Assignment 1

CSD 207
Shiv Nadar University

Professor Sulabh Bansal

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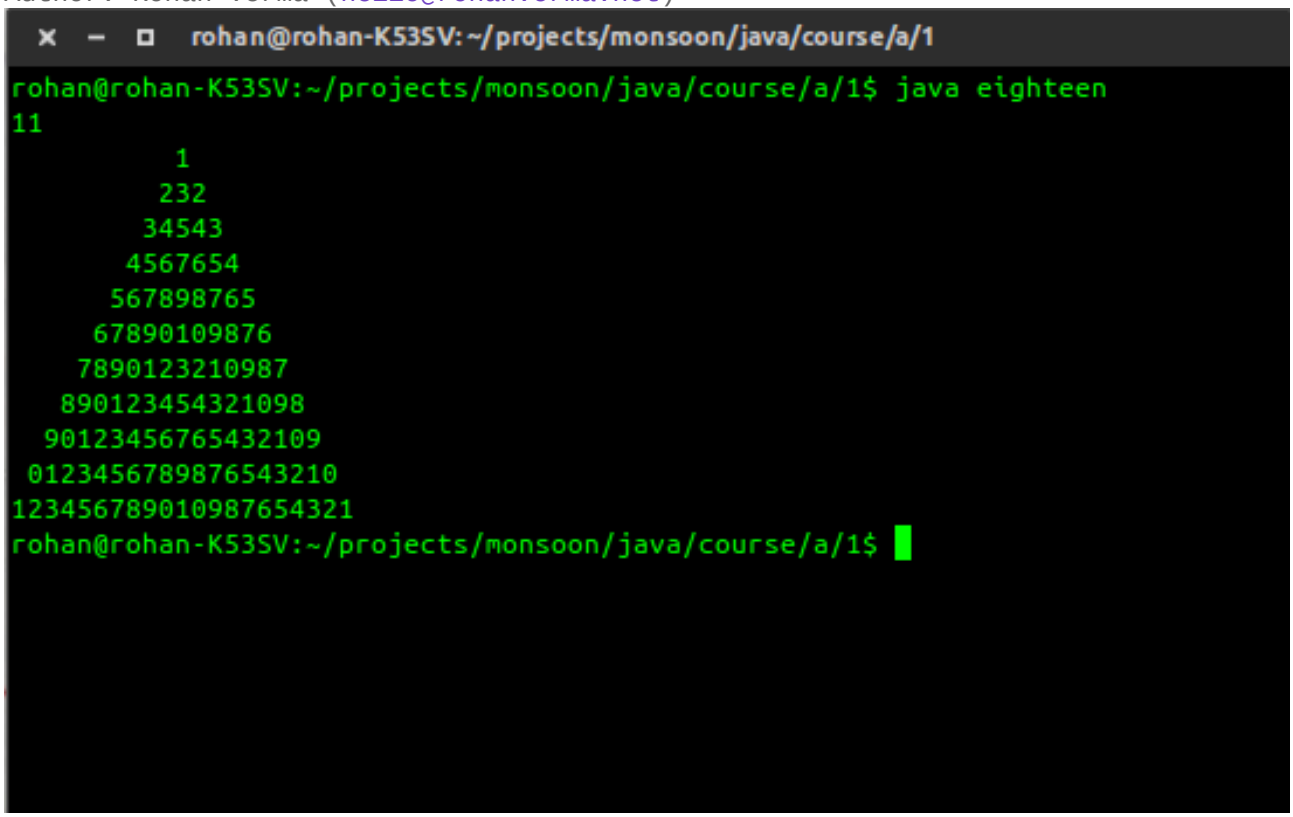
Github Repository: https://github.com/rhnvrm/java_learn (Update after deadline of Assignment 1)

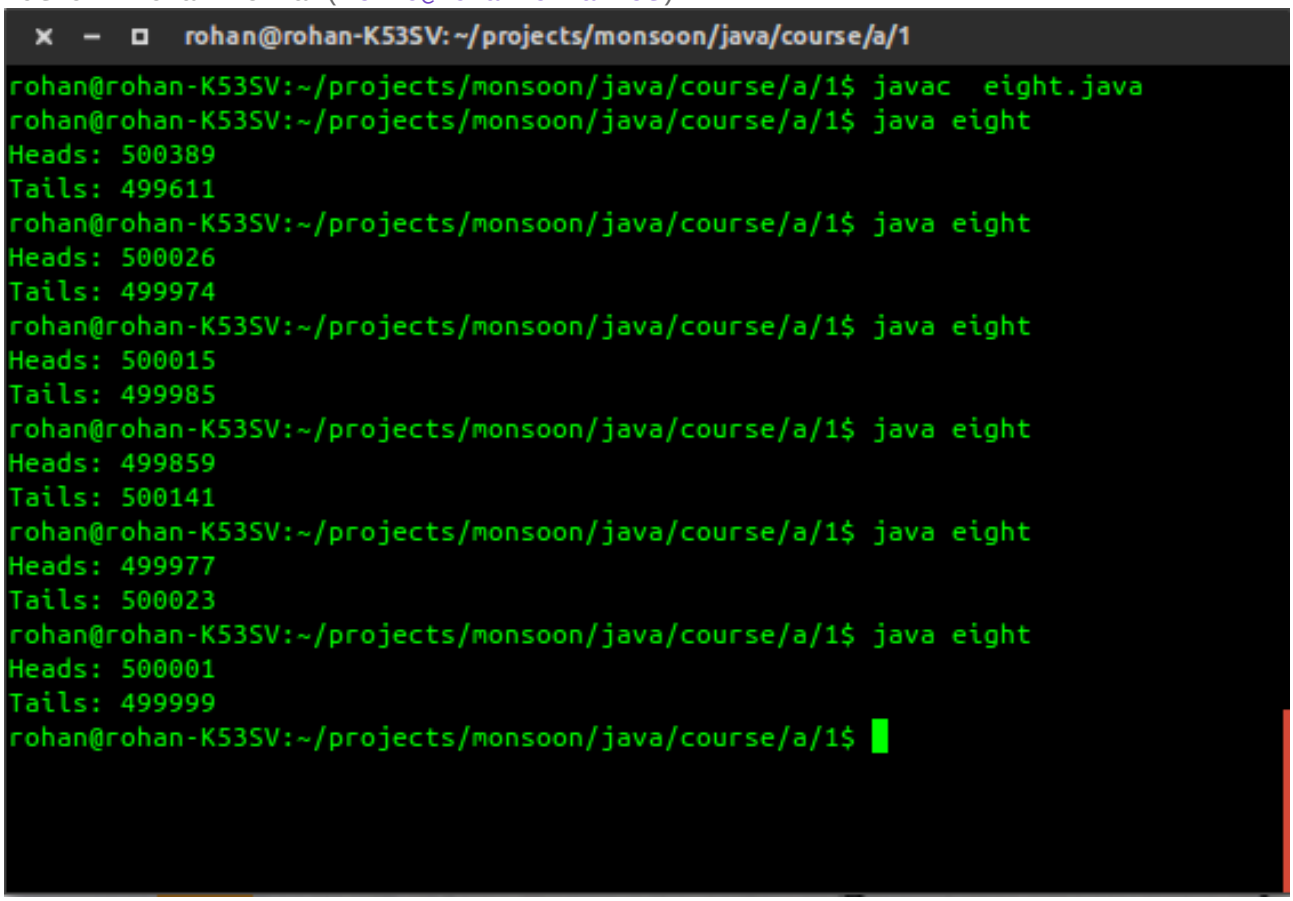
```
/*

1
232
34543
4567654
567898765
67890109876
7890123210987
890123454321098
90123456765432109
0123456789876543210

Done

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;


public class eighteen {

        public static void main( String [] args )
        {

                int n, c, d, num = 1, space;

                Scanner s = new Scanner(System.in);

                n = s.nextInt();

                space = n - 1;
                for ( d = 1 ; d <= n ; d++ )
                {
                        num = d;
                        for ( c = 1 ; c <= space ; c++ )
```

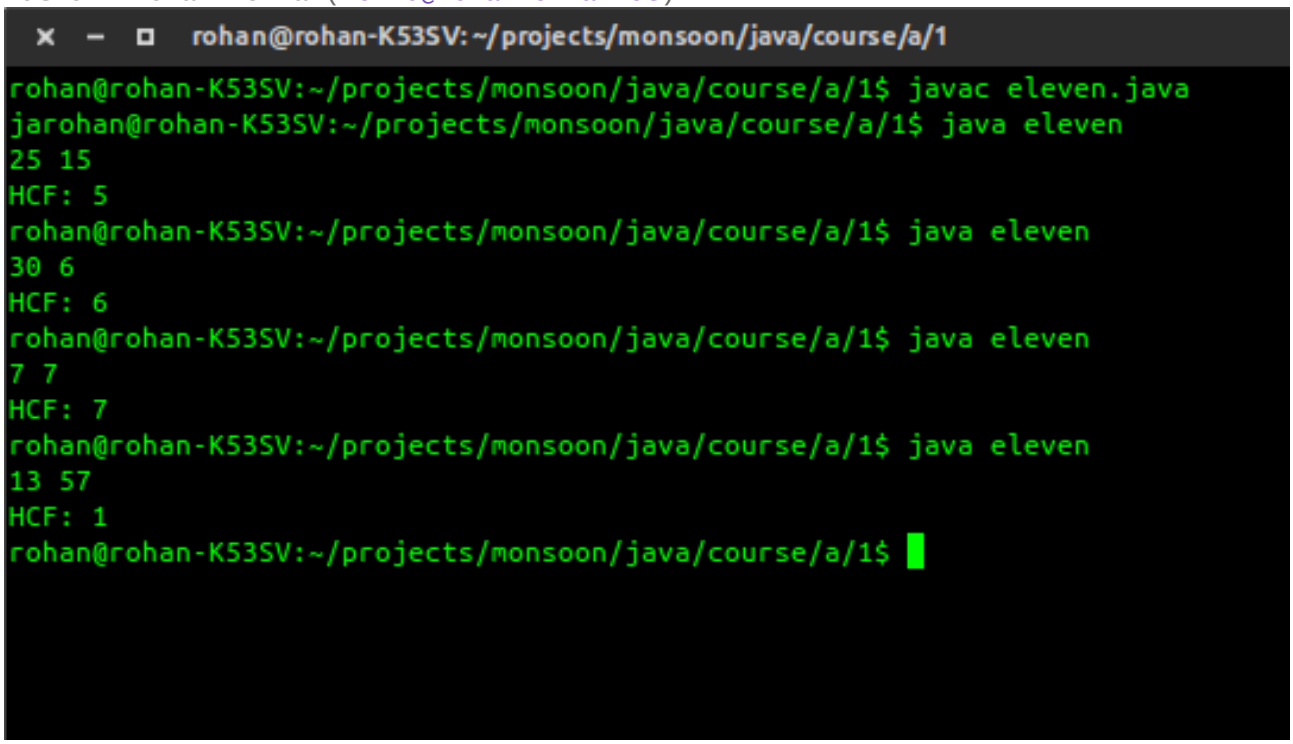
```
                        System.out.printf(" ");
                space--;
                for ( c = 1 ; c <= d ; c++ )
                {
                        System.out.printf("%d", num%10);
                        num++;
                }
                num--;
                num--;
                for ( c = 1 ; c < d ; c++)
                {
                        System.out.printf("%d", num%10);
                        num--;
                }
                System.out.printf("\n");
        }

    }
}
```

```
/*

Write a program that simulates flipping a
coin one million times and displays the number of
heads and tails.

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;

public class eight {

        public static void main( String [] args )
        {

                int FLIPS = 1000000;

                int heads = 0, tails = 0, coin;



                for(int i = 0; i < FLIPS; i++){
                        coin = (int)((Math.random() > 0.5)?1:0);

                        if(coin == 0) heads++;
                        else tails++;
                }

            System.out.println("Heads: " + heads);
            System.out.println("Tails: " + tails);

        }
}
```

