

Week 2 – Logic

Student number:

570215

Assignment 2.1: Parking lot

Which gates do you need?

Two AND gates

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
1	0	0	0
1	1	0	0
0	1	1	0
1	0	1	0
1	1	1	1

Assignment 2.2: Android/iPhone

Which gates do you need?

XOR gate

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	1
0	1	1
1	0	1
1	1	1

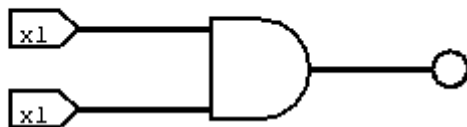
How can the design be simplified?

This design could be simplified by removing the bottom and right NAND gates. Connecting B to only the centre NAND gate

Assignment 2.4: Getting to know Logisim evolution

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

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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) {
        System.out.println("Select Function");
        System.out.println("1. Check if number is odd");
        System.out.println("2. Check if number a power of two");
        System.out.println("3. Return two's complement to a number");

        Scanner scanner = new Scanner(System.in);
```

```

int response = scanner.nextInt();
switch (response) {
    case 1:
        checkIfNumberIsOdd(scanner);
        break;
    case 2:
        checkIfNumberIsPowerOfTwo(scanner);
        break;
    case 3:
        printTwosCompliment(scanner);
        break;
    default:
        System.out.println("Invalid Input. Try again");
        main(args);
}
}

public static void checkIfNumberIsOdd(Scanner scanner)
{
    System.out.println("Give input number");
    int number = scanner.nextInt();
    if ((number & 1) == 1) System.out.println("number is odd");
    else System.out.println("number is even");
}

public static void checkIfNumberIsPowerOfTwo(Scanner scanner)
{
    System.out.println("Give input number");
    int number = scanner.nextInt();
    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");
}

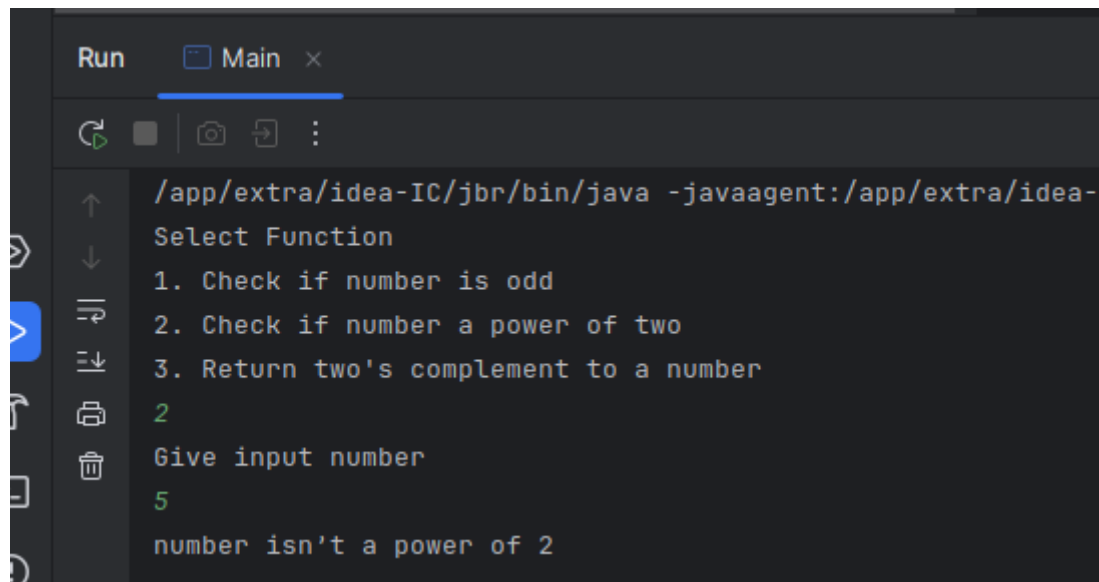
public static void printTwosCompliment(Scanner scanner)
{
    System.out.println("Give input number");
    int number = scanner.nextInt();
    int twosComplementOutput = (~number) + 1;
    System.out.println("Input number: " + number);
    System.out.println("Two's complement output: " + twosComplementOutput);
}
}

```

