

Template Week 2 – Logic

Student number: 563634

Assignment 2.1: Parking lot

Which gates do you need?

We need an 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
0	1	1	0
1	0	0	0
1	1	0	0
1	0	1	0
1	1	1	1

Assignment 2.2: Android/iPhone

Which gates do you need?

Exclusive OR gate

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

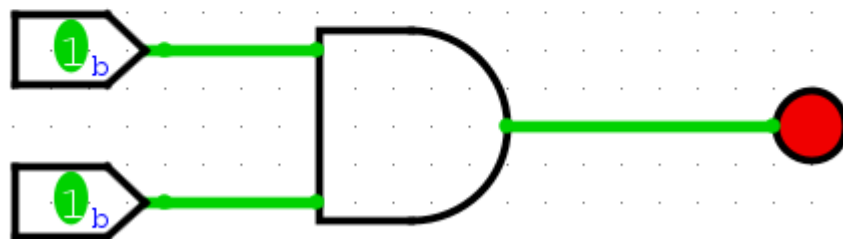
How can the design be simplified?

Instead of using 4 NAND gates, we can only use 1 XOR gate

Assignment 2.4: Getting to know Logisim evolution

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

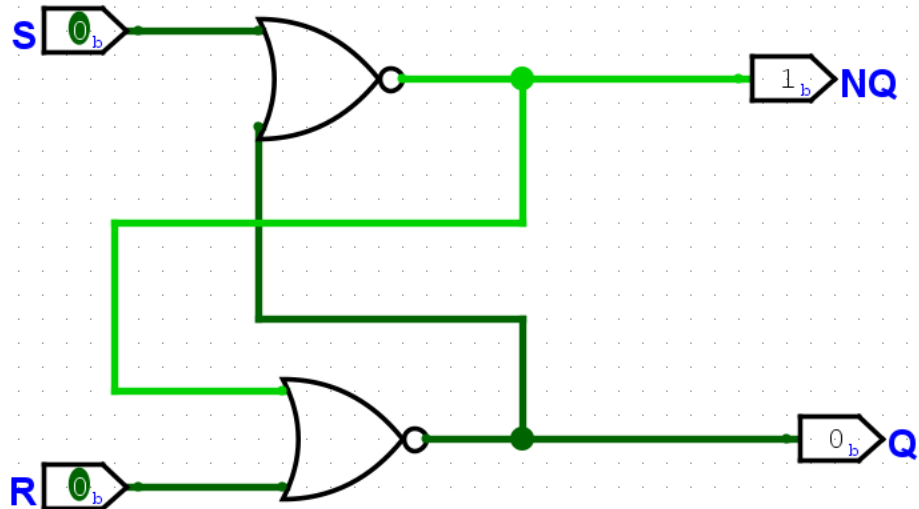
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Assignment 2.5: SR Latch