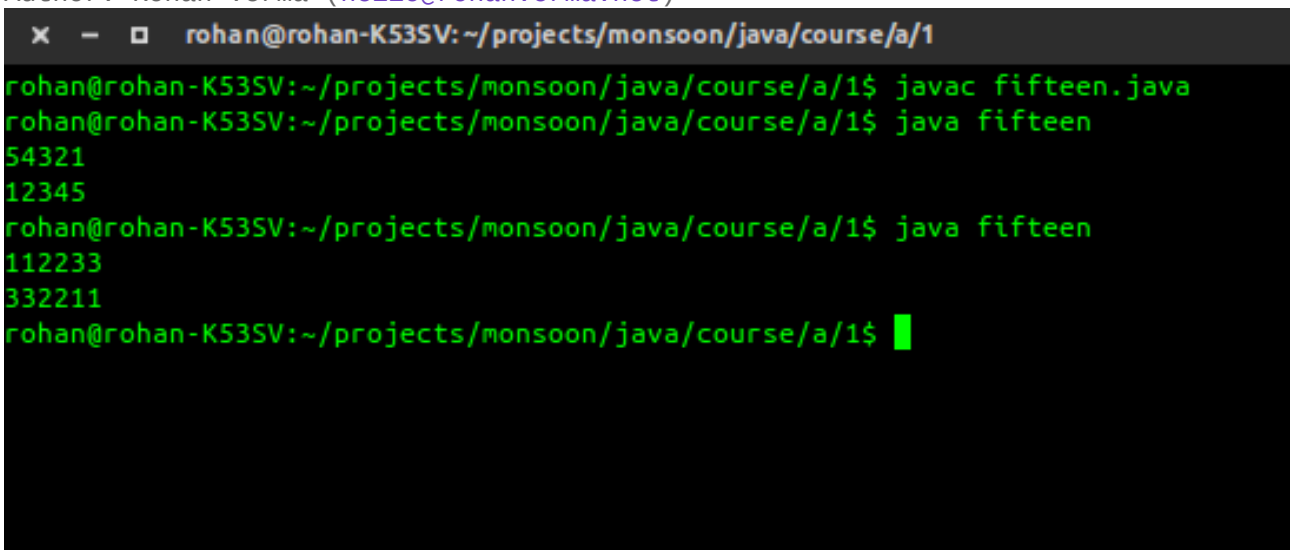
```
/*

A solution to find the greatest common divisor of two integers n1 and n2 is as
follows: First
find d to be the minimum of n1 and n2, then check whether d, d-1, d-2, 2, or 1
is a divisor for
both n1 and n2 in this order. The first such common divisor is the greatest
common divisor
for n1 and n2. Write a program that prompts the user to enter two positive
integers and
displays the gcd.

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;


public class eleven {

        public static int hcf(int a, int b){

                int min = (a>b)?b:a;

                for(int i = min; i >= 1; i--){
                        if(a % i == 0 && b % i == 0){
                                return i;
                        }
                }

                return -1;

        }

        public static void main( String [] args )
        {
            int a, b;

            //Scanner
            Scanner s = new Scanner(System.in);
```

```
            a = s.nextInt();
            b = s.nextInt();

            System.out.println("HCF: " + hcf(a,b));

        }
}
```

```
/*

Write a program to read an integer and reverse it.

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;


public class fifteen {

        public static void main( String [] args )
        {

                int num;

                Scanner s = new Scanner(System.in);

                num = s.nextInt();

                int rev = 0;

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

                        num /= 10;
                }

                System.out.println(rev);
        }
}
```

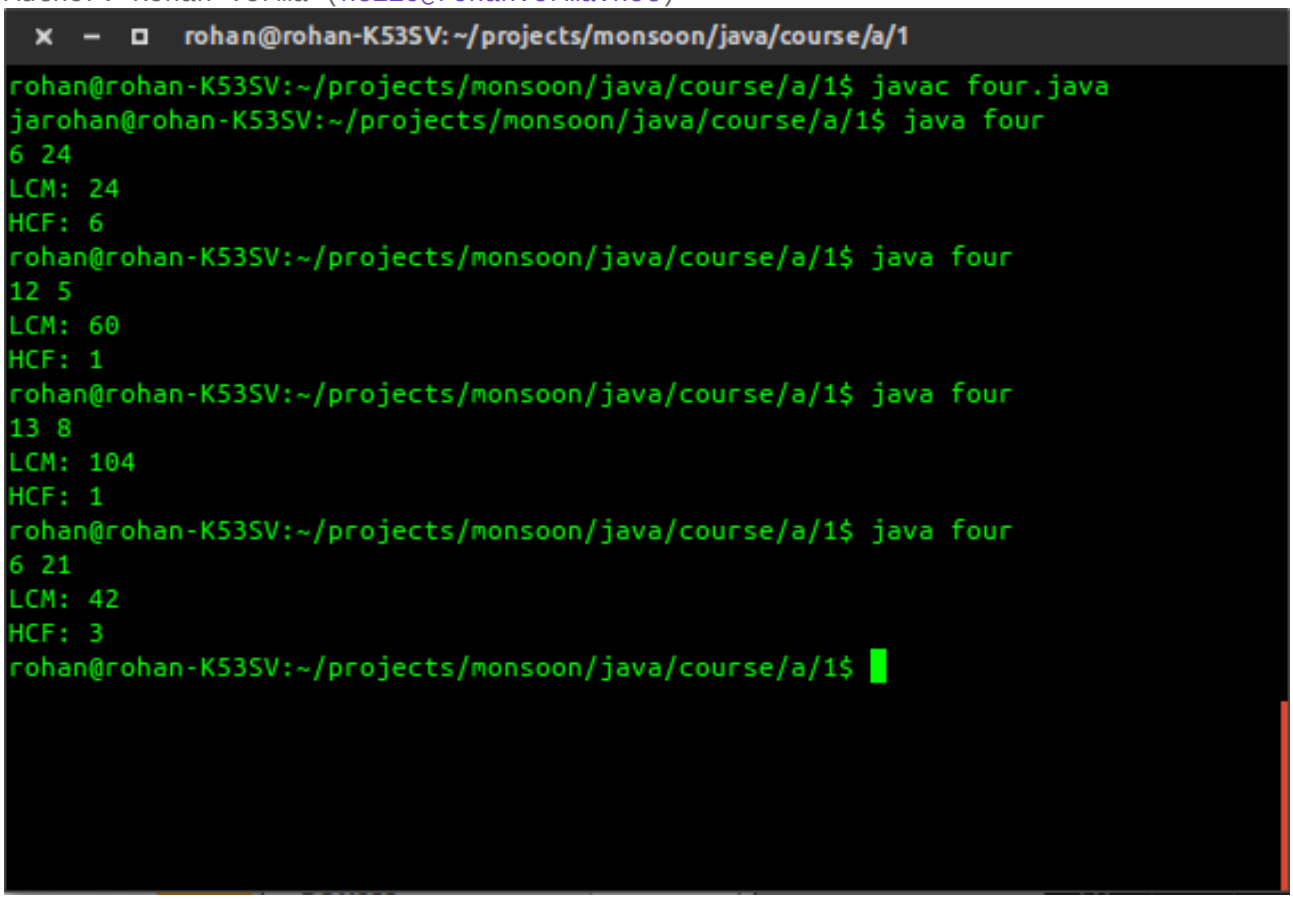
```
/*

Write a program that prompts the user to enter
a decimal integer and displays its
corresponding binary value.
Don't use Java's Integer.toBinaryString(int)
in this program.

Author: Rohan Verma (hello@rohanverma.net)
```

```
rohan@rohan-K53SV:~/projects/monsoon/java/course/a/1
rohan@rohan-K53SV:~/projects/monsoon/java/course/a/1$ javac five.java
rohan@rohan-K53SV:~/projects/monsoon/java/course/a/1$ java five
Enter the center coords and radii of circle 1 then circle 2 respectively:
0 0 5
0 0 7
Circle 1 is inside Circle 2.
rohan@rohan-K53SV:~/projects/monsoon/java/course/a/1$ java five
Enter the center coords and radii of circle 1 then circle 2 respectively:
0 0 7
0 0 5
Circle 2 is inside Circle 1.
rohan@rohan-K53SV:~/projects/monsoon/java/course/a/1$ java five
Enter the center coords and radii of circle 1 then circle 2 respectively:
-1 -1 5
1 1 5
Circle 2 overlaps Circle 1.
rohan@rohan-K53SV:~/projects/monsoon/java/course/a/1$ java five
Enter the center coords and radii of circle 1 then circle 2 respectively:
0.5 0.5 5
0 0 2.5
Circle 2 is inside Circle 1.
rohan@rohan-K53SV:~/projects/monsoon/java/course/a/1$
```

```
*/
import java.util.Scanner;


public class five {

        public static void main( String [] args )
        {
            double x1, y1, r1, x2, y2, r2;

            //Scanner
            Scanner s = new Scanner(System.in);

            System.out.println("Enter the center coords and radii of circle 1
then circle 2 respectively: ");

                x1 = s.nextDouble();
                y1 = s.nextDouble();
                r1 = s.nextDouble();
                x2 = s.nextDouble();
                y2 = s.nextDouble();
                r2 = s.nextDouble();

                double distance = Math.pow((x1 - x2) * (x1 - x2) + (y1 - y2) *
```

```
(y1 - y2), 0.5);

                if (r2 >= r1 && distance <= (r2 - r1)){
                System.out.println("Circle 1 is inside Circle 2.");
            }
            else if (r1 >= r2 && distance <= (r1 - r2) ) {
                System.out.println("Circle 2 is inside Circle 1.");
            }
            else if (distance > (r1 + r2)){
                System.out.println("Circle 2 does not overlap Circle 1.");
            }
            else {
                System.out.println("Circle 2 overlaps Circle 1.");
            }

        }
}
```

