

# Java - Introduction to Programming

## Lecture 14

### Bit Manipulation

#### Get Bit

```
import java.util.*;

public class Bits {
    public static void main(String args[]) {
        int n = 5; //0101
        int pos = 3;
        int bitMask = 1<<pos;

        if((bitMask & n) == 0) {
            System.out.println("bit was zero");
        } else {
            System.out.println("bit was one");
        }
    }
}
```

#### Set Bit

```
import java.util.*;

public class Bits {
    public static void main(String args[]) {
        int n = 5; //0101
        int pos = 1;
        int bitMask = 1<<pos;

        int newNumber = bitMask | n;
        System.out.println(newNumber);
    }
}
```

## Clear Bit

```
import java.util.*;

public class Bits {

    public static void main(String args[]) {

        int n = 5; //0101

        int pos = 2;

        int bitMask = 1<<pos;

        int newBitMask = ~(bitMask);

        int newNumber = newBitMask & n;

        System.out.println(newNumber);

    }

}
```

## Update Bit

```
import java.util.*;

public class Bits {

    public static void main(String args[]) {

        Scanner sc = new Scanner(System.in);

        int oper = sc.nextInt();

        // oper=1 -> set; oper=0 -> clear

        int n = 5;

        int pos = 1;

        int bitMask = 1<<pos;

        if(oper == 1) {

            //set

            int newNumber = bitMask | n;

            System.out.println(newNumber);

        } else {

            //clear

            int newBitMask = ~(bitMask);

            int newNumber = newBitMask & n;

            System.out.println(newNumber);

        }

    }

}
```

## Homework Problems

1. Write a program to find if a number is a power of 2 or not.
2. Write a program to toggle a bit a position = "pos" in a number "n".
3. Write a program to count the number of 1's in a binary representation of the number.
4. Write 2 functions => decimalToBinary() & binaryToDecimal() to convert a number from one number system to another. [BONUS]