Template Week 2 – Logic

Student number: 569508

Assignment 2.1: Parking lot

Which gates do you need?

3 inputs 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
1	1	0	0
0	1	1	0
1	0	1	0
1	1	1	1

Assignment 2.2: Android/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

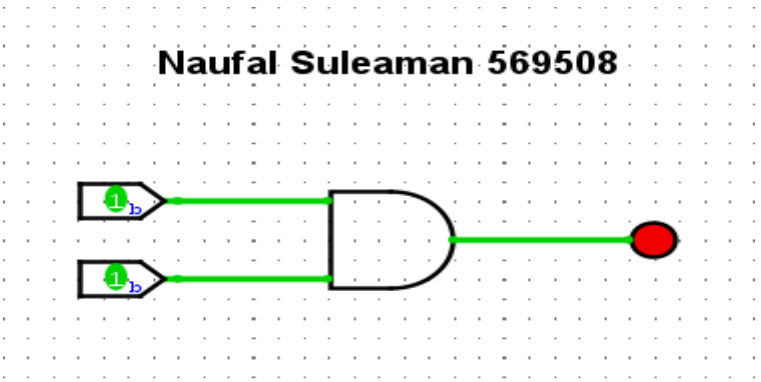
A	B	Q
0	0	0
0	1	1
1	0	1
1	1	0

How can the design be simplified?

Use XOR gate instead

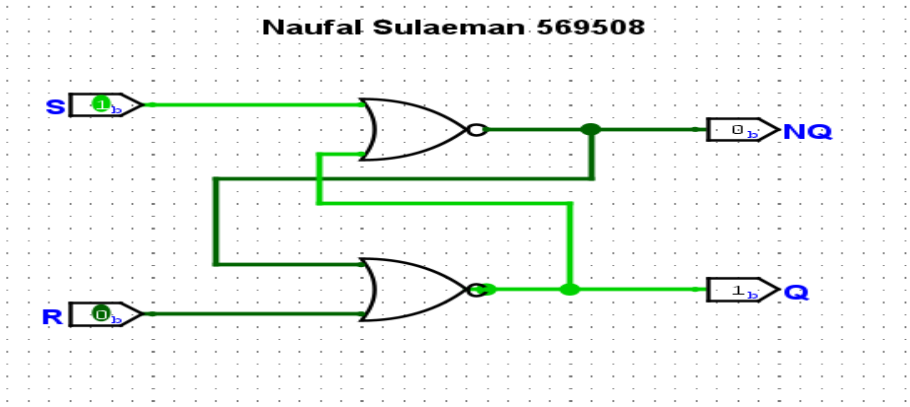
Assignment 2.4: Getting to know Logisim evolution

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



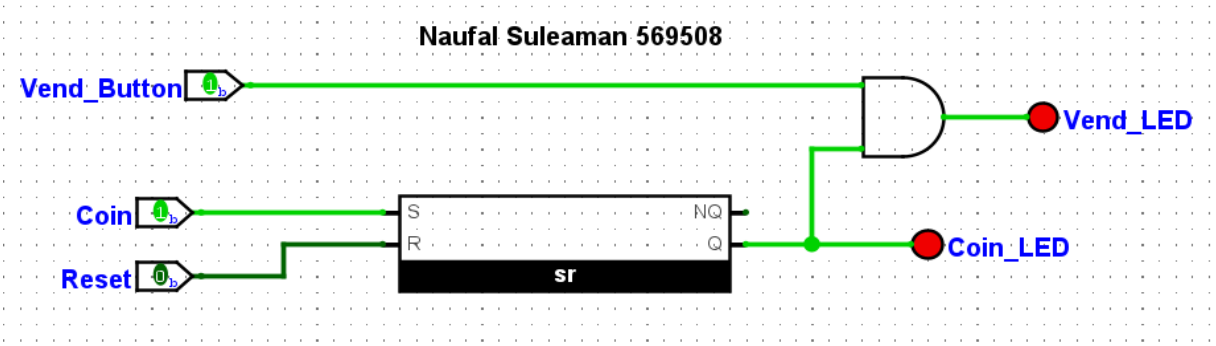
Assignment 2.5: SR Latch

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:



Bonus point assignment – week 2

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?

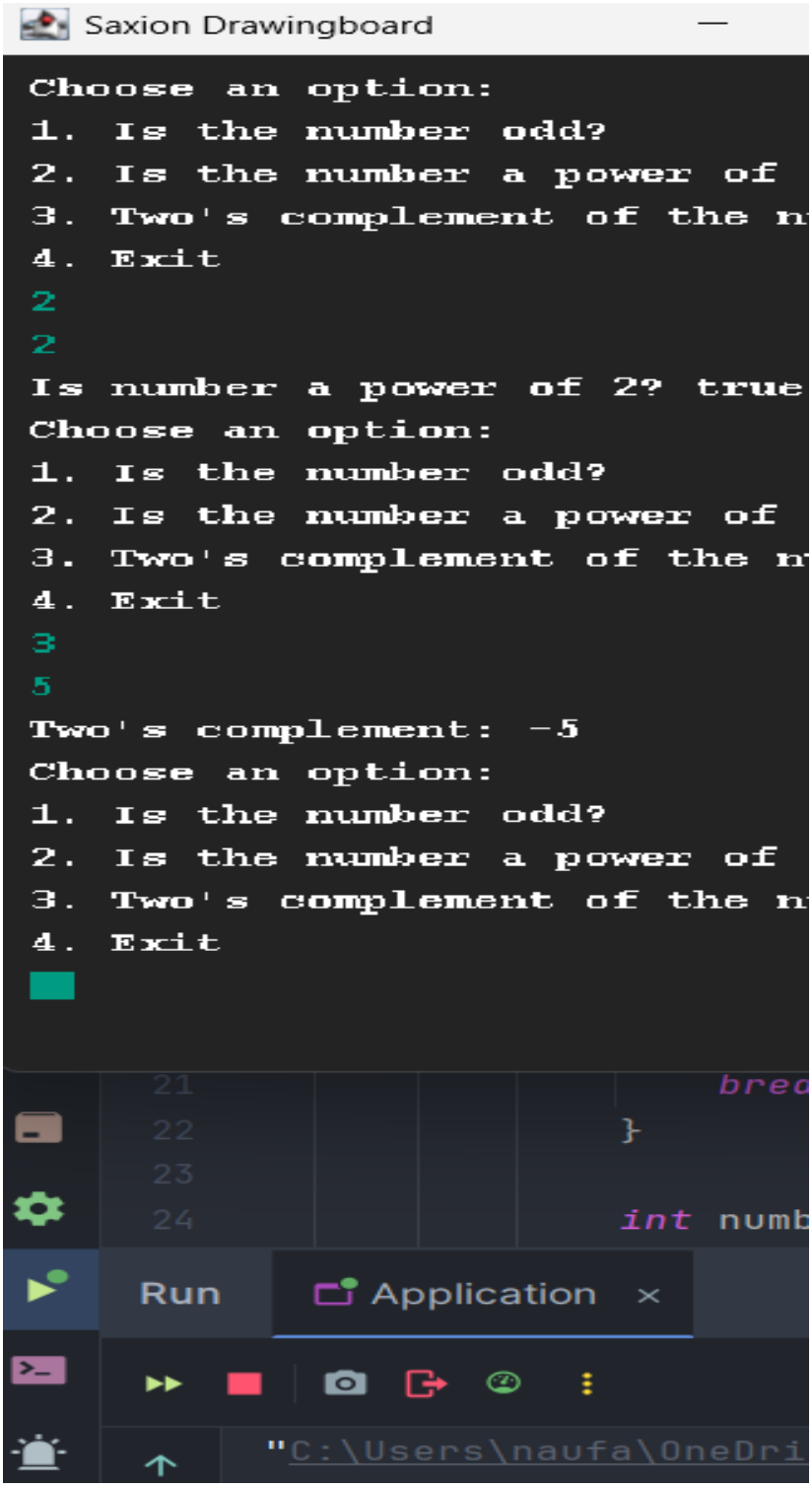
Implement the methods by using the bitwise operators you have just learned.

Organize your source code in a readable manner with the use of control flow and methods.

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

```
import nl.saxion.app.SaxionApp;

public class Application implements Runnable {

    public static void main(String[] args) {
        SaxionApp.start(new Application(), 350, 450);
    }

    public void run() {
        while (true) {
            SaxionApp.printLine("Choose an option:");
            SaxionApp.printLine("1. Is the number odd?");
            SaxionApp.printLine("2. Is the number a power of 2?");
            SaxionApp.printLine("3. Two's complement of the number?");
            SaxionApp.printLine("4. Exit");

            int choice = SaxionApp.readInt();

            if (choice == 4) {
                SaxionApp.printLine("DOEI!");
                break;
```

```
            }

            int number = SaxionApp.readInt("Enter a number: ");

            switch (choice) {
                case 1 -> SaxionApp.printLine("Is number odd? " + isOdd(number));
                case 2 -> SaxionApp.printLine("Is number a power of 2? " + isPowerOfTwo(number));
                case 3 -> SaxionApp.printLine("Two's complement: " + twosComplement(number));
                default -> SaxionApp.printLine("Invalid choice. Try again!!");
            }
        }
    }

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

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

    private int twosComplement(int number) {
        return ~number + 1;
    }
}
```



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