Template Week 2 – Logic

Student number:

Assignment 2.1: Parking lot

Which gates do you need?

OR gate

Complete this table

Parking lot 1	Parking lot 2	Parking lot 3	Result (full)
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

Assignment 2.2: Android/iPhone

Which gates do you need?

OR gate

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	1
0	1	1
1	0	1
1	1	0

How can the design be simplified?

The design can be simplified by using fewer NAND gates. For example, to make an AND gate, you can use two NAND gates: one to combine the inputs and another to reverse the result. This way, you don't use extra gates and keep it simple.
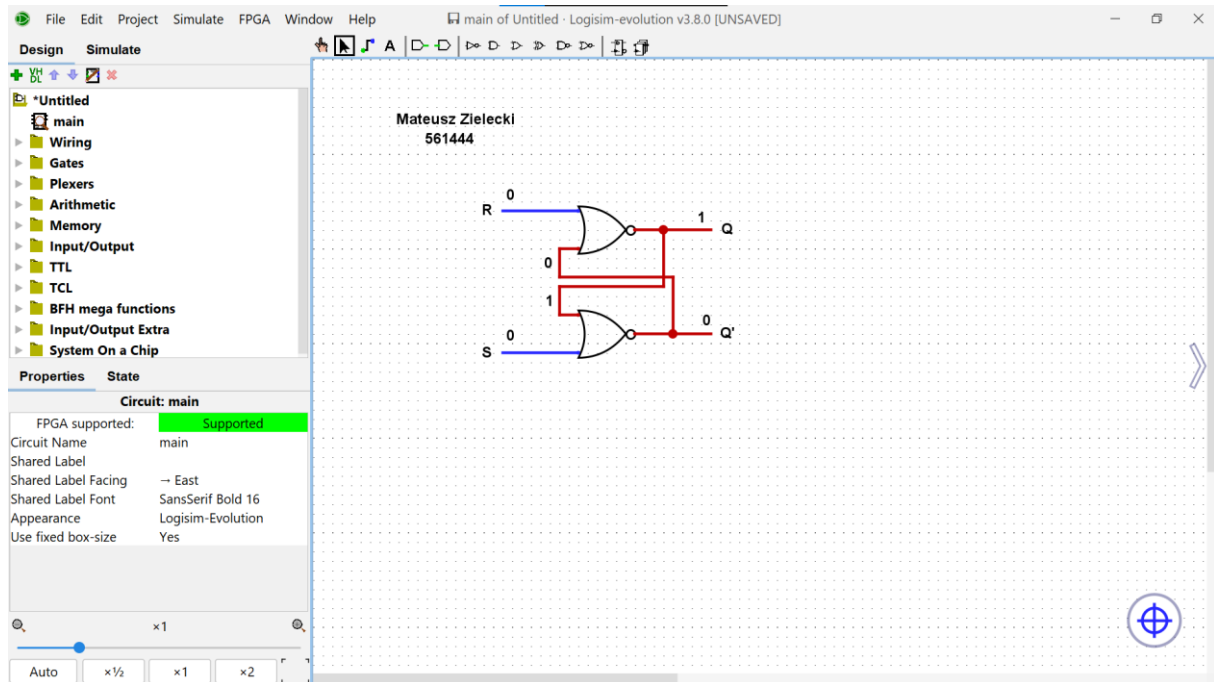
Assignment 2.4: Getting to know Logisim evolution

Screenshot of the design with your name and student number in it:
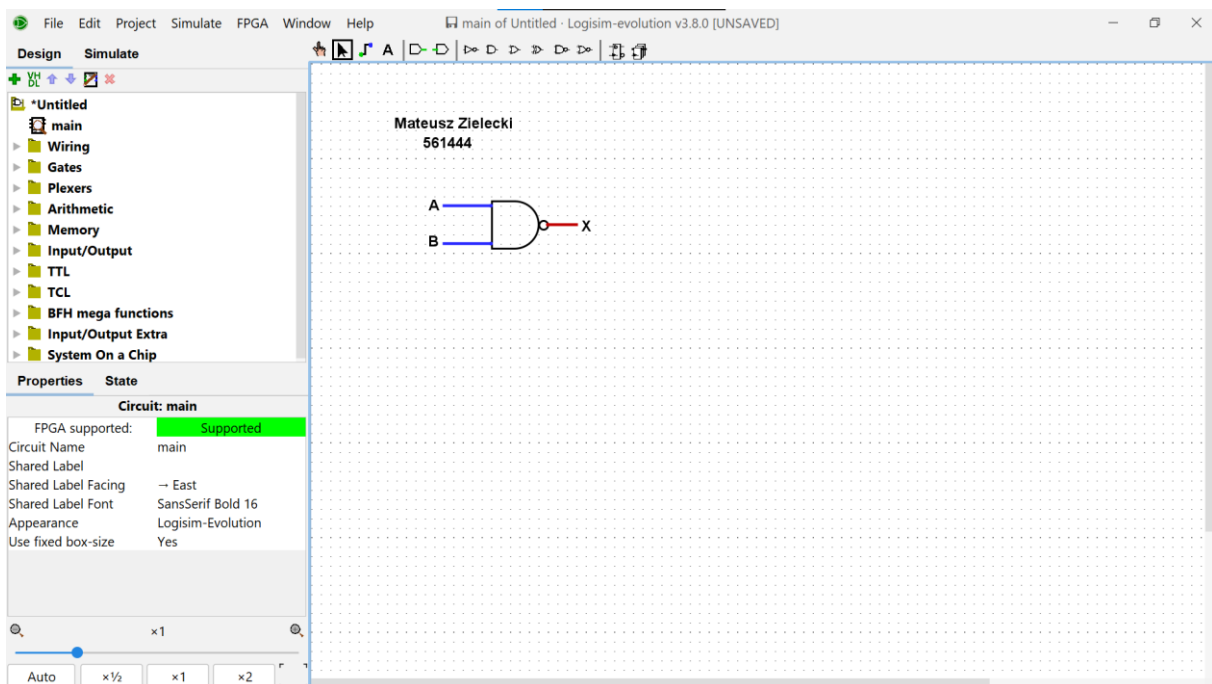
Assignment 2.5: SR Latch

