

# Week 2 – Logic

Student number: 581124

## Assignment 2.1: Parking lot

Which gates do you need?

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

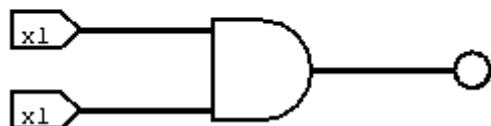
How can the design be simplified?

These four NAND gates can be simplified just in one XOR gate.

### Assignment 2.4: Getting to know Logisim evolution

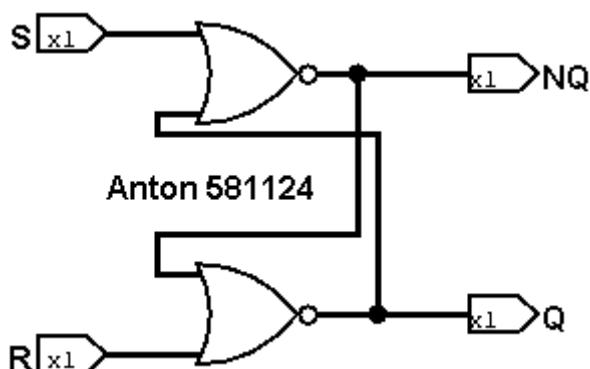
Screenshot of the design with your name and student number in it:

Anton 581124



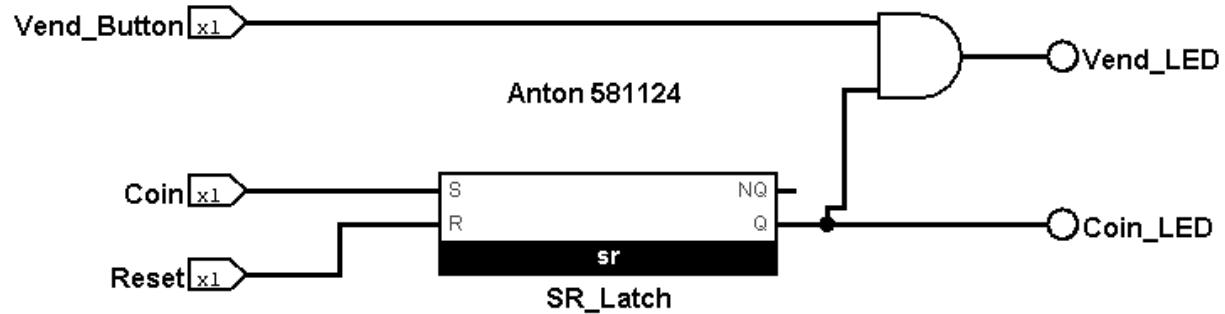
### Assignment 2.5: SR Latch

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.

#### Task 1

```
public class Main {  
    public static void main(String[] args) {  
        int number = 0;  
  
        if((number & 1) == 1)  
            System.out.println("number is odd");  
        else  
            System.out.println("number is even");  
    }  
}
```

#### Task 2

```
public class Main {  
    public static void main(String[] args) {  
        int number = 2;  
        if ( ( (number & (number - 1)) == 0 ) && number > 0)  
            System.out.println("number is a power of 2");  
        else  
            System.out.println("number isn't a power of 2");  
    }  
}
```

### **Task 3**

Permission for the file **verse** in Octal is: **644 (RW for User, R for Group, R for Others)**

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

### **Task 4**

```
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);  
    }  
}
```

### **Task 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 = userPermissions ^ WRITE;  
    System.out.println("User permissions: "+userPermissions);  
  
}  
}
```

**Task 6**

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

**Task 7**

```
public class Main {  
  
    public static void main(String[] args) {  
  
        int number = 10;  
        System.out.println("Decimal integer: "+number);  
  
        String binary = Integer.toBinaryString(number);  
        String octal = Integer.toOctalString(number);  
        String hexadecimal = Integer.toHexString(number);  
  
        System.out.println("Binary representation: " + binary);  
        System.out.println("Octal representation: " + octal);  
        System.out.println("Hexadecimal representation: " + hexadecimal);  
    }  
}
```

### 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 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() {
        displayMenu();
        boolean exit = false;

        while (!exit) {
            SaxionApp.printLine();
            SaxionApp.printLine("What do you want to know?");
            int choice = SaxionApp.readInt();

            SaxionApp.printLine("What is your number?");
            int number = SaxionApp.readInt();

            switch (choice) {
                case 1:
                    SaxionApp.printLine(isOdd(number));
                    break;
                case 2:
                    SaxionApp.printLine(isPowerOfTwo(number));
                    break;
                case 3:
                    SaxionApp.printLine("Two's complement of " + number + " is: " +
getComplementOfNumber(number));
                    break;
            }
        }
    }

    private boolean isOdd(int number) {
        return (number & 1) == 1;
    }

    private boolean isPowerOfTwo(int number) {
        return (number > 0) && ((number & (number - 1)) == 0);
    }

    private int getComplementOfNumber(int number) {
        return ~number;
    }
}
```

```

        case 0:
            exit = true;
            break;
        default:
            SaxionApp.printLine("There is no such option present!", Color.RED);
            break;
    }
}
}

public String isOdd(int number) {
    if ((number & 1) == 1)
        return "Your number is odd";
    else
        return "Your number is even";
}

public String isPowerOfTwo(int number) {
    if (((number & (number - 1)) == 0) && number > 0)
        return "Your number is a power of 2";
    else
        return "Your number isn't a power of 2";
}

public int getComplementOfNumber(int number) {
    return number = ~number + 1;
}

public void displayMenu() {
    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("0. Exit");
}
}

```

## Saxion Drawingboard

1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
0. Exit

What do you want to know?

1

What is your number?

16

Your number is even

What do you want to know?

1

What is your number?

15

Your number is odd

What do you want to know?

2

What is your number?

32

Your number is a power of 2

What do you want to know?

2

What is your number?

34

Your number isn't a power of 2

What do you want to know?

3

What is your number?

5

Two's complement of 5 is: -5

What do you want to know?

0

Пошук програм, параметрів і докуме

### Закріплено



Edge



Word



Excel



Microsoft Store



Фотографії



Налаштування



LinkedIn



Калькулятор



Годинник

### Рекомендовані



Epic Games Launcher

Нещодавно додані



Visual Studio Code

Нещодавно додані



Java bitwise code

7хв. тому



Anton Potovskiy

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