Template Week 2 – Logic

Student number: 575798

Assignment 2.1: Parking lot

Which gates do you need?

I need 2 AND gates for (A AND B) AND C.

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?

1 OR gate is needed. (A OR I)

Complete this table

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

Assignment 2.3: Four NAND gates

Complete this table

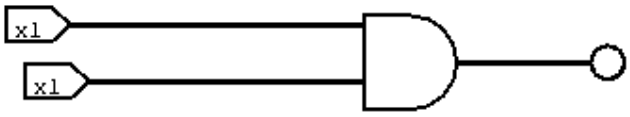
A	B	Q
0	0	0
0	1	1
1	0	1
1	1	0

How can the design be simplified?

The output is the same as an XOR gate therefore (A XOR B) would provide the same results.

Assignment 2.4: Getting to know Logisim evolution

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



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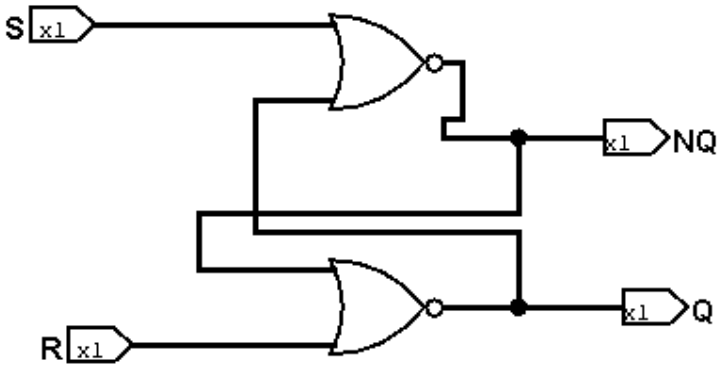
Assignment 2.5: SR Latch

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



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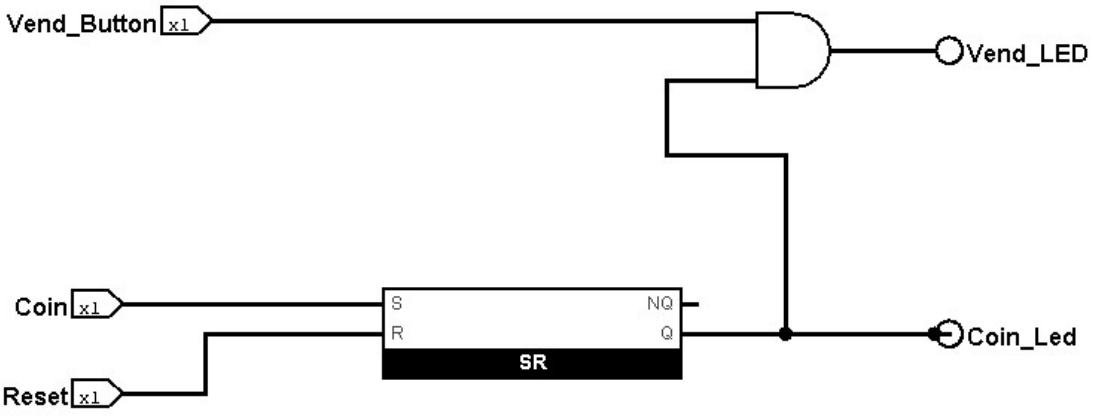
Assignment 2.6: Vending Machine

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



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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 = 5;
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 = 1;
if(((number & (number -1) ) ==0) && number > 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((userPermissions & READ) == READ) 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 = userPermissions | READ | EXECUTE;
 System.out.println("User permissions: "+userPermissions);}}
```

5.

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

6.

```
public class Main {
 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?

