1. Arithmetic & Assignment Operators

Q1: Write a program to swap two numbers without using a third variable and without using arithmetic operators like + or - .

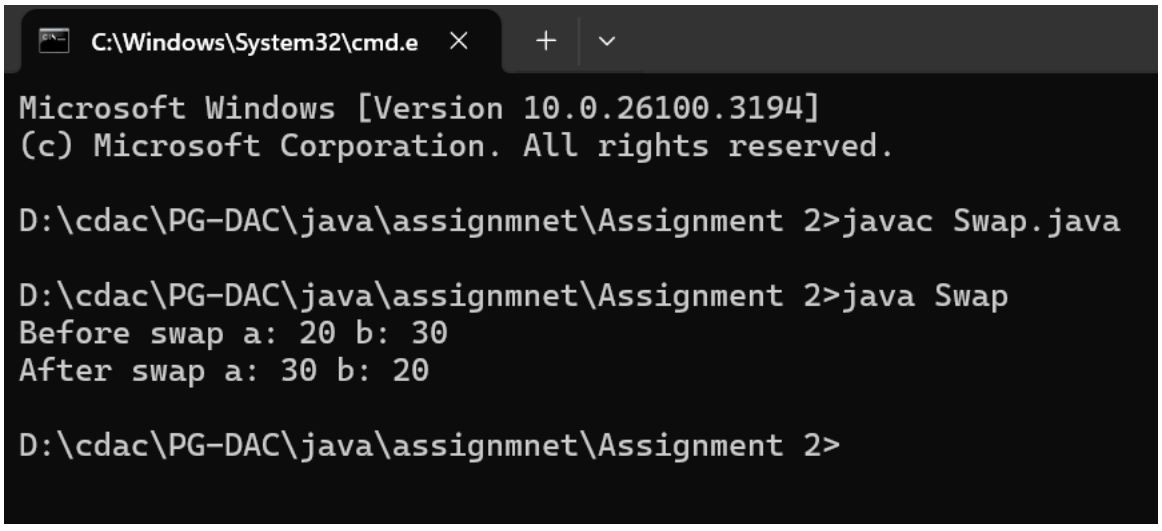
Hint : Use bitwise XOR ^ operator.

Ans:

Input:

```
class Swap{
	public static void main(String args[]){
		int a= 20;
		int b= 30;
		System.out.println("Before swap a: "+a+" b: "+b);
		a=a^b;
		b=b^a;
		a=a^b;
		System.out.println("After swap a: "+a+" b: "+b);
	}
}
```

Output:



Q2: Write a program to check whether a given number is even or odd using only bitwise operators .

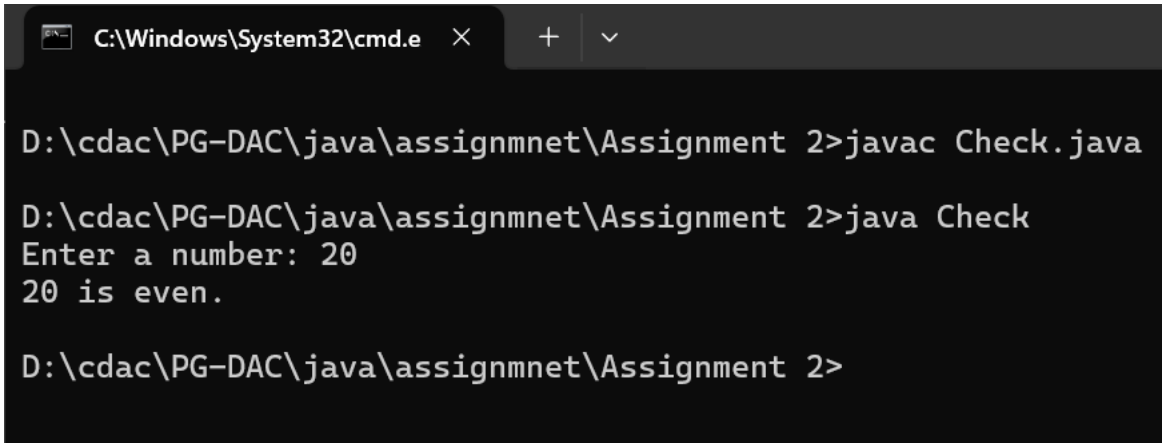
Hint : Use n & 1 to check.

Ans:

Input:

```
import java.util.Scanner;

class Check{

        public static void main(String args[]){

                Scanner input = new Scanner(System.in);

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

    int n = input.nextInt();

    String result = ((n & 1) == 0) ? n + " is even." : n + " is odd.";

    System.out.println(result);

        }

}
```

Output:



Q3: Implement a program that calculates the sum of digits of an integer using modulus (%) and division (/) operators .

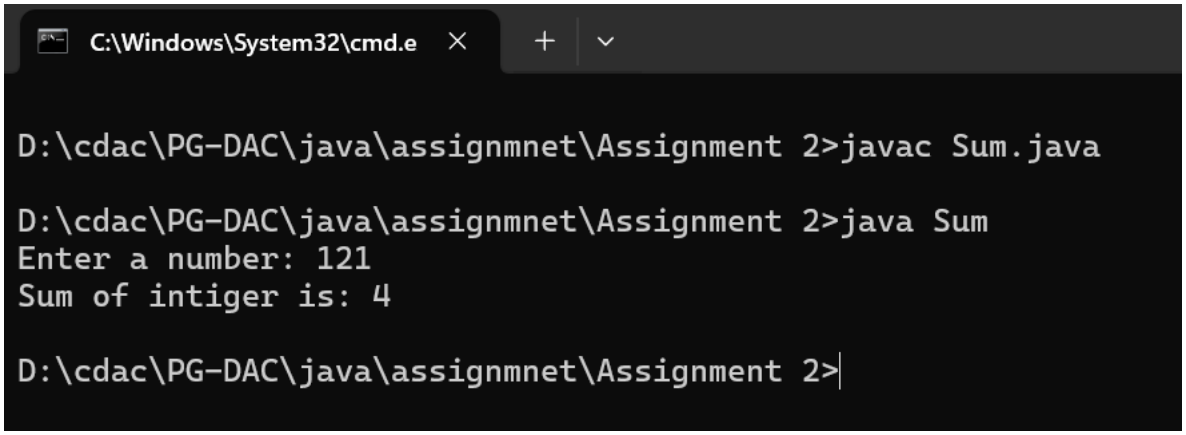
Ans:

Input:

```
import java.util.Scanner;

class Sum{
```

```
    public static void main(String args[]){
            Scanner input = new Scanner(System.in);
System.out.print("Enter a number: ");
int n = input.nextInt();
            int sum=0;
while(n!=0)
            {
                    int temp= n%10;
                    sum = sum + temp;
   n = n/ 10;
            }
            System.out.println("Sum of intiger is: "+ sum);
     }
}
```

Output:



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 .

