1.Write a program to swap two numbers without using a third variable and without using arithmetic operators like + or - .

```java
import java.util.Scanner;
class Swap_Bitwise{
    public static void main(String[] args){
            Scanner sc = new Scanner(System.in);

                    System.out.println("Enter a 1st number: ");
                    int num1 = sc.nextInt();

                    System.out.println("Enter a 2nd number: ");
                    int num2 = sc.nextInt();

                    System.out.println("Before Swapping: " +num1 +"," +num2);

                    num1 = num1 ^ num2;
                    num2 = num1 ^ num2;
                    num1 = num1 ^ num2;

                    System.out.println("After Swapping: " +num1 +"," +num2);
            }
        }
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac Swap_Bitwise.java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Swap_Bitwise
Enter a 1st number:
20
Enter a 2nd number:
50
Before Swapping: 20,50
After Swapping: 50,20

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>
```

2.Write a program to check whether a given number is even or odd using only bitwise operators

```java
import java.util.Scanner;
class Odd_Even_bitwise{
    public static void main(String[] args){
            Scanner sc = new Scanner(System.in);

                    System.out.println("Enter a 1st number: ");
                    int num = sc.nextInt();

                    if((num & 1) == 0)
                    {
                       System.out.println(num + " is even number.");
                    }
                    else
                    {
                     System.out.println(num + " is odd number.");
                    }
            }
        }
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac Odd_Even_bitwise.java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Odd_Even_bitwise
Enter a 1st number:
20
20 is even number.

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Odd_Even_bitwise
Enter a 1st number:
15
15 is odd number.
```

3.Implement a program that calculates the sum of digits of an integer using modulus (%) and division (/) operators.

```java
import java.util.Scanner;

class Sum_Digit{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);

        System.out.println("Enter a number:");
        int num = sc.nextInt();

        int sum = 0;

        while(num !=0){
          sum +=num%10;
            num/=10;
            }
        System.out.println("Sum of digit:" +sum);
        }
}
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac Sum_Digit.java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Sum_Digit
Enter a number:
1234
Sum of digit:10
```

Q4: Write a program to find whether a given number is divisible by 3 without using the modulus (%) or division (/) operators. Hint: Use subtraction and bitwise shifts.

```java
import java.util.Scanner;
class Divisibleby{
    public static void main(String[] args){

            Scanner sc = new Scanner(System.in);
            int num = sc.nextInt();

            if(num < 0)
            {
              num = -num;

            }
            while(num >= 3){
              num = num - (num >> 1) - (num >> 2);
                  }

            if(num == 0)
            {
              System.out.println("Divisible by 3");
            }
            else
            {
              System.out.println("Not divisible by 3");
            }
            sc.close();
          }

      }
```

Q5: Write a Java program to swap two numbers using the += and -= operators only.

```java
import java.util.Scanner;
class Swap1{
    public static void main(String[] args){
            Scanner sc = new Scanner(System.in);

                    System.out.println("Enter a 1st number: ");
                    int num1 = sc.nextInt();

                    System.out.println("Enter a 2nd number: ");
                    int num2 = sc.nextInt();


                    System.out.println("Before Swapping: " +num1 +"," +num2);

                    num1 += num2;
                    num2 = num1 - num2;
                    num1 -= num2;

                    System.out.println("After Swapping: " +num1 +"," +num2);
            }
        }
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac Swap1.java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Swap1
Enter a 1st number:
1
Enter a 2nd number:
6
Before Swapping: 1,6
After Swapping: 6,1
```

Q6.Write a program to find the largest of three numbers using only the ternary operator (? :).

```java
import java.util.Scanner;
class Largernum{
    public static void main(String[] args){
            Scanner sc = new Scanner(System.in);

                System.out.println("Enter 1st no. : ");
                int n1 = sc.nextInt();

                System.out.println("Enter 2nd no. : ");
                int n2 = sc.nextInt();

                System.out.println("Enter 3rd no. : ");
                int n3 = sc.nextInt();

                int large = (n1>n2)?((n1>n3)? n1 : n3):((n2>n3)?n2:n3);

                System.out.println("Large number:" + large);
                }
        }
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac Largernum.
java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Largernum
Enter 1st no. :
10
Enter 2nd no. :
8
Enter 3rd no. :
20
Large number:20

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>
```

