

# Template Week 2 – Logic

Student number: 574642

## Assignment 2.1: Parking lot

Which gates do you need?

Een AND gate met 3 ingangen.

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
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

## Assignment 2.2: Android or iPhone

Which gates do you need?

XOR gate

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

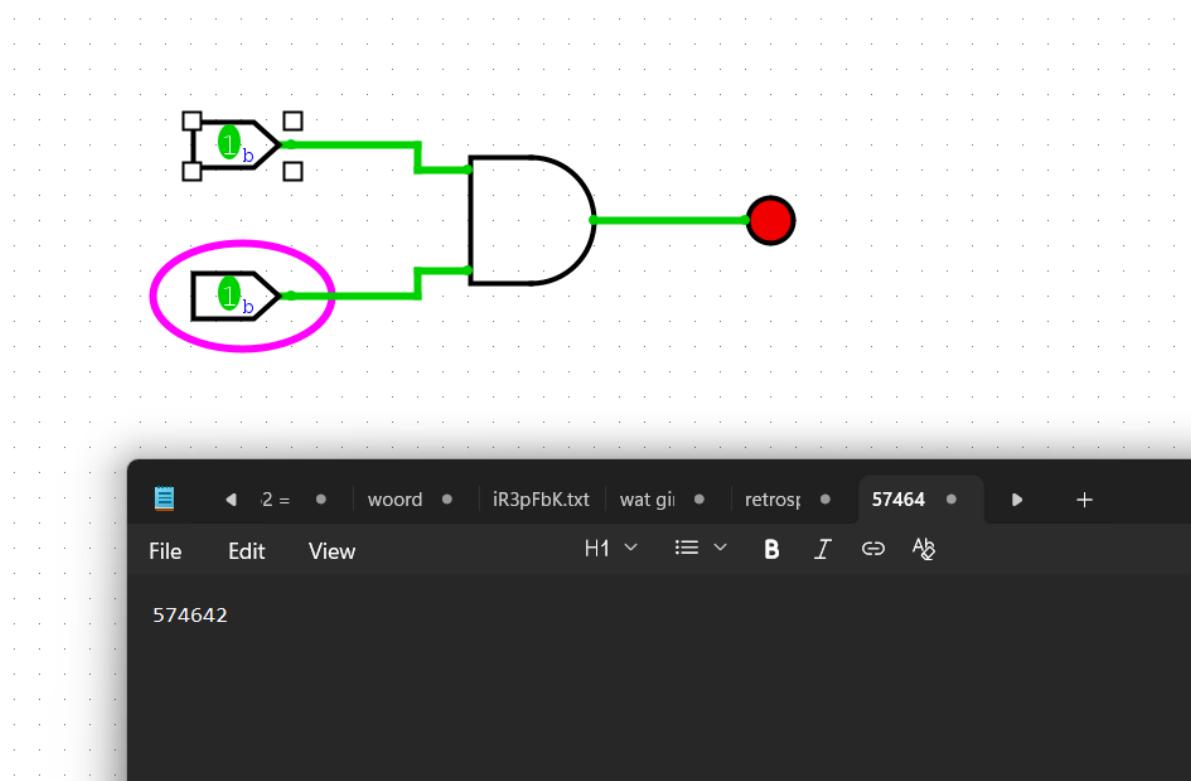
A	B	Q
0	0	0
0	1	1
1	0	1
1	1	0

How can the design be simplified?

Die 4 NAND gates zijn eigenlijk een XOR gate.