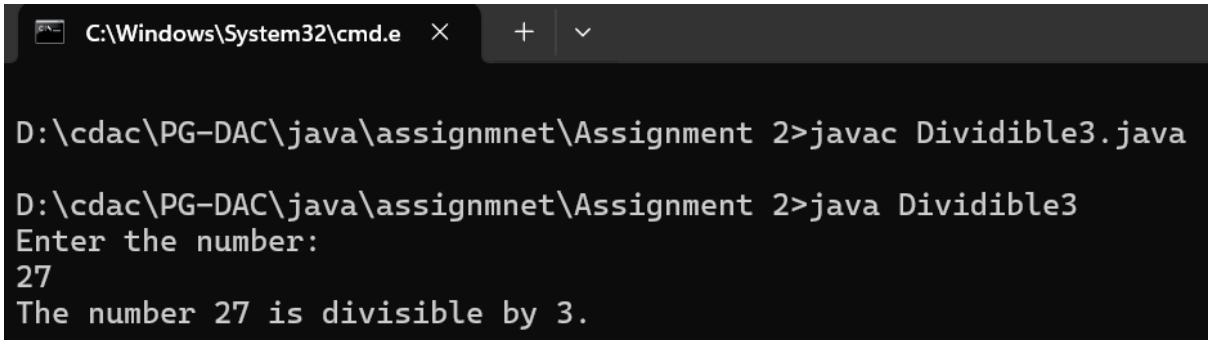
Ans:

Input:

```
import java.util.Scanner;
```

```
class Dividible3{


        public static void main(String[] args) {
                Scanner input = new Scanner(System.in);
    System.out.println("Enter the number:");
    int num = input.nextInt();
    input.close();
    int temp = num;
    while (temp > 0)
                {
      temp = temp - 3;
    }
    if (temp == 0)
                {
      System.out.println("The number " + num + " is divisible by 3.");
    }
                else
                {
      System.out.println("The number " + num + " is not divisible by 3.");
    }
  }
}
```

Output:



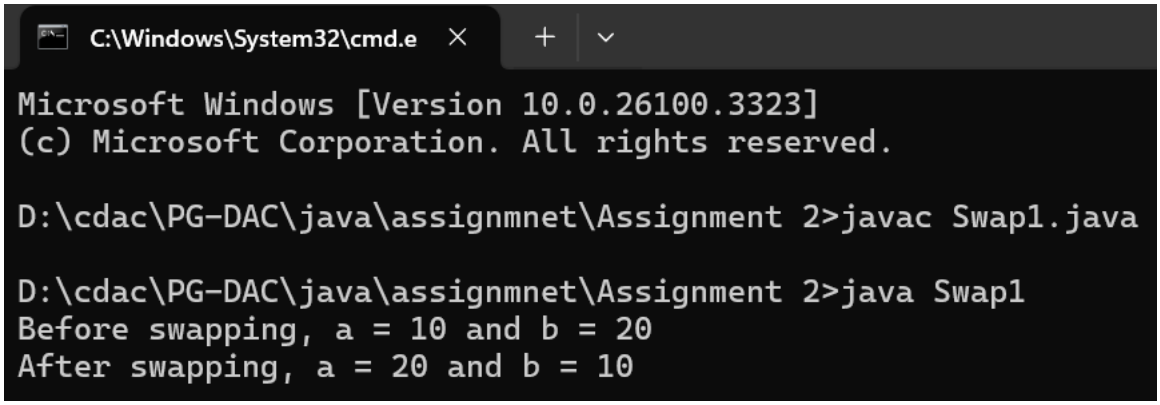
Q5: Write a Java program to swap two numbers using the += and -= operators only.

Ans:

Input:

```
public class Swap1{
   public static void main(String[] args) {
      int a = 10;
      int b = 20;

      System.out.println("Before swapping, a = " + a + " and b = " + b);
      a += b;
      b -= a;
          b=b<0?-b:b;
      a -=b;

      System.out.println("After swapping, a = " + a + " and b = " + b);
   }
}
```

Output:



2. Relational & Logical Operators

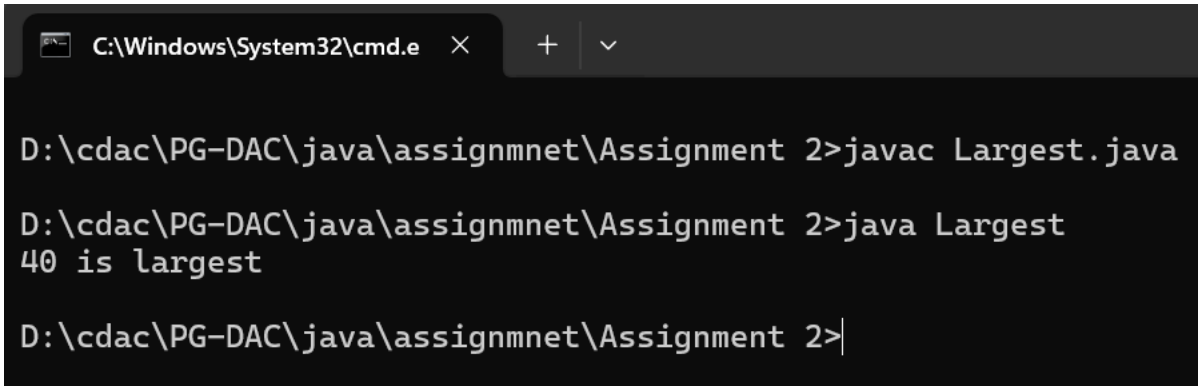
Q6: Write a program to find the largest of three numbers using only the ternary operator (? :) .

Ans:

Input:

```
class Largest{
	public static void main(String args[]){
		int a= 20;
		int b= 30;
		int c=40;
		String result= (a>b && a>c)? a+" is largest" :((b>a && b>c)? b +" is largest": c+
" is largest");
		System.out.println(result);
	}
}
```

Output:



