Note:

1. **The Ans section contains the program /coding part [which you have to write in your IDE to get the output.]**
2. **The output is written after Ans section under the heading Output**
3. **The questions without the output part in this pdf have very large output so those outputs will not be written in assignment copy.**

Q1.

Write a java program to input a string message and display it 10 times in the following manner. Use a *while* loop. Let the string message be "Hello".

```
Enter a message
Hello
1st Hello
2nd Hello
3rd Hello
4th Hello
5th Hello
6th Hello
7th Hello
8th Hello
9th Hello
10th Hello
```

Ans.

```
import java.util.Scanner;
public class A4Q01 {
	public static void main(String[] args) {
		Scanner sc=new Scanner(System.in);
		String msg;
		System.out.println("Enter the message");
		msg=sc.next();
		int i=1;
		while(i<=10)
		{
		if(i==1)
		System.out.println(i+"st "+msg);
		else if(i==2)
		System.out.println(i+"nd "+msg);
		else if(i==3)
		System.out.println(i+"rd "+msg);
		else
		System.out.println(i+"th "+msg);
		i++;
		sc.close();
		}
	}
}
```

Output

```
Enter the message
Hello
1st Hello
2nd Hello
3rd Hello
4th Hello
5th Hello
6th Hello
7th Hello
8th Hello
9th Hello
10th Hello
```

Q2.

Rewrite the above java program in such a way that takes the number of lines to print as a command-line argument. You may assume that the argument is less than 1000.

```
Hint: Use i % 10 and i % 100 to determine when to use st, nd, rd, or th for
printing the ith Hello.
```

Ans

```
public class A4Q02 {
	public static void main(String[] args) {
		int i=1,n;
		n=Integer.parseInt(args[0]);
		while(i<=n)
		{
		if(i%10==1&&i%100!=11)
		System.out.println(i+"st Hello");
		else if(i%10==2&&i%100!=12)
		System.out.println(i+"nd Hello");
		else if(i%10==3&&i%100!=13)
		System.out.println(i+"rd Hello");
		else
		System.out.println(i+"th Hello");
		i++;
		}
	}
}
```

Q3

Write a java program that gets an integer from the user. Count from 0 to that number. Use a *for* loop to do it.

```
Count to: 20
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
```

Ans

```
import java.util.*;
public class A4Q03 {
	public static void main(String[] args) {
```

```
            int i,n;
            Scanner sc=new Scanner(System.in);
            System.out.print("Count to: ");
            n=sc.nextInt();
            for(i=0;i<=n;i++)
            {
            System.out.print(i+" ");
            sc.close();
            }
      }
}
```

Output

```
Count to: 20
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
```

Q4

Write a java program that gets three integers from the user. Count from the first number to the second number in increments of the third number. Use a *for* loop to do it.

```
Count from: 4
Count to: 13
Count by: 3
4 7 10 13
```

Ans

```
import java.util.*;
public class A4Q04 {
      public static void main(String[] args) {
            int cf,ct,cb,i;
            Scanner sc=new Scanner(System.in);
            System.out.print("Count from: ");
            cf=sc.nextInt();
            System.out.print("Count to: ");
            ct=sc.nextInt();
            System.out.print("Count by: ");
            cb=sc.nextInt();
            for(i=cf;i<=ct;i+=cb)
            {
            System.out.print(i+" ");
            sc.close();
            }
      }
}
```

Output

```
Count from: 4
Count to: 13
Count by: 3
4 7 10 13
```

Q5

Write a java program that uses a *for* loop. With the loop, make the variable x go from -2 to 2, counting by 0.5. (This means that x can't be an int.)

```
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
```

Ans

```
public class A4Q05 {
	public static void main(String[] args) {
		double x;
		for(x=-2;x<=2;x+=0.5)
		{
		System.out.println(x);
		}
	}
}
```

Output

```
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
```

Q6

Write a java program that, using one for loop and one if statement, prints the integers from 1,000 to 2,000 with five integers per line. Hint: Use the % operation.

Ans

```
public class A4Q06 {
	public static void main(String[] args) {
		int i,ctr=0;
		for(i=1000;i<=2000;i++)
		{
		System.out.print(i+" ");
		ctr++;
		if(ctr%5==0)
		System.out.println();
		}
	}
}
```

Q7

Write a java program that takes an integer N as a command-line argument, uses Math.random() to print N uniform random values between 0 and 1, and then prints their average value.