```

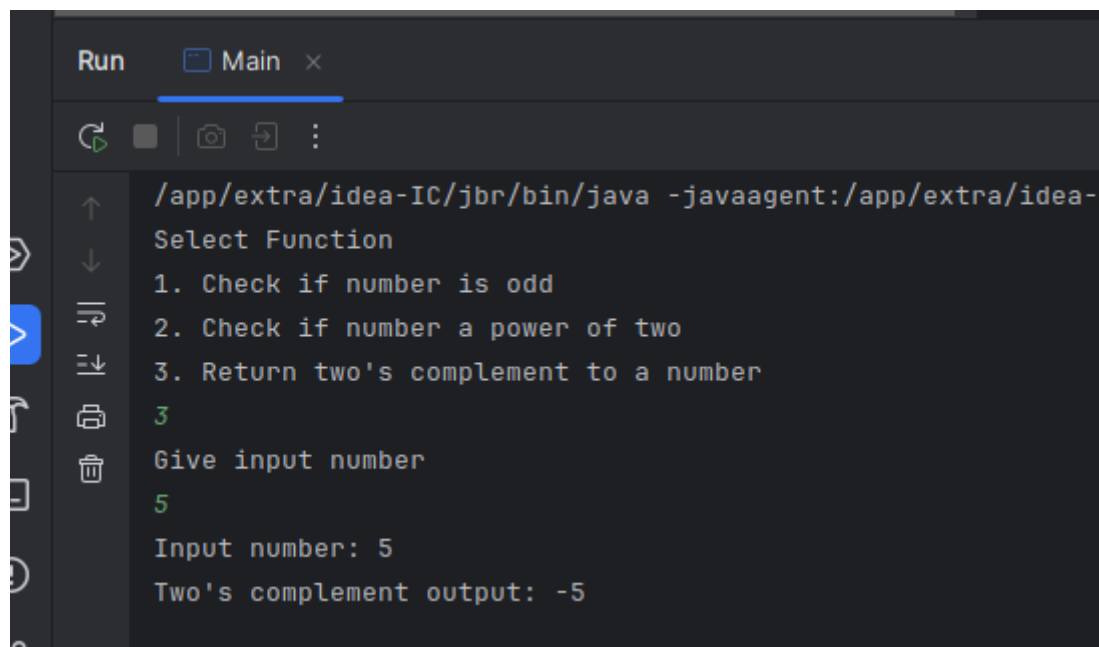
Run    Main x
Select Function
1. Check if number is odd
2. Check if number a power of two
3. Return two's complement to a number
2
Give input number
5
number isn't a power of 2

```



The screenshot shows the Run console of a Java IDE. At the top, there's a tab labeled 'Run' and 'Main'. Below it, a toolbar contains icons for running, debugging, and other actions. The main area of the console displays the following text:

```
/app/extra/idea-IC/jbr/bin/java -javaagent:/app/extra/idea-  
Select Function  
1. Check if number is odd  
2. Check if number a power of two  
3. Return two's complement to a number  
2  
Give input number  
5  
number isn't a power of 2
```



This screenshot shows the same Java IDE Run console as the one above, but with additional output. The menu is the same, and the input '5' is still present. Below the input, the program has calculated and displayed the two's complement of 5.

```
/app/extra/idea-IC/jbr/bin/java -javaagent:/app/extra/idea-  
Select Function  
1. Check if number is odd  
2. Check if number a power of two  
3. Return two's complement to a number  
3  
Give input number  
5  
Input number: 5  
Two's complement output: -5
```

Ready? Then save this file and export it as a pdf file with the name: [week2.pdf](#)