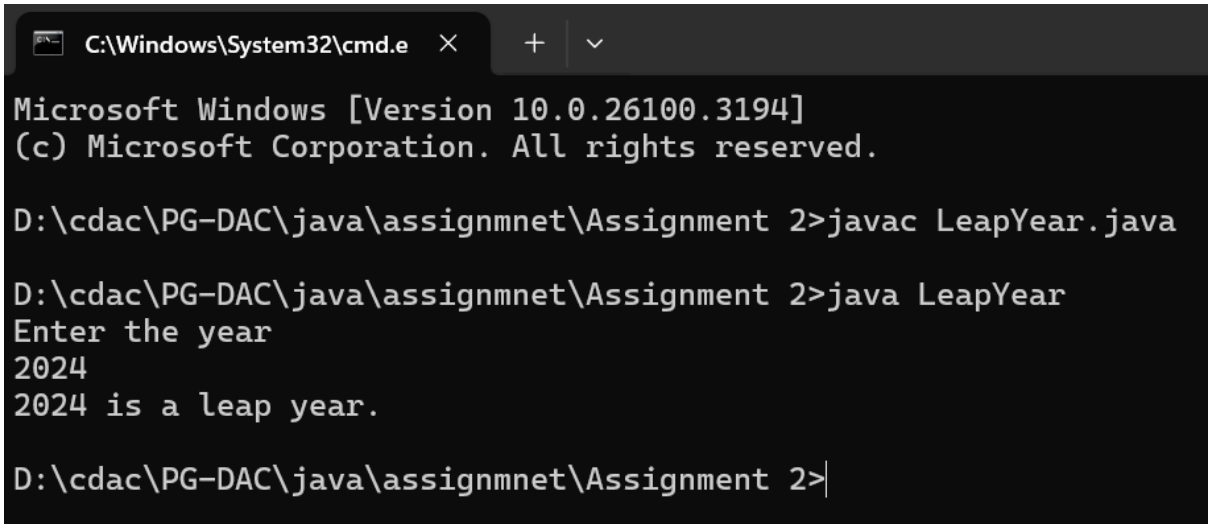
Q7: Implement a Java program that checks whether a given year is a leap year or not using logical (&& , ||) operators .

Ans:

Input:

```
import java.util.Scanner;
class LeapYear{
        public static void main(String args[]){
                Scanner input = new Scanner(System.in);
                System.out.println("Enter the year");
    int year = input.nextInt();
    if ((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0))
{
       System.out.println(year + " is a leap year.");
    }
else
{
       System.out.println(year + " is not a leap year.");
    }
        }
}
```

Output:



Q8: Write a program that takes three boolean inputs and prints true if at least two of them are true .

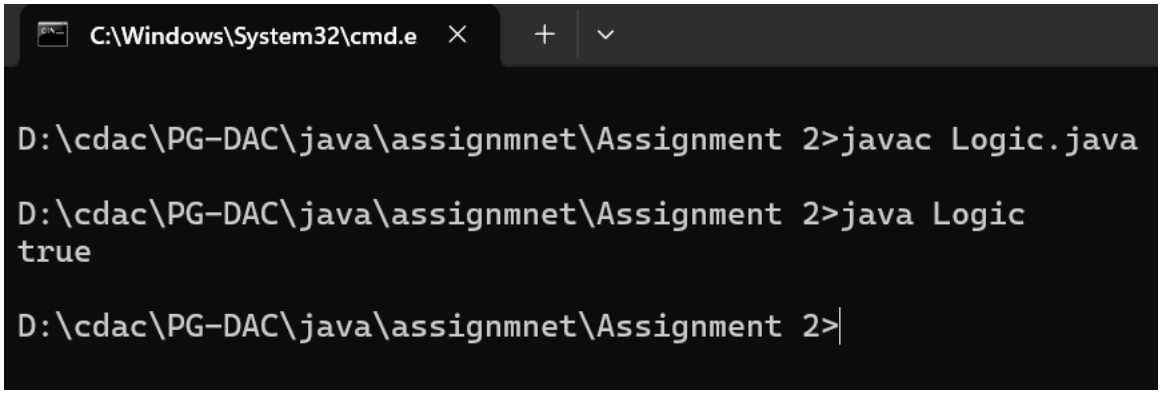
Hint : Use logical operators (&& , ||).

Ans:

Input:

```
class Logic{
	public static void main(String args[]){
		boolean a = true ;
		boolean b = false;
		boolean c = true;
		boolean result= ((a && b)||(b&&c)||(c&&a))?true:false;
		System.out.println(result);

	}
}
```

Output:



Q9: Implement a Java program that checks if a number is within a specific range (20 to 50) without using if-else .

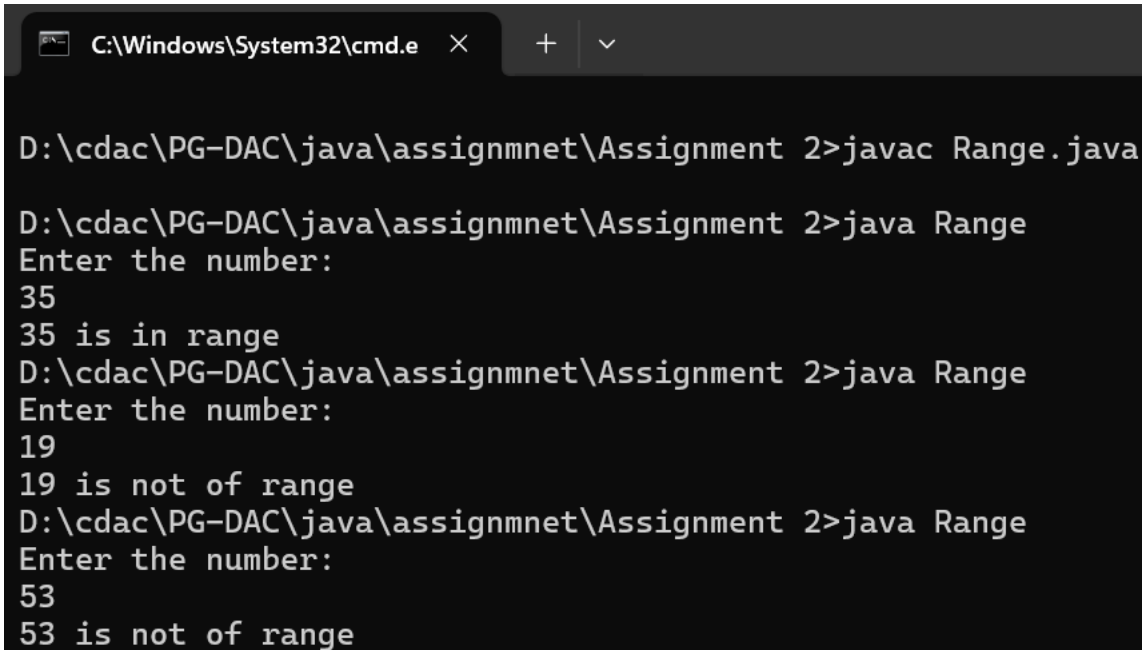
Hint : Use logical AND (&&) in a print statement .