Q7: Implement a Java program that checks whether a given year is a leap year or not using logical (&&, ||) operators

```java
import java.util.Scanner;
class Leap_year{
    public static void main(String[] args){
            Scanner sc = new Scanner(System.in);

                System.out.println("Enter year : ");
                int year = sc.nextInt();

                if(year % 4 == 0 && year % 100 != 0 || year % 400 ==0)
                {
                   System.out.println("Leap year");
                }
                else
                {
                   System.out.println("Not Leap year");
                }
            }
}
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac Leap_year.java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Leap_year
Enter year :
2000
Leap year

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Leap_year
Enter year :
1900
Not Leap year
```

Q8: Write a program that takes three boolean inputs and prints true if at least two of them are true. Hint: Use logical operators (&&, ||).

```java
import java.util.Scanner;
class Boolean_three{
    public static void main(String[] args){
            Scanner sc = new Scanner(System.in);

                System.out.println("Enter 1st no. : ");
                boolean a = sc.nextBoolean();

                System.out.println("Enter 2nd no. : ");
                boolean b = sc.nextBoolean();

                System.out.println("Enter 3rd no. : ");
                boolean c = sc.nextBoolean();

                boolean result = (a && b) || (b && c) || (a && c);

                System.out.println("Result:  " + result);
                }
                }
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac Boolean_three.java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Boolean_three
Enter 1st no. :
True
Enter 2nd no. :
True
Enter 3rd no. :
False
Result: true

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>
```

Q9: Implement a Java program that checks if a number is within a specific range (20 to 50) without using if-else. Hint: Use logical AND (&&) in a print statement.

```java
import java.util.Scanner;
class Num_Range{
    public static void main(String[] args){
            Scanner sc = new Scanner(System.in);

                System.out.print("Enter a number: ");
        int num = sc.nextInt();

                System.out.print(( num >=20 ) && ( num<=50 ));
        }
}
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac Num_Range.java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Num_Range
Enter a number: 20
true
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Num_Range
Enter a number: 60
false
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>
```

Q10: Write a program to determine if a character is a vowel or a consonant using the ternary operator.

```java
public class VowelOrConsonant {
    public static void main(String[] args) {
        char ch = 'a'; // Change this character to test

        ch = Character.toLowerCase(ch);

        String result = (ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u')
```

```
                ? "Vowel"
                : "Consonant";


        System.out.println(ch + " is a " + result);
    }
}
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java VowelOrCons
onant
a is a Vowel

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>
```

Q11: Write a program to check if a given number is a power of 2 using bitwise operators.

Hint: n & (n - 1) == 0 for positive numbers.

```java
import java.util.Scanner;
class Power_of{
    public static void main(String[] args){
            Scanner sc=new Scanner(System.in);


                System.out.println("Enter a number:");
                int n = sc.nextInt();
            System.out.println((n>0)&&((n&(n-1))==0)? "Yes" : "No");
        }
    }
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac Power_of.java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Power_of
Enter a number:
8
Yes
```

**Q12: Write a Java program to multiply a number by 8 without using * or / operators.
Hint: Use bitwise left shift (<<).**

```java
import java.util.Scanner;
class Multiply_num {
   public static void main(String[] args) {
      Scanner sc = new Scanner(System.in);
               System.out.println("Enter a number:");
      int n = sc.nextInt();
      System.out.println(n << 3);


   }
}
```
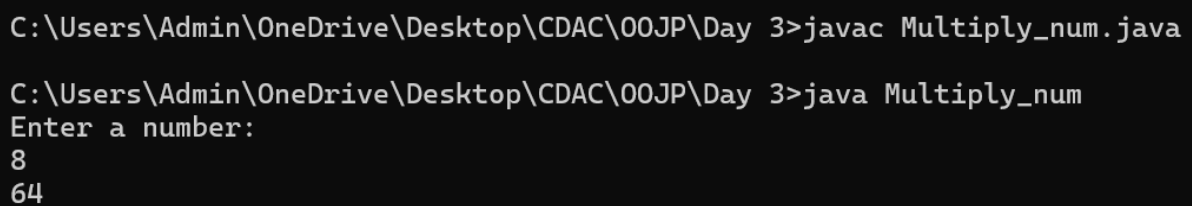
```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac Multiply_num.java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Multiply_num
Enter a number:
8
64
```

