left shift

N<<i

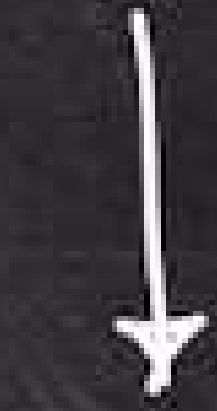
2<<1

010 <<1

100

right shift

N>>i



2>>1

010 >> 1

1 Get
2 Set
3 Clear
4 Update

Get Bit

Get the 3rd bit (position = 2) of a number n. (n = 0101)

Bit Mask : 1<<i

Operation : AND

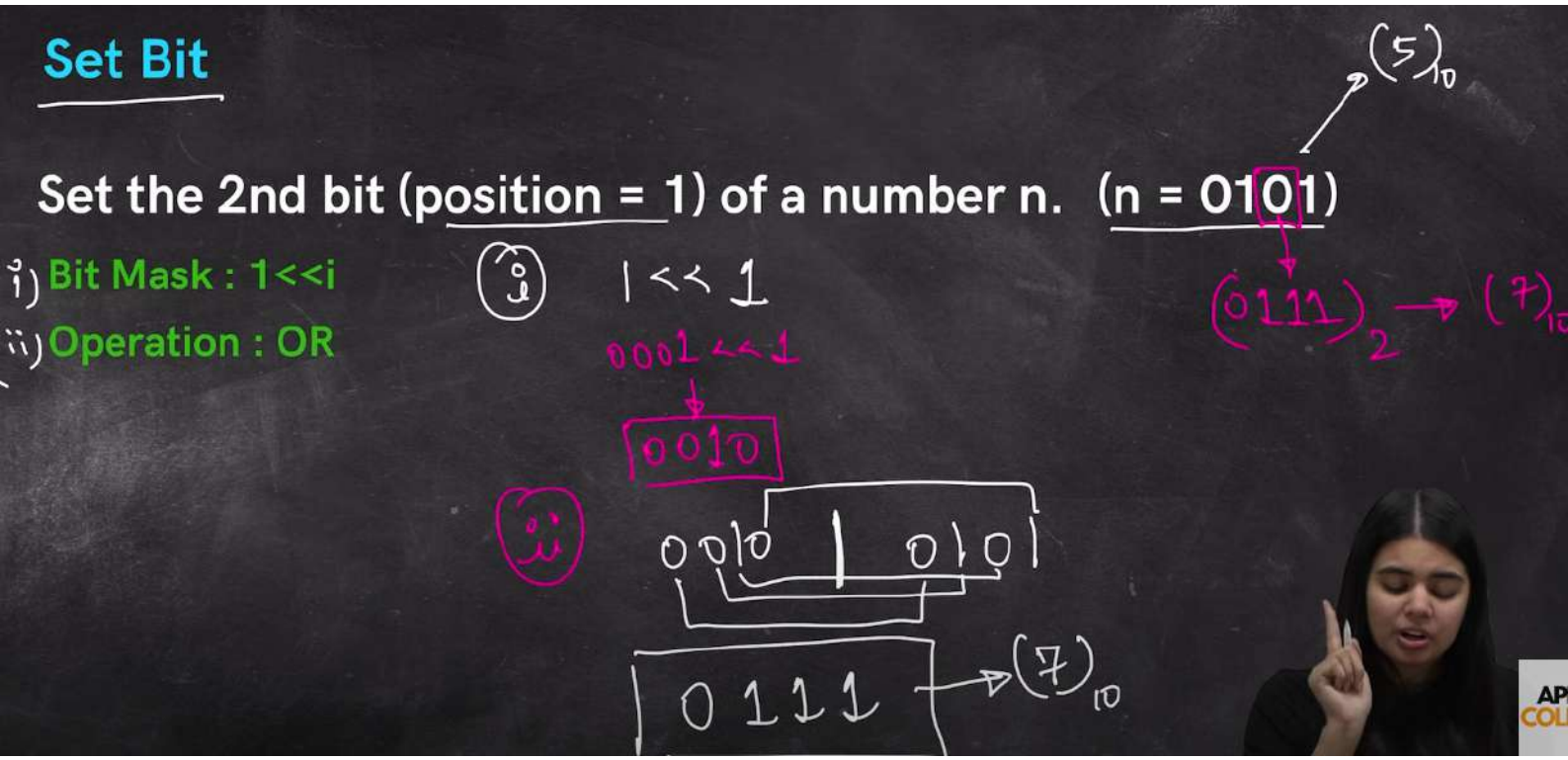
```java
import java.util.*;

public class Bits {
    Run | Debug
    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

