Programming Assignment-IV

(Programming using JAVA)

(Iterative Statements/Looping)

1. 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

Output:

1st Hello

2nd Hello

3rd Hello

4th Hello

5th Hello

6th Hello

7th Hello

8th Hello

9th Hello

10th Hello

2. 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.

3. 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

4. Write a java program that gets three integers from the user. Count from the first number tothe second number in increments of the third number. Use a for loop.

Count from: 4

Count to: 13

Count by: 3

Output: 4 7 10 13

5. 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

6. 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).

7. 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.

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

1

121

1213121

121312141213121

12131214121312151213121 2141213121

9. 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.

10. Write a 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

11. 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 $3025 − 385 = 2640$.

12. 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.

13. 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.

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

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

* * * * *

* * * * *

* * * * *

* * * * *

16. 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

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

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

18. Write a java program that takes the value of N through keyboard and prints a table of the power of 2 that are less than or equal to 2N.

Enter a number

5

Output:

0	1
1	2
2	4
3	8
4	16
5	32

19. Given a set of *n* numbers. Write a java program that adds these numbers and returns the resultant sum and compute the average. Assume *n* is greater than or equal to zero.

20. Write a java program to compute the harmonic mean. The harmonic mean is defined by

$$H = \frac{n}{\sum_{i=1}^{n}(1/a_i)}$$

21. Write a java program to compute the sum of the first *n* terms (*n>=1*) of the series.

S=1-3+5-7+9- ……

22. Input a number *n*, write a java program to compute *n* factorial (written as *n!*) where *n*>=0.

23. For a given *x* and a given *n*, write a java program to compute $x^n/n!$.

24. Write a java program to evaluate the function *sin(x)* as defined by the infinite series expansion.

$$sin\ (x) = x - x^3/3! + x^5/5! - x^7/7! + \ldots$$

The acceptable error for computation is 10^{-6}.

25. Write a java program to evaluate the function *cos(x)* as defined by the infinite series expansion.

$$cos\ (x) = 1 - x^2/2! + x^4/4! - x^6/6! + \ldots.$$

The acceptable error for computation is 10^{-6}.

26. Assume that *x* is a positive variable of type double. Write a code fragment that uses the Taylor series expansion to set the value of sum to $e^x = 1 + x + x^2/2! + x^3/3! + \ldots\ldots$

27. Write a java program to generate and print the first *n* terms of the Fibonacci sequence where *n>=1*. The first few terms are: 0, 1, 1, 2, 3, 5, 8, 13, ...

28. Write a java program to generate and print the first *n t*erms of the Fibonacci numbers using an efficient algorithm. In this case, you need to find a pair of Fibonacci terms, in each iteration and display them and adjust the preceding term *b* and the term before the preceding term *a*. Your program should handle all positive values of *n*.
Example:
If n=10, it will display as: Fibonacci Series is: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34
If n=11, it will display as: Fibonacci Series is: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55

29. Write a java program that accepts a positive integer *n* and reverses the order of its digits.

30. Write a java program that puts the binary representation of a positive integer N into a String *s*.

31. Write a java program Checkerboard that takes one command-line argument N and uses a loop within a loop to print out a two-dimensional N-by-N checkerboard pattern with alternating spaces and asterisks.

32. Write a java program GCD that finds the greatest common divisor (gcd) of two integers using Euclid's algorithm, which is an iterative computation based on the following observation: if *x* is greater than *y*, then if *y* divides *x*, the gcd of *x* and *y* is *y*; otherwise, the gcd of *x* and *y* is the same as the gcd of *x % y* and *y*.

33. Write a java program to find the sum of the first n terms of the series
fs=0!+1!+2!+3!+.....+n! (n>=0)

34. The first few members of the Lucas sequence which is a variation on the Fibonacci sequence are: 1 3 4 7 11 18 29 .....
Write a java program to generate the Lucas sequence.

35. Given a=0, b=1 and c=1 are the first three numbers of some sequence. All other numbers in the sequence are generated from the sum of their three most recent predecessors. Write a java program to generate this sequence.

36. Write a java program that counts the no of digits in an integer.

37. Write a java program to compute the sum of the digits in an integer.

38. Write a java program to find all common prime divisors of two integers.

39. A perfect number is one whose divisors add up to the number. Example: The first perfect number is 6. Because 1, 2, and 3 are its proper divisors, and 1+2+3=6
Write a java program that prints all perfect numbers in between 1 and 500.