**Q13: Implement a Java program to find the absolute value of an integer using bitwise
operators. Hint: mask = num >> 31; abs = (num + mask) ^ mask;**

```java
import java.util.Scanner;
class Abs_val{
   public static void main(String[] args){
           Scanner sc = new Scanner(System.in);

               System.out.println("Enter a number:");
               int num = sc.nextInt();

               int mask = num >> 31;
               int abs = (num + mask) ^ mask;

               System.out.println("Mask: " + mask);
```

```
            System.out.println("Absolute value: " + abs);

        }

}
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Abs_val
Enter a number:
10
Mask: 0
Absolute value: 10

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Abs_val
Enter a number:
-5
Mask: -1
Absolute value: 5

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>|
```

Q14: Write a program to count the number of 1s (set bits) in a binary representation of a number using bitwise operations. Hint: Use n & (n - 1).

```
import java.util.Scanner;
class Count_bit{
   public static void main(String[] args){
         Scanner sc = new Scanner(System.in);

            System.out.println("Enter a number:");
            int n = sc.nextInt();

            int count = 0;
            while(n > 0){
              n = n & (n - 1) ;
              count ++;
             }
         System.out.println("Count of bits: " +count );
            }
```

```
        }
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac Count_bit.
java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Count_bit
Enter a number:
5
Count of bits: 2

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>
```

Q15: Implement a program to swap odd and even bits of a number using bitwise operators. Hint: Use masks: (x & 0xAAAAAAAA) >> 1 | (x & 0x55555555) << 1.

import java.util.Scanner;

class Swap_odd_even{

    public static void main(String[] args){

        Scanner sc = new Scanner(System.in);

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

        int x = sc.nextInt();

        int result = (x & 0xAAAAAAAA) >> 1 | (x & 0x55555555) << 1;

        System.out.println(" Result: " +result);

    }

}

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac Swap_odd_even.java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Swap_odd_even
Enter a number:
10
 Result: 5
```

Q16: Write a program that determines whether a given number is positive, negative, or zero using only the ternary operator.

import java.util.Scanner;

class Positive_Negative{

```java
    public static void main(String[] args){
                Scanner sc = new Scanner(System.in);

                System.out.println("Enter a number:");
                int n = sc.nextInt();

                String result = (n > 0) ? "Positive":(n < 0)? "Negative" : "Zero";

                System.out.println("Result: "+result);
                }
        }
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac Positive_Negative.java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Positive_Negative
Enter a number:
10
Result: Positive

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Positive_Negative
Enter a number:
-10
Result: Negative

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Positive_Negative
Enter a number:
0
Result: Zero

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>
```

Q25: Implement a program that reverses an integer number without using string conversion (StringBuilder or toCharArray). Hint: Use while(n!=0) { rev = rev * 10 + n % 10;   n /=10;}

```java
import java.util.Scanner;
class Reverse{
    public static void main(String[] args){
            Scanner sc = new Scanner(System.in);
                System.out.println("Enter a number: ");
                int n = sc.nextInt();
```

```
        int rev = 0;


        while(n != 0)
        {
        rev = rev * 10 + n % 10;


        n= n/10;
        }
        System.out.println("Reverse number: "+rev);
    }
}
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac Reverse.java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Reverse
Enter a number:
12345
Reverse number: 54321

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>
```

Q18: Given a student's percentage, print "Pass" if the percentage is 40 or above; otherwise, print "Fail", using only the ternary operator

```
import java.util.Scanner;
class Pass_Fail{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
            System.out.println("Enter a percentage: ");
            int p =sc.nextInt();

            String result = (p >=40)? "Pass" : "Fail" ;
```

```
                System.out.println("Result: " +result);

                }

        }
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Pass_Fail.java
Enter a percentage:
45
Result: Pass

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Pass_Fail.java
Enter a percentage:
20
Result: Fail
```

Q19: Write a Java program that checks whether a character is uppercase, lowercase, or not a letter using only the ternary operator.

