

Template Week 2 – Logic

Student number: 591527

Assignment 2.1: Parking lot

Which gates do you need?

AND gate 2X

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	1	0
1	1	1	1
1	1	0	0

Assignment 2.2: Android or iPhone

Which gates do you need?

XOR

Complete this table

Android phone	iPhone	Result (Phone in possession)
0	0	None
1	0	Android
0	1	Iphone
1	1	None

Assignment 2.3: Four NAND gates

Complete this table

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

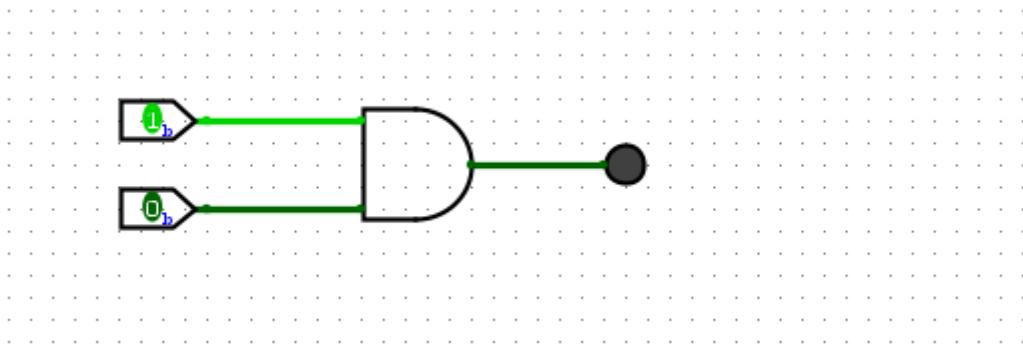
1	1	1
---	---	---

How can the design be simplified?

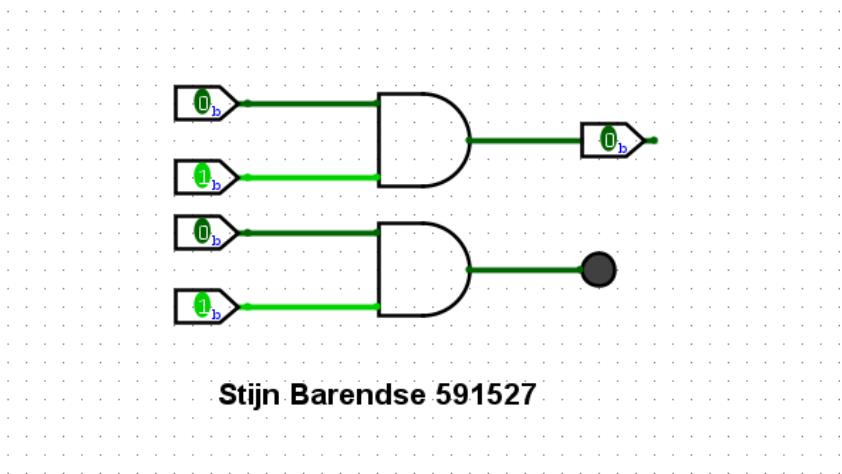
By using a single XNOR gate

Assignment 2.4: Getting to know Logisim evolution

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

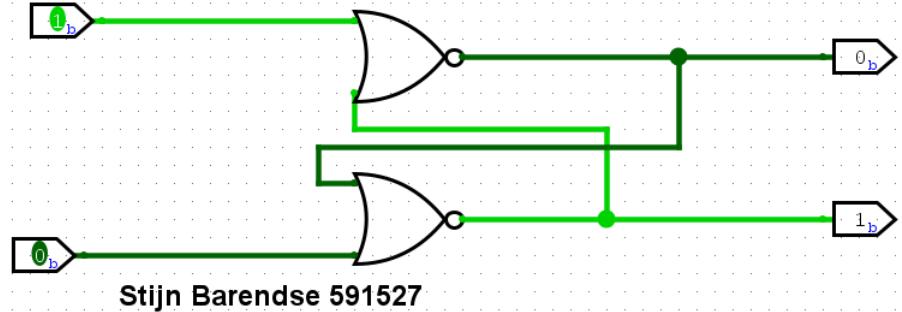


The output is 0. Because it is an AND gateway.



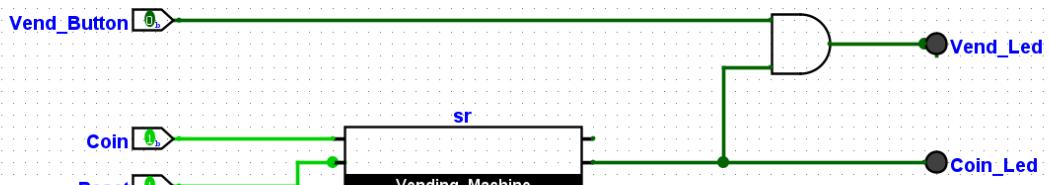
Assignment 2.5: SR Latch

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.

```
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");  
    }  
}
```

number is odd

```
public class Main {  
    public static void main(String[] args) {  
        int number = 4; // Example number  
  
        if ((number > 0) && ((number & (number - 1)) == 0)) {  
            System.out.println(number + " is a power of 2");  
        } else {  
            System.out.println(number + " isn't a power of 2");  
        }  
    }  
}
```

4 is a power of 2

```
public class Main {  
    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.");  
    }  
}
```

User has read permissions

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) {
```

```

Scanner input = new Scanner(System.in);
boolean programmaDraait = true;

while (programmaDraait) {
    // Het menu printen
    System.out.println("\n--- MENU ---");
    System.out.println("1. Is nummer oneven?");
    System.out.println("2. Is nummer een macht van 2?");
    System.out.println("3. Two's complement berekenen");
    System.out.println("4. Stoppen");
    System.out.print("Kies een optie: ");

    int keuze = input.nextInt();

    if (keuze == 4) {
        System.out.println("Doei, chiao!");
        programmaDraait = false;
    } else {
        System.out.print("Voer een getal in: ");
        int getal = input.nextInt();
        // gebruikers input checken
        if (keuze == 1) {
            checkOneven(getal);
        } else if (keuze == 2) {
            checkMachtVanTwee(getal);
        } else if (keuze == 3) {
            berekenTwosComplement(getal);
        } else {
            // mooie error handling kijk kijk
        }
    }
}

```

```

        System.out.println("Die optie bestaat niet.");
    }
}

}

// Methode om te kijken of het oneven is
public static void checkOneven(int n) {
    // Als de laatste bit 1 is, dan is het getal altijd oneven, anders is t even
    if ((n & 1) == 1) {
        System.out.println("Ja, " + n + " is oneven.");
    } else {
        System.out.println("Nee, " + n + " is even.");
    }
}

// Methode voor macht van 2
public static void checkMachtVanTwee(int n) {
    // ik denk als (n & (n-1)) 0 is, is het een macht van 2 toch
    // check ook ff of n groter is dan 0
    if (n > 0 && (n & (n - 1)) == 0) {
        System.out.println("Ja, macht van 2!");
    } else {
        System.out.println("Nee, geen macht van 2.");
    }
}

// Methode voor 2s compliment.
public static void berekenTwosComplement(int n) {

```

```

// Formule is: alle bits omdraaien (~) en dan + 1

int resultaat = ~n + 1;

System.out.println("Two's complement van " + n + " is: " + resultaat);

}

// dit duurde lang :(

}

```

C:\Users\Stijn\Downloads\javatest>java Main.java

--- MENU ---

1. Is nummer oneven?
2. Is nummer een macht van 2?
3. Two's complement berekenen
4. Stoppen

Kies een optie: 1

Voer een getal in: 100

Nee, 100 is even.

--- MENU ---

1. Is nummer oneven?
2. Is nummer een macht van 2?
3. Two's complement berekenen
4. Stoppen

Kies een optie: 2

Voer een getal in: 30

Nee, geen macht van 2.

--- MENU ---

1. Is nummer oneven?
2. Is nummer een macht van 2?
3. Two's complement berekenen
4. Stoppen

Kies een optie: 3

Voer een getal in: 44

Two's complement van 44 is: -44

--- MENU ---

1. Is nummer oneven?
2. Is nummer een macht van 2?
3. Two's complement berekenen
4. Stoppen

Kies een optie: |

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