Set the 2nd bit (position = 1) of a number n. (n = 0101)

Bit Mask : 1<<i

Operation : OR


Set Bit
Set the 2nd bit (position = 1) of a number n. (n = 0101)
(5)10
i) Bit Mask : 1<<i
ii) Operation : OR
1 << 1
0001 << 1
0010
(0111)2 → (7)10
0010 | 0101
0111 → (7)10

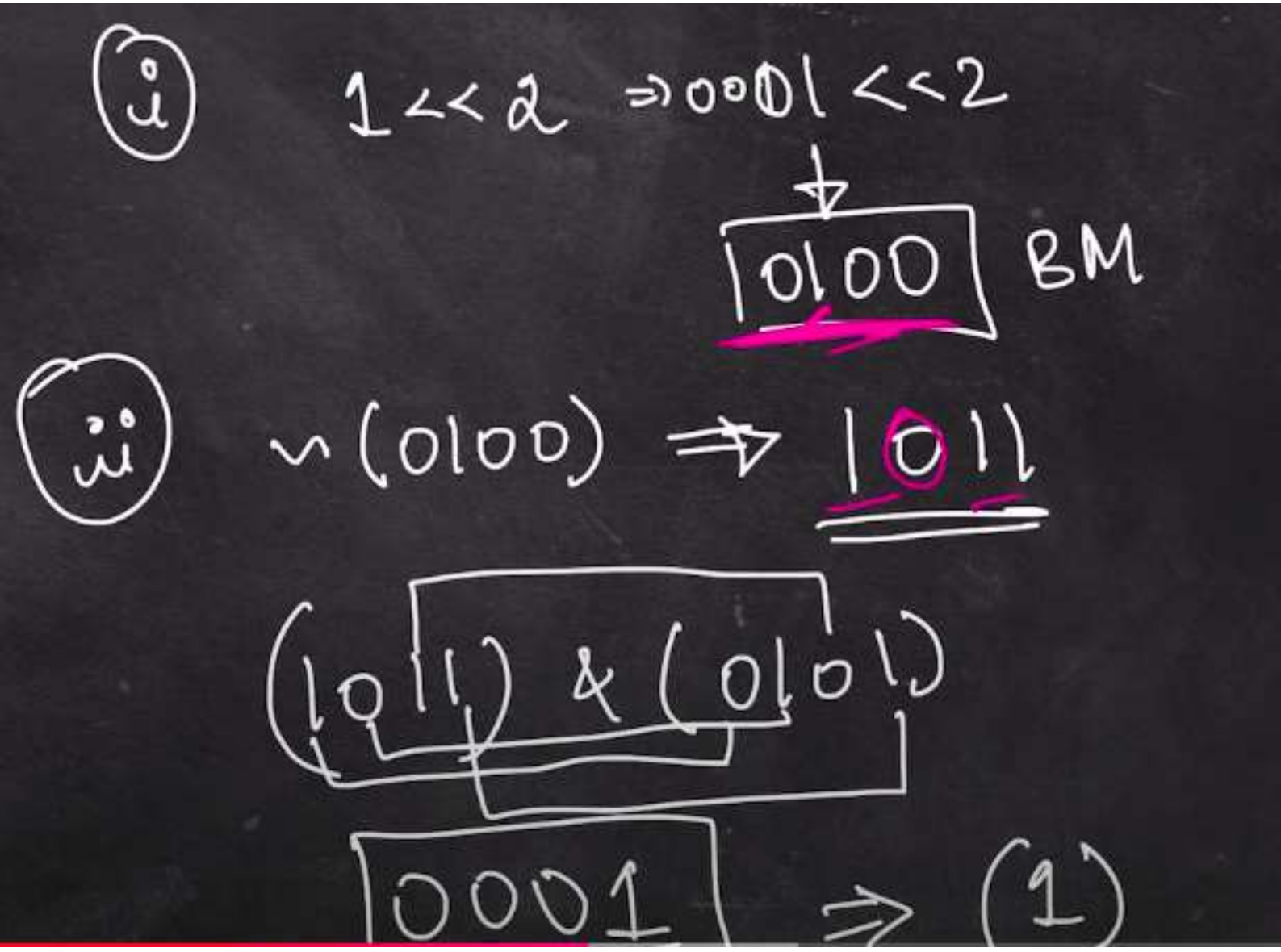
```java
import java.util.*;

public class Bits {
    Run | Debug
    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