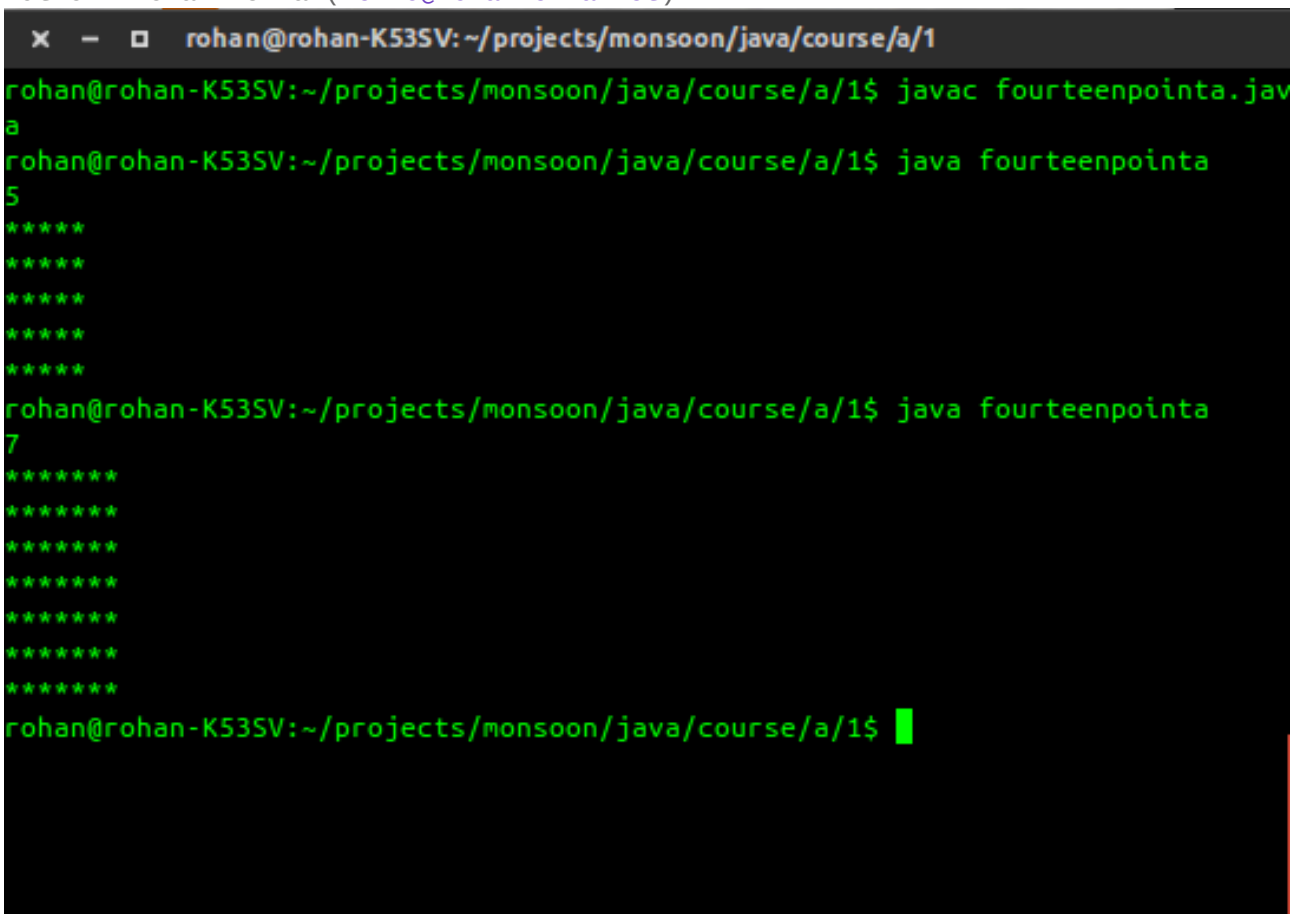
```
/*

Write a program to find out the L.C.M. and H.C.F. of two numbers.

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;


public class four {

        public static int hcf(int a, int b){
                if (b == 0) {
                        return a;
                }
                else {
                        return hcf(b, a % b);
                }
                //return -1;
        }

        public static int lcm(int a, int b){

                return (a*b)/hcf(a,b);
        }

        public static void main( String [] args )
        {
            int a, b;

            //Scanner
            Scanner s = new Scanner(System.in);
```

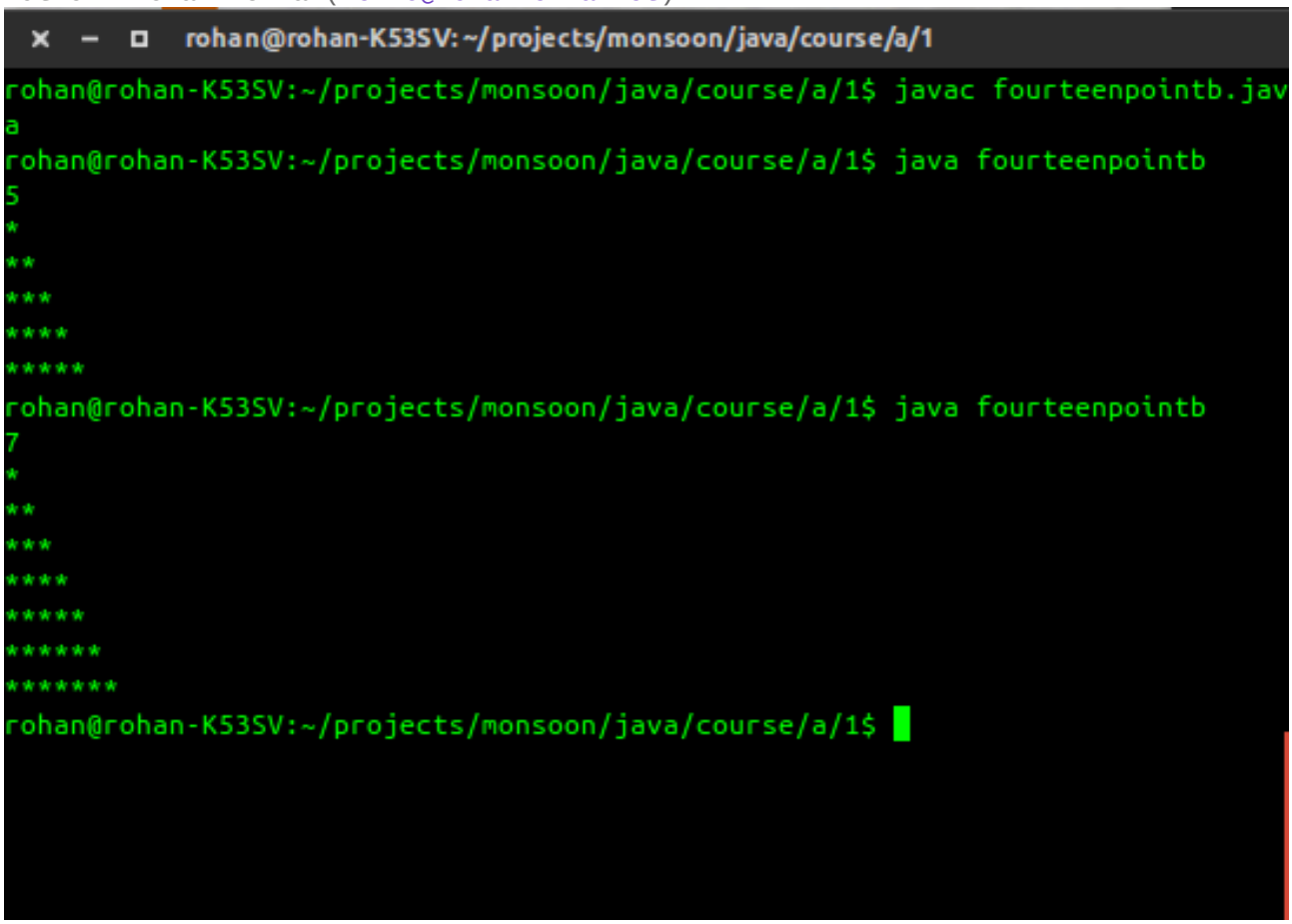
```
            a = s.nextInt();
            b = s.nextInt();

            System.out.println("LCM: " + lcm(a,b));
            System.out.println("HCF: " + hcf(a,b));

        }
}
```

```
/*

* * * * *
* * * * *
* * * * *
* * * * *
* * * * *

Author: Rohan Verma (hello@rohanverma.net)
```



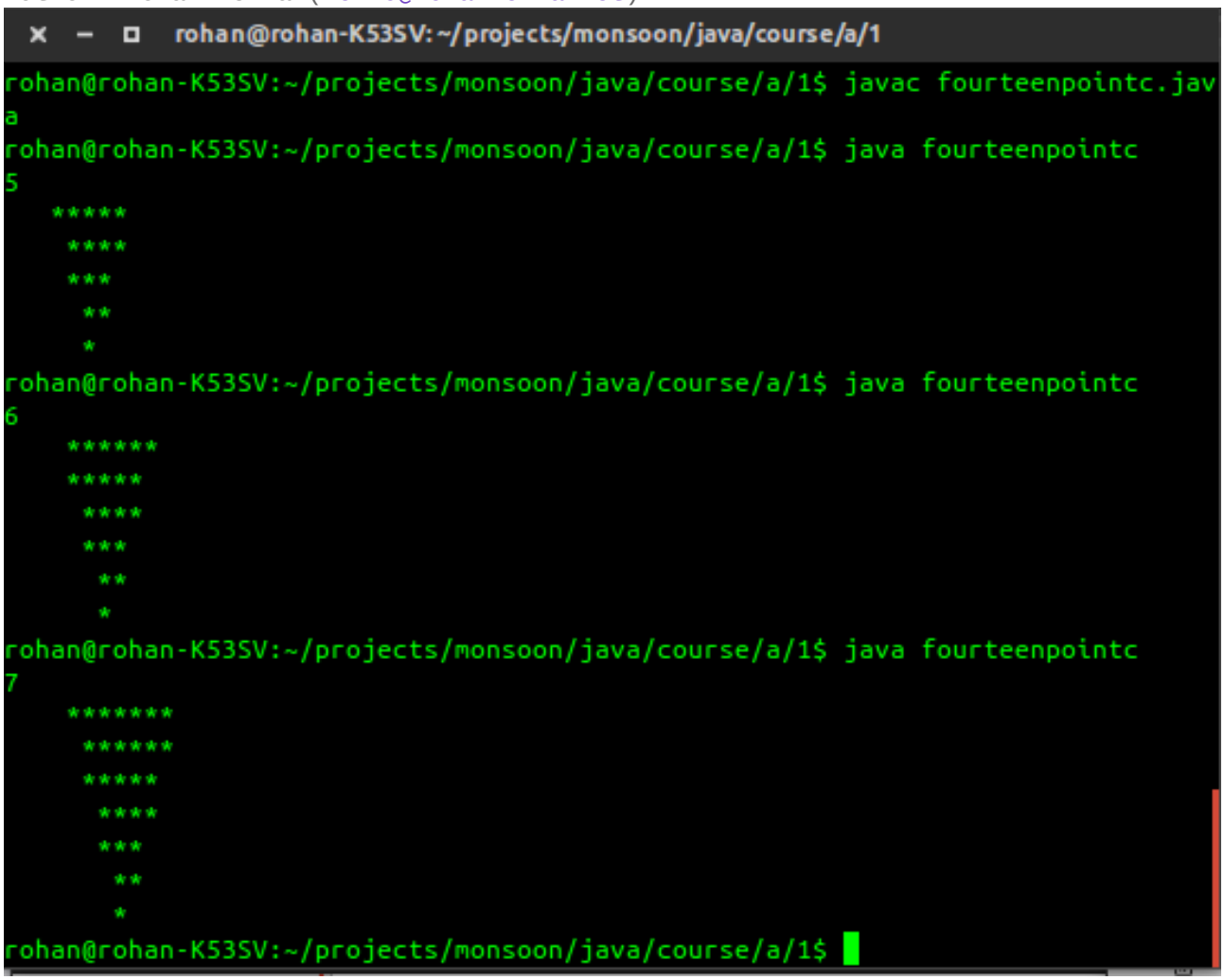

```
*/
import java.util.Scanner;


public class fourteenpointa {

        public static void main( String [] args )
        {

                int num;

                Scanner s = new Scanner(System.in);

                num = s.nextInt();

                for(int i = 0; i < num; i++){
                        for(int j = 0; j < num; j++){
                                System.out.print('*');
                        }
                        System.out.print('\n');
                }
        }
}
```

```
/*

*
* *
* *
* * *
* * * *

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;


public class fourteenpointb {

        public static void main( String [] args )
        {

                int num;

                Scanner s = new Scanner(System.in);

                num = s.nextInt();

                for(int i = 0; i < num; i++){
                        for(int j = num - i - 1; j < num; j++){
                                System.out.print('*');
                        }
                        System.out.print('\n');
                }
        }
}
```

