

# Template Week 2 – Logic

Student number: 499193

## Assignment 2.1: Parking lot

Which gates do you need?

2 AND gates.

Complete this table

Parking lot 1	Parking lot 2	Parking lot 3	Result (full)
0	0	0	
0	0	1	
0	1	0	
1	0	0	
0	1	1	
1	1	0	
1	0	1	
1	1	1	Full

## Assignment 2.2: Android or iPhone

Which gates do you need?

Een XOR 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

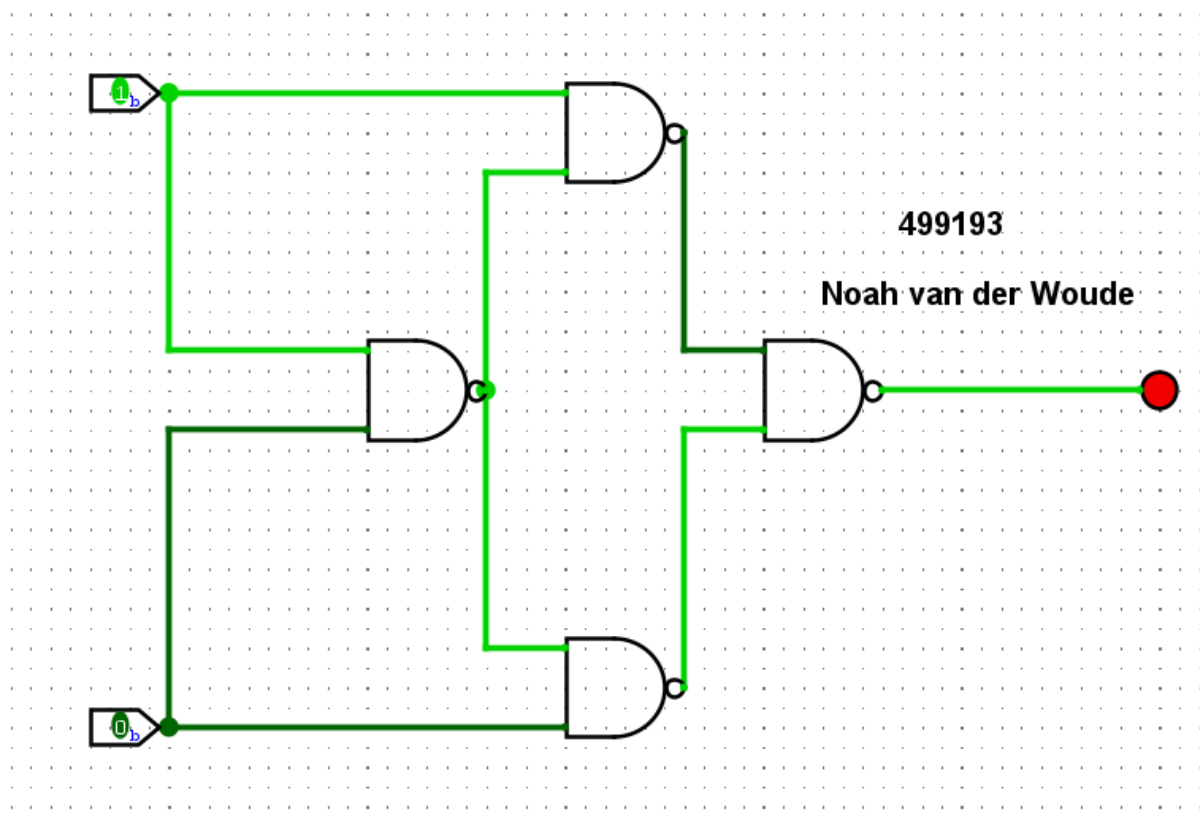
A	B	Q
0	0	0
1	0	1
1	1	0
0	1	1

How can the design be simplified?

XOR gate

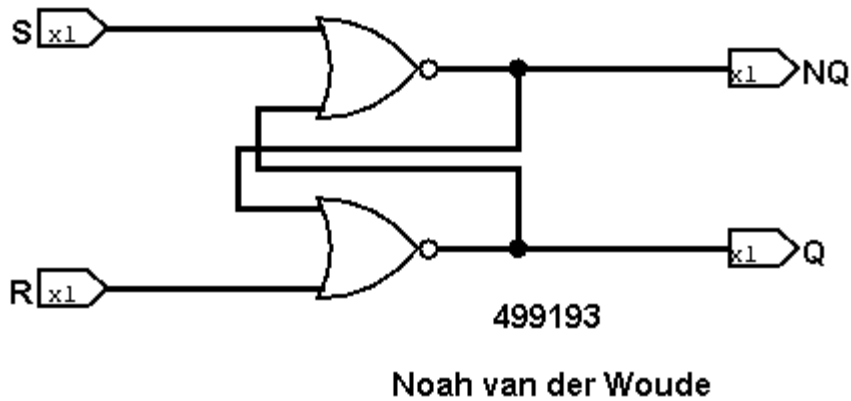
### Assignment 2.4: Getting to know Logisim evolution