Clear the 3rd bit (position = 2) of a number n. (n = 0101)

Bit Mask : 1<<i

Operation : AND with NOT

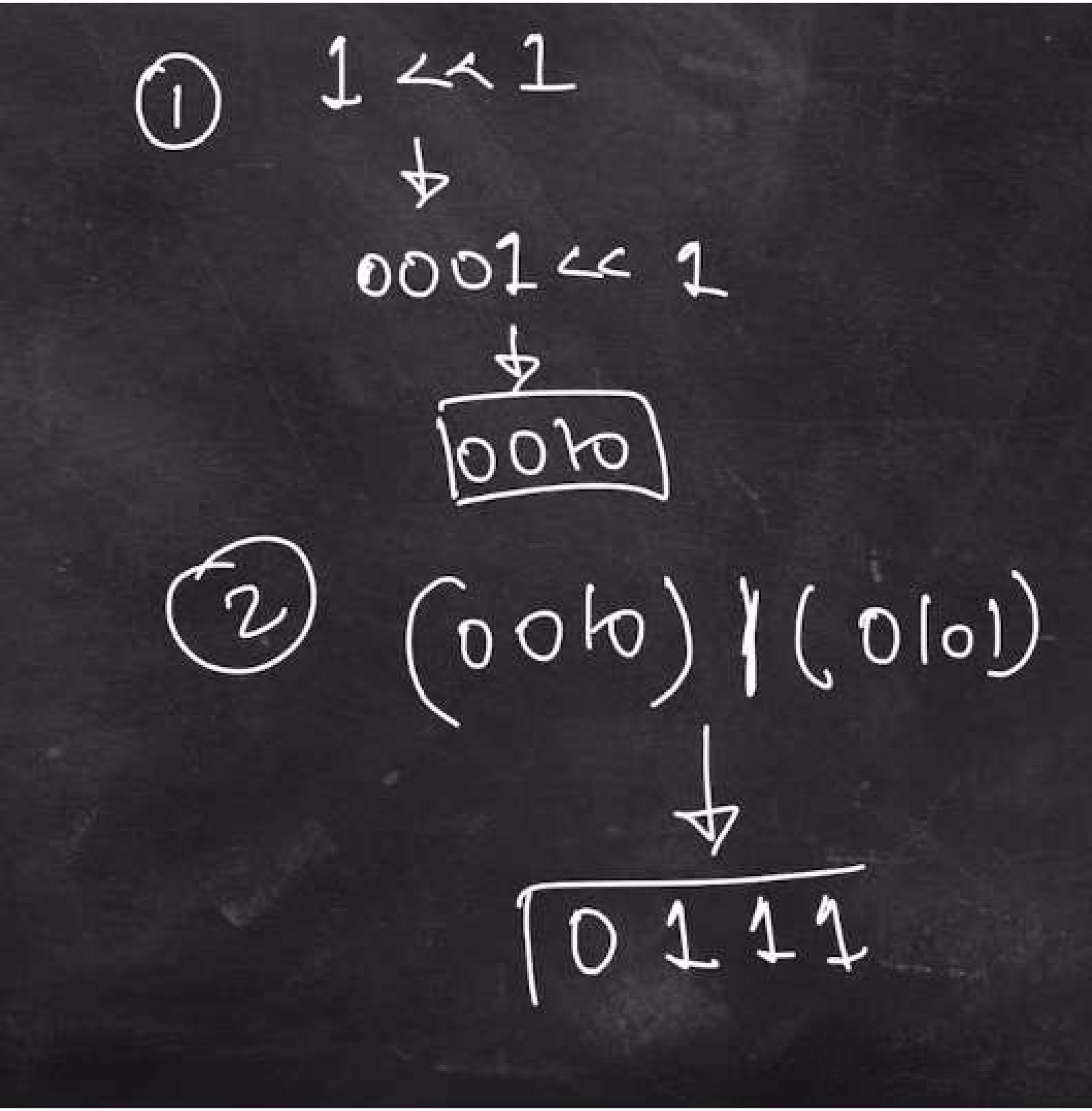

i
1<<2 ⇒0001<<2
0100
BM
ii
~(0100) ⇒ 1011
(1011) & (0101)
0001
⇒ (1)

