Template Week 2 – Logic

Student number: 589892

Assignment 2.1: Parking lot

Which gates do you need?
You need a AND gate which only outputs a true signal (1) when all outputs are true.

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

Assignment 2.2: Android or iPhone

Which gates do you need?
A XOR gate is needed which outputs a true signal when exactly one of its inputs is true and will output a false signal when both of its inputs are true or false.

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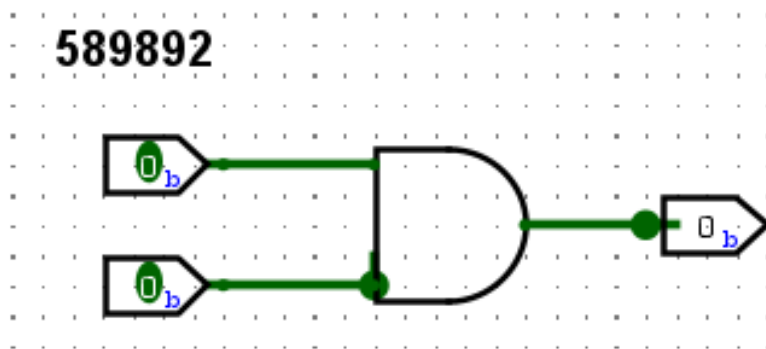
A	B	Q
0	0	0
0	1	1
1	0	1
1	1	0

How can the design be simplified?

The design of this chip can be simplified by using a XOR gate which outputs a true signal when both inputs are equal and outputs a false signal when the inputs differ.
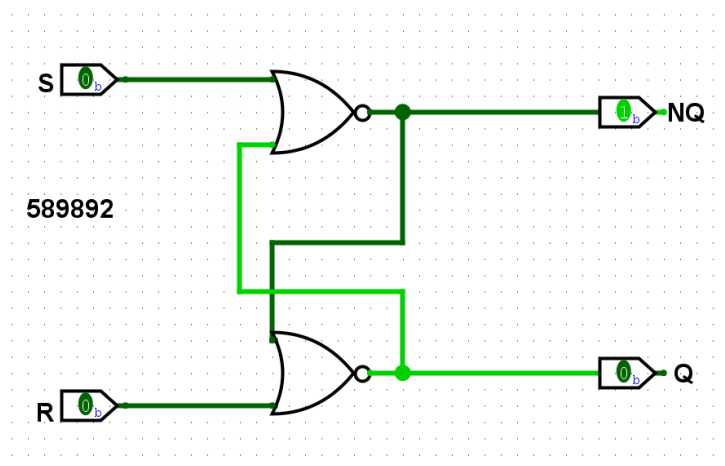
Assignment 2.4: Getting to know Logisim evolution

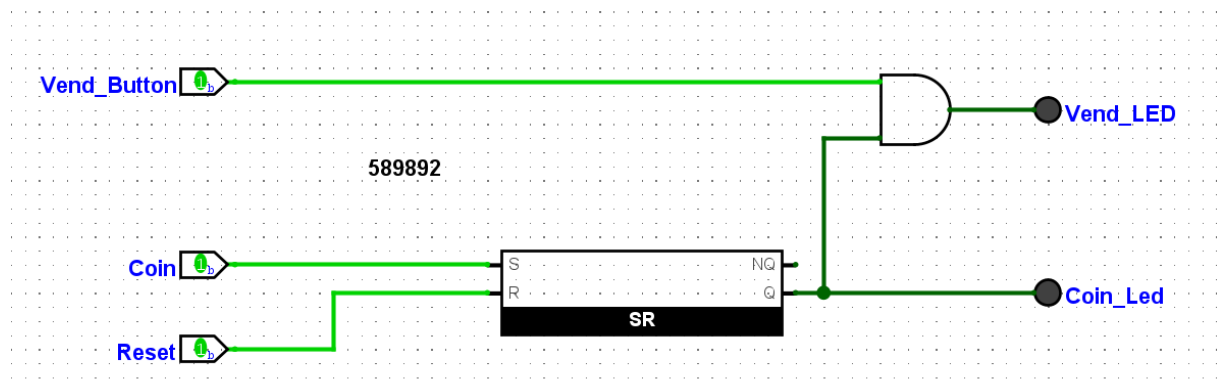Screenshot of the design with your name and student number in it:

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:

Assignment 2.7: Bitwise operators

Complete the java source code for bitwise operators. Put the source code here.
#1 Even or odd
public class Main {

 public static void main(String[] args) {

int number = 5;

if((number & 1) == 1) System.out.println("number is odd");

else System.out.println("number is even");

 }

}

#2 Power of 2
public class Main {

 public static void main(String[] args) {

int number = 4;

if((number & number-1) == 0) System.out.println("number is a power of 2");

else System.out.println("number isn't a power of 2");

 }

}

#3 Check permissions
public class Main {

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

    final int READ = 4;

    final int WRITE = 2;

    final int EXECUTE = 1;


    int userPermissions = 7;


    if((userPermissions & READ)== READ) System.out.println("User has read permissions");

    else System.out.println("User can't read. No permissions.");

    }
}
```

#4 Assign permissions
```java
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);


    }
}
```

#5 Update permissions
```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;
```

```java
userPermissions = userPermissions ^ WRITE;

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


 }
}

#6 Two's complement
public class Main {

 public static void main(String[] args) {

 int number = 5;

 number = ~number + 1;

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


 }
}
```

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.

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