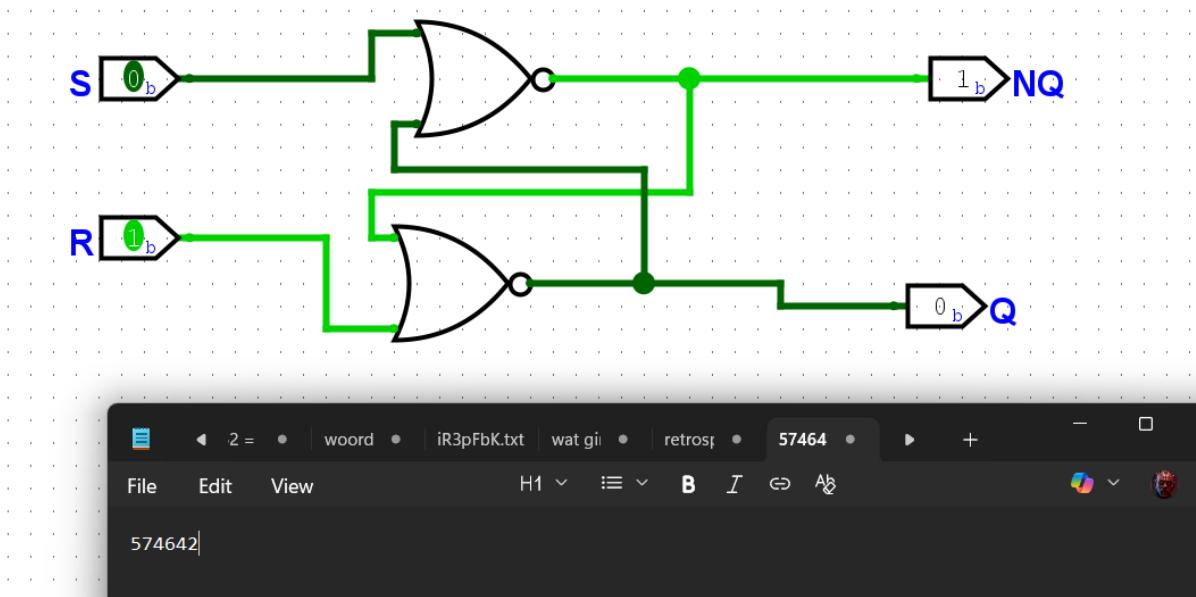
### Assignment 2.4: Getting to know Logisim evolution