Ans:

Input:

```
import java.util.Scanner;
class Range{
	public static void main(String args[]){
		Scanner input = new Scanner(System.in);
		System.out.println("Enter the number: ");
		int num = input.nextInt();
		String result=(num>=20 && num<=50)?num+" is in range":num+" is not of range";
		System.out.print(result);
	}
```

}**Output:**



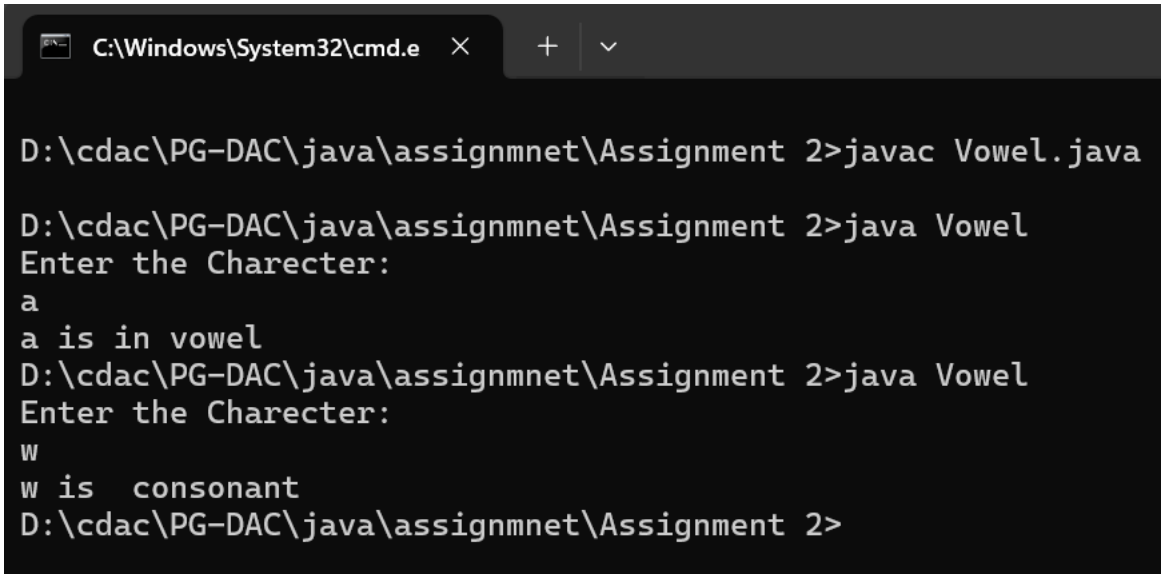
Q10: Write a program to determine if a character is a vowel or a consonant using the ternary operator.

Ans:

Input:

```
import java.util.Scanner;

class Vowel{

	public static void main(String args[]){

		Scanner input = new Scanner(System.in);

		System.out.println("Enter the Charecter: ");

		char a = input.next().charAt(0);

		String result=(a == 'a'||a =='e'|| a=='i'||a=='o'||a=='u')?a+" is in vowel":a+"
is  consonant ";

		System.out.print(result);

	}

}
```

Output:



3. Bitwise Operators

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.

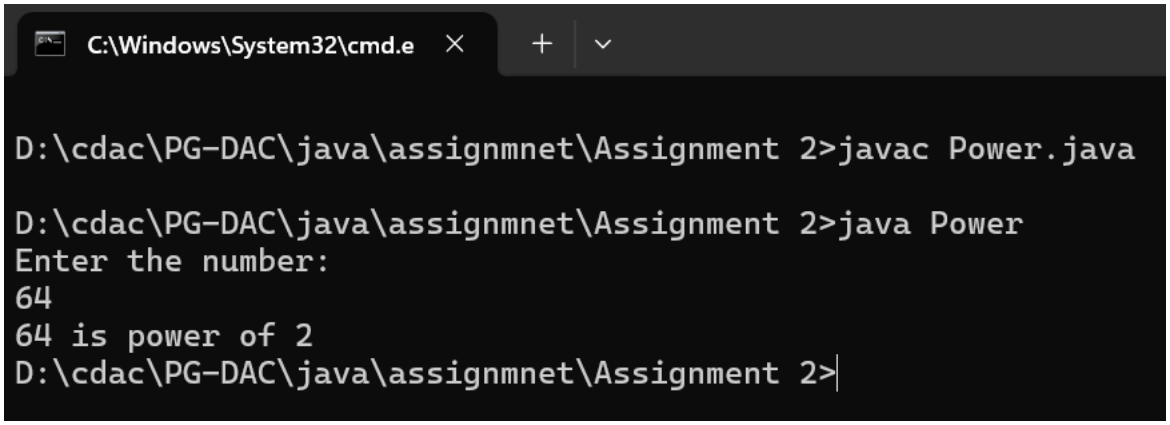
Ans:

Input:

```
import java.util.Scanner;
class Power{
	public static void main(String args[]){
		Scanner input = new Scanner(System.in);
		System.out.println("Enter the number: ");
		int n = input.nextInt();
		if((n&(n-1))==0)
		{
			System.out.print(n+" is power of 2");
		}
		else
		{
			System.out.print(n+" is not power of 2");
```

```
            }


        }
}
```

Output:



Q12: Write a Java program to multiply a number by 8 without using * or / operators.

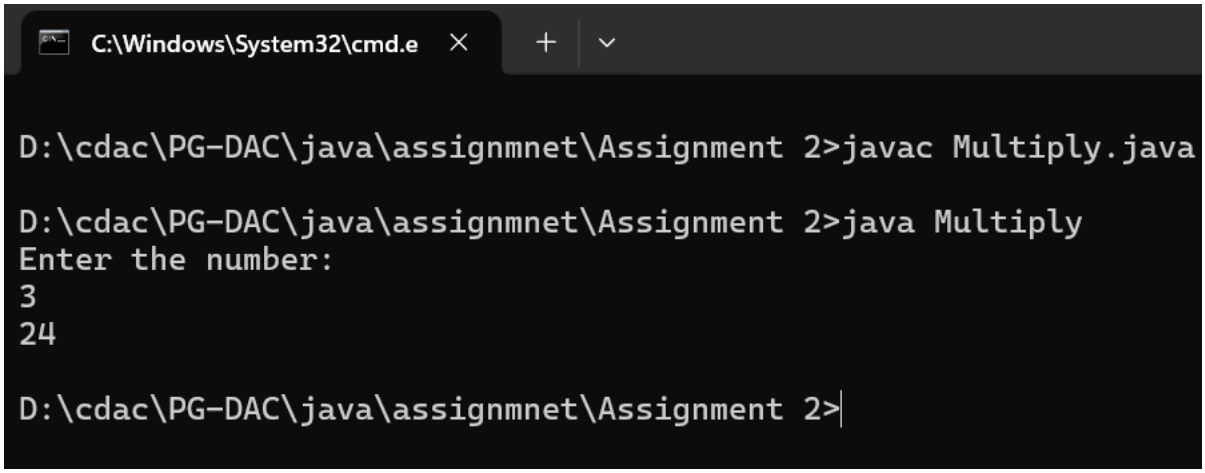
Hint : Use bitwise left shift (<<).