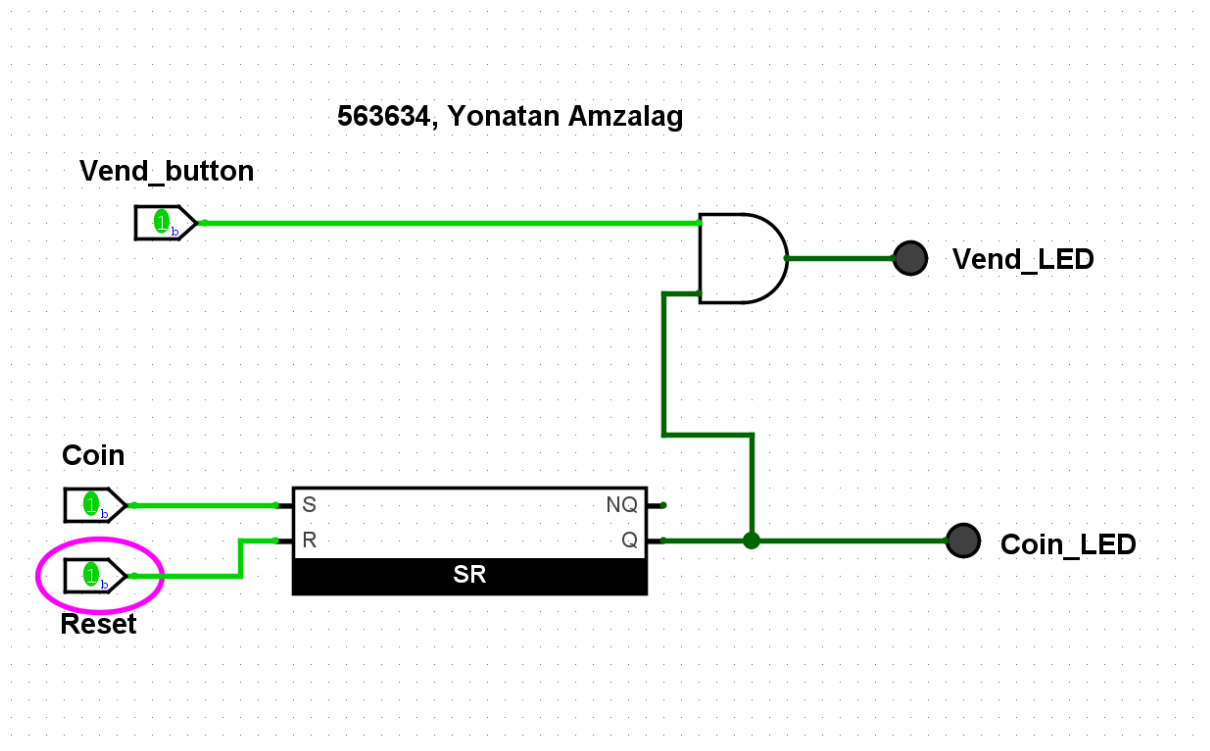
Screenshot SR Latch in Logisim with your name and student number:

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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());
    }

    public void run() {

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

            int choice = SaxionApp.readInt();

            if (choice == 4) {
                SaxionApp.println("BYE BYE!");
                break;
            }

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

            if (choice == 1) {
                if (isOdd(number)) {
                    SaxionApp.println("Number " + number + " is odd.");
                } else {
                    SaxionApp.println("Number " + number + " is even.");
                }
            } else if (choice == 2) {
                if (powerOfTwo(number)) {
                    SaxionApp.println("Number " + number + " is a power of 2.");
                } else {
```

```

        SaxionApp.println("Number " + number + " is not a power of 2.");
    }
} else if (choice == 3) {
    int complement = twosComplement(number);
    SaxionApp.println("Two's complement of " + number + " is " + complement);
} else {
    SaxionApp.println("Bad choice, please try again");
}
}
}

