Template Week 2 – Logic

Student number:

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
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? XOR

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

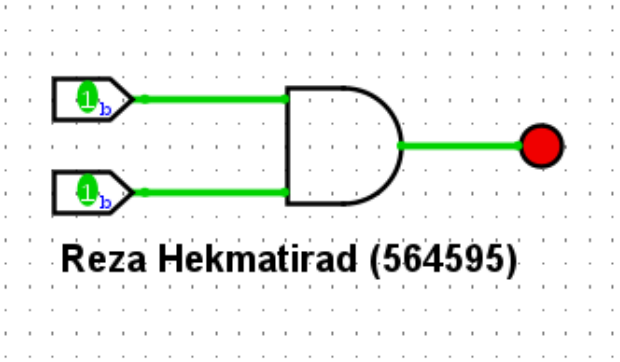
Complete this table

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

How can the design be simplified? By designing a XOR gate.

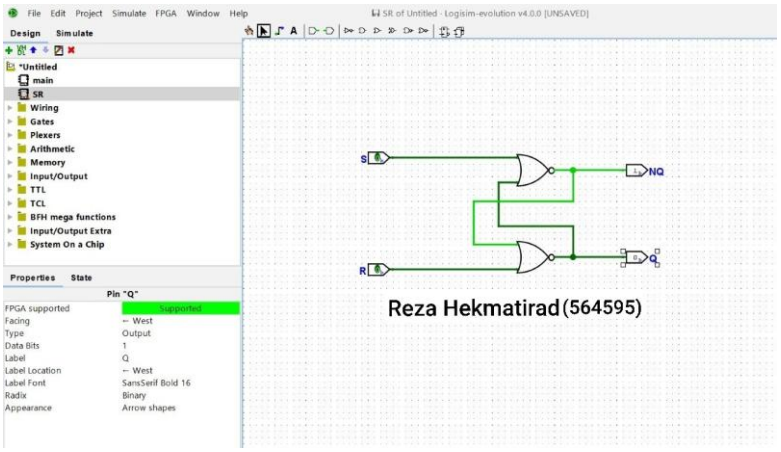
Assignment 2.4: Getting to know Logisim evolution

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



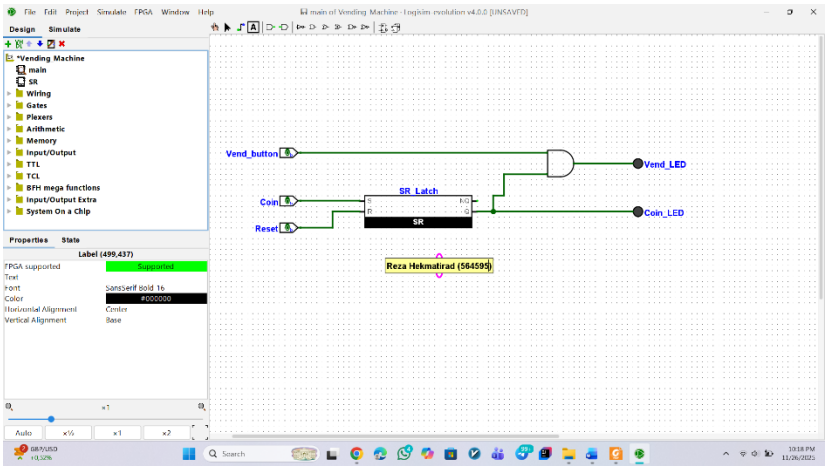
Assignment 2.5: SR Latch

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.

#1 even or odd

```
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 power of 2

```
public class Main {

public static void main(String[] args) {

int number = 4;

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");

}

}
```

#3 Check permissions

```
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 Assign permissions

```
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 Update permissions

```
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 Two's complement

```
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.

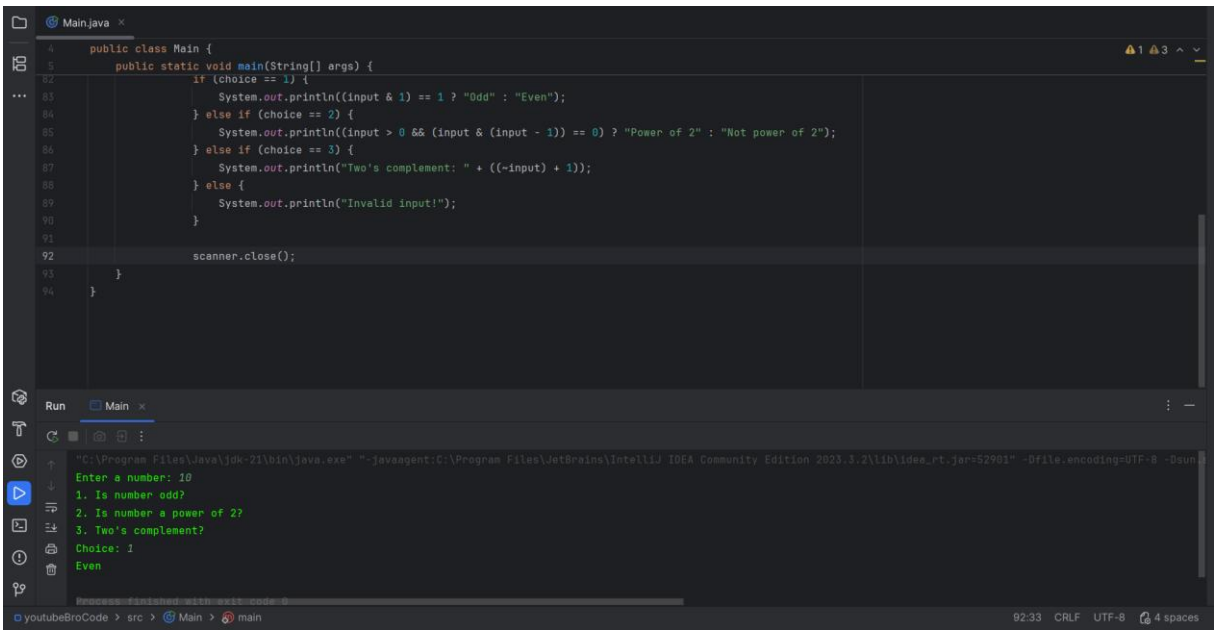
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?

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.print("Enter a number: ");
        int input = scanner.nextInt();

        System.out.println("1. Is number odd?");
        System.out.println("2. Is number a power of 2?");
        System.out.println("3. Two's complement?");
        System.out.print("Choice: ");
        int choice = scanner.nextInt();

        if (choice == 1) {
            System.out.println((input & 1) == 1 ? "Odd" : "Even");
        } else if (choice == 2) {
            System.out.println((input > 0 && (input & (input - 1)) == 0) ? "Power of 2" : "Not power of 2");
        } else if (choice == 3) {
            System.out.println("Two's complement: " + ((~input) + 1));
        } else {
            System.out.println("Invalid input!");
        }

        scanner.close();
    }
}
```

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