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:

Bonus point assignment – week 2

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.

Paste source code here, with a screenshot of a working application.

```java
import java.util.Scanner;

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

        System.out.println("Enter a number:");
        int number = scanner.nextInt();

        while (true) {
            System.out.println("\nMenu:");
            System.out.println("1. Check if the number is odd");
            System.out.println("2. Check if the number is a power of 2");
            System.out.println("3. Find the Two's complement of the number");
            System.out.println("4. Exit");
            System.out.print("Choose an option: ");

            int choice = scanner.nextInt();

            switch (choice) {
                case 1:
                    System.out.println(isOdd(number));
                    break;
                case 2:
                    System.out.println(isPowerOfTwo(number));
                    break;
                case 3:
                    System.out.println(twosComplement(number));
                    break;
                case 4:
                    scanner.close();
                    return;
                default:
                    System.out.println("Something went wrong. Please try again.");
            }
        }
    }

    public static boolean isOdd(int num) {
        return (num & 1) == 1;
    }

    public static boolean isPowerOfTwo(int num) {
        return num > 0 && (num & (num - 1)) == 0;
    }

    public static int twosComplement(int num) {
        return ~num + 1;
    }
}
```
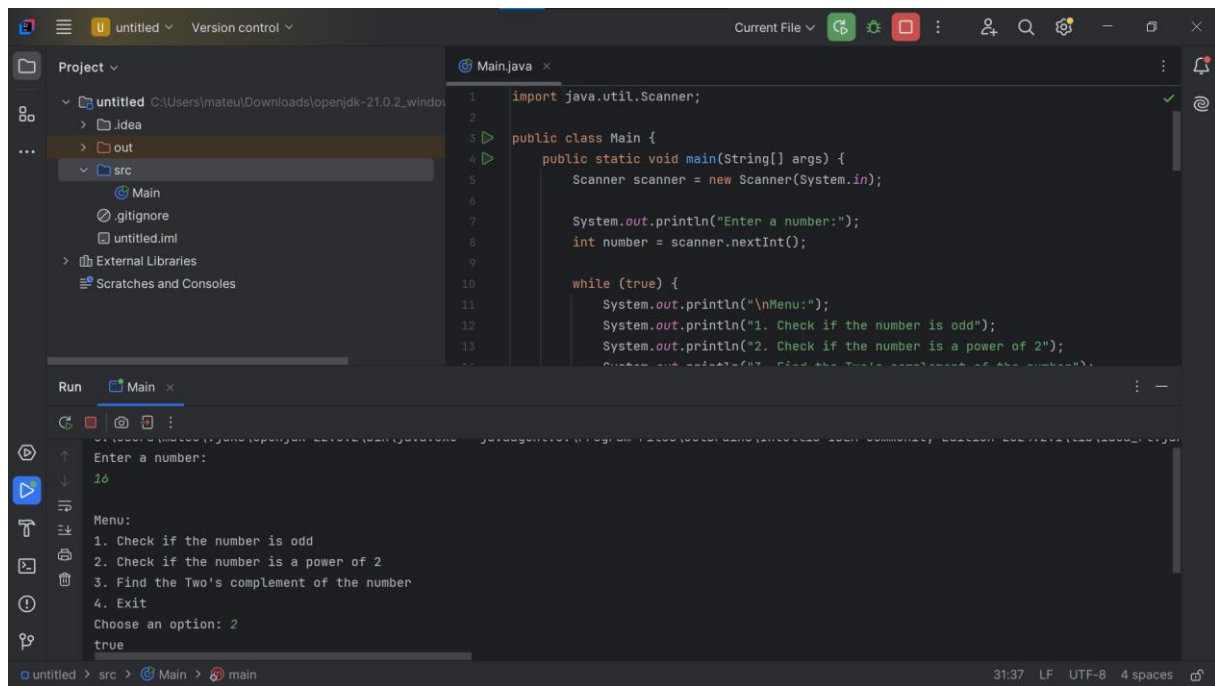
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