Template Week 2 – Logic

Student number: 572121

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.

```java
import nl.saxion.app.SaxionApp;

public class Application implements Runnable {
    public static void main(String[] args) {
        SaxionApp.start(new Application(), 1024, 768);
    }

    public void run() {
        // Show menu options
        SaxionApp.printLine("Keuzemenu: 572121");
        SaxionApp.printLine("1. Is number odd?");
        SaxionApp.printLine("2. Is number a power of 2?");
        SaxionApp.printLine("3. Two's complement of number");

        // Read user choice
        int choice = SaxionApp.readInt();

        // Execute chosen option
        if (choice == 1) {
            checkOddEven();
        } else if (choice == 2) {
            checkPowerOf2();
        } else if (choice == 3) {
            calculateTwosComplement();
        } else {
            SaxionApp.printLine("Invalid choice!");
        }
    }

    // Option 1: Check if number is odd/even
    public void checkOddEven() {
        SaxionApp.printLine("Enter a number:");
        int number = SaxionApp.readInt();

        // Simple check: if dividing by 2 has remainder, number is odd
        if (number % 2 == 0) {
            SaxionApp.printLine(number + " is even");
        } else {
```

```java
            SaxionApp.printLine(number + " is odd");
        }
    }

    // Option 2: Check if number is power of 2
    public void checkPowerOf2() {
        SaxionApp.printLine("Enter a number:");
        int number = SaxionApp.readInt();

        // A number is power of 2 if it has only one '1' bit
        boolean isPowerOf2 = number > 0 && (number & (number - 1)) == 0;

        if (isPowerOf2) {
            SaxionApp.printLine(number + " is a power of 2");
        } else {
            SaxionApp.printLine(number + " is not a power of 2");
        }
    }

    // Option 3: Calculate two's complement
    public void calculateTwosComplement() {
        SaxionApp.printLine("Enter a number:");
        int number = SaxionApp.readInt();

        // Calculate two's complement
        int twosComplement = ~number + 1;

        SaxionApp.printLine("Two's complement of " + number + " is: " + twosComplement);

        // Show we can convert back to original number
        int backToOriginal = ~twosComplement + 1;
        SaxionApp.printLine("Converting back gives us: " + backToOriginal);
    }
}
```
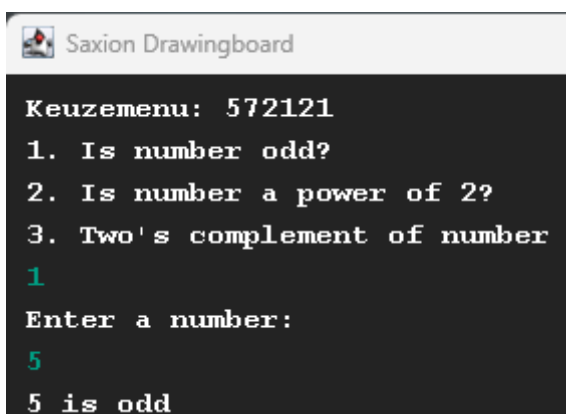
```
Saxion Drawingboard

Keuzemenu: 572121

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

Enter a number:
5

5 is odd
```

Saxion Drawingboard

```
Keuzemenu: 572121
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number
1
Enter a number:
8
8 is even
```


Saxion Drawingboard

```
Keuzemenu: 572121
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number
2
Enter a number:
8
8 is a power of 2
```
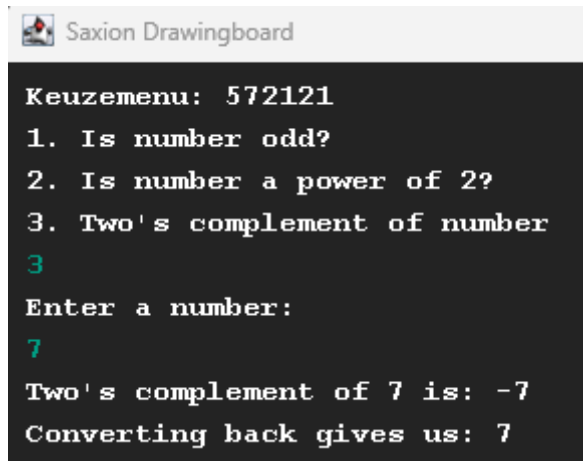

Saxion Drawingboard

```
Keuzemenu: 572121
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number
2
Enter a number:
7
7 is not a power of 2
```

7 = 00000111

Flip

11111000 +1

11111001

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