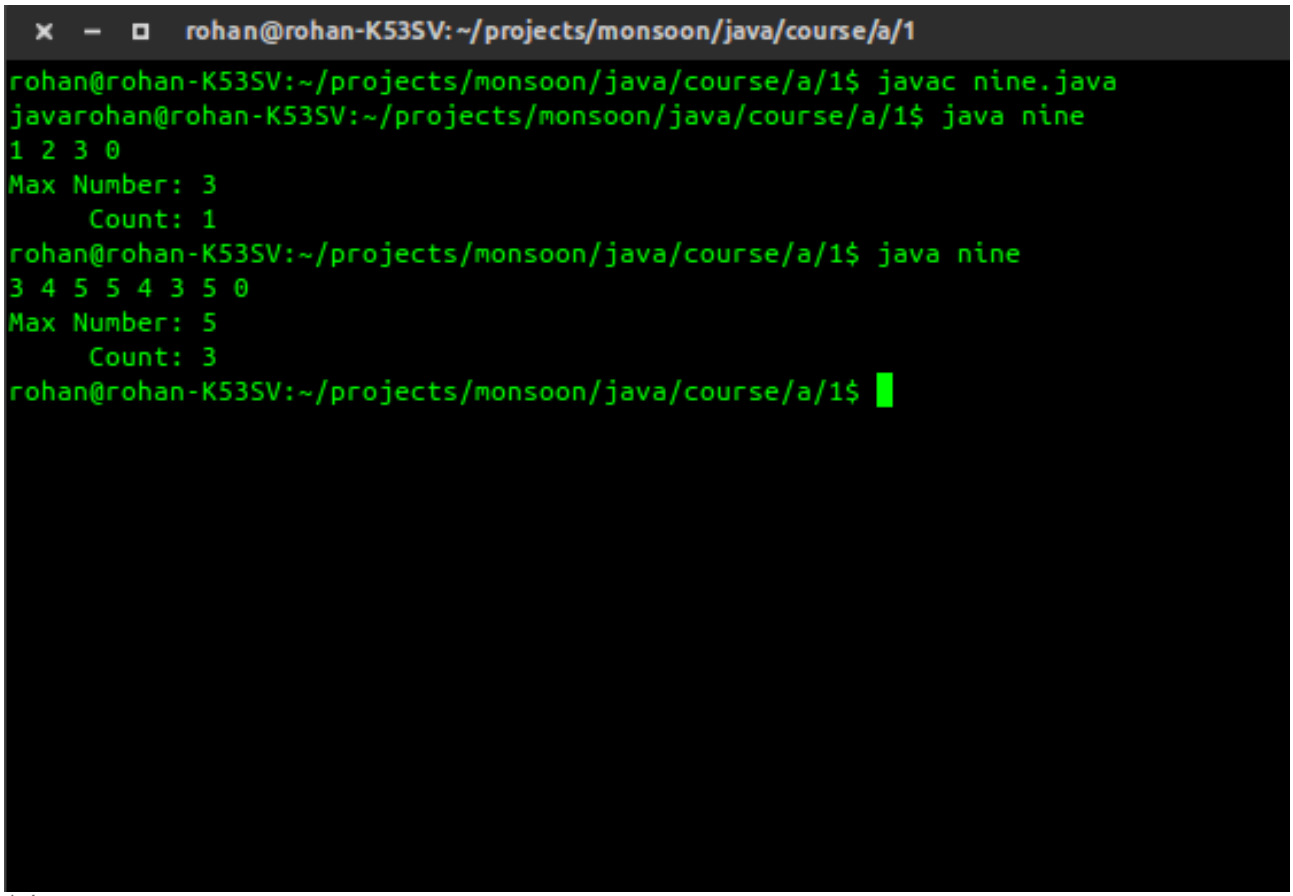
```
/*

* * * * *
* * * * *
* * * * *
* * * * *
* * * * *

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;


public class fourteenpointc {

        public static void main( String [] args )
        {

                int num;

                Scanner s = new Scanner(System.in);

                num = s.nextInt();

                for(int i = 0; i < num; i++){
                        for(int j = (num - i - 1)/2; j < num; j++){
                                System.out.print(' ');
                        }
                        for(int j = i; j < num; j++){
```

```
                        System.out.print('*');
                    }

                    System.out.print('\n');
                }
            }
        }
```

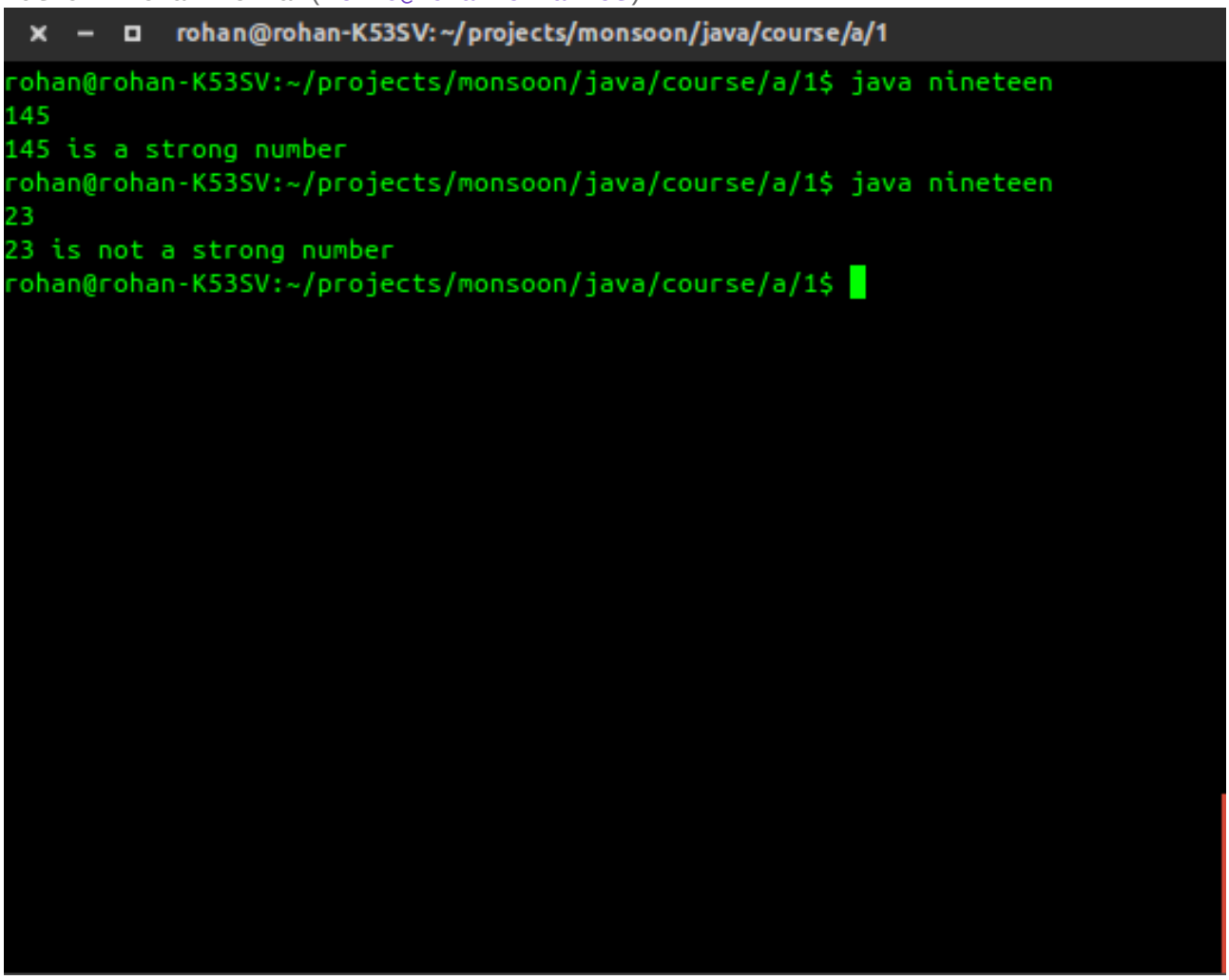
```
/*

Write a program that prompts the user to
enter the number of seconds, displays a message at
every second, and terminates when the time expires.

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;


public class nine {

        public static void main( String [] args )
        {

                int num, max = Integer.MIN_VALUE, count = 0;

                Scanner s = new Scanner(System.in);

                do{

                        num = s.nextInt();

                        if(max == num){
                                count += 1;
                        }
                        else if(max < num){
                                count = 1;
                                max = num;
                        }
                        else{
```

```
                }


            }while(num != 0);

            System.out.println("Max Number: " + max);
            System.out.println("     Count: " + count);

        }
}
```

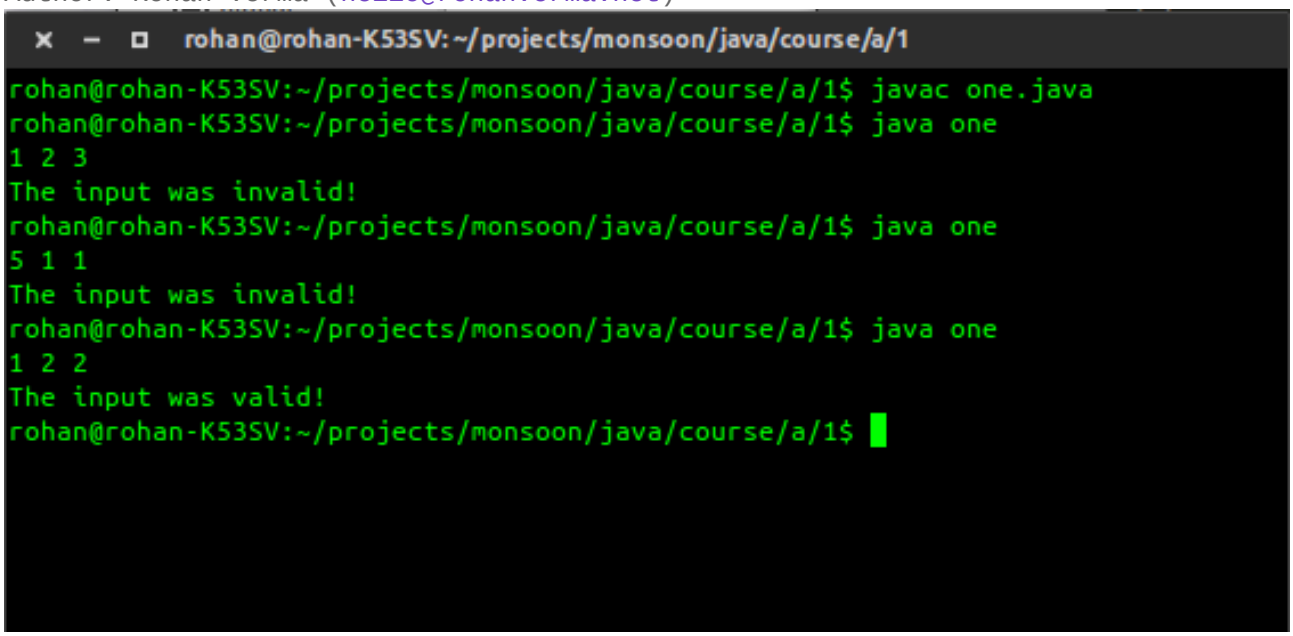
```
/*

In a strong number, the sum of the factorials of digits of a number is equal to
the original
number. Write a program to check given number is strong number or not.

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;


public class nineteen {

        public static void main( String [] args )
        {

                int num;

                Scanner s = new Scanner(System.in);

                num = s.nextInt();

                int temp = num,i,f,r,sum=0;
                while(num!=0){
                        i=1;f=1;
                        r=num%10;

                        while(i<=r){
                                f=f*i;
```

