Template Week 2 – Logic

Student number: 589948

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
1	0	1
0	1	1
1	1	0

Assignment 2.3: Four NAND gates

Complete this table

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

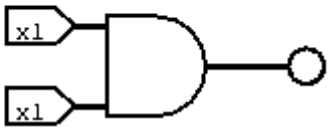
How can the design be simplified?

De truth table komt overeen met een enkele NAND-poort, dus het ontwerp kan worden vereenvoudigd tot één NAND-gate A en B direct op één NAND aansluiten.

Assignment 2.4: Getting to know Logisim evolution

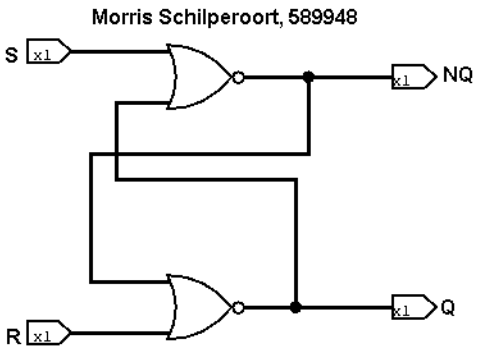
Screenshot of the design with your name and student number in it:

Morris Schilperoort, 589948



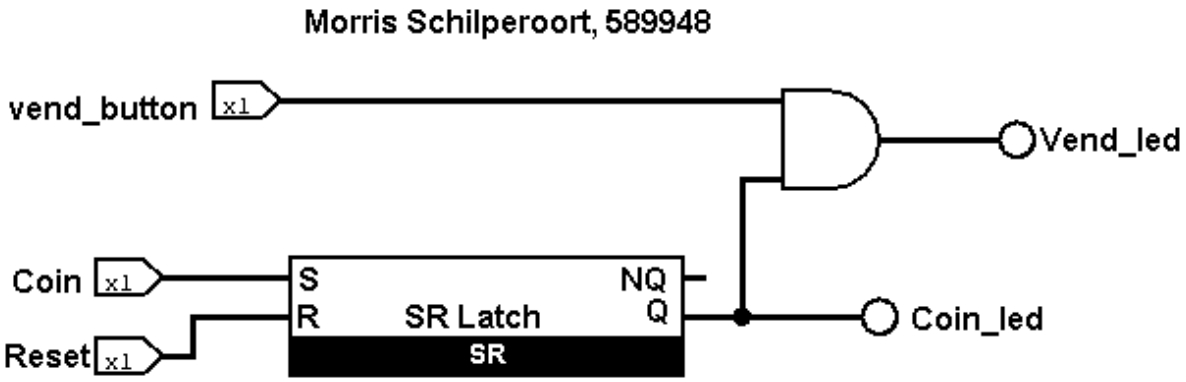
Assignment 2.5: SR Latch

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:

```java
public class Main {
    public static void main(String[] args) {

        int number = 5;

        if ((number & 1) == 0) {
            System.out.println("number is even");
        } else {
            System.out.println("number is odd");
        }
    }
}
```

```
number is odd
```

#2:

```java
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");
    }
}
```

```
number is a power of 2
```

#3:

#4:

```java
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 | EXECUTE;

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

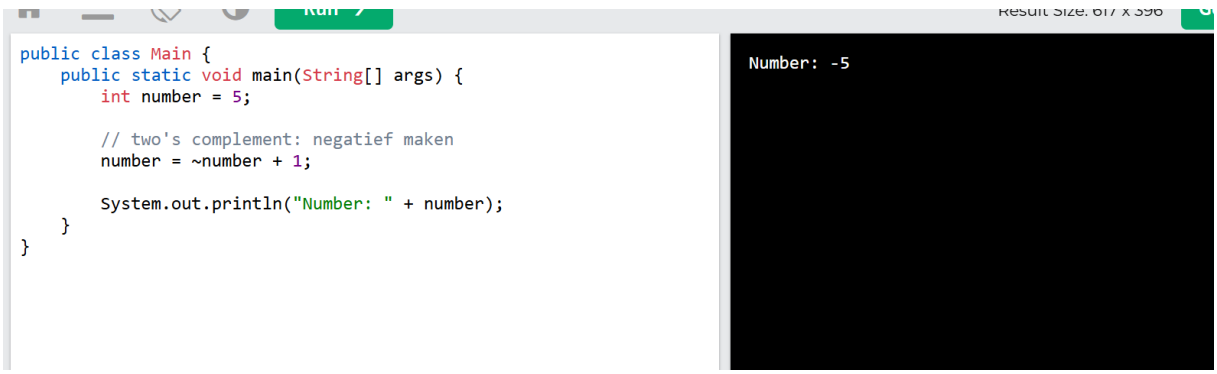
```
User permissions: 5
```

#5:

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

        int userPermissions = 6; // rw-

        // WRITE verwijderen met XOR
        userPermissions = userPermissions ^ WRITE;

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

