Template Week 2 – Logic

Student number:

Assignment 2.1: Parking lot

Which gates do you need?

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 or iPhone

Which gates do you need?

Complete this table

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

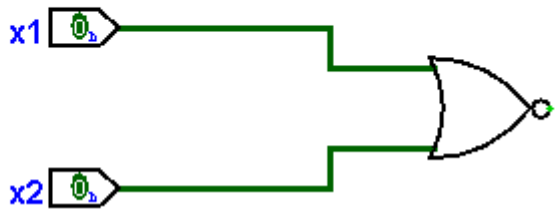
How can the design be simplified?

If we use 1 XOR gate, would be more simplified than 4 NAND gates.

Assignment 2.4: Getting to know Logisim evolution

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

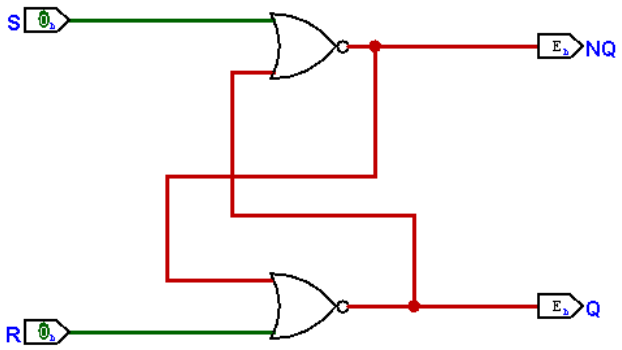
Ozan Gyuler- 582777



Assignment 2.5: SR Latch

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

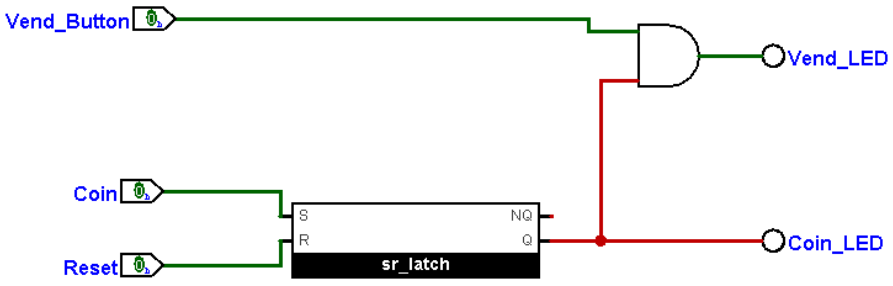
Ozan Gyuler - 582777



Assignment 2.6: Vending Machine

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

Ozan Gyuler - 582777



Assignment 2.7: Bitwise operators

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

```
#1 public class Main {
        public static void main(String[] args) {
          int number = 2;
          if((number & 1) == 1) System.out.println("number is odd");
          else System.out.println("number is even");
    }
}
#2
public class Main {
      public static void main(String[] args) {
          int number = 2;
          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");
    }
}
#3
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((READ & userPermissions) != 0) System.out.println("User has read permissions");
      else System.out.println("User can't read. No permissions.");
    }
}
```

#4

```
public class Main {
    public static void main(String[] args) {
        final int READ = 4;
        final int WRITE = 2;
        final int EXECUTE = 1;
        int userPermissions = 0
        userPermissions = READ | EXECUTE;
        System.out.println("User permissions: "+userPermissions);
    }
}
```

#6

```
public class Main {
  public static void main(String[] args) {
     int number = 5; number = ~number + 1;
     System.out.println("Number: "+number);
   }
}
```

#7

```
public class Main {
    public static void main(String[] args) {
        int number = 10;
        System.out.println("Decimal integer: "+number);
        String binary = Integer.toBinaryString(number);
        String octal = Integer.toOctalString(number);
        String hexadecimal = Integer.toHexString(number);
        System.out.println("Binary representation: " + binary);
       System.out.println("Octal representation: " + octal);
       System.out.println("Hexadecimal representation: " + hexadecimal);
    }
}
```

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.

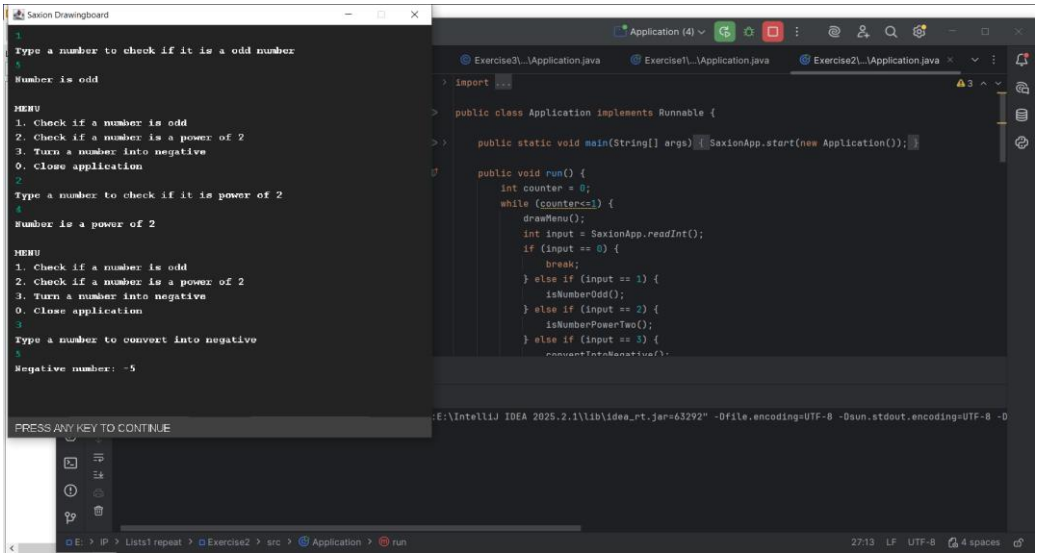
Organize your source code in a readable manner with the use of control flow and methods.

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.

```
public class Application implements Runnable {

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

   public void run() {
      int counter = 0;
      while (counter<=1) {
         drawMenu();
         int input = SaxionApp.readInt();
         if (input == 0) {
            break;
         } else if (input == 1) {
            isNumberOdd();
         } else if (input == 2) {
            isNumberPowerTwo();
         } else if (input == 3) {
            convertIntoNegative();
         }
         SaxionApp.pause();

      }
   }

   public void isNumberOdd() {
      SaxionApp.printLine("Type a number to check if it is a odd number");
      int input = SaxionApp.readInt();
      if ((input & 1) == 1) {
         SaxionApp.printLine("Number is odd");
      }
      else {
```

```
            SaxionApp.printLine("Number is even");
        }
    }

    public void isNumberPowerTwo() {
        SaxionApp.printLine("Type a number to check if it is power of 2");
        int input = SaxionApp.readInt();
        if (input > 0 && (input & (input - 1)) == 0) {
            SaxionApp.printLine("Number is a power of 2");
        }
        else {
            SaxionApp.printLine("Number isn't a power of 2");
        }
    }

    public void convertIntoNegative() {
        SaxionApp.printLine("Type a number to convert into negative");
        int input = SaxionApp.readInt();
        input = ~input + 1;
        SaxionApp.printLine("Negative number: " + input);
    }

    public void drawMenu() {
        SaxionApp.printLine("MENU");
        SaxionApp.printLine("1. Check if a number is odd");
        SaxionApp.printLine("2. Check if a number is a power of 2");
        SaxionApp.printLine("3. Turn a number into negative");
        SaxionApp.printLine("0. Close application");
    }
}
```



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