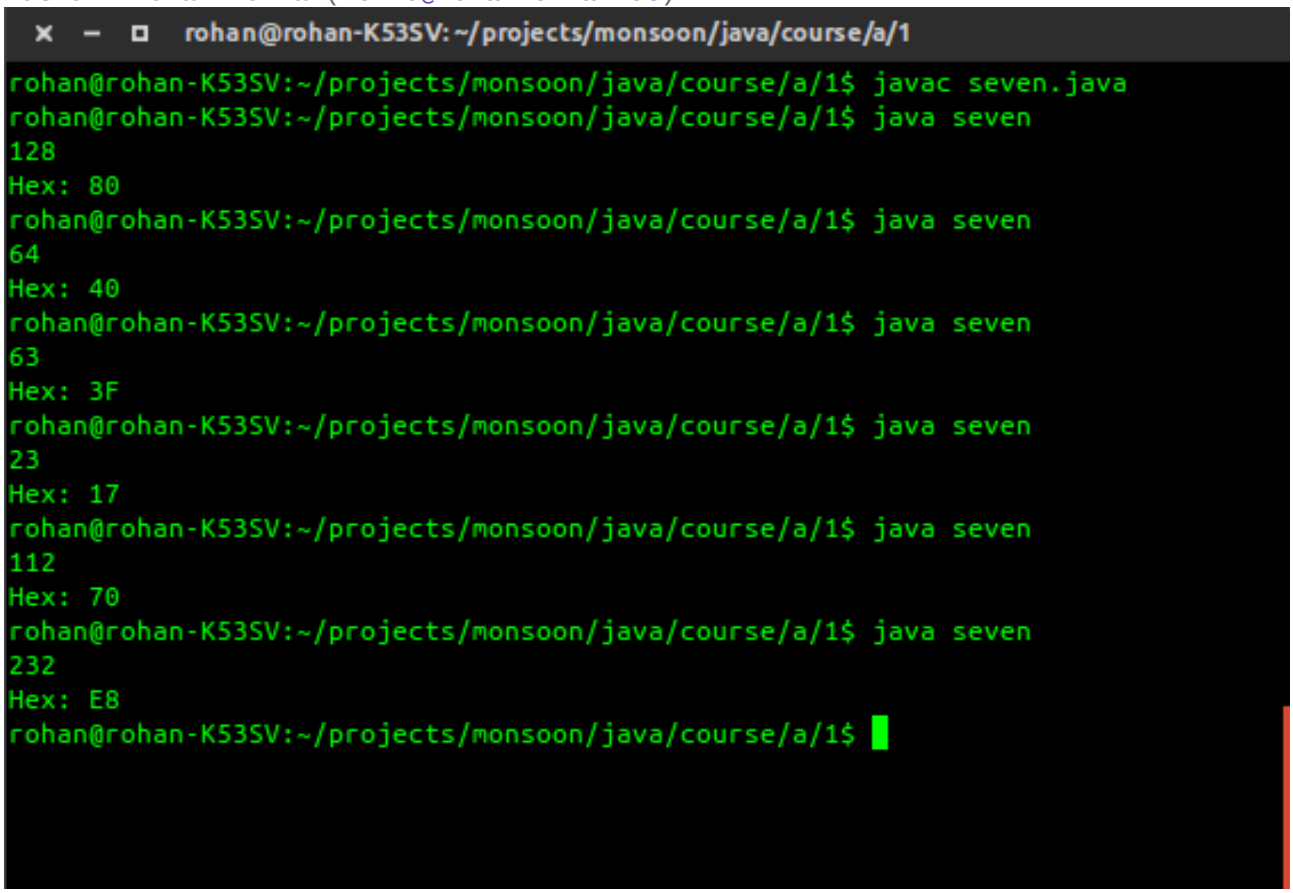
```
                        i++;
                }
                sum=sum+f;
                num=num/10;
        }
        if(sum==temp)
                System.out.printf("%d is a strong number\n",temp);
        else
                System.out.printf("%d is not a strong number\n",temp);

    }
}
```

```
/*

Write a program that reads three edges for a triangle and determines whether the
input is
valid. The input is valid if the sum of any two edges is greater than the third
edge.

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;


public class one {

        public static void main( String [] args )
        {
            // Input edge lengths of a b c
            int a,b,c;

            //Scanner
            Scanner s = new Scanner(System.in);

            a = s.nextInt();
            b = s.nextInt();
            c = s.nextInt();

            //Calculate sums
            int x = a + b;
            int y = b + c;
            int z = c + a;

            if(x > c && y > a && z > b){
                System.out.println("The input was valid!");
            }
            else{
                System.out.println("The input was invalid!");
            }
        }
}
```

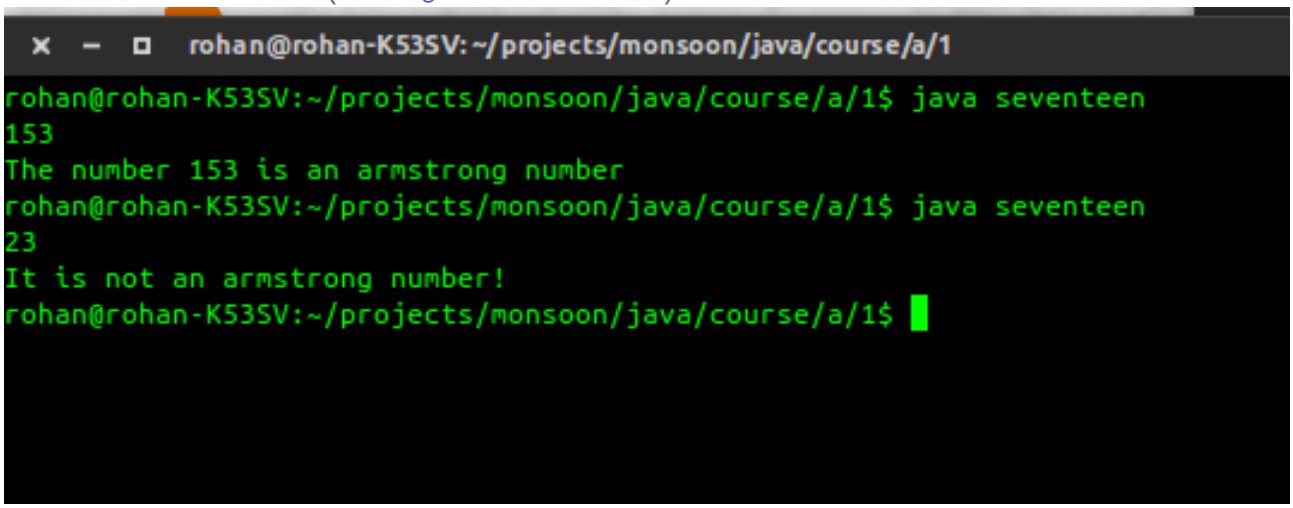
```
/*

Write a program that prompts the user to enter a
decimal integer and displays its
corresponding hexadecimal value.
Don’t use Java’s Integer.toHexString(int) in this
program.

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;


public class seven {

        public static String reverse(String source){
        if(source == null || source.isEmpty()){
            return source;
        }
        String reverse = "";
        for(int i = source.length() -1; i>=0; i--){
            reverse = reverse + source.charAt(i);
        }

        return reverse;
        }

        public static String convert(int dec)
        {
            String hex = "";

            while(dec != 0){

                int remainder = dec % 16;
```

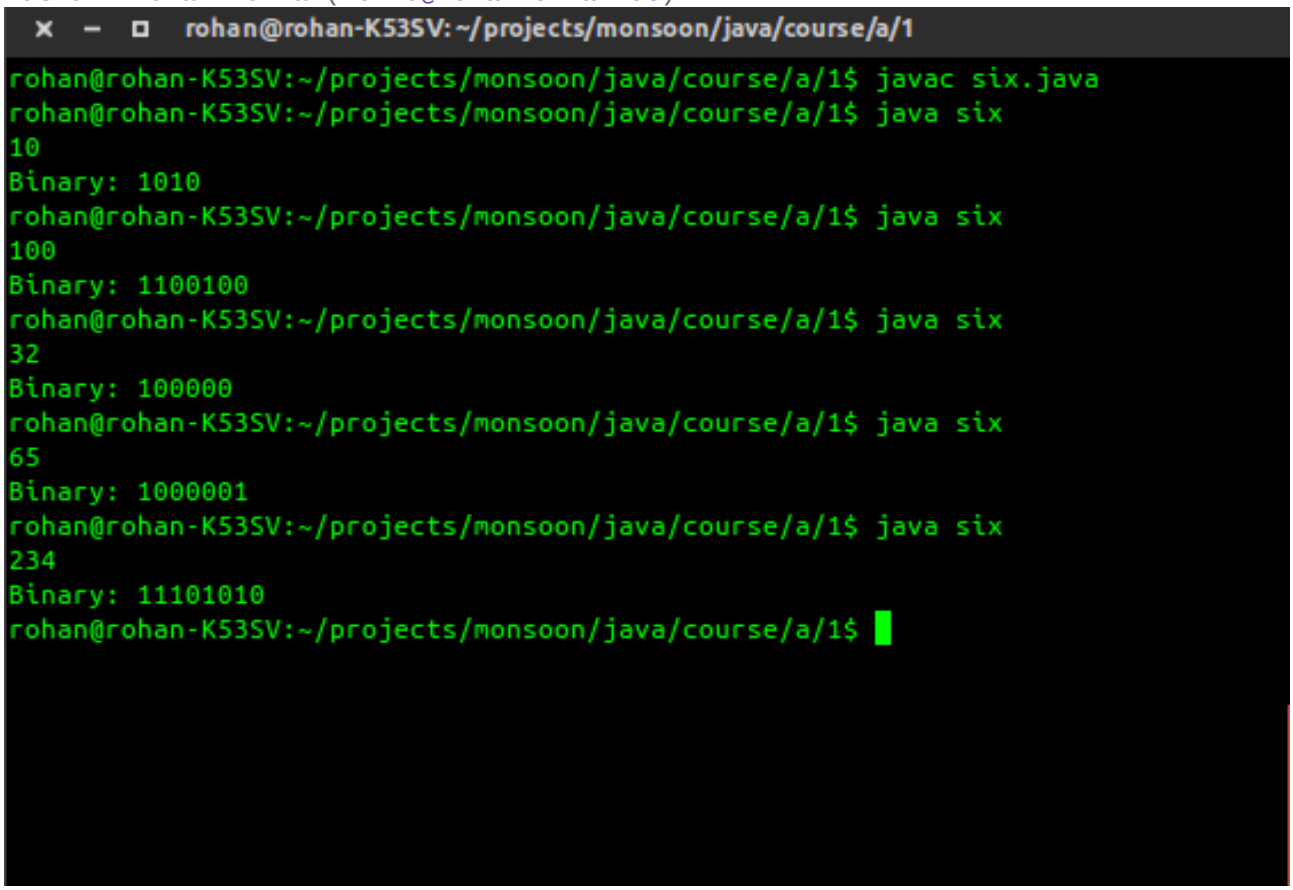
```
            if(remainder > 9){
                    char x='e';
                    remainder -= 10;
                    switch(remainder){
                            case 0:
                                    x = 'A';
                                    break;
                            case 1:
                                    x = 'B';
                                    break;
                            case 2:
                                    x = 'C';
                                    break;
                            case 3:
                                    x = 'D';
                                    break;
                            case 4:
                                    x = 'E';
                                    break;
                            case 5:
                                    x = 'F';
                                    break;
                    }

                    hex += x;


            }
            else{
                            hex += (char)(remainder + 48);
            }
            dec /= 16;
        }
        return reverse(hex);
    }

    public static void main( String [] args )
    {
        int num;

        Scanner s = new Scanner(System.in);

        num = s.nextInt();

        System.out.println("Hex: " + convert(num));

    }
}
```

```
/*

An Armstrong number is one in which the sum of the cubes of digits of a number
is equal to
the original number. Write a program to check given number is Armstrong number
or not.
For example: n=153 => 1 3 + 5 3 +3 3 = 1+125+27= 153, so 153 is an Armstrong
number.

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;


public class seventeen {

        public static void main( String [] args )
        {

                int num;

                Scanner s = new Scanner(System.in);

                num = s.nextInt();

                int sum = 0;
                int temp = num;
                while(num != 0){
                        sum += Math.pow((num%10),3);
                        num/=10;
                }
                if(sum == temp){
                        System.out.println("The number "+ temp + " is an
armstrong number");
                }
                else
                        System.out.println("It is not an armstrong number!");

        }
}
```

