

Java Programming

Q. 1. Write a program to display the upper half of a 2D array If arr [][] is

2 3 1 5 0	Output 2 3 1 5 0
9 5 3 2 5	5 3 2 5
7 5 9 2 4	9 2 4
7 3 4 9 5	9 5
8 3 0 4 5	5

Q. 2. Write a program to display hcf and lcm of any two nos.

Q. 3. Write a program which inputs a positive natural no N and output all combinations of consecutive naturals which add up to give N. Example if N = 15 then output should be

1 2 3 4 5
4 5 6
7 8

Q. 4. Write a program to read a positive integer from the console and find out whether it is automorphic or not.

(Automorphic numbers are those which are found on the extreme right side of their square).

Eg. $52 = 25$, $62 = 36$, $252 = 625$. 5,6,25 are automorphic numbers

Q. 5. Write a program to accept a sentence from the user and print out the frequency of each letter.

Q. 6. The length() method of string class returns the number of characters in a given string. However, here you have to develop a method OnlyChars() that should return the count of characters excluding the spaces in a string.

Q. 7. Write a method namely Countwords() that should receive a string and return the numbers of words in the present string.

Q. 8. Write a method namely ReverseStr() that receive a string and returns the reversal string. Don't use library functions for reversing.

Q. 9. Write a method namely Revwords() of class strings that should receive a string and return the strings with its words reversed individually e.g. if you pass "I love Java", it should return "I evol avaJ"

Q. 10. Write a method in java to calculate the value of the following series :

$$S = (1 + 2) / (1 * 2) + (1 + 2 + 3) / (1 * 2 * 3) + \dots + (1 + 2 + 3 + 4 + \dots + n) / (1 * 2 * 3 * \dots * n)$$

Q. 11. Write a program in java to store elements in a matrix and perform the following

- Whether matrix is strictly symmetric or not. A matrix is said to be symmetric if and only if it is a square matrix and it is equal to its transpose
- Find total number of prime elements from the matrix
- Find the sum of the elements which lie above the main diagonal

Q. 12. Write a program to input a string and display the string with the first character of every word in capital and the rest of the word in small letters.

Q. 13. Write a method to find out the total number of prime and palindrome numbers from a range of numbers.

Q. 14. Write a program in java to read a number having more than 5 digits and print whether the given number is divisible by 11 or not. A number is divisible by 11 if and only if the difference of the sums of digits at odd positions and even positions is either zero or divisible by 11

Q. 15. Define a class salary described as below:

Data members: name, Address, Phone, Subject Specialization, Monthly Salary, Income Tax

Member methods:

- To accept the details of a teacher including the monthly salary
- To display the details of the teacher.
- To compute the annual Income Tax as 5% of the annual salary above Rs. 1,75,000/-

Write a main method to create object of a class and call the above member method.

Q. 16. Write a program to initialize the given data (2,5,4,1,3) in an array and find out the minimum and maximum values along with the sum of the given elements.

Q. 17. Write a program to input twenty names in an array and display all the names whose first alphabet matches with the alphabet entered by the user.

Q. 18. Write a program using string function to input any string and print the same in alphabetical order.

Q. 19. Write a program to enter a sentence and display the following.

- a. Number of upper case vowels
- b. Number of lower case vowels
- c. Number of digits
- d. Number of consonants
- e. Number of blank spaces
- f. Number of special character

Q. 20. Input the index number and name of boys appearing in the coming ICSE Examination and print the list with index numbers in a sequence. Also make sure while entering the index numbers that no index should be repeated.

Q. 21. Define a class named sentence with a data member named s, string type and the following methods:

- Sentence(string)-to assign an initial value to s
- Countword()-to count and return the number of words in the sentence
- Palindrome()-to test whether the sentence is a palindrome and return true or false.

Q. 1. Fill in the blanks.(1 x 5)

- a. A member function having the same name as that of its class is called _____ function.
- b. An _____ is a combination of token i.e., of literals ,operators , variables and parenthesis used to calculate a value.
- c. JVM combined with _____ makes Java platform.
- d. The Java statement available to jump from one loop to another is _____.
- e. _____ means that if the two operand bits are different , the result is 1.

Q. 2. Differentiate between: (3 x 5)

- a. switch and if-else
- b. continue and continue label
- c. class and object
- d. equals() and equalsIgnoreCase()
- e. parameterized and non-parameterized constructor

Q. 3. Write short notes with example:(3 x 5)

- a. Nested Loop
- b. Wrapper class
- c. Function overloading
- d. Ternary Operator
- e. this keyword
- f. Package
- g. compareTo()

Q. 4. a) What are escape sequences ? List any two sequences with their functions. (2)

(b) How is ordinary compilation process different from java compilation ? (3)

Section – B

(Attempt any four questions from this section. The answers in this section should consist of the **program in Blue J environment with java**. Each program should be written using **Variable description / Mnemonic** codes such that the logic of the program is clearly depicted. Flow-charts and Algorithms are not required.)