Ans:

Input:

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


        }
}
```

Output:



Q13: Implement a Java program to find the absolute value of an integer using bitwise operators.

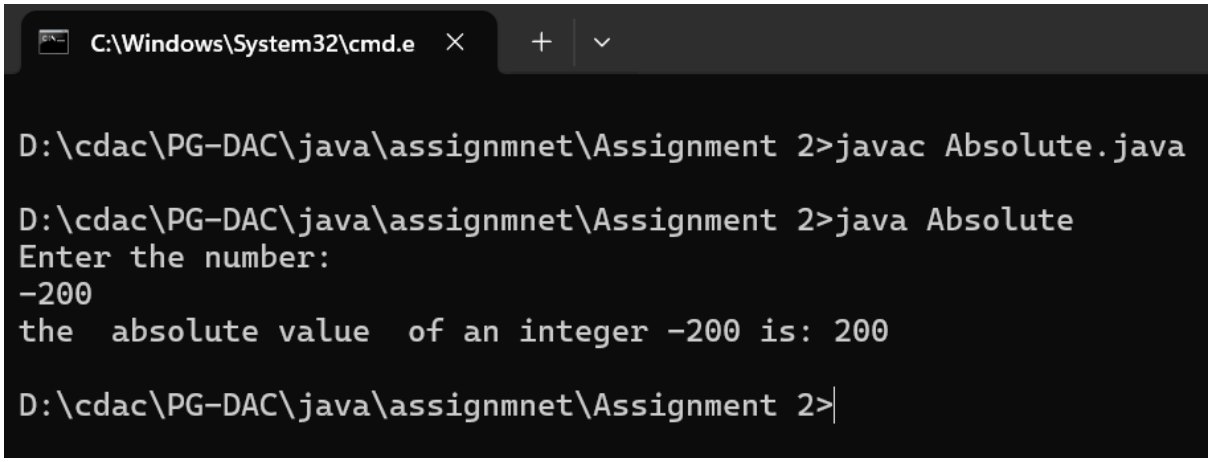
Hint : mask = num >> 31; abs = (num + mask) ^ mask;

Ans:

Input:

```
import java.util.Scanner;

class Absolute {

	public static void main(String args[]){

		Scanner input = new Scanner(System.in);

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

		int num = input.nextInt();

		int mask =num>>31;

		int abs= (num + mask)^mask;

		System.out.println("the  absolute value  of an integer "+num+" is: "+abs);


	}

}
```

Output:



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) .

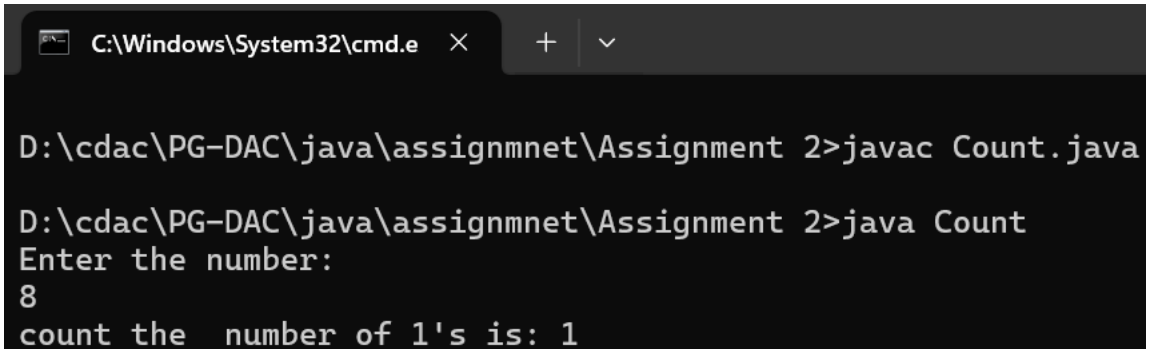
Ans:

Input:

```
import java.util.Scanner;
class Count{
	public static void main(String args[]){
		Scanner input = new Scanner(System.in);
		System.out.println("Enter the number: ");
		int n = input.nextInt();
		int count = 0;
		while (n > 0)
			{
				n = n & (n - 1);
				count++;
			}
		System.out.println("count the  number of 1's is: "+count);

	}
```

}

Output:



Q15: Implement a program to swap odd and even bits of a number using bitwise operators.

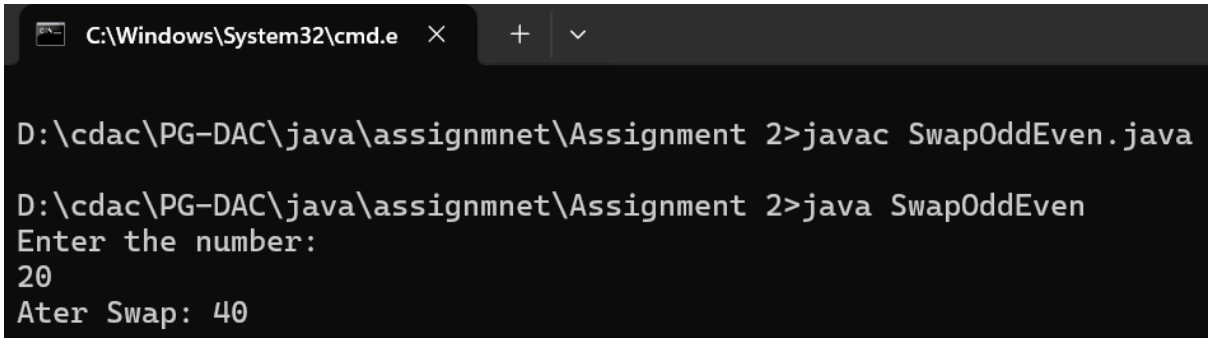
Hint : Use masks: (x & 0xAAAAAAAA) >> 1 | (x & 0x55555555) << 1 .

Ans:

Input:

```
import java.util.Scanner;
class SwapOddEven{
	public static void main(String args[]){
		Scanner input = new Scanner(System.in);
		System.out.println("Enter the number: ");
		int a = input.nextInt();
		int result = (a & 0xAAAAAAAA) >> 1 | (a & 0x55555555) << 1 ;
		System.out.println("Ater Swap: "+ result);

