Template Week 2 – Logic

Student number: 588421

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

Assignment 2.2: Android or iPhone

Which gates do you need?

OR

Complete this table

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

Assignment 2.3: Four NAND gates

Complete this table

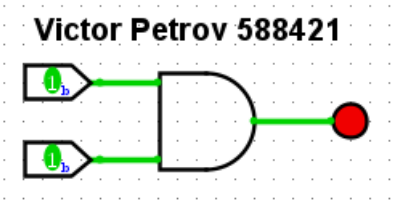
A	B	Q
1	1	0
0	1	1
1	0	1
0	0	0

How can the design be simplified?

Doormiddel van een XOR gate.

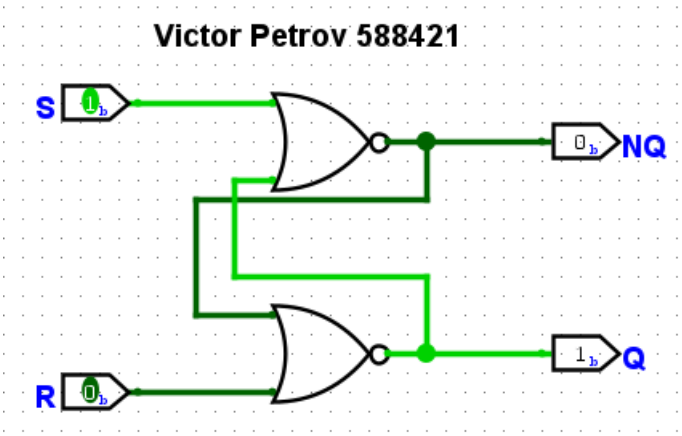
Assignment 2.4: Getting to know Logisim evolution

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



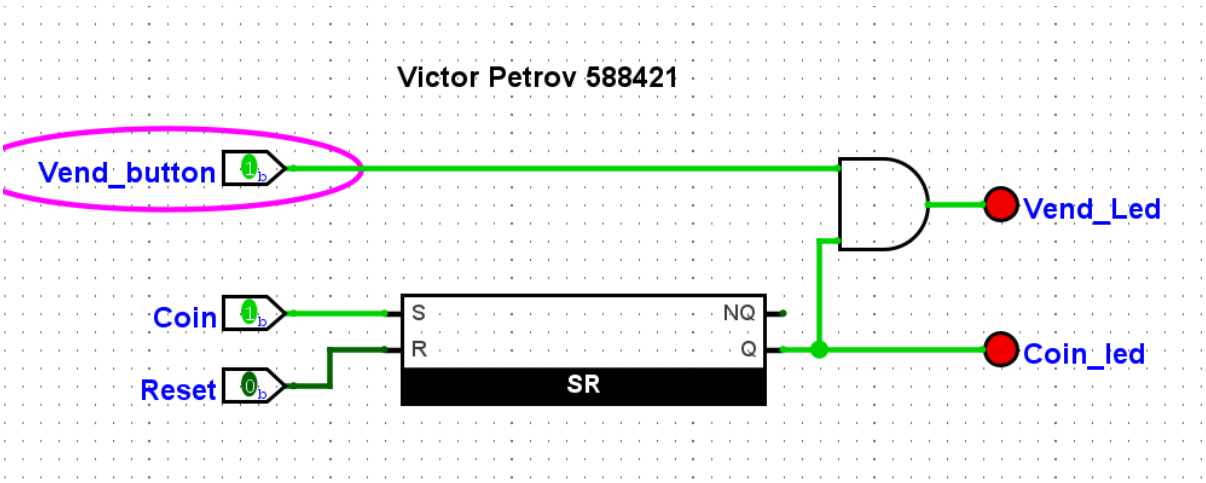
Assignment 2.5: SR Latch

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:



Assignment 2.7: Bitwise operators

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

#Opdracht 1

```
int number = 5;
if((number  & 1) == 1){
   System.out.println("number is odd");
} else{
   System.out.println("number is even");
}
```

#Opdracht 2

```
Int number = 15;
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");
}
```

#Opdracht 3

```
final int READ = 4;
final int WRITE = 2;
final int EXECUTE = 1;

int userPermissions = 7;

if(userPermissions > READ) {
   System.out.println("User has read permissions");
} else {
   System.out.println("User can't read. No permissions.");
}
```

#Opdracht 4

```
final int READ = 4;
final int WRITE = 2;
final int EXECUTE = 1;

int userPermissions = READ | EXECUTE;
System.out.println("User permissions: "+userPermissions);
```

#Opdracht 5

```
final int READ = 4;
final int WRITE = 2;
final int EXECUTE = 1;

int userPermissions = 6;
userPermissions = userPermissions ^ WRITE;
System.out.println("User permissions: "+userPermissions);
```

