

Template Week 2 – Logic

Student number: 563437

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.

Code:

```
import java.util.Scanner;

public class BitwiseOperations {

    public static void main(String[] args) {

        Scanner scanner = new Scanner(System.in);

        boolean exit = false;

        while (!exit) {

            System.out.println("\n--- Bitwise Operations Menu ---");

            System.out.println("1. Check if a number is odd");

            System.out.println("2. Check if a number is a power of 2");

            System.out.println("3. Find the two's complement of a number");

            System.out.println("4. Exit");

            System.out.print("Enter your choice (1-4): ");

            int choice = scanner.nextInt();

            switch (choice) {

                case 1: // Check if odd

                    System.out.print("Enter a number: ");

                    int numberOdd = scanner.nextInt();

                    System.out.println("The number " + numberOdd + " is " + (isOdd(numberOdd) ? "odd." :
"even."));

                    break;

                case 2: // Check if power of 2
```

```

        System.out.print("Enter a number: ");

        int numberPower = scanner.nextInt();

        System.out.println("The number " + numberPower + " is " +
(isPowerOfTwo(numberPower) ? "a power of 2." : "not a power of 2.));

        break;

    case 3: // Find two's complement

        System.out.print("Enter a number: ");

        int numberComplement = scanner.nextInt();

        System.out.println("The two's complement of " + numberComplement + " is: " +
twosComplement(numberComplement));

        break;

    case 4: // Exit

        exit = true;

        System.out.println("Exiting the program. Goodbye!");

        break;

    default: // Invalid choice

        System.out.println("Invalid choice! Please select a valid option.");

    }

}

scanner.close();

}

/**
 * Check if a number is odd using bitwise AND.
 * @param number The input number.
 * @return True if the number is odd, false otherwise.
 */
public static boolean isOdd(int number) {
    return (number & 1) == 1;
}

/**
 * Check if a number is a power of 2 using bitwise operations.
 * @param number The input number.

```

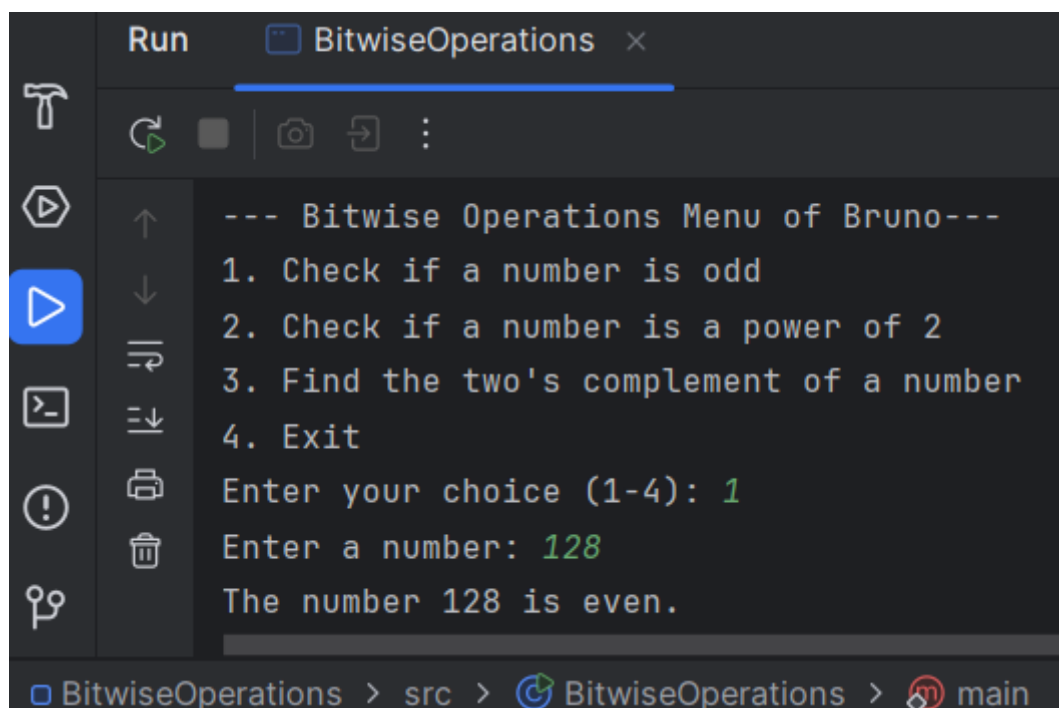
```

* @return True if the number is a power of 2, false otherwise.
*/
public static boolean isPowerOfTwo(int number) {
    return number > 0 && (number & (number - 1)) == 0;
}

/**
 * Calculate the two's complement of a number using bitwise NOT and addition.
 * @param number The input number.
 * @return The two's complement of the input number.
 */
public static int twosComplement(int number) {
    return ~number + 1;
}
}