	}
}
```

Output:



4. Ternary Operator Challenges

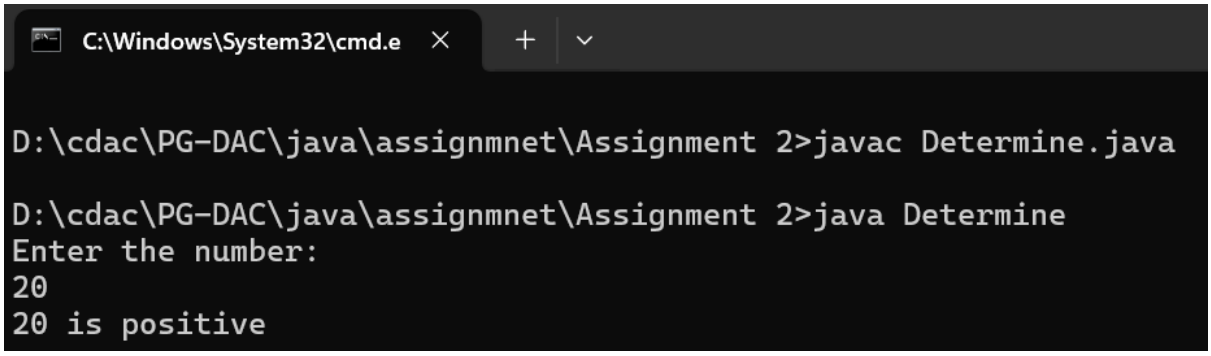
Q16: Write a program that determines whether a given number is positive, negative, or zero using only the ternary operator .

Ans:

Input:

```
import java.util.Scanner;
class Determine{
	public static void main(String args[]){
		Scanner input = new Scanner(System.in);
		System.out.println("Enter the number: ");
		int a = input.nextInt();
		String result = a>0?a+" is positive":(a<0? a+" is negative number":a+ "is zero");
		System.out.println(result);
	}
}
```

Output:



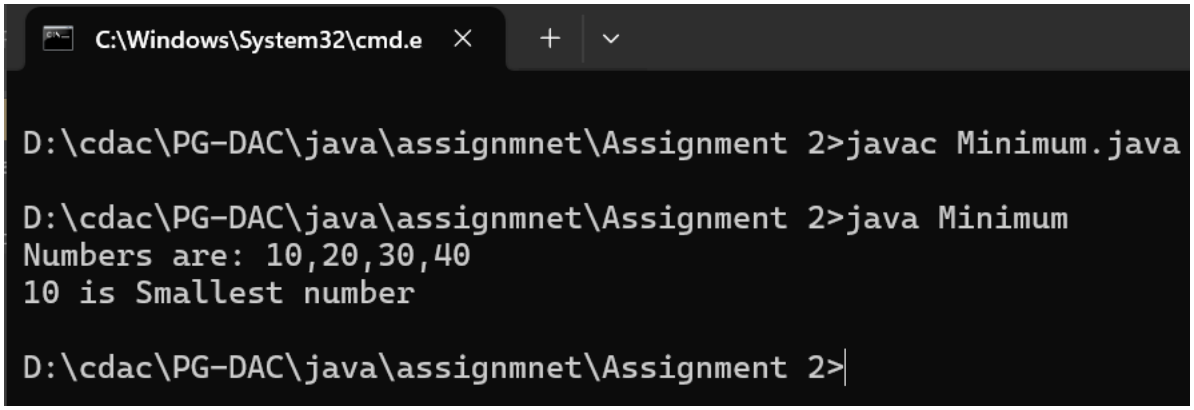
Q17: Implement a Java program that finds the minimum of four numbers using nested ternary operators.

Ans:

Input:

```
class Minimum{
	public static void main(String args[]){
		int a = 10;
		int b=20;
		int c=30;
		int d= 40;
		System.out.println("Numbers are: "+a+","+b+","+c+","+d);
		String min = (a<b&&a<c&&a<d)?a+ " is Smallest number":((b<a&&b<c&&b<d)?b+ " is Smallest number":((a<b&&c<a&&c<d)?c+ " is Smallest number":d+ " is Smallest number"));
		System.out.println(min);
	}
}
```

Output:



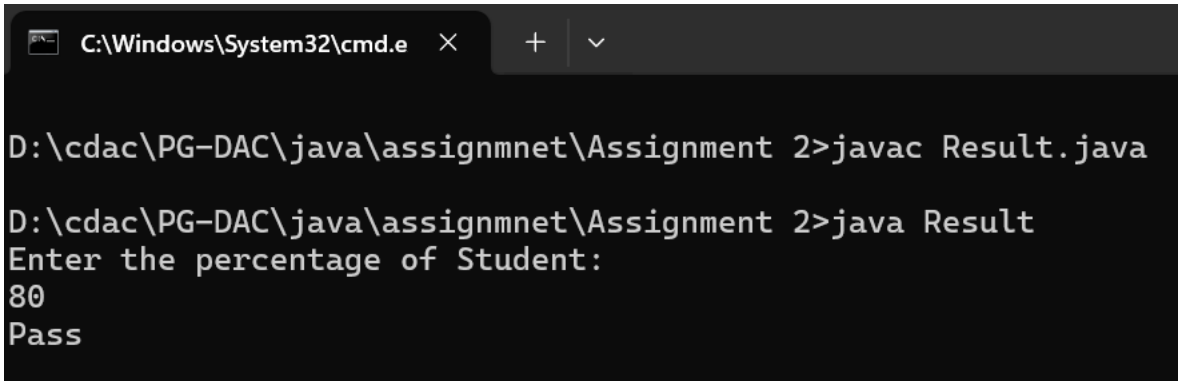
Q18: Given a student's percentage, print "Pass" if the percentage is 40 or above; otherwise, print "Fail" , using only the ternary operator.

Ans:

Input:

```
import java.util.Scanner;
class Result{
	public static void main(String args[]){
		System.out.println("Enter the percentage of Student:");
		Scanner input= new Scanner(System.in);
		int percentage= input.nextInt();
		String remark = percentage>=40?"Pass":"Fail";
		System.out.println(remark);
	}
}
```

Output:



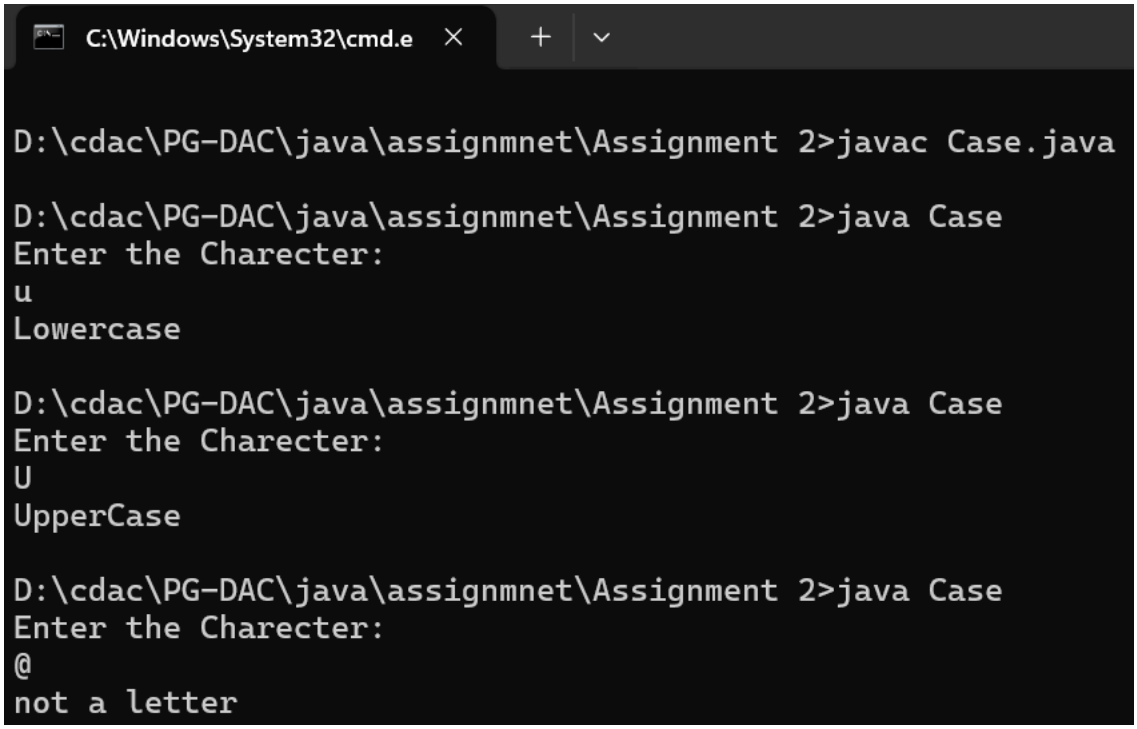
Q19: Write a Java program that checks whether a character is uppercase, lowercase, or not a letter using only the ternary operator.

Ans:

Input:

