Template Week 2 – Logic

Student number: 569681

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

Assignment 2.2: Android/iPhone

Which gates do you need?

XOR

Complete this table

Android phone	iPhone	Result (Phone in possession)
0	0	0
0	1	1 (iPhone)
1	0	1 (Android)
1	1	0

Assignment 2.3: Four NAND gates

Complete this table

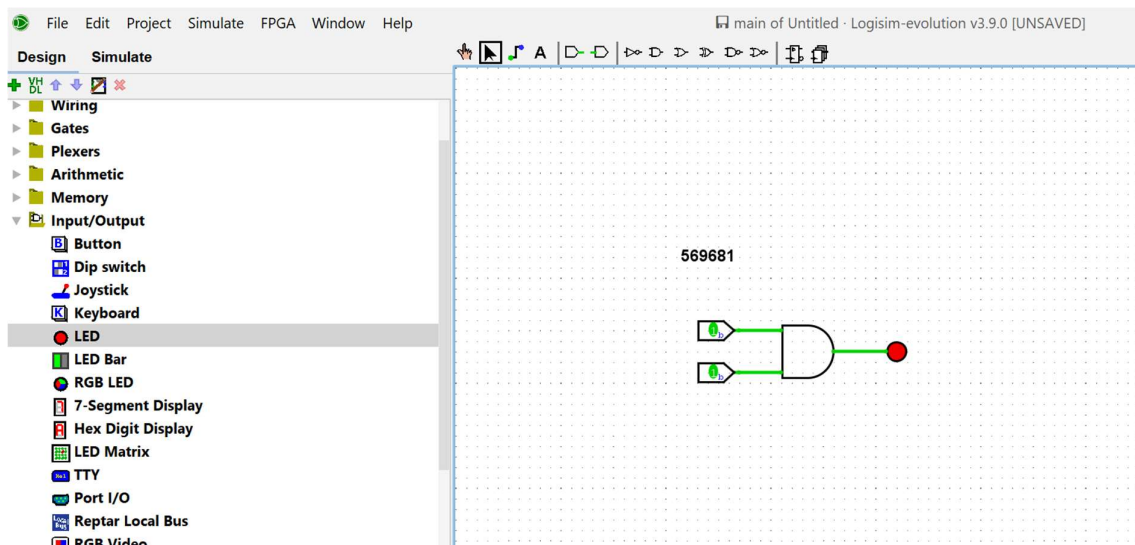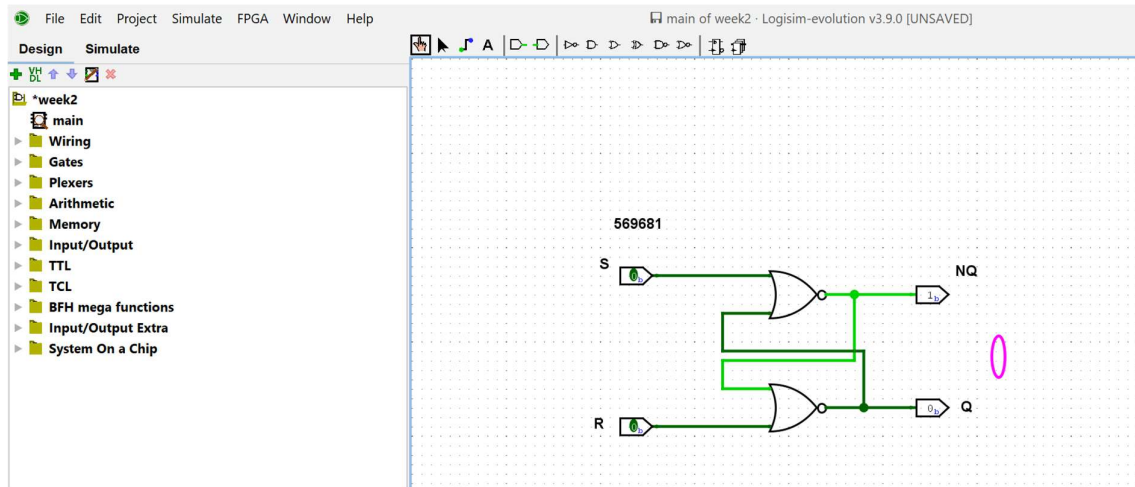| A	B	Q
0	0	0
0	1	1
1	0	1
1	1	0

How can the design be simplified?