Q. 5. A company sells 15 items at different rates and details of sells (total amount) of each item are stored month wise from January to December. Write a class sale to compute and display the following (15)

- a. The annual sale of each item
- b. The total sale of all items for each month

Q. 6. Write a class to compute and print the amounts that a principal of Rs. N produces after each year (from 1 to 5 years) at 5% , 10% and 15% rates of compound interest using a method amount ().(15)

Q. 7. In an interview 20 candidates are selected to continue their job as P.R.O. There names , date of birth and monthly salary are stored randomly in different single dimension arrays respectively. Write a program to arrange and display those names in alphabetical order along with other details using sequential sorting method. (15)

Q. 8. A boy enters a string in which he repeats few alphabets accidentally. Now write a program by taking that string as input to remove repeated alphabets from the string. Then display both original and newly formed string on the screen.(15)

Q. 9. A number is said as a perfect number if the sum of its factors is double of the number. By knowing this logic write a program to calculate and display all the three digit perfect numbers and total number of such numbers are generated. (15)

Q. 10. Write a program to input a sentence in which words are separated by one or more blank spaces. Create and display a new sentence in which each word should be separated by a single blank space.(15)

Q. 1. Multiple choice: (5)

(a) A program of java that can be executed from any remote machine is called:

- a. Application
- b. Applet
- c. Object
- d. None

(b) Find which one is not a character literal.

- a. '1'
- b. '10'
- c. '\0'
- d. '\n'

(c) Which of the following return type does a constructor have:

- a. Void
- b. Boolean
- c. Int
- d. None

(d) The arguments of the function given in the function definition are called:

- a. Formal parameter
- b. Actual parameter
- c. Reference parameter
- d. None

(e) The address of a memory location which can store a value and which may change during the program execution is known as:

- a. Identifier
- b. Keyword
- c. Separator
- d. Literal

Q. 2. Fill in the blanks: (5)

- a. The compiler ignores the characters in the ____.
- b. ____ is used to force a conversion from one data type to another.
- c. The logical ____ is equivalent to OR function.

- d. A _____ is a blue print of the attributes and the methods common to all its objects.
- e. When an expression within the parenthesis in a set of statements returns zero value, the condition is considered to be _____.

Q. 3. State True/False: (5)

- a. Switch statement can use characters and numbers in its case.
- b. The continue statement force an early iteration of a loop.
- c. do While is an entry controlled loop.
- d. For every primitive type in java , there is a built in object type called Wrapper class.
- e. Software objects interact and communicate with each other using machine language.

Q. 4. Write the output: (5)

(a)

```
public class test
{
    public void main( )
    {
        int a=5,b;
        b=2*a - - + - - a;
        System.out.print(++a+" "+b);
        System.out.println(a);
    }
}
```

b)

```
public class result
{
    public static void main( )
    {
        char a= 'a' ;
        System.out.println(++a);
        a++;
    }
}
```

Q. 5.Explain the following with example. (2 x 5)

- a. Type casting
- b. Switch statement
- c. Literal
- d. Looping
- e. Possible loss of precision

Q. 6. Answer the following.(2 x 2)

- a. What is the need of JVM ?
- b. What do you mean by Polymorphism ?

Q. 7. Differentiate between. (2 x 3)

- a. keyword and reserved word.
- b. conventions and rules ?
- c. java application and java applet ?

Section – B
(Answer any four)

(The answers of this section should consist of the **Program in Blue J environment with Java**. Each program should be written using **Variable description / Mnemonic Codes** such that the logic of the program is clearly depicted.)

Q. 8. Write a java class to calculate the income tax by taking monthly salary of an employee based on the following conditions: **(15)**

<u>Annual income(Rs)</u>	<u>Tax</u>
Upto 130000	No tax
Between 130000 – 200000	15% of the amount exceeding over Rs.130000
From 200000 – 250000 Rs. 2000000	Rs. 5000 + 20% of the amount exceeding over
Above 250000	30% of the amount exceeding Rs.250000

Q. 9. Write a java class to calculate and print the electricity bill to be paid by a customer. **(15)**

Assume that the customer pays a rent of Rs. 250.00 .

<u>No. of units</u>	<u>Charge per unit</u>
Upto 100 units	Rs. 1.50
For the next 100 units	Rs. 2.00
For next 50 units	Rs. 2.50
Beyond 250 units	Rs. 4.00

Q. 10. A ball is dropped from a certain height (h) and each time it bounces 0.8 % less than the previous height. The ball is at rest when the height is 0.2 cm. Write a java class using a call by value method drop () to print the number of bounces occurred. (15)

Q. 11. Write a class with a special member function to input a multi digit number (max. 9 digit) and print the following: (15)

1. total number of even and odd digits
2. the reverse number
3. total number of zero's present.