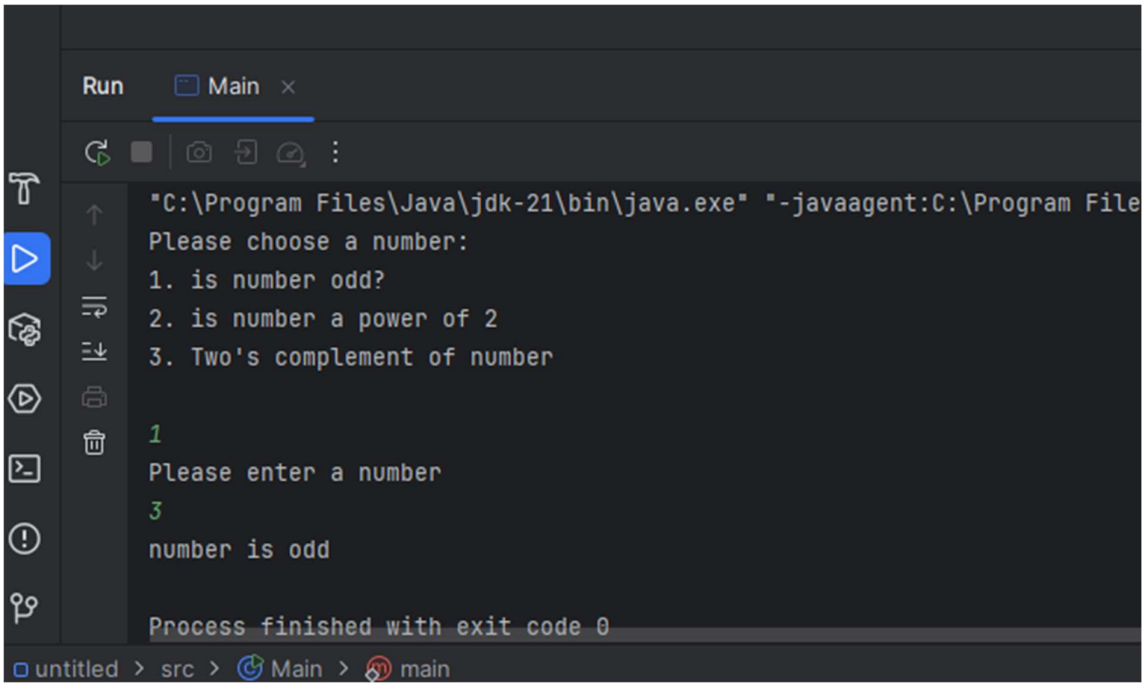
Implement the methods by using the bitwise operators you have just learned.

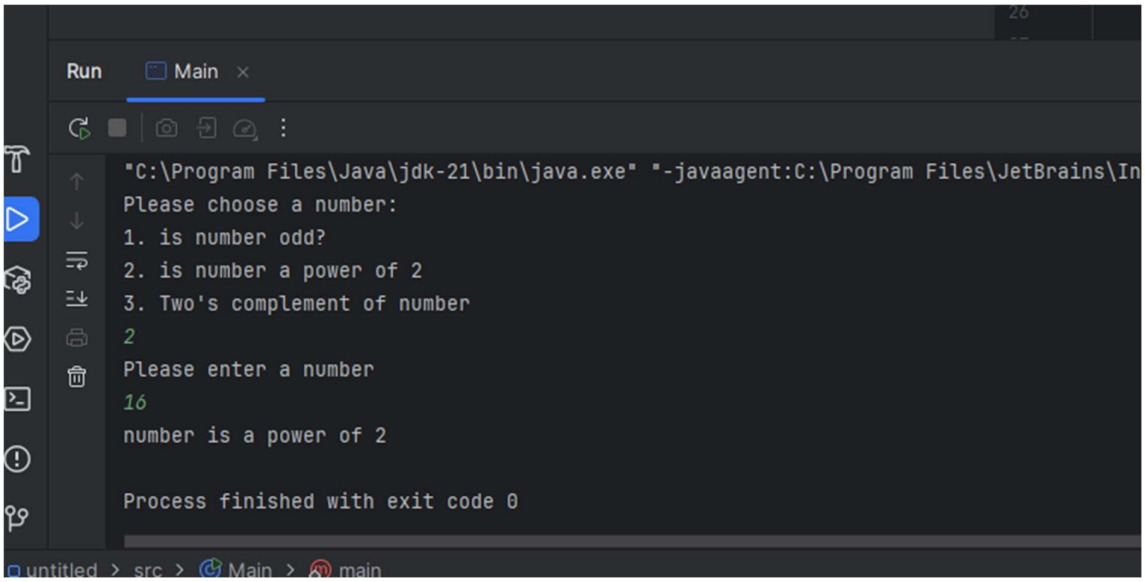
Organize your source code in a readable manner with the use of control flow and methods.

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 java.util.Scanner;

public class Main {
   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);
      System.out.println("Please choose a number: ");
      System.out.println("1. is number odd? ");
      System.out.println("2. is number a power of 2 ");
      System.out.println("3. Two's complement of number ");

      int input = scanner.nextInt();

      if(input ==1) {
         System.out.println("Please enter a number");
         int number = scanner.nextInt();
         if ((number & 1) == 1) System.out.println("number is odd");
         else System.out.println("number is even");
      }
      else if (input ==2) {
         System.out.println("Please enter a number");
         int number = scanner.nextInt();
         if (((number & (number - 1)) == 0) && number > 0) System.out.println("number is a power of
2");
         else System.out.println("number isn't a power of 2");

      } else if (input == 3) {
         System.out.println("Please enter a number");
         int number = scanner.nextInt();
         number = ~number + 1;
         System.out.println("Number: "+number); }}

}
```


Run
Main
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Program File
Please choose a number:
1. is number odd?
2. is number a power of 2
3. Two's complement of number
1
Please enter a number
3
number is odd
Process finished with exit code 0
untitled > src > Main > main


Run
Main
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\In
Please choose a number:
1. is number odd?
2. is number a power of 2
3. Two's complement of number
2
Please enter a number
16
number is a power of 2
Process finished with exit code 0
untitled > src > Main > main

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