Template Week 2 – Logic

Student number: 578688

Assignment 2.1: Parking lot

Which gates do you need?

2 AND gates

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? XOR Gate

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

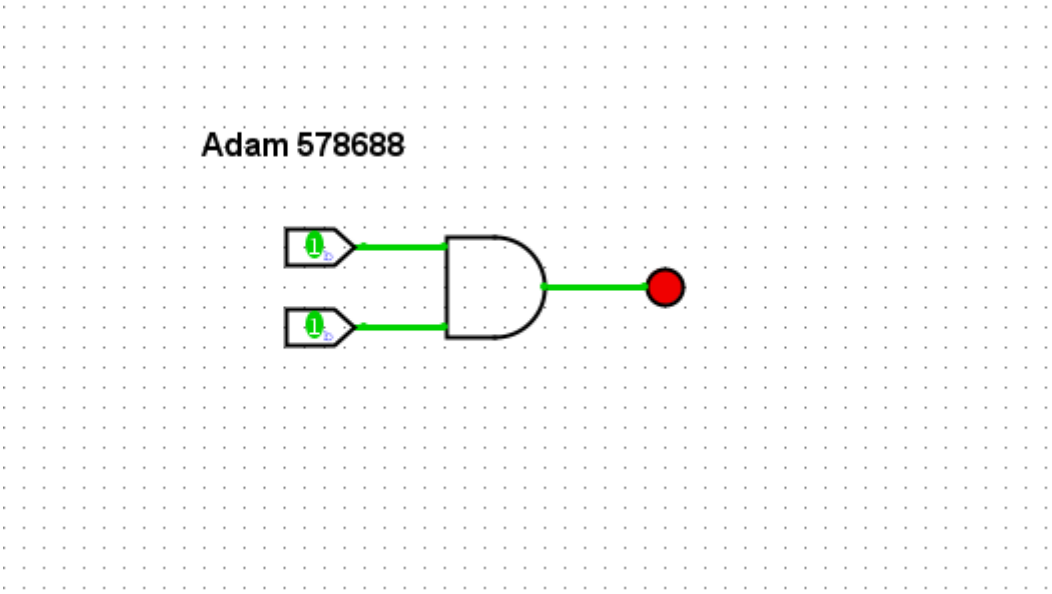
A	B	Q
0	0	0
1	0	1
0	1	1
1	1	0

How can the design be simplified?

One XOR gate could've been used.

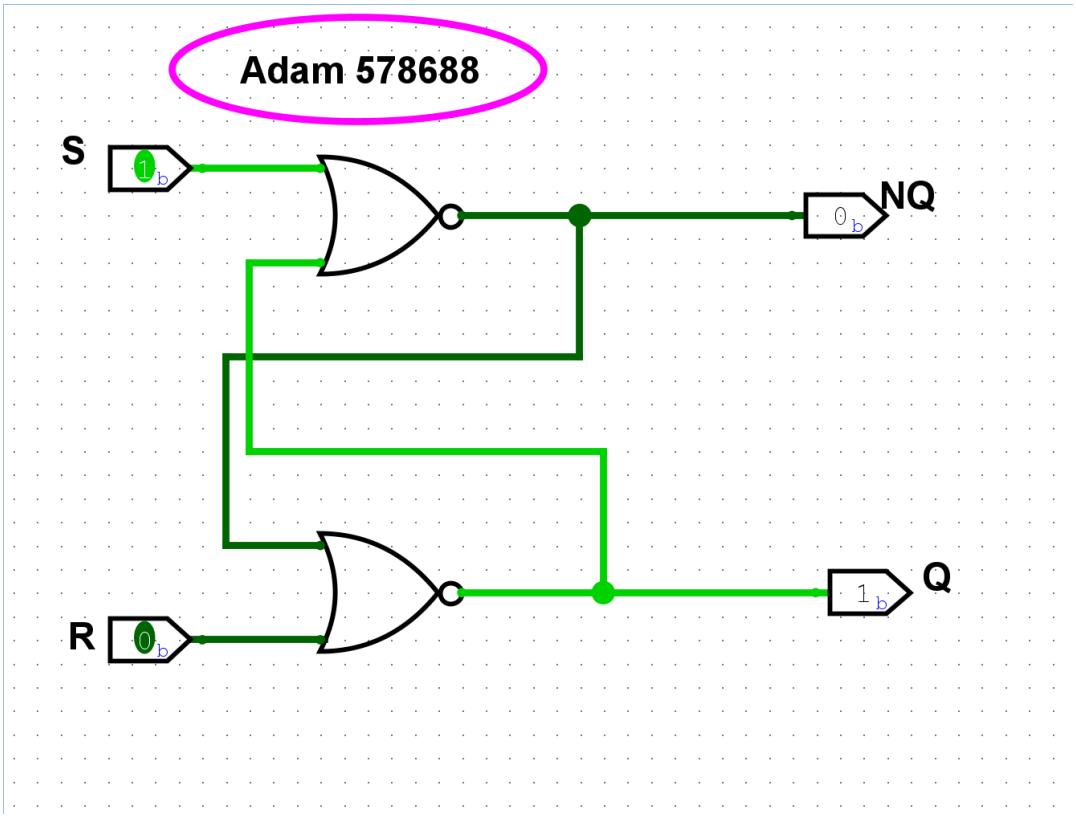
Assignment 2.4: Getting to know Logisim evolution