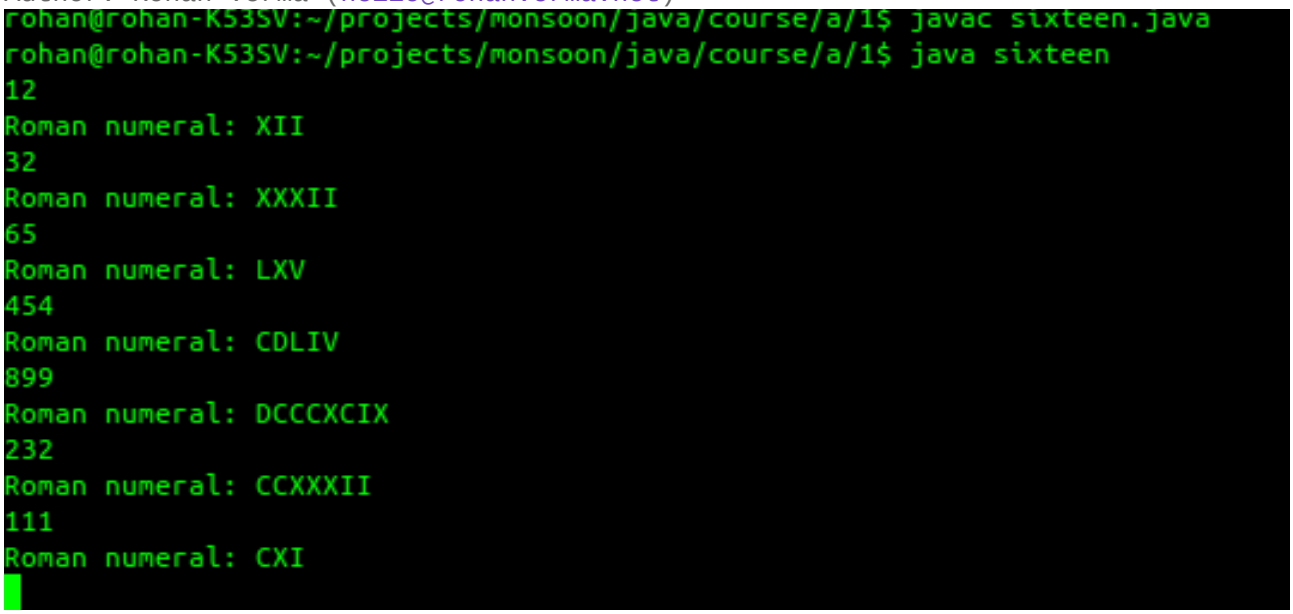
```
/*

Write a program that prompts the user to enter
a decimal integer and displays its
corresponding binary value.
Don't use Java's Integer.toBinaryString(int)
in this program.

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;


public class six {

        public static int convert(int dec)
        {
            if (dec == 0)
            {
                return 0;
            }
            else
            {
                return (dec % 2 + 10 * convert(dec / 2));
            }
        }

        public static void main( String [] args )
        {
            int num;

            Scanner s = new Scanner(System.in);

            num = s.nextInt();
```

```
            System.out.println("Binary: " + convert(num));
        }
}
```

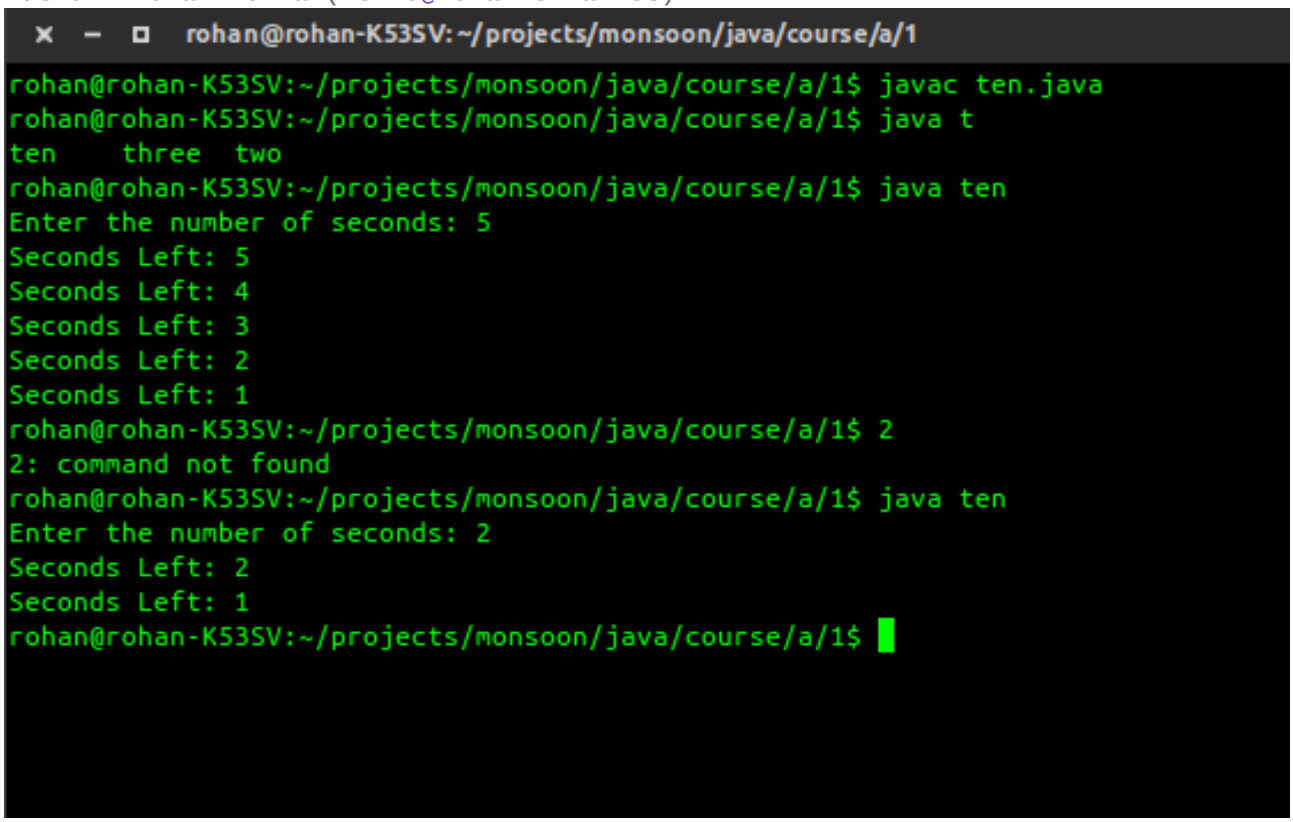
```
/*

Write an interactive program that will convert a positive integer
 quantity to a roman numeral
(e.g., 12 will be converted to XII, 14 will be converted to XIV,
and so on). Design the
program so that it will execute repeatedly, until a value of zero
is read in from the keyboard.

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;


public class sixteen {

        public static String IntegerToRomanNumeral(int input) {
            if (input < 1 || input > 3999)
                return "Invalid Roman Number Value";
            String s = "";
            while (input >= 1000) {
                s += "M";
                input -= 1000;        }
            while (input >= 900) {
                s += "CM";
                input -= 900;
            }
            while (input >= 500) {
                s += "D";
                input -= 500;
            }
            while (input >= 400) {
                s += "CD";
                input -= 400;
            }
            while (input >= 100) {
                s += "C";
                input -= 100;
            }
            while (input >= 90) {
                s += "XC";
                input -= 90;
            }
```

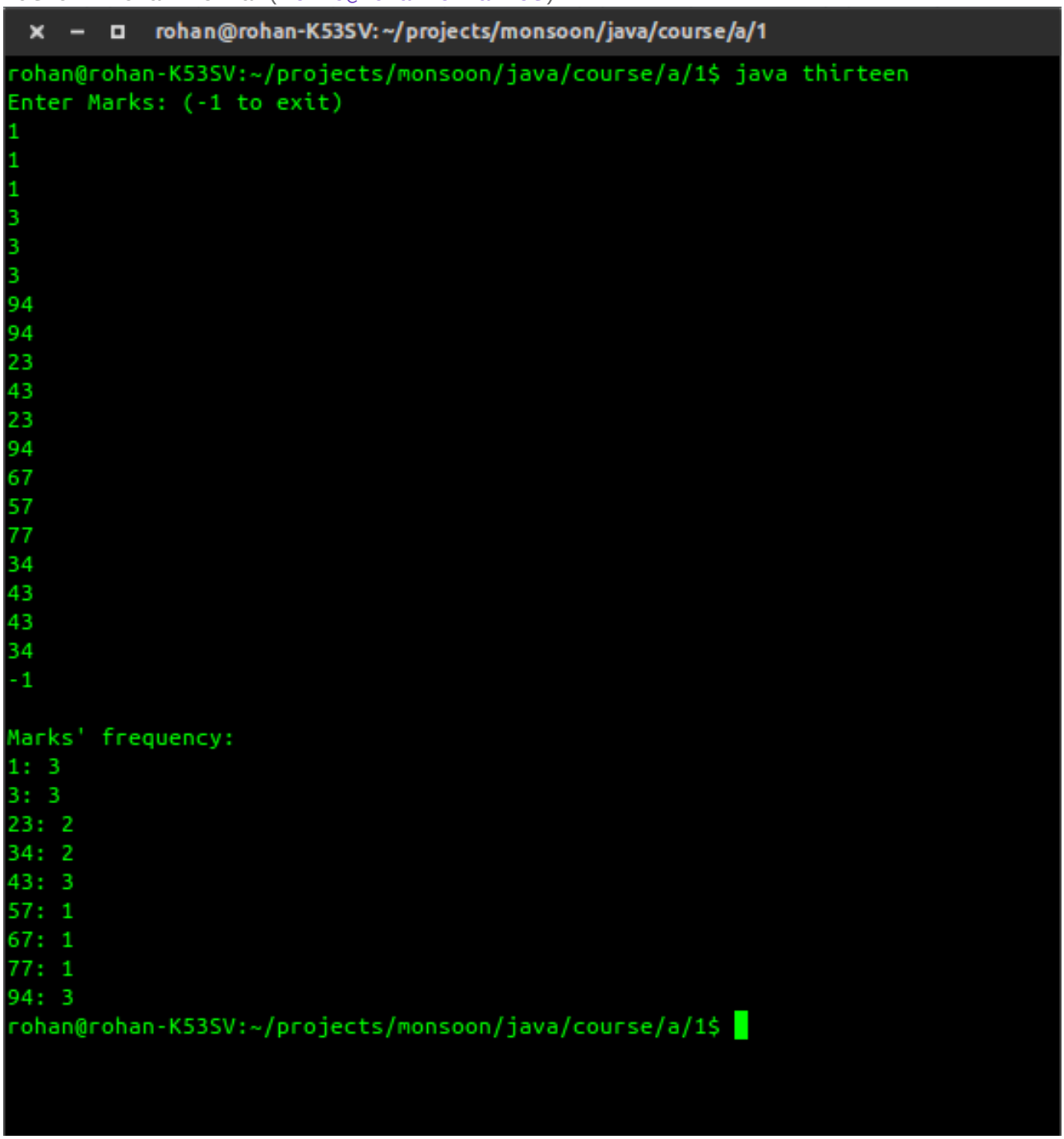
```
            while (input >= 50) {
                s += "L";
                input -= 50;
            }
            while (input >= 40) {
                s += "XL";
                input -= 40;
            }
            while (input >= 10) {
                s += "X";
                input -= 10;
            }
            while (input >= 9) {
                s += "IX";
                input -= 9;
            }
            while (input >= 5) {
                s += "V";
                input -= 5;
            }
            while (input >= 4) {
                s += "IV";
                input -= 4;
            }
            while (input >= 1) {
                s += "I";
                input -= 1;
            }
            return s;
        }

        public static void main( String [] args )
        {

                int num;

                Scanner s = new Scanner(System.in);

                do{

                        num = s.nextInt();

                        if(num!=0){
                                System.out.println("Roman numeral: " +
IntegerToRomanNumeral(num));
                        }

                }while(num != 0);

        }
}
```

```
/*

Write a program that prompts the user to
enter the number of seconds, displays a message at
every second, and terminates when the time expires.

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.*;

public class ten {

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

                System.out.print("Enter the number of seconds: ");
                int sec = s.nextInt();

        while (sec > 0) {
            System.out.println("Seconds Left: " + sec);
            long start = System.currentTimeMillis();
            //wait till 1 sec \/
            while (start + 1000 > System.currentTimeMillis());
            sec--;
        }

        }

}
```

