

Template Week 2 – Logic

Student number:580693

Assignment 2.1: Parking lot

Which gates do you need?

You need a AND gate to check if every spot is taken.

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	0	1	0
1	1	0	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

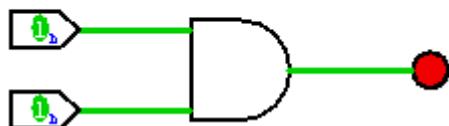
A	B	Q
0	0	0
1	0	1
0	1	1
1	1	0

How can the design be simplified?

Assignment 2.4: Getting to know Logisim evolution

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

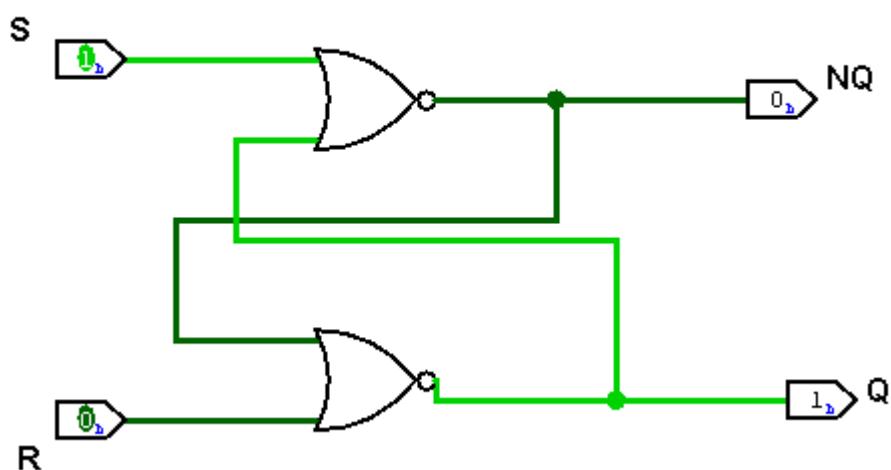
Kliment Tenev - 580693



Assignment 2.5: SR Latch

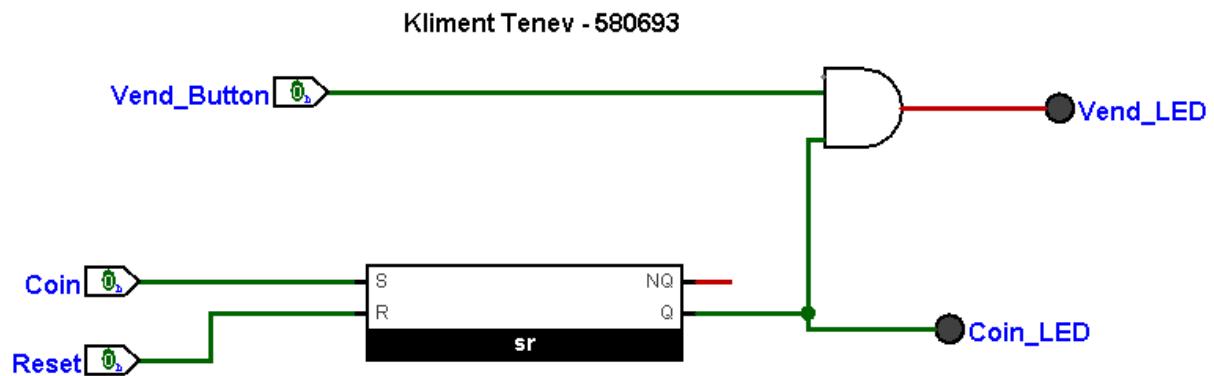
Screenshot SR Latch in Logisim with your name and student number:

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Assignment 2.6: Vending Machine

Screenshot Vending Machine in Logisim with your name and student number:



Assignment 2.7: Bitwise operators

Complete the java source code for bitwise operators. Put the source code here.

```
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");  
    }  
}
```

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.

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        int num = showMenu();
        do{
            showMenu();
        }while (num == 0);
    }

    private static int showMenu(){
        Scanner sc = new Scanner(System.in);

        System.out.println("Please choose an option");
        System.out.println("Option 1: Is number odd");
        System.out.println("Option 2: Is number a power of 2");
        System.out.println("Option 3: Two's complement of number");

        int menuChoice = sc.nextInt();
        int number;

        switch (menuChoice) {
            case 1:
                System.out.println("Enter number");
                number = sc.nextInt();
                isNumberOdd(number);
                return 0;
            case 2:
                System.out.println("Enter number");
                number = sc.nextInt();
                isPowerOfTwo(number);
                return 0;
        }
    }

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

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

    int twoComplement(int number){
        return ~number;
    }
}
```

```

case 3:
    System.out.println("Enter number");
    number = sc.nextInt();
    twoComplement(number);
    return 0;
}
return 0;
}

public static void twoComplement (int num) {
    num = ~num;
    System.out.println("This is the negative version of the number: " + (num + 1));
}

public static void isNumberOdd(int num) {
    if (num % 2 != 0) {
        System.out.println("Number is odd");
    } else {
        System.out.println("Number is even");
    }
}

public static void isPowerOfTwo(int num) {
    if ((num & num - 1) == 0) {
        System.out.println("The number is a power of 2");
    }
    else {
        System.out.println("The number is not a power of 2");
    }
}

```

```
Please choose an option
Option 1: Is number odd
Option 2: Is number a power of 2
Option 3: Two's complement of number

1
Enter number
2
Number is even
Please choose an option
Option 1: Is number odd
Option 2: Is number a power of 2
Option 3: Two's complement of number

2
Enter number
3
The number is not a power of 2
```

```
Option 3: Two's complement of number
2
Enter number
3
The number is not a power of 2
Please choose an option
Option 1: Is number odd
Option 2: Is number a power of 2
Option 3: Two's complement of number

3
Enter number
2
This is the negative version of the number: -2
```

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