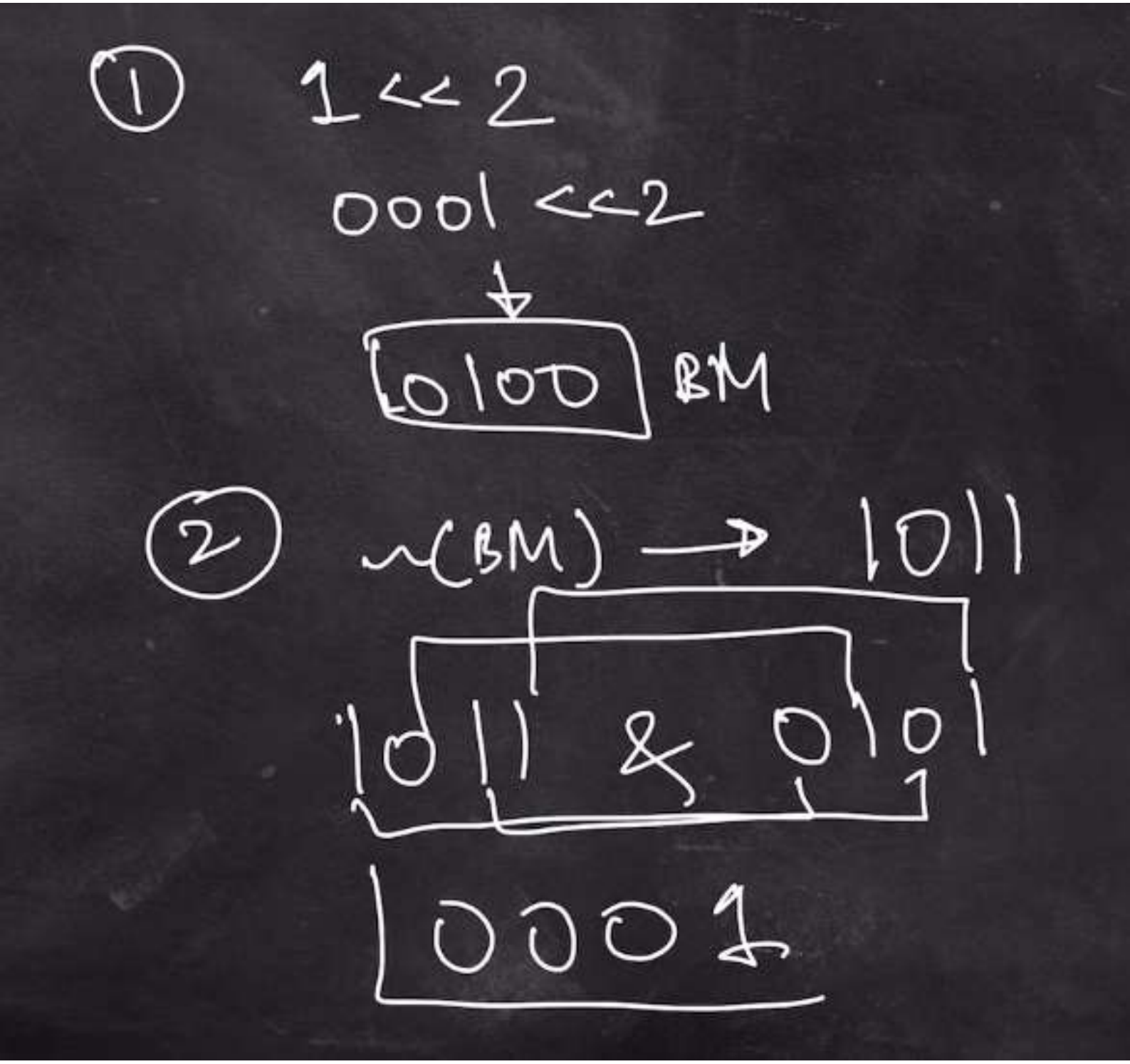
```java
import java.util.*;

public class Bits {
    Run | Debug
    public static void main(String args[]) {
        int n = 5; //0101
        int pos = 2;
        int bitMask = 1<<pos;
        int notBitMask = ~(bitMask);

        int newNumber = notBitMask & n;
        System.out.println(newNumber);
    }
}
```

Update Bit

Update the 2nd bit (position = 1) of a number n to 1. (n = 0101)

For 1	For 0
Bit Mask : 1<<i	Bit Mask : 1<<i
Operation : AND with NOT	Operation : OR


① 1 << 1
0001 << 1
0010
② (0010) | (0101)
0111


1
1 << 2
0001 << 2
0100
BM
2
~(BM) → 1011
1011 & 0101
0001

```
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; //0101
   int pos = 1;

   int bitMask = 1<<i;
   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);
   }
```