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	1	
0	1	0	

Assignment 2.2: Android/iPhone

Which gates do you need?

Complete this table

Android phone	iPhone	Result (Phone in possession)
0	0	

Assignment 2.3: Four NAND gates

Complete this table

A	B	Q

How can the design be simplified?

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.

```
import java.util.Scanner;

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

        while (true) {
            System.out.println("\nMenu:");
            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?");
            System.out.println("4. Exit");
            System.out.print("Enter your choice: ");

            int choice = scanner.nextInt();
            if (choice == 4) {
                System.out.println("Exiting program. Goodbye!");
                break;
            }

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

            switch (choice) {
                case 1:
                    mainInstance.isOdd(number);
                    break;
                case 2:
                    mainInstance.isPowerOfTwo(number);
                    break;
                case 3:
                    mainInstance.twoComplement(number);
                    break;
                default:
                    System.out.println("Invalid choice. Please try again.");
            }
```

```
        }

        scanner.close();
    }

    public void isOdd(int number) {
        if ((number & 1) == 1) {
            System.out.println(number + " is odd.");
        } else {
            System.out.println(number + " is even.");
        }
    }

    public void isPowerOfTwo(int number) {
        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.");
        }
    }

    public void twoComplement(int number) {
        System.out.println("Original Number: " + number);

        int negative = ~number + 1;
        System.out.println("After Two's Complement (Negative): " + negative);
    }
}
```

```
Menu:
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Exit
Enter your choice: 1
Enter a number: 3
3 is odd.

Menu:
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Exit
Enter your choice: 1
Enter a number: 4
4 is even.

Menu:
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Exit
Enter your choice: 2
Enter a number: 3
3 isn't a power of 2.

Menu:
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Exit
Enter your choice: 2
Enter a number: 4
4 is a power of 2.

Menu:
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Exit
Enter your choice: 3
Enter a number: 3
Original Number: 3
After Two's Complement (Negative): -3

Menu:
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Exit
Enter your choice:
```

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