```java
import java.util.Scanner;
class Character_check{
    public static void main(String[] args){
            Scanner sc = new Scanner(System.in);

                    System.out.println("Enter a character:");
                    char ch = sc.next().charAt(0);

                    String result = (ch >= 'A' && ch <= 'Z') ? "Uppercase" :
            (ch >= 'a' && ch <= 'z') ? "Lowercase" : "Not a letter";

                    System.out.println("Result: "+result);
                }
        }
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac Character_check.java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Character_check
Enter a character:
B
Result: Uppercase

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Character_check
Enter a character:
c
Result: Lowercase

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>
```

Q20: Implement a Java program that returns the absolute value of a given number using the ternary operator (without using Math.abs()).

```java
import java.util.Scanner;
class Absoulate_val{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter a number: ");
        int num = sc.nextInt();

        int absvalue = (num<0)?-num:num;

        System.out.println("Absolute value: " +absvalue);
    }
}
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac Absoulate_val.java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Absoulate_val
Enter a number:
5
Absolute value: 5

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Absoulate_val
Enter a number:
-4
Absolute value: 4

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>
```

Q21: Write a program that increments a number without using + or ++ operators. Hint: Use bitwise - (~x).

import java.util.Scanner;
class Increment{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter a number: ");
        int x = sc.nextInt();

                System.out.println("Increment number: " + -(~x));
        }
}

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac Increment.java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Increment
Enter a number:
5
Increment number: 6
```

Q22: Implement a calculator that takes two numbers and an operator (+, -, *, /) as input and prints the result using only switch-case

```java
import java.util.Scanner;
class Switch_cal{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);

        System.out.println("Enter 1st number: ");
        int num1 = sc.nextInt();

        System.out.println("Enter an operator(+, -, *, /): ");
        char op = sc.next().charAt(0);

        System.out.println("Enter 2st number: ");
        int num2 = sc.nextInt();
        int result=0;
        switch(op){
        case '+':
            result = num1 + num2;
                    break;

        case '-':
            result = num1 - num2;
                    break;

        case '*':
            result = num1 * num2;
                    break;

        case '/':
            if(num2!=0){
            result = num1 / num2;
                    }
```

```
                else{
                System.out.println("Division by zero is not allowed.");
                }
                break;

            default:
                System.out.println("Invalid operator");
        return;
                }

            System.out.println("Result: " +result);
        }
}
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac Switch_cal.java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java Switch_cal
Enter 1st number:
20
Enter an operator(+, -, *, /):
+
Enter 2st number:
20
Result: 40
```

Q23: Given a number, find whether it is odd or even using the & bitwise operator and print the result without using if-else.

```
import java.util.Scanner;
class OddEven{
    public static void main(String[] args){
            Scanner sc = new Scanner(System.in);

            System.out.println("Enter a number: ");
            int num = sc.nextInt();

            String result = (num & 1)==0?"Even":"Odd";
```

```
        System.out.println(num + " is " + result);

        }

    }
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac OddEven.java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java OddEven
Enter a number:
20
20 is Even

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java OddEven
Enter a number:
13
13 is Odd
```

Q24: Write a program that prints all even numbers from 1 to 100 using only bitwise AND (&) and for loop.

```java
public class EvenNumbers {
    public static void main(String[] args) {
        for (int i = 1; i <= 100; i++) {

            if ((i & 1) == 0) {
                System.out.print(i + " ");
            }
        }
    }
}
```

```
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>javac EvenNumber
s.java

C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>java EvenNumbers
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46
 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88
90 92 94 96 98 100
C:\Users\Admin\OneDrive\Desktop\CDAC\OOJP\Day 3>
```