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



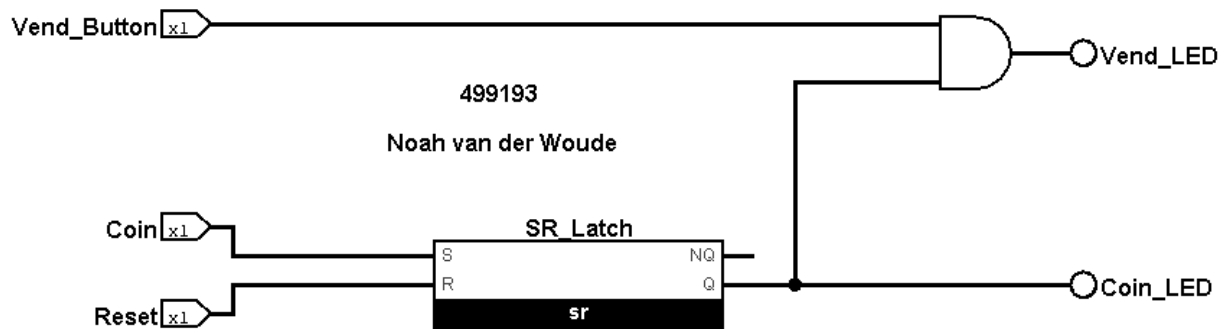
### Assignment 2.5: SR Latch

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.

### 1. EVEN OR ODD

```
public class Main {  
    public static void main(String[] args) {  
int number = 33;  
        if ((number & 1) == 1)  
            System.out.println("number is odd");  
        else  
            System.out.println("number is even");  
    }  
}
```

### 2. POWER OF TWO

```
public class Main {  
    public static void main(String[] args) {  
int number = 32;  
        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");  
    }  
}
```

### 3. CHECK PERMISSIONS

*File verse octal value: 644*

```
public class Main {
    public static void main(String[] args) {
final int READ = 4;
final int WRITE = 2;
final int EXECUTE = 1;
int userPermissions = 7;
        if((READ & userPermissions) == 4) System.out.println("User has read permissions");
        else System.out.println("User can't read. No permissions.");
    }
}
```

### 4. ASSIGN PERMISSIONS

```
public class Main {
    public static void main(String[] args) {
final int READ = 4;
final int WRITE = 2;
final int EXECUTE = 1;
int userPermissions = READ | EXECUTE;
        System.out.println("User permissions: " + userPermissions);
    }
}
```

## 5. UPDATE PERMISSIONS

```
public class Main {  
    public static void main(String[] args) {  
final int READ = 4;  
final int WRITE = 2;  
final int EXECUTE = 1;  
int userPermissions = 6;  
userPermissions = (userPermissions ^ WRITE);  
System.out.println("User permissions: "+userPermissions);  
    }  
}
```

## 6. TWO'S COMPLEMENT

```
public class Main {  
    public static void main(String[] args) {  
int number = 5;  
System.out.println("Number: "+number);  
number = ~number;  
System.out.println("Number: "+number);  
number = ~number;  
System.out.println("Number: "+number);  
    }  
}
```

## 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 void main(String[] args) {
        Scanner userInput = new Scanner(System.in);
        System.out.println("Enter a number: ");
        int number = userInput.nextInt();
        int twocomp = 0;
        boolean continueProgram = true;
        while (continueProgram) {
            System.out.println("1) Is number odd?");
            System.out.println("2) Is number power of two?");
            System.out.println("3) Show two's complement.");
            System.out.println("0) Exit.");
            int input = userInput.nextInt();

            if (input == 1) {
                if ((number & 1) == 1)
                    System.out.println("number is odd");
                else
                    System.out.println("number is even");
            } else if (input == 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 (input == 3) {
                twocomp = ~number + 1;
                System.out.println(+twocomp);
            } else if (input == 0) {
                continueProgram = false;
            }
        }
    }
}
```

```

Main x
C:\Users\noahv\.jdk\ms-21.0.8\bin\java.e
Enter a number:
4
1) Is number odd?
2) Is number power of two?
3) Show two's complement.
0) Exit.
1
number is even
1) Is number odd?
2) Is number power of two?
3) Show two's complement.
0) Exit.
2
number is a power of 2
1) Is number odd?
2) Is number power of two?
3) Show two's complement.
0) Exit.
3
-4
1) Is number odd?
2) Is number power of two?
3) Show two's complement.
0) Exit.
|

```

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