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

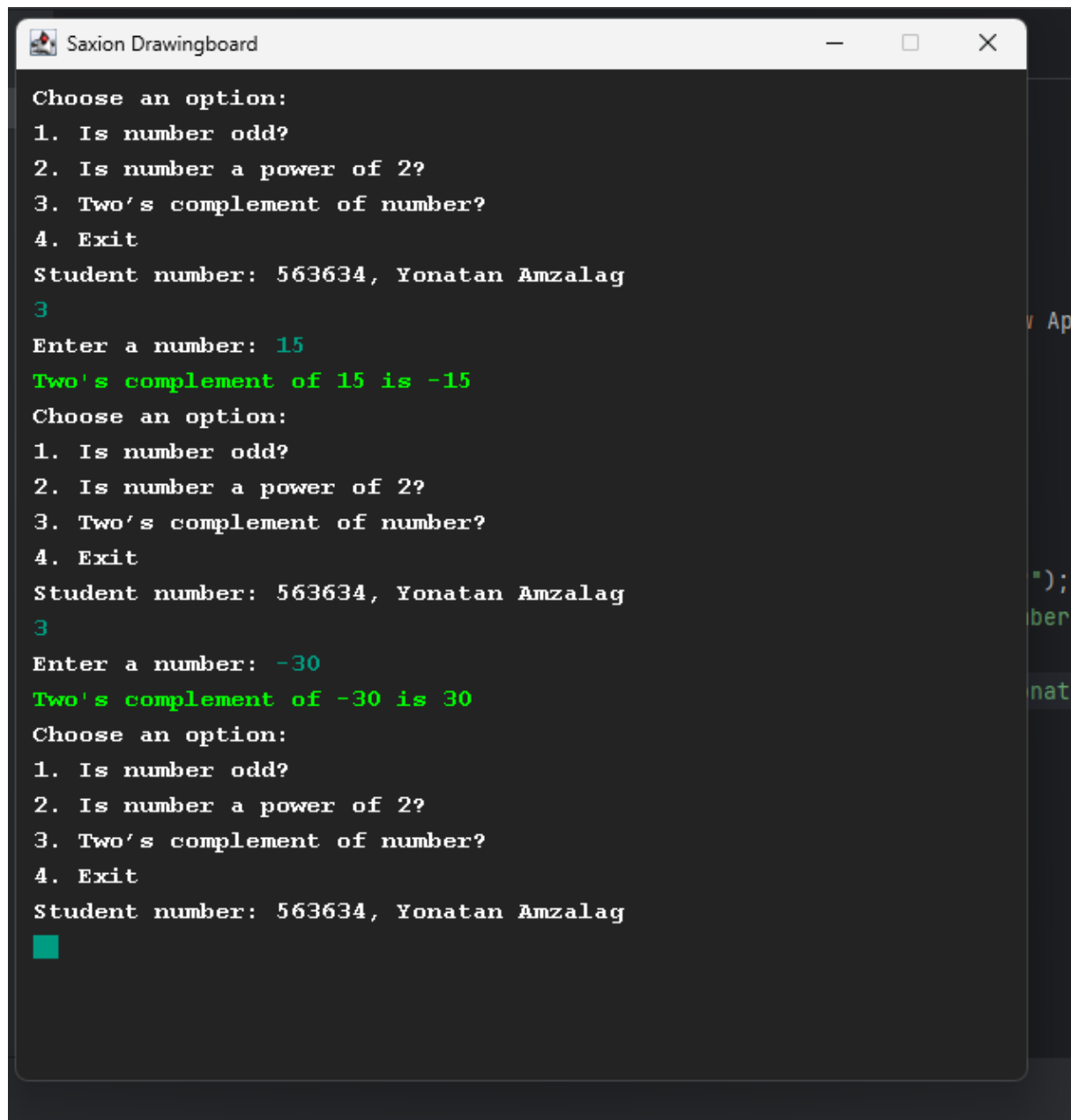
public static boolean powerOfTwo(int number) {
    return number > 0 && (number & (number - 1)) == 0;
}

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

```

```
Saxion Drawingboard
Choose an option:
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Exit
Student number: 563634, Yonatan Amzalag
1
Enter a number: 50
Number 50 is even.
Choose an option:
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Exit
Student number: 563634, Yonatan Amzalag
1
Enter a number: 49
Number 49 is odd.
Choose an option:
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Exit
Student number: 563634, Yonatan Amzalag
```

```
Saxion Drawingboard
Choose an option:
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Exit
Student number: 563634, Yonatan Amzalag
2
Enter a number: 16
Number 16 is a power of 2.
Choose an option:
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Exit
Student number: 563634, Yonatan Amzalag
2
Enter a number: 15
Number 15 is not a power of 2.
Choose an option:
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Exit
Student number: 563634, Yonatan Amzalag
■
```



```
Choose an option:
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Exit
Student number: 563634, Yonatan Amzalag
3
Enter a number: 15
Two's complement of 15 is -15
Choose an option:
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Exit
Student number: 563634, Yonatan Amzalag
3
Enter a number: -30
Two's complement of -30 is 30
Choose an option:
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Exit
Student number: 563634, Yonatan Amzalag
█
```

Ready? Then save this file and export it as a pdf file with the name: [week2.pdf](#)