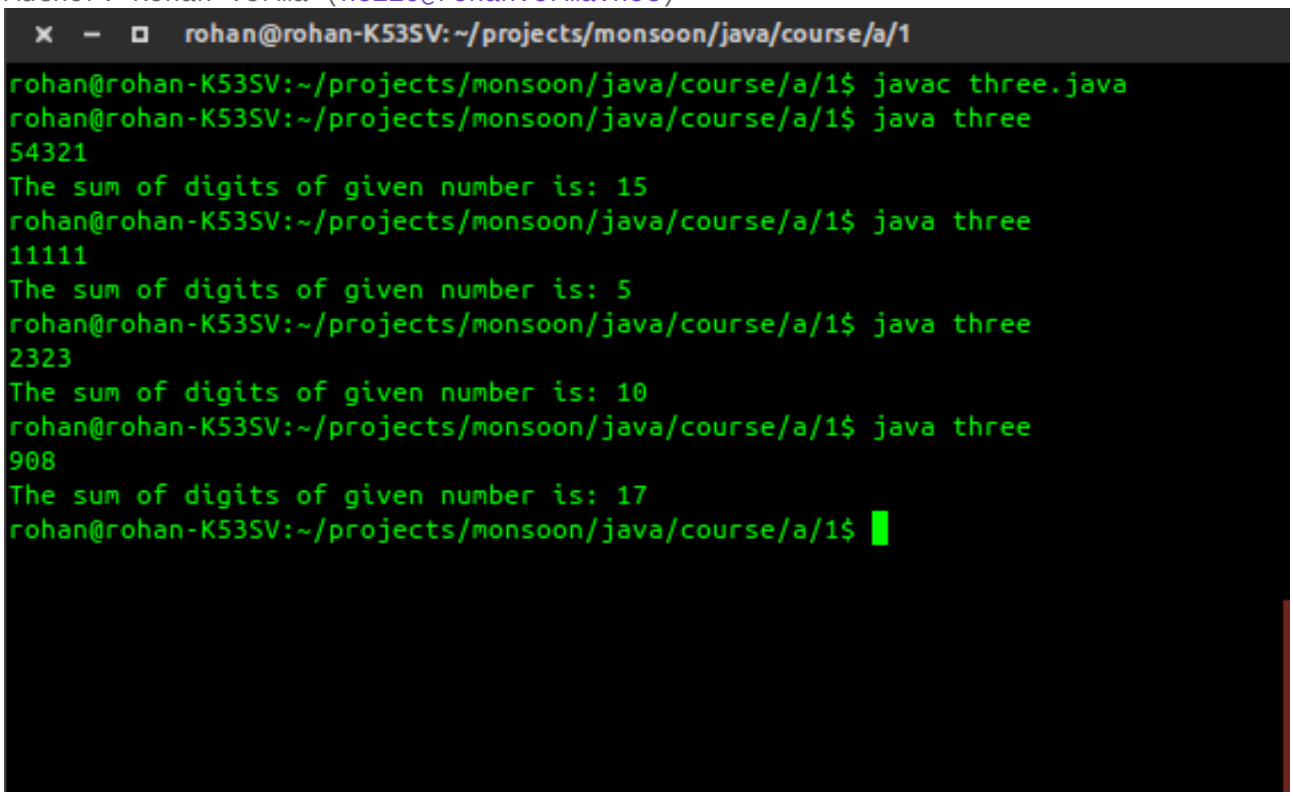
```
/*

Write a program to determine input the marks of n students in a subject and
determine the
frequency count of marks obtained i.e. how many students obtained 100, how many
99, how
many 98 and so on up to 0.

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;


public class thirteen {

        public static void main( String [] args )
        {
```

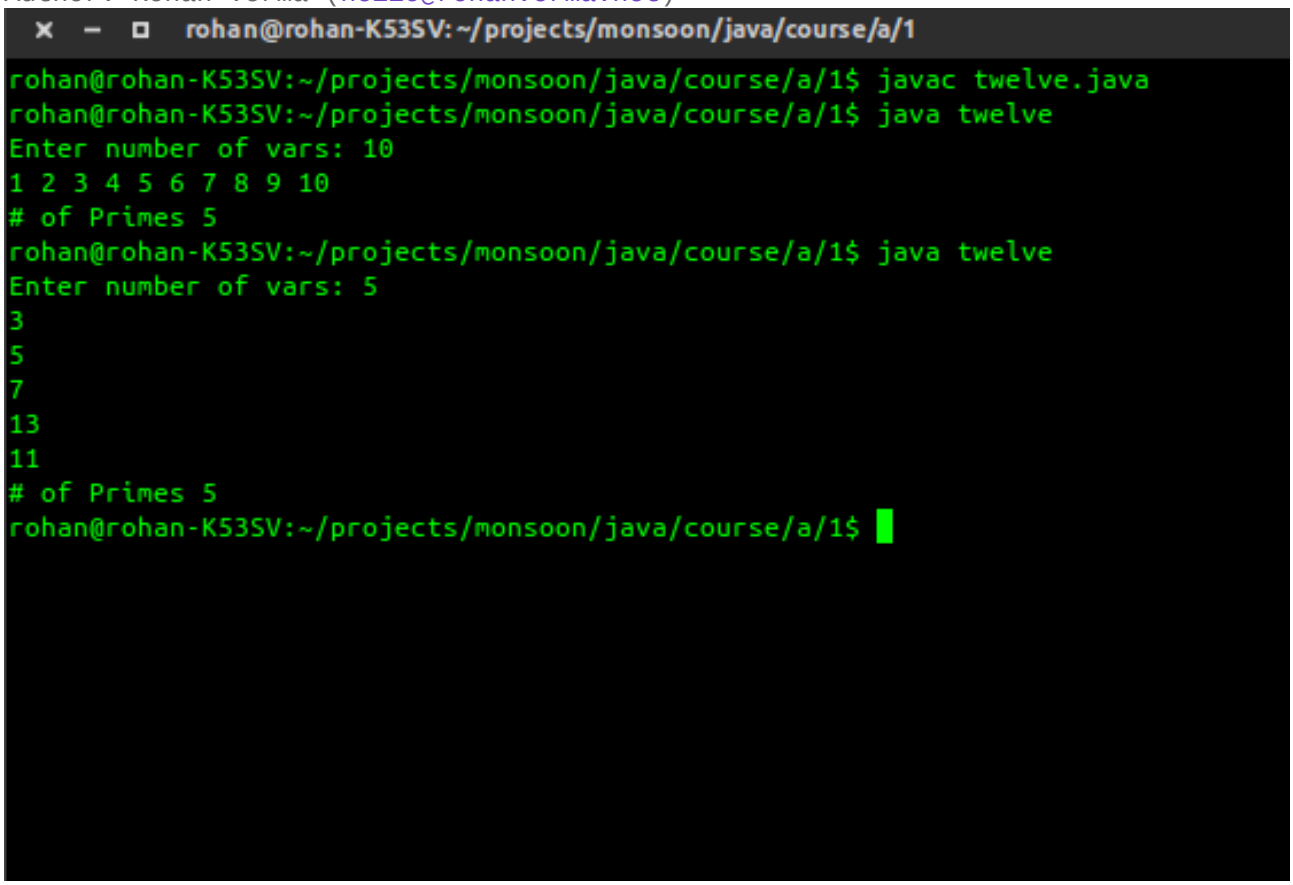
```
                int num;

                int[] arr = new int[101];

                Scanner s = new Scanner(System.in);

                System.out.println("Enter Marks: (-1 to exit)");
                do{

                        num = s.nextInt();

                        if(num!=-1)arr[num] += 1;

                }while(num != -1);

                System.out.println("\nMarks' frequency: ");
                for(int i = 0; i < 101; i++){
                        if(arr[i] != 0){
                                System.out.println(i + ": " + arr[i]);
                        }
                }

        }
}
```

```
/*

Write a program to find out sum of digits of a given number.

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;


public class three {

        public static void main( String [] args )
        {
            int num, sum;

            //Scanner
            Scanner s = new Scanner(System.in);

            num = s.nextInt();

            sum = 0;

            while(num != 0){
                //add remainder from num
                sum += num % 10;
                num /= 10;
            }
            System.out.println("The sum of digits of given number is: " + sum);
        }
}
```

