

# Template Week 2 – Logic

Student number: 589845

## Assignment 2.1: Parking lot

Which gates do you need?

AND

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
0	1	1	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

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

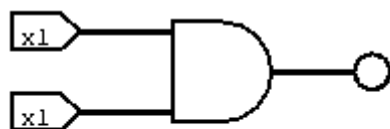
A	B	Q
0	0	0
1	0	1
0	1	1
1	1	0

How can the design be simplified?

Place a single XOR gate

### Assignment 2.4: Getting to know Logisim evolution

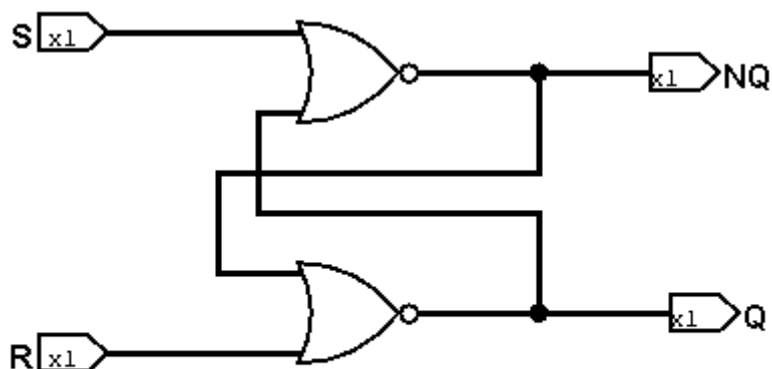
Screenshot of the design with your name and student number in it:



Maickel Veldman 589845

### Assignment 2.5: SR Latch

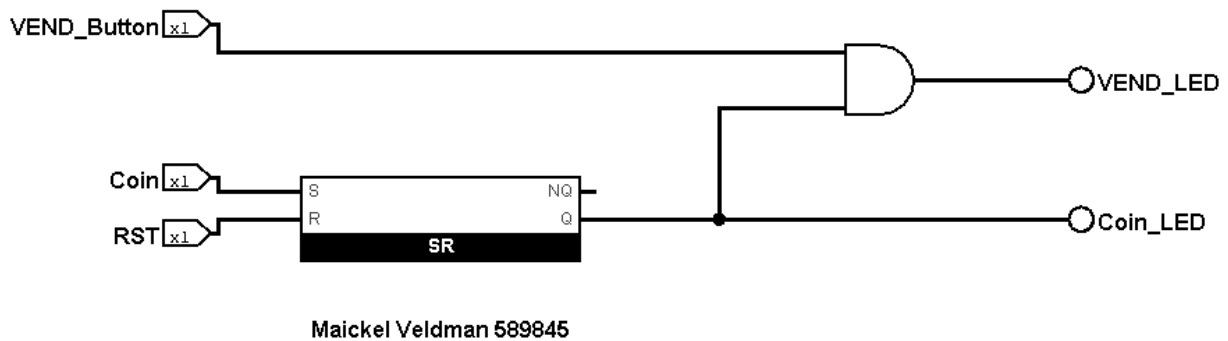
Screenshot SR Latch in Logisim with your name and student number:



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## Assignment 2.6: Vending Machine

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



## Assignment 2.7: Bitwise operators

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

#1

```
public class Main {
    public static void main(String[] args) {
        int number = 5;
        if((number & 1) == 1) System.out.println("number is odd");
        else System.out.println("number is even");
    }
}
```

#2

```
public class Main {
    public static void main(String[] args) {
        int number = 17;
        if((number & (--number)) == 0) System.out.println("number is a
power of 2");
        else System.out.println("number isn't a power of 2");
    }
}
```

#3

```
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((userPermissions & READ) != 0) System.out.println("User has read
permissions");
        else System.out.println("User can't read. No permissions.");
    }
}
```

#### #4

```
public class Main {
    public static void main(String[] args) {
        final int READ = 4;
        final int WRITE = 2;
        final int EXECUTE = 1;
        int userPermissions = 0;

        userPermissions |= READ;
        userPermissions |= EXECUTE;

        System.out.println("User permissions: "+userPermissions);
    }
}
```

#### #5

```
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 ^= WRITE;

        System.out.println("User permissions: "+userPermissions);
    }
}
```

#### #6

```
public class Main {
    public static void main(String[] args) {
        int number = 5;
        number = ~number + 1;
        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.io.IOException;
import java.util.Scanner;

public class Main {
    public static void main(String[] args) throws IOException {
        Scanner in = new Scanner(System.in);

        System.out.println("Give me a number");
        int userNumber = in.nextInt();

        System.out.println("What should i do with the number?:");
        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?");
        int userOption = in.nextInt();

        switch (userOption){
            case(1):
                isNumberOdd(userNumber);
                break;
            case(2):
                powerOfTwo(userNumber);
                break;
            case(3):
                TwoComplement(userNumber);
                break;
            default:
                System.out.println("Chose a option");
                break;
        }
    }

    static void isNumberOdd(int number){
        if((number & 1) == 1) System.out.println("number is odd");
        else System.out.println("number is even");
    }

    static void powerOfTwo(int number){
        if((number & (--number)) == 0) System.out.println("number is a
power of 2");
        else System.out.println("number isn't a power of 2");
    }

    static void TwoComplement(int number){
        number = ~number + 1;
        System.out.println("Number: "+number);
    }
}
```

```
Give me a number
```

```
43
```

```
What should i do with the number?:
```

```
1. Is number odd?
```

```
2. Is number a power of 2?
```

```
3. Two's complement of number?
```

```
2
```

```
number isn't a power of 2
```

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