Ans

```
public class A4Q07 {
	public static void main(String[] args) {
		int n,i;
		double r,s=0,avg=0;
		n=Integer.parseInt(args[0]);
		for(i=1;i<=n;i++)
		{
		r=Math.random();
		System.out.println("Random no."+i+" = "+r);
		s+=r;
		}
		avg=s/n;
		System.out.println("Average value = "+avg);
	}
}
```

Output

```
Random no.1 = 0.19738571251235182
Random no.2 = 0.5956642681590005
Random no.3 = 0.8961699660582327
Average value = 0.5630733155765283
```

Q8

Write a java program to print the following output using loop.

```
1
121
1213121
121312141213121
12131214121312151213121412131 21
```

Ans

```
public class A4Q08 {
	public static void main(String[] args) {
		int i;
		String p="";
		for(i=1;i<=5;i++)
		{
		p+=i+p;
		System.out.println(p);
		}
	}
}
```

Output

```
1
121
1213121
121312141213121
12131214121312151213121412131 21
```

Q9

If we list all the natural numbers below 10 that are multiples of 3 or 5, we get 3, 5, 6 and 9. The sum of these multiples is 23. Write a java program to find the sum of all the multiples of 3 or 5 below 1000.

Ans

```
public class A4Q09 {
	public static void main(String[] args) {
		int i,sum=0;
		for(i=1;i<1000;i++)
		{
		if(i%3==0||i%5==0)
		sum+=i;
		}
		System.out.println("Sum of multiples of 3 or 5 below 1000 is =
"+sum);
	}
}
```

Output

```
Sum of multiples of 3 or 5 below 1000 is = 233168
```

Q10

Write a java program to print the multiplication table of a number entered by the user.

```
Enter a no. for which you want to find the multiplication table: 8
8x1=8
8x2=16
8x3=24
8x4=32
8x5=40
8x6=48
8x7=56
8x8=64
8x9=72
8x10=80
```

Ans

```
import java.util.*;
public class A4Q10 {
	public static void main(String[] args) {
		int i,r=0;
		Scanner sc=new Scanner(System.in);
```

```
            System.out.print("Enter a number for which you want to find the
multiplication table: ");
            int num=sc.nextInt();
            for(i=1;i<=10;i++)
            {
            r=1;
            r=num*i;
            System.out.println(num+" x "+i+" = "+r);
            sc.close();
            }
      }
}
```

Output

```
Enter a number for which you want to find the multiplication table: 8
8 x 1 = 8
8 x 2 = 16
8 x 3 = 24
8 x 4 = 32
8 x 5 = 40
8 x 6 = 48
8 x 7 = 56
8 x 8 = 64
8 x 9 = 72
8 x 10 = 80
```

Q11

Write a java program to find the difference between the sum of the squares of the first one hundred natural numbers and the square of the sum.

The sum of the squares of the first ten natural numbers is,
$1^2 + 2^2 + ... + 10^2 = 385$
The square of the sum of the first ten natural numbers is,
$(1 + 2 + ... + 10)^2 = 55^2 = 3025$
Hence the difference between the sum of the squares of the first ten natural numbers and the square of the sum is 3025 − 385 = 2640.

Ans

```
public class A4Q11 {
      public static void main(String[] args) {
            int i,sum1=0,sum2=0,diff=0,s=0;
            for(i=1;i<=100;i++)
            {
            sum1+=i*i;
            sum2+=i;
            } s=sum2*sum2;
            diff=s-sum1;
            System.out.println("The sum of squares of the integers = "+sum1);
            System.out.println("The square of the sum of the integers = "+s);
```

```
            System.out.println("The difference between the sum of the squares
of the first "+"\n"+"100 natural numbers and the square of the sum =
"+diff);
      }
}
```

Output

```
The sum of squares of the integers = 338350
The square of the sum of the integers = 25502500
The difference between the sum of the squares of the first
100 natural numbers and the square of the sum = 25164150
```

Q12

Write a java program called FunctionGrowth that prints a table of the values log N, N, N log N, N^2, N^3, and 2^N for N = 16, 32, 64, ..., 2048. Use tabs (\t characters) to line up columns.

[If you use only one "\t" in between log N, N, NlogN etc in the 1st "System.out.println" line, then that's also right, because it's used for column lining up purpose only]

Ans

```
public class A4Q12 {
      public static void main(String[] args) {
            int N;
            double s=0,t=0,p=0;
            System.out.println("log
N"+"\t"+"\t"+"\t"+"N"+"\t"+"NlogN"+"\t"+"\t"+"\t"+"N2"+"\t"+"N3"+"\t"+"2N");
            for(N=16;N<=2048;N=N*2)
            {

      System.out.println(Math.log(N)+"\t"+N+"\t"+N*Math.log(N)+"\t"+Math.pow(N,2)+
"\t"+
            Math.pow(N, 3)+"\t"+Math.pow(2, N));
            }
      }
}
```

Q13

An integer n is divisible by 9 if the sum of its digits is divisible by 9. Write a java program to display each digit, starting with the rightmost digit.

Your program should also determine whether or not the number is divisible by 9. Test it on the following numbers:

```
n = 154368
n = 621594
n = 123456
```

Hint: Use the % operator to get each digit; then use / to remove that digit. So 154368 % 10 gives 8 and 154368 / 10 gives 15436. The next digit extracted should be 6, then 3 and so on.