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



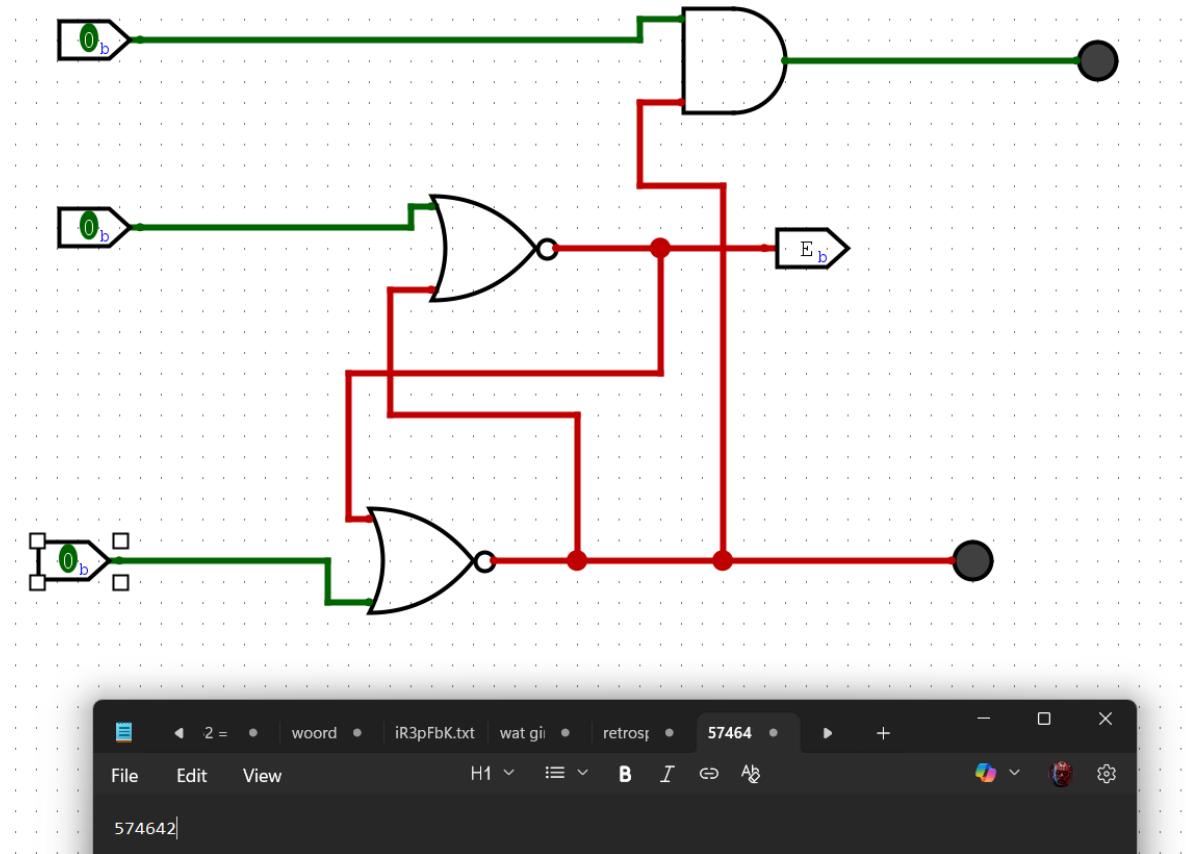
### Assignment 2.5: SR Latch

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.

```
public class Main {  
    public static void main(String[] args) {  
        int number = 6;  
        if ((number & 1) == 1)  
            System.out.println("number is odd");  
        else  
            System.out.println("number is even");  
    }  
}
```

```
public class Main {  
    public static void main(String[] args) {  
        int number = 4;  
        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");  
        }  
    }  
}
```

```
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.");  
    }  
}
```

```
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);  
    }  
}
```

```
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);  
    }  
}
```

```
public class Main {  
    public static void main(String[] args) {  
        int number = 5;  
        number = (~number) + 1;  
        System.out.println("Number: " + number);  
        number = (~number) + 1;  
        System.out.println("Back to: " + 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.

The screenshot shows an IDE interface with several tabs and panes. The top tab bar includes 'Exercise1', 'Exercise2', 'Exercise3', 'Exercise4', 'Exercise5', 'Agos.java', and 'ages.csv'. Below the tabs, there are two main code editors. The left editor contains a Java class named 'SaxionApp' with a static 'main' method that prints a menu with three options: 1. Is the number odd?, 2. Is the number a power of 2?, and 3. Two's complement of number?. It then reads a user choice and prints corresponding messages based on the choice. The right editor contains another Java class 'Application' with a static 'main' method that starts a new 'Application' object with width 600 and height 600. The bottom pane shows the command line output of the application running, displaying the menu and the message 'The number is odd'. The status bar at the bottom indicates the application exited normally.

```
public class Application implements Runnable {
    public static void main(String[] args) { SaxionApp.start(new Application(), width 600, height 600); }

    public void run() {
        int number = SaxionApp.readInt(alternativeErrorMessage, "Please enter a number:");

        System.out.println("Menu:");
        System.out.println("1. Is the number odd?");
        System.out.println("2. Is the number a power of 2?");
        System.out.println("3. Two's complement of number?");

        int choice = SaxionApp.readInt(alternativeErrorMessage, "Choose an option:");

        if (choice == 1) {
            if ((number & 1) == 1) {
                SaxionApp.println("The number is odd");
            } else {
                SaxionApp.println("The number is even");
            }
        } else if (choice == 2) {
            if (number > 0 && (number & (number - 1)) == 0) {
                SaxionApp.println(number + " is a power of 2");
            } else {
                SaxionApp.println(number + " isn't a power of 2");
            }
        } else if (choice == 3) {
            number = (~number) + 1;
            SaxionApp.println("Number:" + number);
            number = (~number) + 1;
            SaxionApp.println("Back to:" + number);
        }
    }
}
```

```
C:\Users\thijn\jdk\ms-21.0.0\bin\java.exe "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA 2025.2.4\lib\idea_rt.jar=59019" -Dfile.encoding=UTF-8 -Dsun.stdout.encoding=UTF-8 -Dsun.stderr.encoding=UTF-8 -classpath C:\Users\thijn\Downloads\Lists\Exercise2\Saxion\Desingnred\SaxionApp version: 1.0.1 ==
== SaxionApp
```

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