```
User permissions: 4
```

#6:



```java
public class Main {
    public static void main(String[] args) {
        int number = 5;

        // two's complement: negatief maken
        number = ~number + 1;

        System.out.println("Number: " + number);
    }
}
```

```
Number: -5
```

#7:

Assignment 2.8: Java Application Bit Calculations

Create a java program that accepts user input and presents a menu with options.

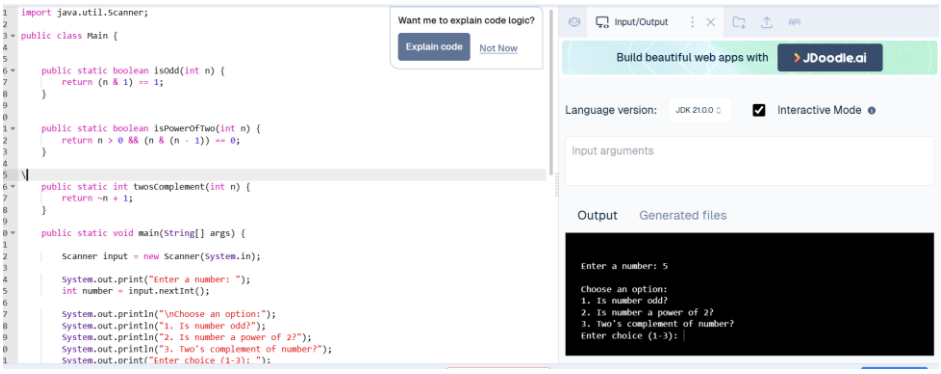
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?

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.

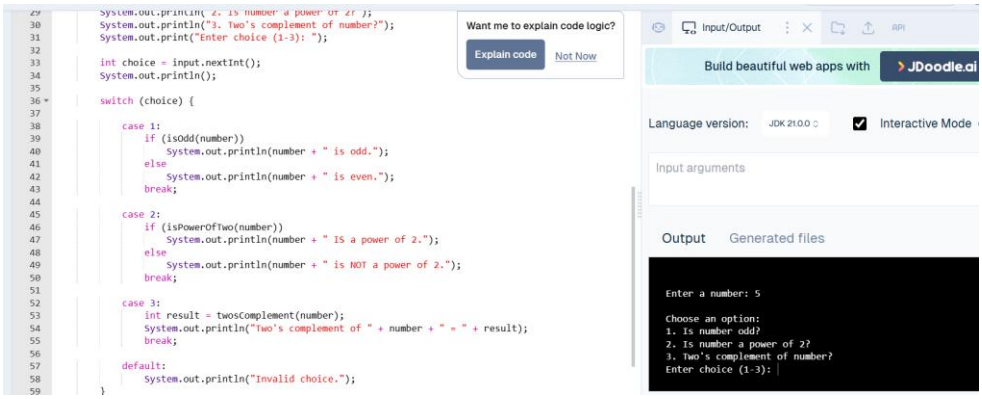
Keep this application because you need to expand it in week 6 for calculating network segments.

Paste source code here, with a screenshot of a working application.



```java
import java.util.Scanner;

public class Main {


    public static boolean isOdd(int n) {
        return (n & 1) == 1;
    }


    public static boolean isPowerOfTwo(int n) {
        return n > 0 && (n & (n - 1)) == 0;
    }


    public static int twosComplement(int n) {
        return ~n + 1;
    }

    public static void main(String[] args) {

        Scanner input = new Scanner(System.in);

        System.out.print("Enter a number: ");
        int number = input.nextInt();

        System.out.println("\nChoose an option:");
        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?");
        System.out.print("Enter choice (1-3): ");
```

```
Want me to explain code logic?
Explain code  Not Now

Input/Output

Build beautiful web apps with JDoodle.ai

Language version: JDK 21.0.0   Interactive Mode

Input arguments

Output  Generated files

Enter a number: 5

Choose an option:
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
Enter choice (1-3):
```




```
            default:
                System.out.println("Invalid choice.");
        }

        input.close();
    }
}
```

Ready? Then save this file and export it as a pdf file with the name: **week2.pdf**