

# Template Week 2 – Logic

Student number: 522880

## Assignment 2.1: Parking lot

Which gates do you need?

Two AND gates

Complete this table

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

## Assignment 2.2: Android/iPhone

Which gates do you need?

One XOR gate

Complete this table

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

### Assignment 2.3: Four NAND gates

Complete this table

A	B	Q
0	0	FALSE
0	1	TRUE
1	0	TRUE
1	1	FALSE

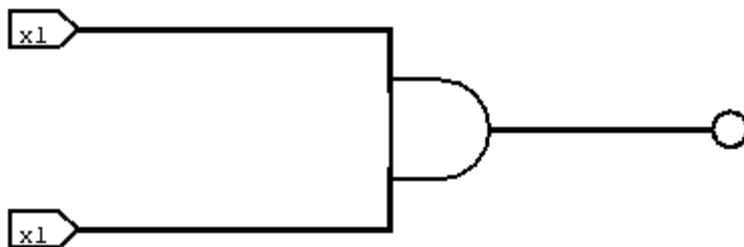
How can the design be simplified?

It is an XOR gate

### Assignment 2.4: Getting to know Logisim evolution

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

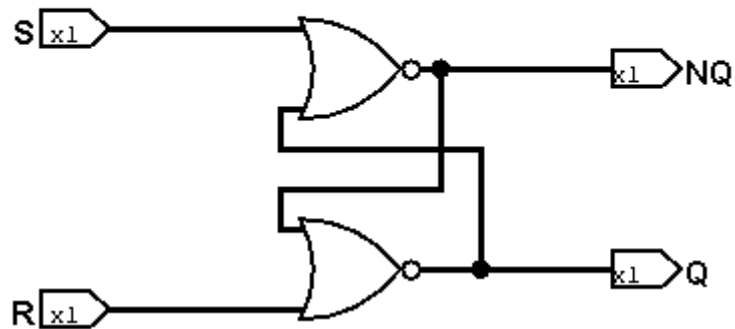
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### Assignment 2.5: SR Latch

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

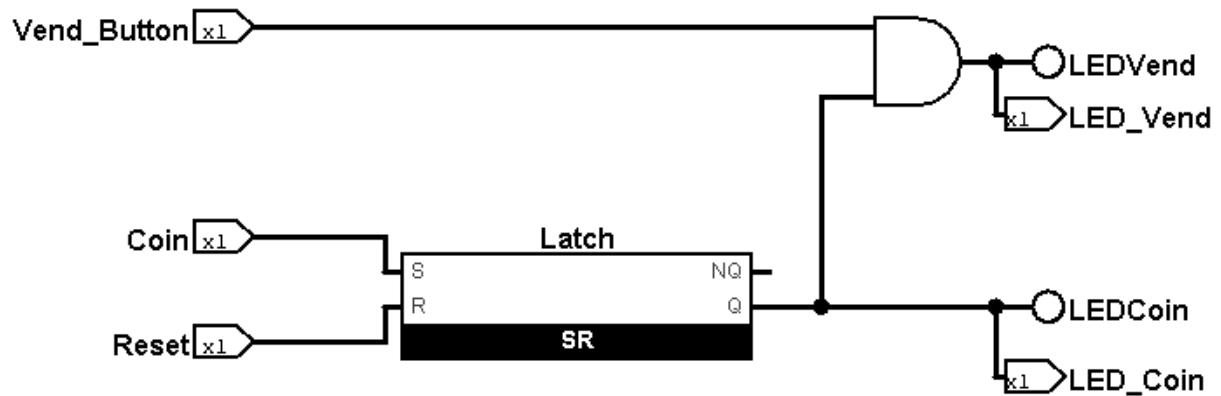
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### Assignment 2.6: Vending Machine

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

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## Bonus point assignment – week 2

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.

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

```
public class Main {
    public static void main(String[] args) {
        while (true) {
            try {
                System.out.println("""
                    Would you like to run:
                    1. Is number even comparison
                    2. Is number power of two comparison
                    3. Two's complement of number
                    4. Exit
                    """);
                var selection = Integer.parseInt(System.console().readLine());

                if (selection == 4) return;

                System.out.println("Please enter a valid number: ");
                var number = Integer.parseInt(System.console().readLine());

                switch (selection) {
                    case 1 -> System.out.println("Is number even: "
                        + isEven(number) + "\n");
                    case 2 -> System.out.println("Is number power of two: "
                        + isPowerOfTwo(number) + "\n");
                    case 3 -> System.out.println("Two's complement of number: "
                        + twosComplement(number) + "\n");
                    default -> System.out.println("Not a valid choice!\n");
                }
            } catch (Exception e) {
                System.out.println("Not a valid choice!!");
            }
        }
    }

    private static boolean isEven(int number) {
        return (number & 1) != 1;
    }

    private static boolean isPowerOfTwo(int number) {
        return (number & (number - 1)) == 0;
    }

    private static int twosComplement(int number) {
        return ~number + 1;
    }
}
```

IsEven:

```
C:\Users\nrich\.jdk\openjdk-22.0.2\bin\java.exe
Would you like to run:
1. Is number even comparison
2. Is number power of two comparison
3. Two's complement of number
4. Exit

1
Please enter a valid number:
16
Is number even: true

Would you like to run:
1. Is number even comparison
2. Is number power of two comparison
3. Two's complement of number
4. Exit

1
Please enter a valid number:
15
Is number even: false
```

IsPowerOfTwo:

```
C:\Users\nrich\.jdk\openjdk-22.0.2\bin\java.exe
Would you like to run:
1. Is number even comparison
2. Is number power of two comparison
3. Two's complement of number
4. Exit

2
Please enter a valid number:
16
Is number power of two: true

Would you like to run:
1. Is number even comparison
2. Is number power of two comparison
3. Two's complement of number
4. Exit

2
Please enter a valid number:
15
Is number power of two: false
```

TwoComplementOfNumber:

```
C:\Users\nrich\.jdk\openjdk-22.0.2\bin\java.exe
Would you like to run:
1. Is number even comparison
2. Is number power of two comparison
3. Two's complement of number
4. Exit

3
Please enter a valid number:
15
Two's complement of number: -15

Would you like to run:
1. Is number even comparison
2. Is number power of two comparison
3. Two's complement of number
4. Exit

3
Please enter a valid number:
-15
Two's complement of number: 15
```

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