

# Template Week 2 – Logic

Student number: 587707

## Assignment 2.1: Parking lot

Which gates do you need?

Two AND gates

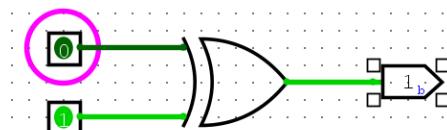
Complete this table

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

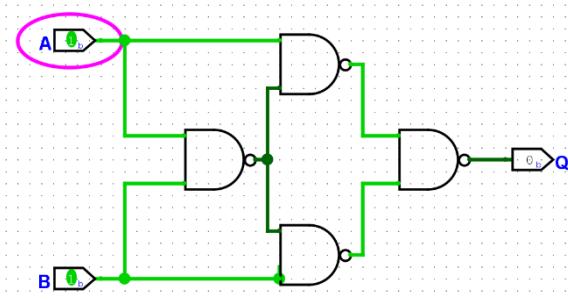
## Assignment 2.2: Android or iPhone

Which gates do you need?

One XOR gate:



or 4 NAND gates:



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

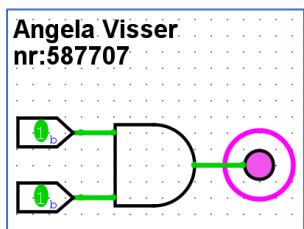
A	B	Q
0	0	0
0	1	1
1	0	1
1	1	0

How can the design be simplified?

With one XOR gate

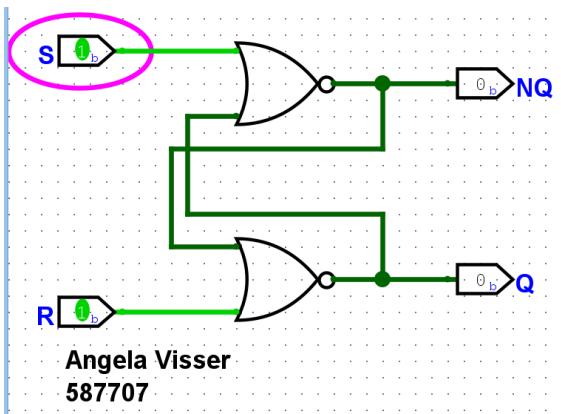
### Assignment 2.4: Getting to know Logisim evolution

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



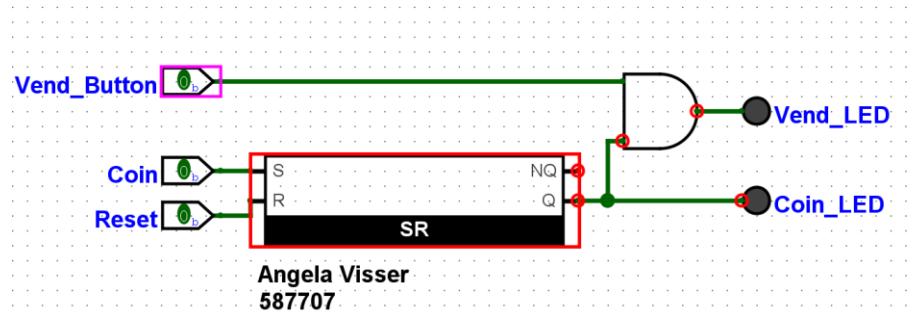
### Assignment 2.5: SR Latch

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.

### 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.

```
Please enter a number: 16
Menu
-----
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Choose a new number.
0. Exit
Choose option: 1
16 is even.

Choose option: 2
16 is a power of 2

Choose option: 3
-16 is 16 as two's complement

Choose option: Angela Visser, 587707
```

```
Please enter a number: 21
Menu
-----
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Choose a new number.
0. Exit
Choose option: 1
21 is odd.

Choose option: 2
21 is not a power of 2

Choose option: 3
-21 is 21 as two's complement

Choose option: Angela Visser, 587707
```

**source code:**

```
import nl.saxion.app.SaxionApp;
import java.awt.*;
public class Application implements Runnable {

    public static void main(String[] args) {
        SaxionApp.start(new Application(), 800, 800);
    }
    public void run() {
        int input = -1;
        SaxionApp.print("Please enter a number: ");
        int number = SaxionApp.readInt();
        ShowMenu();
        while (input!=0) {

            SaxionApp.print("Choose option: ");
            input = getUserInput(0,4,"Menu option does not exist");

            if (input == 1) {
                if ((number&1)==1){
                    SaxionApp.printLine(number + " is odd.");
                }else{
                    SaxionApp.printLine(number + " is even.");
                }
                SaxionApp.pause();

            } else if (input == 2) {
                if((number&(number-1))==0){
                    SaxionApp.printLine(number + " is a power of 2");
                } else {
                    SaxionApp.printLine(number + " is not a power of 2");
                }
                SaxionApp.pause();

            } else if (input == 3) {
                int numberInverted = (~number)+1;
                SaxionApp.printLine(number + " is " + numberInverted + " as two's complement");
                SaxionApp.pause();

            } else if (input==4) {
                SaxionApp.clear();
                SaxionApp.print("Please enter a number: ");
                number = SaxionApp.readInt();
                ShowMenu();
            }
        }
    }
}
```

```
public void ShowMenu(){
    SaxionApp.printLine("Menu");
    SaxionApp.printLine("-----");
    SaxionApp.printLine("1. Is number odd?");
    SaxionApp.printLine("2. Is number a power of 2?");
    SaxionApp.printLine("3. Two's complement of number?");
    SaxionApp.printLine("4. Choose a new number.");
    SaxionApp.printLine("0. Exit");
}

public int getUserInput(int min, int max, String errorMessage){
    int input = SaxionApp.readInt();
    while (input < min || input > max){
        SaxionApp.printLine(errorMessage, Color.red);
        input = SaxionApp.readInt();
    }
    return input;
}
```

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