**********OUTPUT**********

Enter a number no larger than 2,000,000,000:

1

Enter a larger number no larger than 2,000,000,000:

15

array to be created of size: 15 to hold decimals

array to be created of size: 15 to hold decimals in binary form

array to be created of size: 210 to store all possible bitwise AND

Decimal number in array is: 1

The decimal number is: 1

*** This program will convert decimal 1 into binary

The binary version is: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1]

Decimal number in array is: 2

The decimal number is: 2

*** This program will convert decimal 2 into binary

The binary version is: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1]

Decimal number in array is: 3

The decimal number is: 3

*** This program will convert decimal 3 into binary

The binary version is: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1]

Decimal number in array is: 4

The decimal number is: 4

*** This program will convert decimal 4 into binary

The binary version is: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1]

Decimal number in array is: 5

The decimal number is: 5

*** This program will convert decimal 5 into binary

The binary version is: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1]

Decimal number in array is: 6

The decimal number is: 6

*** This program will convert decimal 6 into binary

The binary version is: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1]

Decimal number in array is: 7

The decimal number is: 7

*** This program will convert decimal 7 into binary

The binary version is: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1]

Decimal number in array is: 8

The decimal number is: 8

*** This program will convert decimal 8 into binary

The binary version is: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1]

Decimal number in array is: 9

The decimal number is: 9

*** This program will convert decimal 9 into binary

The binary version is: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1]

Decimal number in array is: 10

The decimal number is: 10

*** This program will convert decimal 10 into binary

The binary version is: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 1]

Decimal number in array is: 11

The decimal number is: 11

*** This program will convert decimal 11 into binary

The binary version is: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 1]

Decimal number in array is: 12

The decimal number is: 12

*** This program will convert decimal 12 into binary

The binary version is: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 1]

Decimal number in array is: 13

The decimal number is: 13

*** This program will convert decimal 13 into binary

The binary version is: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 1]

Decimal number in array is: 14

The decimal number is: 14

*** This program will convert decimal 14 into binary

The binary version is: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 1]

Decimal number in array is: 15

The decimal number is: 15

*** This program will convert decimal 15 into binary

The binary version is: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 1]

** Process exited - Return Code: 0 **

**********CODE**********

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

public class Main
{

   public static void main(String[] args) {

      int num;
      int num1;
      test t;

      //do {
      Scanner reader = new Scanner(System.in);  // Reading from System.in
      System.out.println("Enter a number no larger than 2,000,000,000: ");

      num = reader.nextInt(); // Scans the next token of the input as an int.

      System.out.println("Enter a larger number no larger than 2,000,000,000: ");

      num1 = reader.nextInt(); // Scans the next token of the input as an int.

      //once finished
      reader.close();
```

```
      int sizeArray = (num1-num)+1;   // this is to ensure the size of array to store decimals and binary conversions
                                      //  is inclusive of the lower and upper limit


      int arrayBitwiseAnd = sizeArray * (sizeArray -1);  // this size ensures all combinations of BitWiseAnd can be stored


      System.out.println("Array to be created of size: " + sizeArray + " to hold decimals");
      System.out.println("Array to be created of size: " + sizeArray + " to hold decimals in binary form");
      System.out.println("Array to be created of size: "  + arrayBitwiseAnd + " to store all possible bitwise AND");
      System.out.println("\n");



      //  THE FUNCTION HAS TO START here


     t= new test(num,num1,sizeArray, arrayBitwiseAnd);


    }


}



class test
{
   int binary[] = new int[31];   //This is to define 31 bit array to hold binary value. Maximum value is over 2 billion.
                                 // This is Java's limitation.


      int j;  //counter


      int i;   //counter
```

```
String conversion;   // this will be used to output binary conversion on screen without having to iterate through loop again

int num;


int sizeArray;

int arrayBitwiseAnd;

int bitwiseAnd[] = new int[arrayBitwiseAnd];


public test(int num, int num1, int sizeArray, int arrayBitwiseAnd)

{

this.sizeArray=sizeArray;

this.num=num;

this.arrayBitwiseAnd=arrayBitwiseAnd;

int rangeDecimal[] = new int[sizeArray];      // this will hold all the decimal values to be converted




// This is to store all decimal numbers into array

for (int i=0; i<sizeArray;i++)

{

rangeDecimal[i]=num+i;

System.out.println("\n");

System.out.println("Decimal number in array is: " + rangeDecimal[i]);


// This is tricky part... Unsure of how to store array of binary conversions.

int rangeBinary[][] = new int[sizeArray][32];  //this will hold the



System.out.println("The decimal number is:  " + rangeDecimal[i]);


int length = binary.length;
```

```
        System.out.println("*** This program will convert decimal " + rangeDecimal[i]+ "  into binary");

        //Execute a for loop to check modulus (i.e no remainder)


        for (j=length-1; j>=0; j--)
        {

            int divisor = (int)(Math.pow(2,j));

            if (rangeDecimal[i] - divisor >=0)
        {

           binary[(length-1)-j] = 1;
           rangeDecimal[i]=rangeDecimal[i]-divisor;

        }

           }

           conversion = Arrays.toString(binary);

         System.out.println("The binary version is:  " + conversion );



        }
        }
}
```