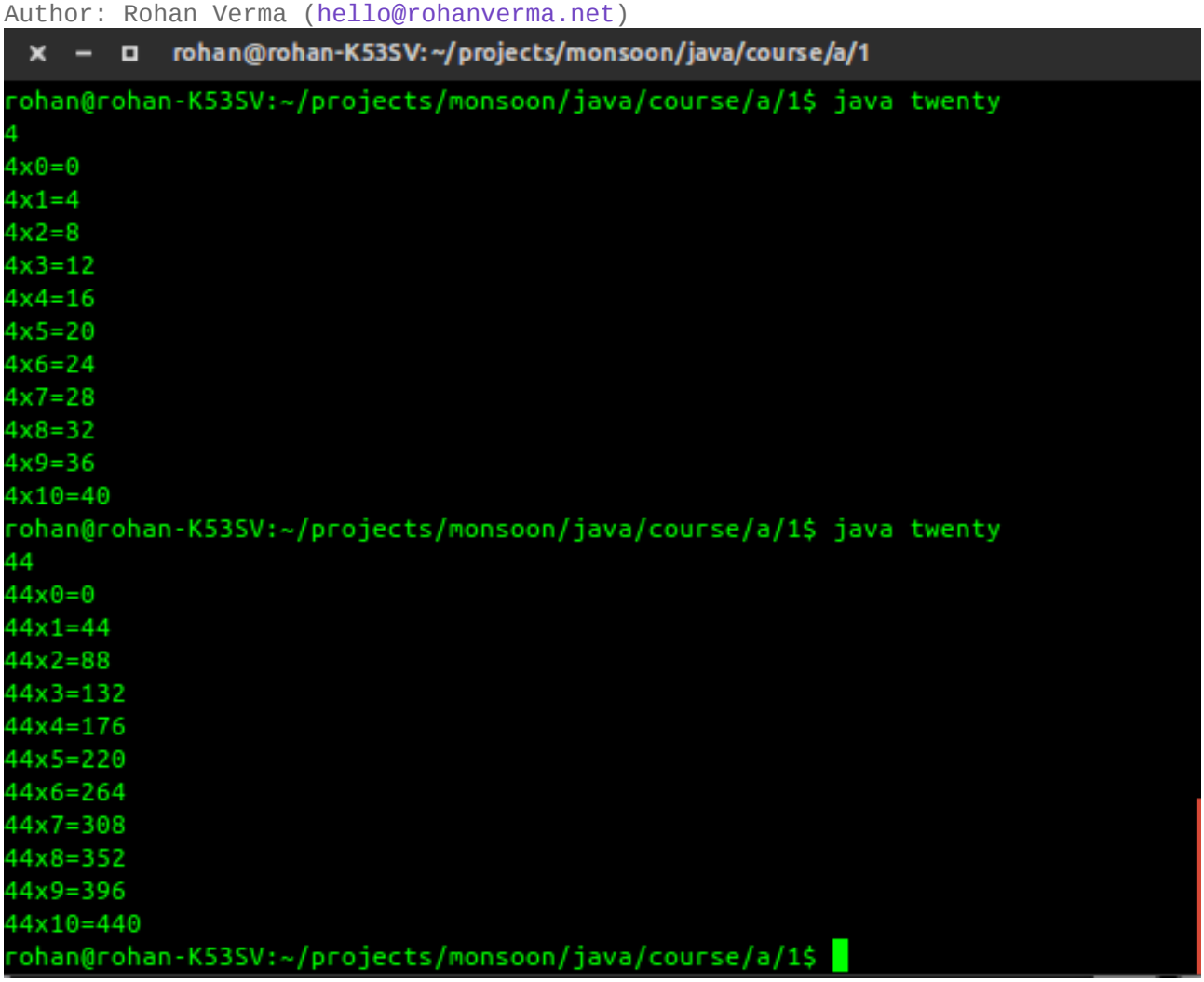
```
/*

Write a program to input a set of integers and count the number of primes.

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;


public class twelve {

        public static boolean isPrime(int num) {
        if (num == 2 ) return true;
        if (num % 2 == 0) return false;
        for (int i = 3; i * i <= num; i += 2)
            if (num % i == 0) return false;
        return true;
        }

        public static void main( String [] args )
        {
            int num, vars, count = 0;

            //Scanner
            Scanner s = new Scanner(System.in);



            System.out.print("Enter number of vars: ");
            vars = s.nextInt();
            while(vars-- != 0){
                if(isPrime(num = s.nextInt())){
                        count+=1;
                }
```

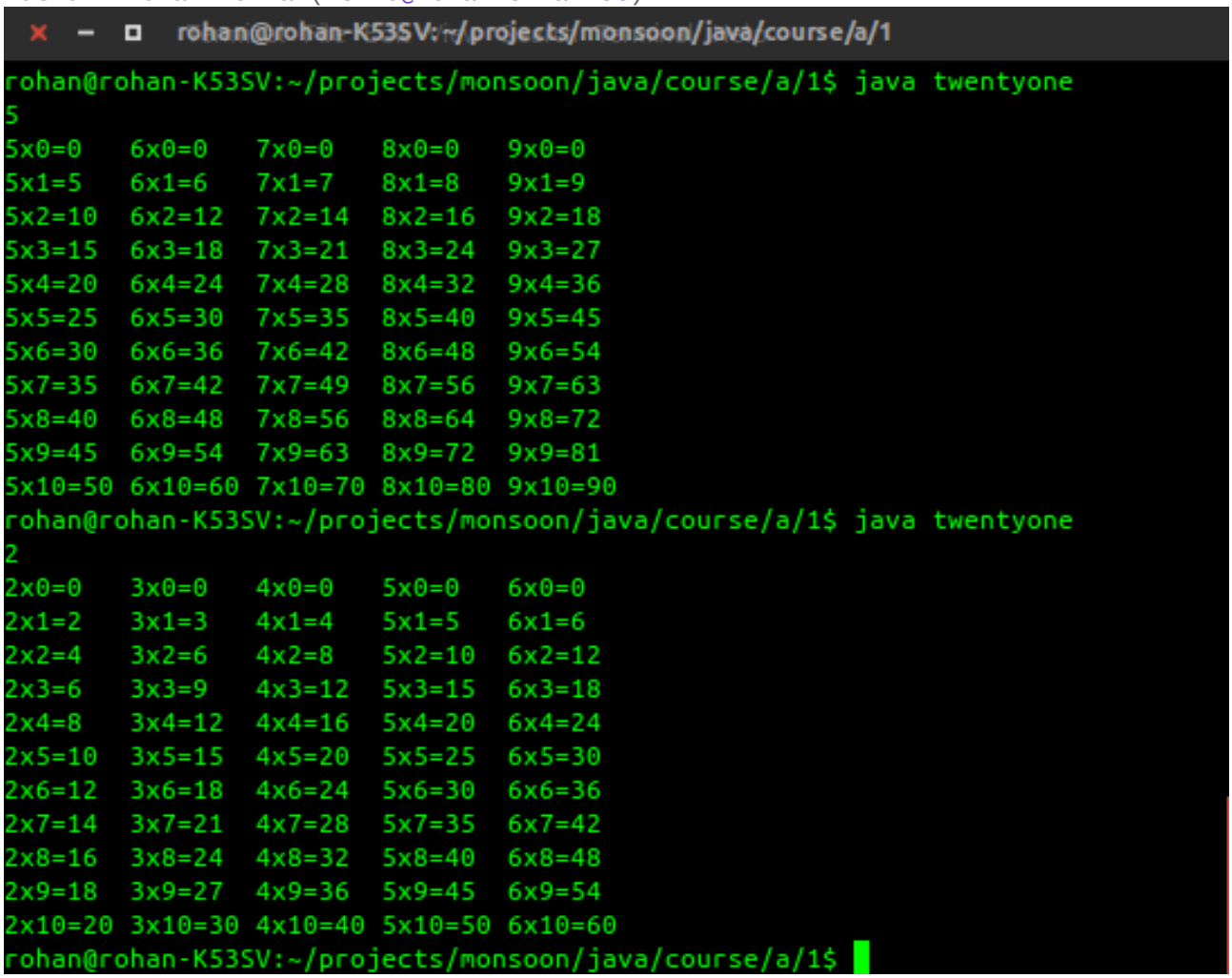
```
            }

            System.out.println("# of Primes " + count);

        }
}
```

```
/*

Write a program to generate multiplication tables for 1 ,2, ..., 10. Each table
up to 10

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;


public class twenty {

        public static void main( String [] args )
        {

                int num;

                Scanner s = new Scanner(System.in);

                num = s.nextInt();

                for(int i = 0; i <= 10; i++){
                        System.out.println(num + "x" + i + "=" + num*i);
                }

        }
}
```

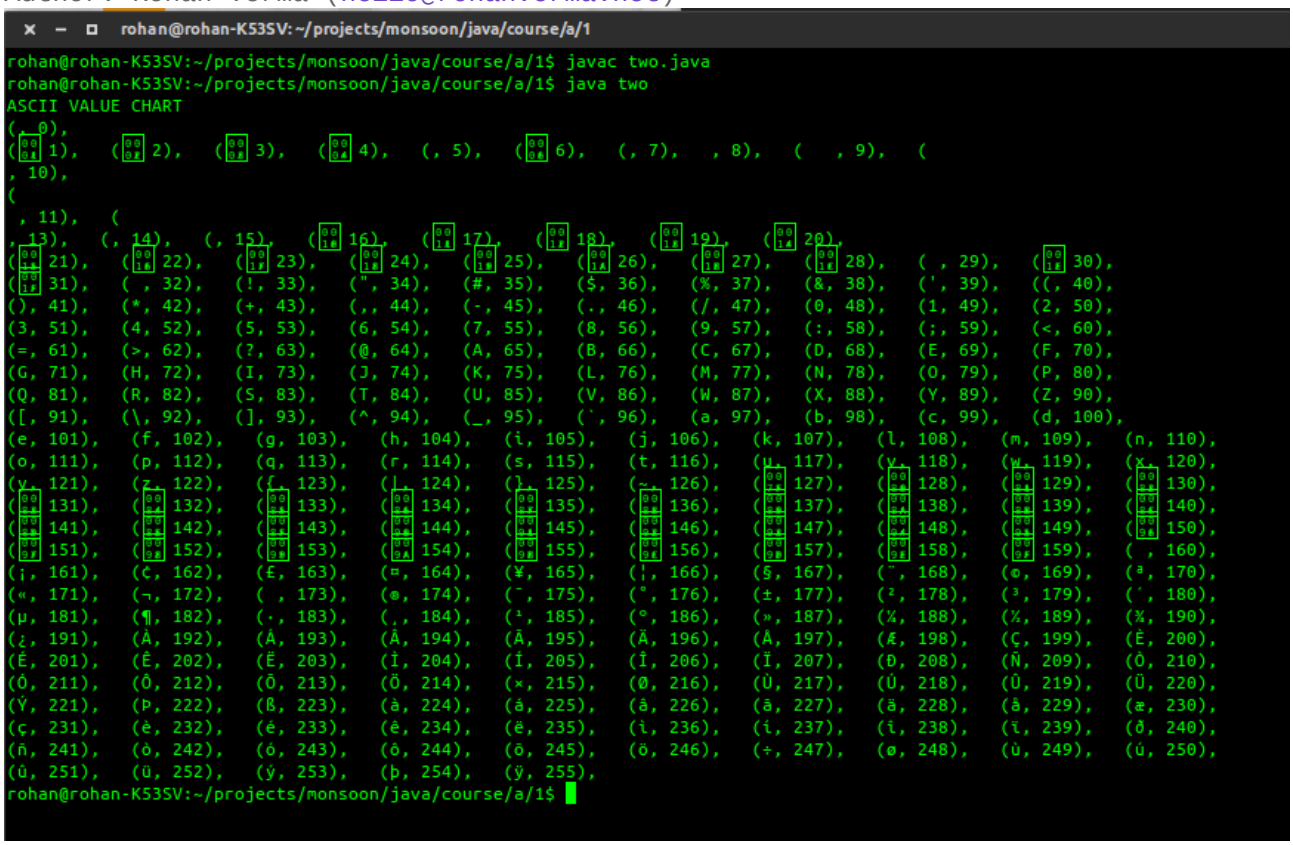
```
/*

Write a program to generate multiplication tables for 1 ,2, ..., 10. Each table
up to 10

Modify (20) so that your output now looks like this:
2x1=2 3x1=3 ... 5x1=5
2x2=4 3x2=6 ... 5x2=10
...
...
2x10=20 3x10=30 ... 5x10=50

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;


public class twentyone {

        public static void main( String [] args )
        {

                int num;

                Scanner s = new Scanner(System.in);

                num = s.nextInt();

                for(int i = 0; i <= 10; i++){
```

```
                        System.out.print(num + "x" + i + "=" + num*i);
                        System.out.print('\t');
                        System.out.print(num+1 + "x" + i + "=" + (num+1)*i);
                        System.out.print('\t');
                        System.out.print(num+2 + "x" + i + "=" + (num+2)*i);
                        System.out.print('\t');
                        System.out.print(num+3 + "x" + i + "=" + (num+3)*i);
                        System.out.print('\t');
                        System.out.print(num+4 + "x" + i + "=" + (num+4)*i);
                        System.out.print('\n');
                }

        }
}
```

```
/*

Write a program to print ASCII value of all characters.

Author: Rohan Verma (hello@rohanverma.net)
```




```
*/
import java.util.Scanner;


public class two {

        public static void main( String [] args )
        {
                System.out.println("ASCII VALUE CHART");
            for(int i = 0; i < 256; i++){
                System.out.print('(');
                        System.out.print((char)i);
                        System.out.print(", ");
                System.out.print(i);
                System.out.print("),   ");

                if(i % 10 == 0) System.out.print('\n');
            }
            System.out.print('\n');
        }
}
```