1 XOR gate

Assignment 2.4: Getting to know Logisim evolution

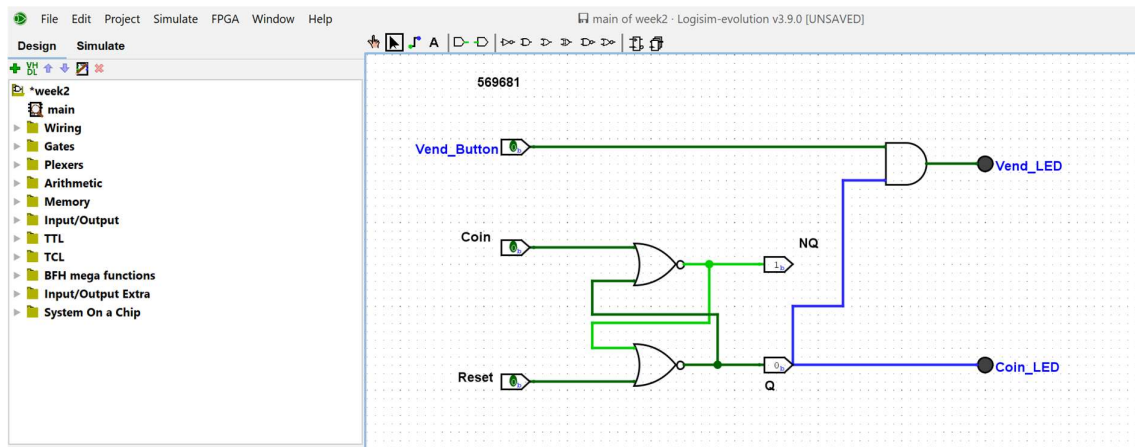Screenshot of the design with your name and student number in it:

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:

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.

Source:

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

import java.awt.*;

public class Application implements Runnable {

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

    public void run() {
        showMenu();
    }

    private void showMenu(){
        int chosenOption;

        SaxionApp.clear();

        SaxionApp.printLine("Choose a menu option:");
        SaxionApp.printLine("1. Is number odd?");
        SaxionApp.printLine("2. Is number a power of two?");
        SaxionApp.printLine("3. Print two's complement of a number");

        chosenOption = SaxionApp.readInt();

        while(!checkInputBounds(chosenOption, 0,4)){
            SaxionApp.printLine("Choose valid option!", Color.RED);
            chosenOption = SaxionApp.readInt();
        }

        switch(chosenOption){
            case 1:
                isNumberOdd();
                break;
            case 2:
                isPowerOfTwo();
                break;
            case 3:
                printTwoComplement();
                break;
        }
```

```java
    }

    private boolean checkInputBounds(int input, int lowerBound, int
upperBound){
        return input >= lowerBound && input <= upperBound;
    }

    private void isNumberOdd(){
        int number;

        SaxionApp.clear();
        SaxionApp.printLine("Input your number");
        number = SaxionApp.readInt();

        if ((number & 1) == 1) {
            SaxionApp.printLine(number + " is odd.");
        } else {
            SaxionApp.printLine(number + " is even.");
        }

        SaxionApp.pause();
        showMenu();
    }

    private void isPowerOfTwo(){

        int number;

        SaxionApp.clear();
        SaxionApp.printLine("Input your number");
        number = SaxionApp.readInt();

        if (number > 0 && (number & (number - 1)) == 0) {
            SaxionApp.printLine(number + " is a power of two.");
        } else {
            SaxionApp.printLine(number + " is not a power of two.");
        }

        SaxionApp.pause();
        showMenu();

    }

    private void printTwoComplement(){
        int number;

        SaxionApp.clear();
        SaxionApp.printLine("Input your number");

        number = SaxionApp.readInt();
        number = ~number + 1;

        SaxionApp.printLine("Two's complement is: " + number);

        SaxionApp.pause();
        showMenu();

    }
}
```

```
Saxion Drawingboard                          —    □    ✕

Choose a menu option:
1. Is number odd?
2. Is number a power of two?
3. Print two's complement of a number
▮
```