```
import java.util.Scanner;

class Case{

	public static void main(String args[]){

		System.out.println("Enter the Charecter:");

		Scanner input= new Scanner(System.in);

		char c= input.next().charAt(0);

		String result =
Character.isUpperCase(c)?"UpperCase":Character.isLowerCase(c)?"Lowercase":"not a
letter";

		System.out.println(result);

	}

}
```

Output:



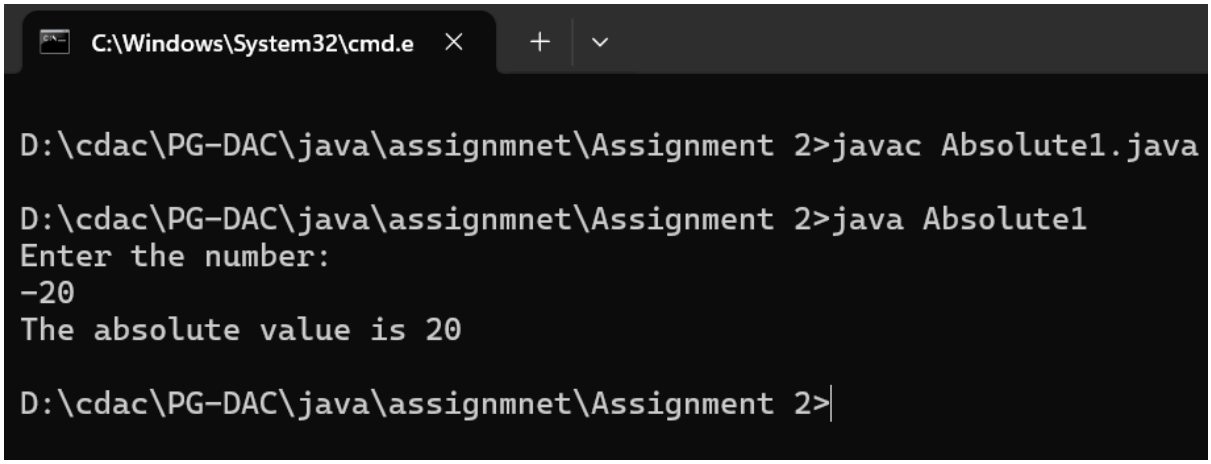
Q20: Implement a Java program that returns the absolute value of a given number using the ternary operator (without using Math.abs()).

Ans:

Input:

```
import java.util.Scanner;
class Absolute1 {
	public static void main(String args[]){
		Scanner input = new Scanner(System.in);
		System.out.println("Enter the number: ");
		int num = input.nextInt();
      int absValue = (num < 0) ? -num : num;
      System.out.println("The absolute value is " + absValue);

	}
}
```

Output:



5. Miscellaneous Operator Questions

Q21: Write a program that increments a number without using + or ++ operators.

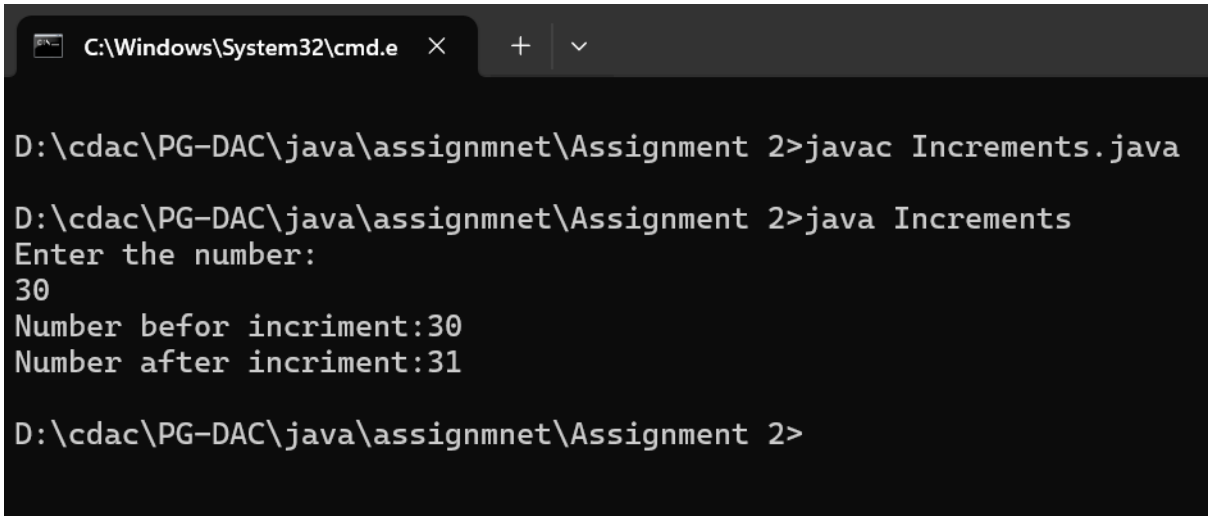
Hint : Use bitwise - (~x) .

Ans:

Input:

```
import java.util.Scanner;

class Increments {

	public static void main(String args[]){

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

		Scanner input= new Scanner(System.in);

		int a= input.nextInt();

		System.out.println("Number befor incriment:"+a);

		a=-(~a);

		System.out.println("Number after incriment:"+a);