#Opdracht 6

```
int number = 5;
number = ~ number + 1;
System.out.println("Number: "+number);
```

#Opdracht 7

```
public void convertToWhateverYouWant(int number, int radix){
   String hexadecimal = "0123456789ABCDEF";
   String result = "";
   String resultFlipped = "";
   while(number > 0){
      int hex = number % radix;
      char digit = hexadecimal.charAt(hex);
      result += digit;
      number = number / radix;
   }
   for (int getal = result.length() - 1; getal >= 0; getal--) {
      char letter = result.charAt(getal);
      resultFlipped += letter;
   }
   SaxionApp.printLine(resultFlipped);
}
```

Assignment 2.8: Java Application Bit Calculations

Create a java program that accepts user input and presents a menu with options.

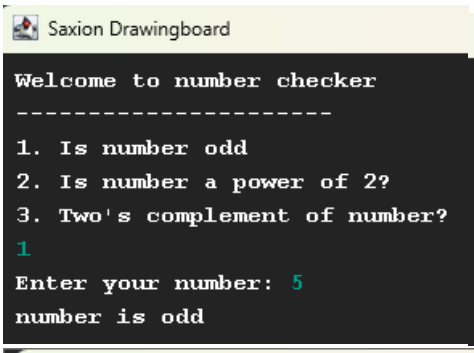
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?

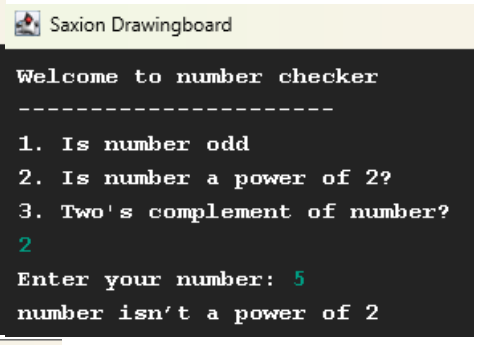
Implement the methods by using the bitwise operators you have just learned.

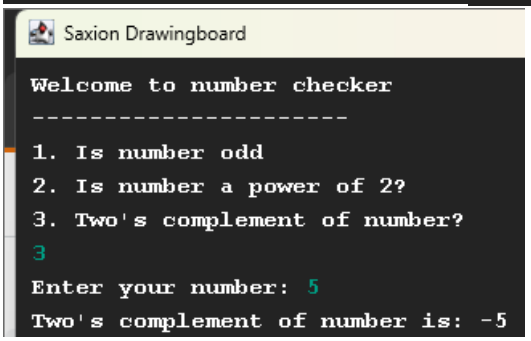
Organize your source code in a readable manner with the use of control flow and methods.

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 nl.saxion.app.SaxionApp;

import java.awt.*;

public class Application implements Runnable {

   public static void main(String[] args) {
      SaxionApp.start(new Application(), 800, 800);
   }

   public void run() {

      int keuze = -1;
      while(keuze != 0) {
```

```
        SaxionApp.printLine("Welcome to number checker");
        SaxionApp.printLine("----------------------");
        SaxionApp.printLine("1. Is number odd");
        SaxionApp.printLine("2. Is number a power of 2?");
        SaxionApp.printLine("3. Two's complement of number?");
        keuze = SaxionApp.readInt();

        if(keuze == 1){
            SaxionApp.print("Enter your number: ");
            isNumberOdd(SaxionApp.readInt());
            SaxionApp.pause();
            SaxionApp.clear();
        } else if (keuze == 2) {
            SaxionApp.print("Enter your number: ");
            powerOfTwo(SaxionApp.readInt());
            SaxionApp.pause();
            SaxionApp.clear();
        } else if (keuze == 3) {
            SaxionApp.print("Enter your number: ");
            twosComplementOfNumber(SaxionApp.readInt());
            SaxionApp.pause();
            SaxionApp.clear();
        }
    }
}

public void isNumberOdd(int number){
    if((number  & 1) == 1){
        SaxionApp.printLine("number is odd");
    } else{
        SaxionApp.printLine("number is even");
    }
}

public void powerOfTwo(int number){
    //  1000
    //& 0111
    //-------
    //= 0000
    // Eerst bijvoorbeeld number -1 en daarna vergelijk je number & number, als er een 1 in het
antwoord zit is het een power of two
    if((number & (number - 1)) == 0) {
        SaxionApp.printLine("number is a power of 2");
    } else {
        SaxionApp.printLine("number isn't a power of 2");
    }
}
```

```
public void twosComplementOfNumber(int number){
    number = ~ number + 1;
    SaxionApp.printLine("Two's complement of number is: "+number);
}
```

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