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



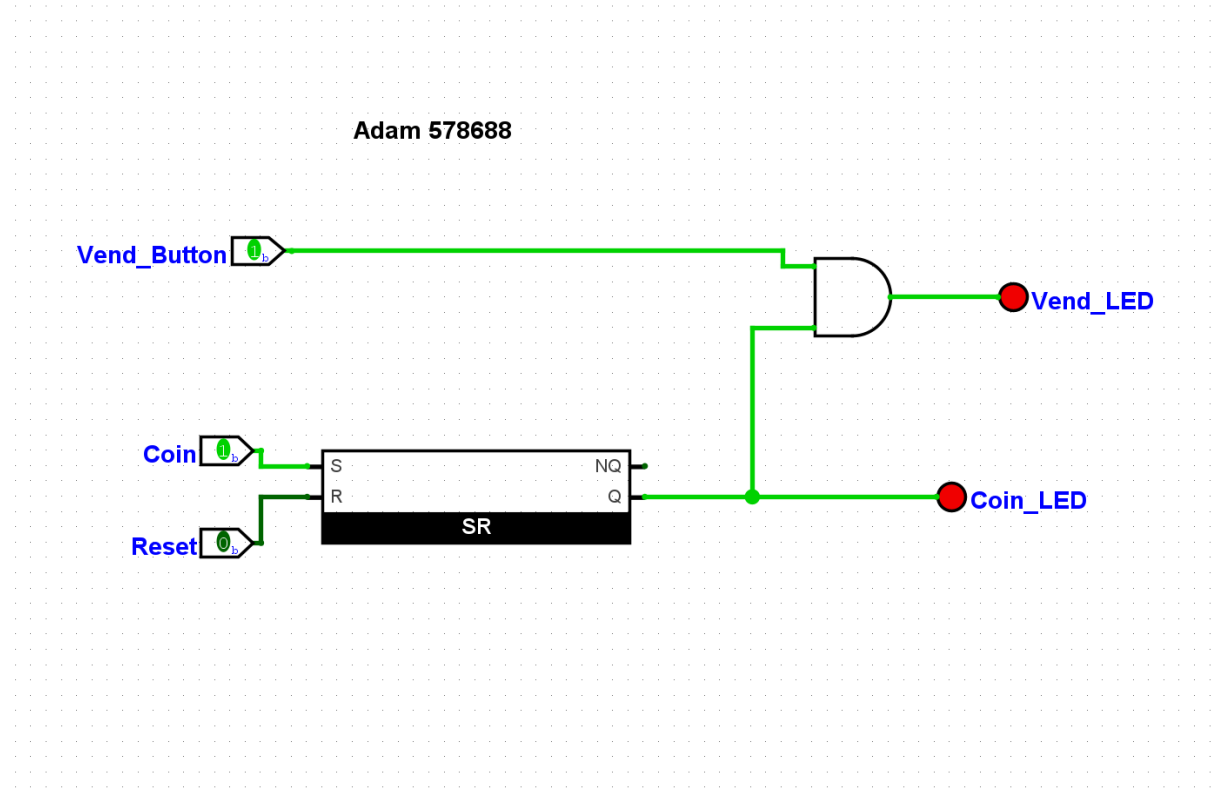
Assignment 2.5: SR Latch

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.

Even or Odd:

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

      int constant = 1;
      int customNumber = 6;

      if ((constant & customNumber) == 1) {
         System.out.print(true);
      } else if ((constant & customNumber) == 0) {
         System.out.print(false);
      }


   }
}
```

Power of 2:

```
public class PowerOf2 {

   public static void main(String[] args) {

      int customNumber = 64;


      if ((customNumber&(customNumber - 1)) == 0){
         System.out.print("True");
      }
      else {
         System.out.print("False");

      }


   }

}
```

Check permissions:

```
public class CheckPermission {

   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.print("This person has read permissions");
      } else {
         System.out.print("This person does NOT have read permissions.");
      }

   }

}
```

Assign permissions:

```
public class AddPermissions {

   public static void main(String[] args) {
      final int READ = 4;
      final int WRITE = 2;
      final int EXECUTE = 1;

      int userPermissions = 0;

      userPermissions = userPermissions | READ | EXECUTE;

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

   }
}
```

Update permissions:

```
public class UpdatePermissions {

    public static void main(String[] args) {
        final int READ = 4;
        final int WRITE = 2;
        final int EXECUTE = 1;

        int userPermissions = 6;


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

    }
}
```

Two's complement :

```
public class TwosComplement {

    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.

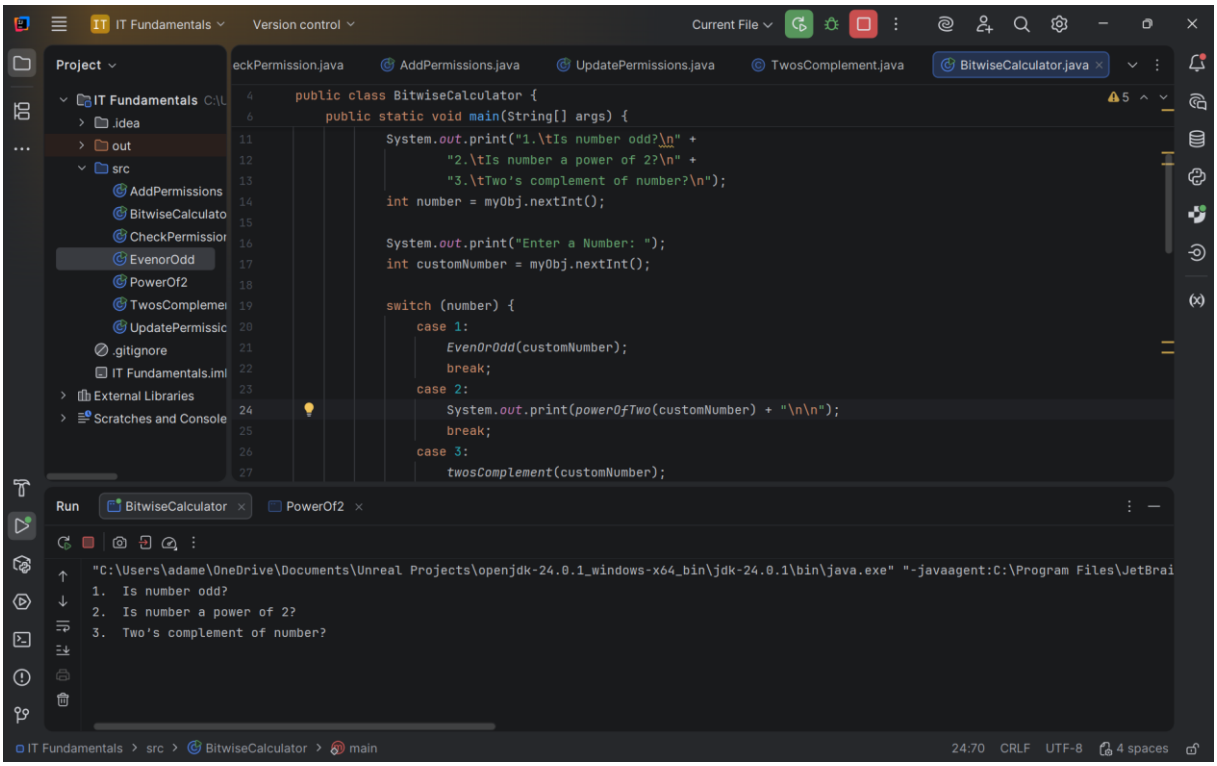
Organize your source code in a readable manner with the use of control flow and methods.

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.

```
import javax.xml.parsers.SAXParser;
import java.util.Scanner;

public class BitwiseCalculator {

   public static void main(String[] args) {
      Scanner myObj = new Scanner(System.in);

      while (true) {

         System.out.print("1.\tIs number odd?\n" +
               "2.\tIs number a power of 2?\n" +
               "3.\tTwo's complement of number?\n");
         int number = myObj.nextInt();

         System.out.print("Enter a Number: ");
         int customNumber = myObj.nextInt();

         switch (number) {
            case 1:
               EvenOrOdd(customNumber);
               break;
            case 2:
               System.out.print(powerOfTwo(customNumber) + "\n\n");
               break;
            case 3:
               twosComplement(customNumber);
               break;
            case 0:
               break;
         }
```

```
        }


    }


    public static void EvenOrOdd(int customNumber) {


        if ((1 & customNumber) == 1) {
            System.out.print(true + "\n\n");
        } else if ((1 & customNumber) == 0) {
            System.out.print(false + "\n\n");
        }
    }


    public static boolean powerOfTwo(int customNumber) {

        return (customNumber & (customNumber - 1)) == 0;
    }

    public static void twosComplement(int number) {

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

    }


}
```



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