	}

}
```

Output:



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

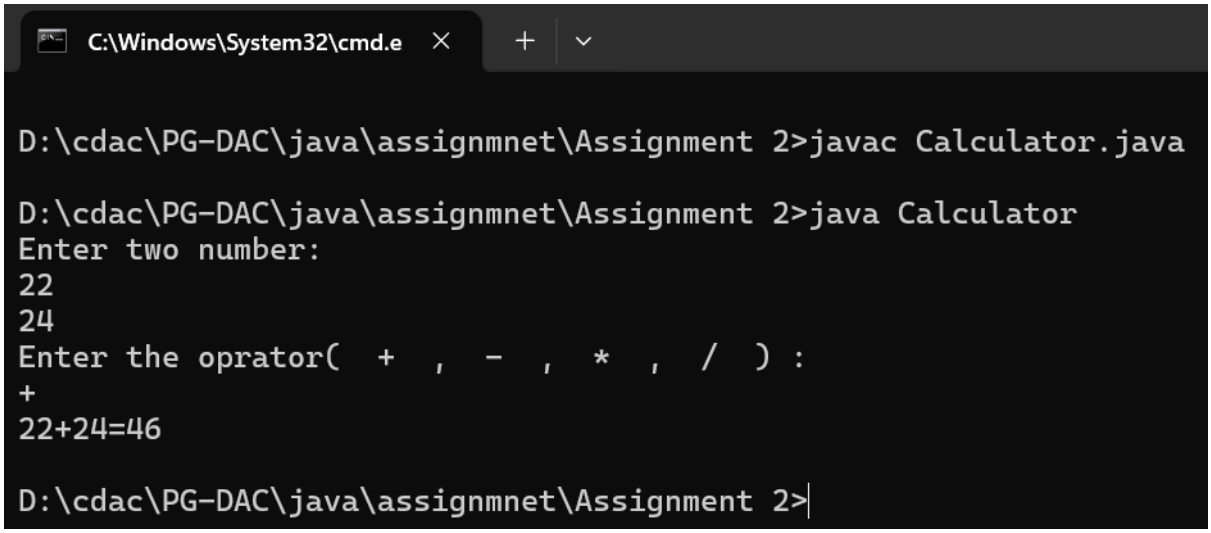
Ans:

Input:

```
import java.util.Scanner;
class Calculator{
	public static void main(String args[]){
		Scanner input= new Scanner(System.in);
		System.out.println("Enter two number: ");
		int a= input.nextInt();
		int b= input.nextInt();
		System.out.println("Enter the oprator( + , - , * , / ) : ");
		char o=input.next().charAt(0);
		switch(o)
		{
			case '+':
				int sum = a+b;
				System.out.println(a+"+"+b+"="+sum);
				break;
			case '-':
```

```
                int sub = a-b;
                System.out.println(a+"-"+b+"="+sub);
                break;
            case '*':
                int mul = a*b;
                System.out.println(a+"*"+b+"="+mul);
                break;
            case '/':
                double div = a/b;
                System.out.println(a+"/"+b+"="+div);
                break;
            default:
                System.out.println("Error! Enter valid operator!!");
        }
    }
}
```

Output:



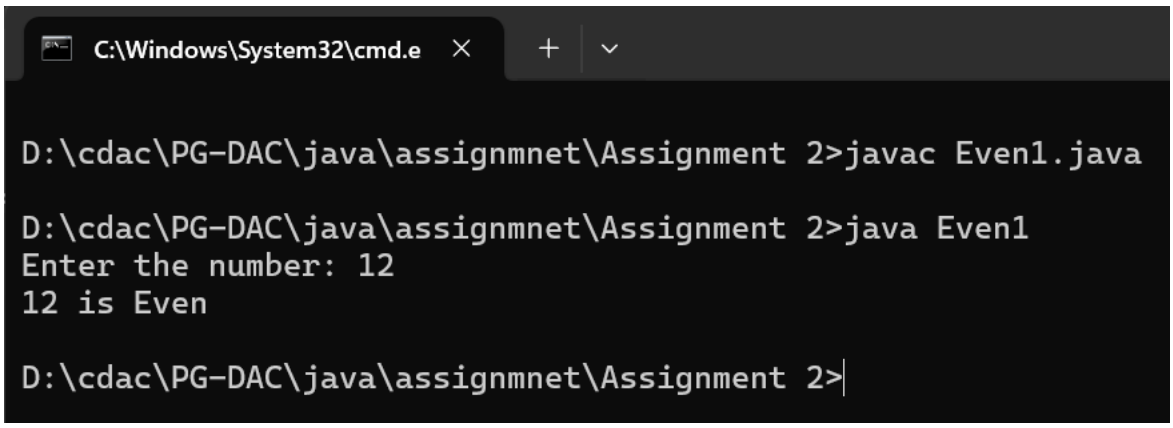
Q23: Given a number, find whether it is odd or even using the & bitwise operator and print the result without using if-else .

Ans:

Input:

```
import java.util.Scanner;
class Even1 {
	public static void main(String args[]){
		Scanner input= new Scanner(System.in);
		System.out.print("Enter the number: ");
		int num= input.nextInt();
		String result=((num&1)==0)?num+" is Even":" is Odd";
		System.out.println(result);
	}
}
```

Output:



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

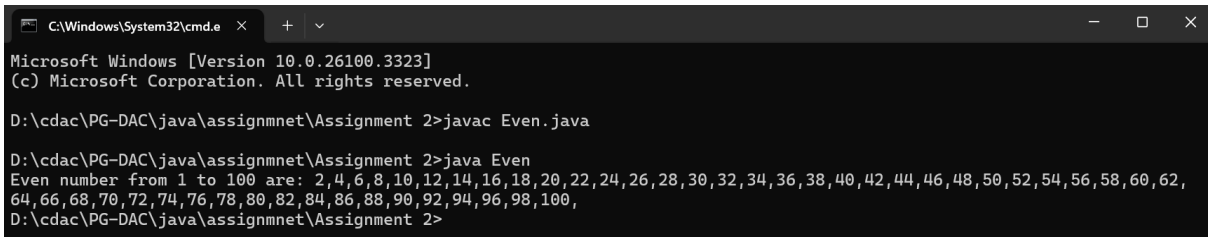
Ans:

Input:

```
class Even {
	public static void main(String args[]){
		System.out.print("Even number from 1 to 100 are: ");
		for(int i=1;i<=100;i++)
		{
```

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

Output:



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; }

Ans:

Input:

```
import java.util.Scanner;
public class Reverse{
   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);
      System.out.println("Enter the number: ");
      int num = scanner.nextInt();
          int reverse = 0;
      while (num != 0) {
                  int digit = num % 10;
```

```
                reverse = reverse * 10 + digit;
            num /= 10;
            }
        System.out.println("The reverse of the number is " + reverse);
    }
}
```

Output: