
3. Check two's complement of a number
Choose an operation:
2
Choose a number:
6581486
The number 6581486 is not a power of 2!


Process finished with exit code 0
```

```
1. Check if number is odd
2. Check if number is a power of 2
3. Check two's complement of a number
Choose an operation:
1
Choose a number:
89854
The number 89854 is not odd!


Process finished with exit code 0
```

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