

Template Week 2 – Logic

Student number: 579675

Assignment 2.1: Parking lot

Which gates do you need?

An AND-GATE

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?

An XOR-gate, to make sure the employee only has one, and atleast one, phone

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 | 1 |
| 1 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 1 | 0 |

How can the design be simplified?

Door gewoonweg gebruik te maken van een XOR gate, zoals hieronder uitgewerkt:

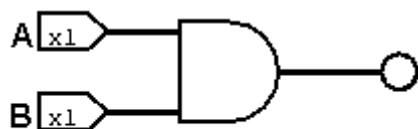


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Dit levert hetzelfde effect op als de overmatig ingewikkelde uitwerking op het opdrachtenformulier.

Assignment 2.4: Getting to know Logisim evolution

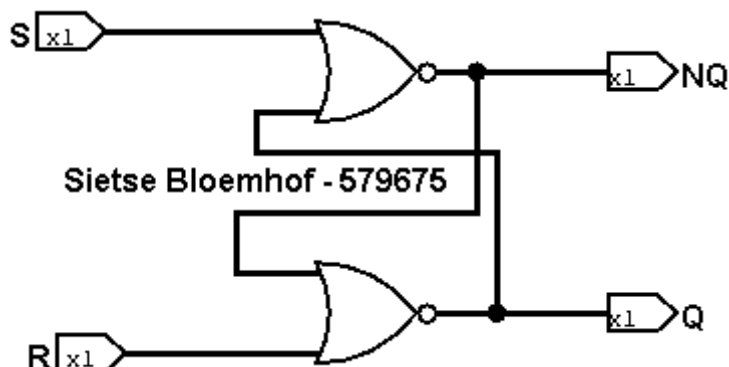
Screenshot of the design with your name and student number in it:



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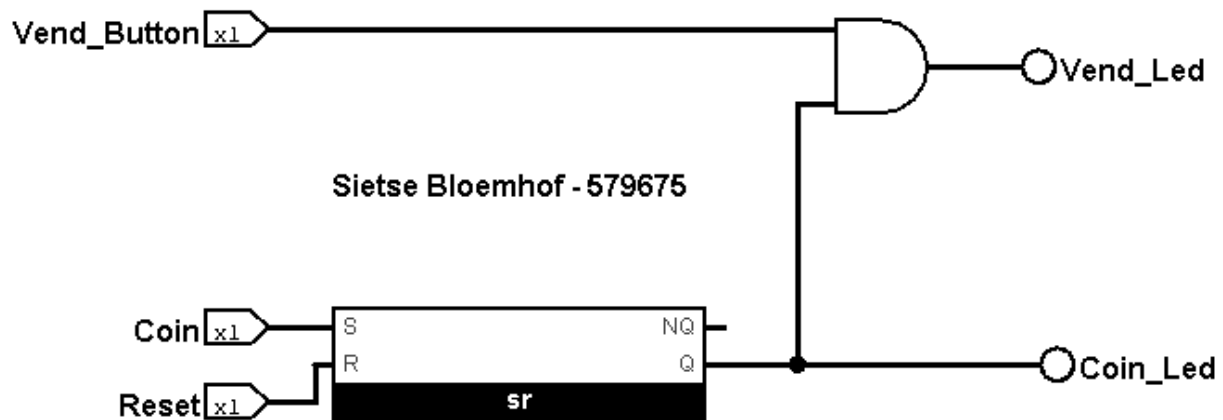
Assignment 2.5: SR Latch

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



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 & 0b0001) == 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 {

    private static Scanner s = new Scanner(System.in);

    public static void main(String[] args) {
        System.out.print("Please enter a number: ");
        int number = s.nextInt();

        while(true) {
            printMenu();
            switch(s.nextInt()) {
                case 1:
                    printIfNumIsOdd(number);
                    break;
                case 2:
                    printIfNumIsPowerOfTwo(number);
                    break;
                case 3:
                    printTwosComplementOfNum(number);
                    break;
                default:
                    break;
            }
        }
    }

    public static void printMenu() {
        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?");
    }

    public static void printIfNumIsOdd(int number) {
        if((number & 0b0001) == 1) System.out.println("number is odd");
        else System.out.println("number is not odd");
    }

    public static void printIfNumIsPowerOfTwo(int number) {
        if(number > 0 && (number & (number-1)) == 0) System.out.println("Number is to the power of 2");
        else System.out.println("Number is not to the power of two");
    }

    public static void printTwosComplementOfNum (int number) {
        System.out.println(~number + 1);
    }
}

```

```
}  
}
```

```
C:\Users\bloem\.jdk\ms-21.0.8\bin\java.exe "-javaagent:C:\Users\bloem\AppData\Local\Programs\IntelliJ IDEA Ultimate\lib\idea_rt.jar=51580" -Dfile.encoding=UTF-8 -Dsun.stdout  
Please enter a number: 8  
1. is number odd?  
2. is number a power of 2?  
3. Two's complement of number?  
1  
number is not odd  
1. is number odd?  
2. is number a power of 2?  
3. Two's complement of number?  
2  
Number is to the power of 2  
1. is number odd?  
2. is number a power of 2?  
3. Two's complement of number?  
3  
-8
```

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