Ans

```
import java.util.*;
public class A4Q13 {
      public static void main(String[] args) {
            Scanner sc=new Scanner(System.in);
            int n,r=0,s=0;
            System.out.print("Enter the number: ");
```

```
            n=sc.nextInt();
            int n1=n;
            while(n>0)
            {
            r=n%10;
            s+=r;
            n/=10;
            System.out.println(r+" ");
            } if(s%9==0)
            System.out.println(n1+" is divisible by 9");
            else
            System.out.println(n1+" is not divisible by 9");
            sc.close();
      }
}
```

Output

```
Enter the number: 154368
8
6
3
4
5
1
154368 is divisible by 9
```

Q14

Write a java program to print largest power of two less than or equal to N.

Ans

```
import java.util.Scanner;
public class A4Q14 {
      public static void main(String[] args) {
            Scanner sc=new Scanner(System.in);
            int n;
            double s=0,res=0;
            System.out.print("Enter the value of n: ");
            n=sc.nextInt();
            int x=0;
            int v=1;;
            while(v<=n)
            {
            x=v;
            v=v*2;
            }
            System.out.println(x);
            sc.close();
      }
}
```

Output

```
Enter the value of n: 150
128
```

Q15

Write a java program to print the below given pattern using while loop as well as for loop in two different programs.

```
* * * * *
* * * * *
* * * * *
* * * * *
```

Ans

```
public class A4Q15 {
	public static void main(String[] args) {
		System.out.println("Using while loop");
		int i=1,j;
		while(i<=4)
		{
		j=1;
		while(j<=5)
		{
		System.out.print("* ");
		j++;
		}
		System.out.println();
		i++;
		}
		System.out.println("Using for loop");
		for(int i2=0;i2<=3;i2++)
		{
			for(int j2=0;j2<=4;j2++)
				System.out.print("* ");
			System.out.println();
		}
	}
}
```

Output

```
Using while loop
* * * * *
* * * * *
* * * * *
* * * * *
Using for loop
* * * * *
* * * * *
* * * * *
* * * * *
```

Q16

Write the java programs to print the following four patterns using for loop using four different programs.

(a)	(b)	(c)	(d)
*	1	1	1
* *	1 2	2 2	2 3
* * *	1 2 3	3 3 3	4 5 6
* * * *	1 2 3 4	4 4 4 4	7 8 9 10
* * * * *	1 2 3 4 5	5 5 5 5 5	11 12 13 14 15

Ans

(a)

```
public class A4Q16a {
	public static void main(String[] args) {
		int i,j;
		for(i=1;i<=5;i++)
		{
		for(j=1;j<=i;j++)
		{
		System.out.print("* ");
		}
		System.out.println();
		}
	}
}
```

Output

```
*
* *
* * *
* * * *
* * * * *
```

(b)

```
public class A4Q16b {
	public static void main(String[] args) {
		int i,j;
		for(i=1;i<=5;i++)
		{
		for(j=1;j<=i;j++)
		{
		System.out.print(j+" ");
		}
		System.out.println();
		}
	}}
```

Output

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

(c)

```
public class A4Q16c {
	public static void main(String[] args) {
		int i,j;
		for(i=1;i<=5;i++)
		{
		for(j=1;j<=i;j++)
		{
		System.out.print(i+" ");
		}
		System.out.println();
		}
	}
}
```

Output

```
1
2 2
3 3 3
4 4 4 4
5 5 5 5 5
```

(d)

```
public class A4Q16d {
	public static void main(String[] args) {
		int i,j,k=1;
		for(i=1;i<=5;i++)
		{
		for(j=1;j<=i;j++)
		{
		System.out.print(k+" ");
		k++;
		}
		System.out.println();
		}
	}
}
```

Output

```
1
2 3
4 5 6
7 8 9 10
11 12 13 14 15
```

Q17

Write a java program to print the following pattern using nested loops.

```
* * * * * * * * * * 1
* *   *   *   *   * 2
*   *     *     *   3
* *   *       *     4
*       *         * 5
* * *     *         6
*           *       7
* *   *       *     8
*   *           *   9
* *     *         * 10
```

Ans

```
public class A4Q17 {
	public static void main(String[] args) {
		int n=10;
		for(int i=1;i<=n;i++)
		{
		for(int j=1;j<=n;j++)
		{
		if((i%j==0)||(j%i==0))
		System.out.print("* ");
		else
		System.out.print("  ");
		}
		System.out.println(i);
		}
	}
}
```

Output

```
* * * * * * * * * * 1
* *   *   *   *   * 2
*   *     *     *   3
* *   *       *     4
*       *         * 5
* * *     *         6
*           *       7
* *   *       *     8
*   *           *   9
* *     *         * 10
```

Credit – Grande Latte

The End