```

Screenshots of working App:

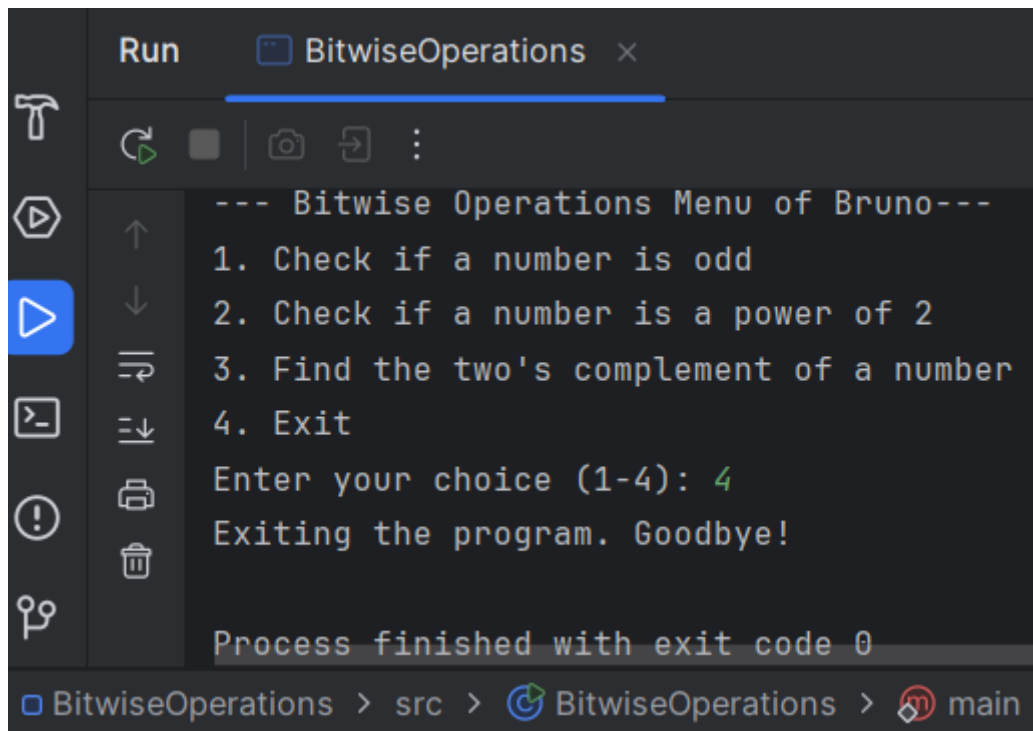


```
Run BitwiseOperations x
--- Bitwise Operations Menu of Bruno---
1. Check if a number is odd
2. Check if a number is a power of 2
3. Find the two's complement of a number
4. Exit
Enter your choice (1-4): 2
Enter a number: 1024
The number 1024 is a power of 2.
```

BitwiseOperations > src > BitwiseOperations > main

```
Run BitwiseOperations x
--- Bitwise Operations Menu of Bruno---
1. Check if a number is odd
2. Check if a number is a power of 2
3. Find the two's complement of a number
4. Exit
Enter your choice (1-4): 3
Enter a number: 256
The two's complement of 256 is: -256
```

BitwiseOperations > src > BitwiseOperations > main



The screenshot shows the 'Run' console in the Bruno IDE. The window title is 'Run BitwiseOperations'. The console output is as follows:

```
--- Bitwise Operations Menu of Bruno---  
1. Check if a number is odd  
2. Check if a number is a power of 2  
3. Find the two's complement of a number  
4. Exit  
Enter your choice (1-4): 4  
Exiting the program. Goodbye!  
  
Process finished with exit code 0
```

At the bottom, the breadcrumb navigation shows the file path: `BitwiseOperations > src > BitwiseOperations > main`.

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