

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 at 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]