Q. 12. Write a class to print the value of ' n ' by accepting ' p ' as a single digit integer. (15)

$$n = \underbrace{p}_{(1+2)} + \underbrace{p^2}_{(2+3)} + \underbrace{p^3}_{(3+4)} + \underbrace{p^4}_{(4+5)} + \dots + \underbrace{p^n}_{((n-1) + n)}$$

Q. 13. Write a class to generate the following series using a special member function. (15)

1
2 3
4 5 6
7 8 9 10

This Paper is divide into two Sections. Attempt **all** questions from **Section – A** and **any four** questions from **Section – B**. The intended marks for questions or parts of questions are given in brackets[].

Section – A (40 Marks)

(Attempt **all** Questions)

Q. 1. Multiple choice: [6]

(i) The smallest element of a program that is meaningful to the compiler:

- a. keyword
- b. class
- c. token

d. object

(ii) When an expression contains more than one operator then their execution is based on their:

- a. precedence
- b. type
- c. method
- d. none

(iii) The string class provides function to convert other objects to string objects:

- a. toString ()
- b. java.io
- c. comments
- d. all

(iv) The variable which is declared inside a class is :

- a. local variable
- b. instance variable
- c. both
- d. none

(v) Find the odd one out :

- a. int prime ()
- b. double radius ()
- c. String reverse ()
- d. void display ()

(vi) Comments can be written

- a. In the beginning of the prog.
- b. at the end of the prog.
- c. anywhere
- d. none

Q. 2. Fill in the blanks: [6]

- a. A program having _____ error does not compile.
- b. An _____ is a combination of constants, operators, variables which are used to calculate some value.

- c. If $n = 5$ and $m = 9$, then **System.out.println(n > m);** will return _____ .
- d. Condition in _____ loop is tested after execution.
- e. _____ function removes white spaces from both the ends of a string.
- f. _____ function returns the all the characters from a given location to the end of the string.

Q. 3 Write the output [$2 * 4 = 8$]

```
(i) public class test_1
    {
        public void res_1( )
        {
            int m,p=2;
            for( m=0;m<=p;)
            {
                System.out.println( m );
            }
        }
    }

    ); k++;

    k ++;
    }
```

(1)

```
i) public class test_3
    {
        int a=5,b=0;
        public void res_3( )
        {
            while(b<5)
            {
                b++; a- - ;
                System.out.println(a+ " " +b);
            }
            System.out.println(a+ " " +b);
            System.out.print(x);
        }
    }
```

```
ii) public class test_2
    {
        public void res_2( )
        {
            int k=1,j=0
            while ( k <=10)
            {
                for(j=k; k<5;j++)
                {
                    System.out.print(j+"
                )
                System.out.println(
```

```
ii) public class test_4
    {
        int x,y=2
        public void res_4( )
        {
            for(x = y; x<=50;)
            {
                System.out.print(x+
                x*=5;
            }
        }
    }
```

Q. 4. Answer the following:

- a. What is the use of Logical operator **and** (&&) and **or** (||) ? [2]
- b. What do you mean by **Debugging** ? [2]
- c. Explain **Dynamic initialization** [2]
- d. Explain **abstraction**? [2]
- e. Explain the function of return type in a function.[2]

Q. 5. Differentiate between:

- a. compareTo() and equalsIgnoreCase() [2]
- b. Math.ceil() and Math.floor() [2]
- c. constructor() and method() [2]
- d. class and object [2]
- e. compiler and interpreter [2]

Section – B

(Attempt any four questions from this section. The answers in this section should consist of the **program in Blue J environment with java**. Each program should be written using **Variable description / Mnemonic** codes such that the logic of the program is clearly depicted. Flow-charts and Algorithms are not required.)

Q. 6. Digital World announces seasonal discount on the laptops in the given order.
[15]

Cost of the laptop	Discount
Rs.20,000 - Rs.30,000	10%
Rs.30,000 – Rs.40,000	15%
Rs.40,000 – Rs.50,000	18%
> = Rs.50,000	20%

An additional discount of 5% on all types of laptops is given. Sales tax is calculated at 12% on the price after the discounts. Define a class to accept the cost of the laptop and print the amount payable by the customer on purchase (use constructor).(2)

Q. 7. Write a class to accept a number and check whether it is a Prime-palindrome number or Armstrong number based on user's choice.

Prime-palindrome number - a number is a prime no. and palindrome no. Eg. 101

Armstrong number - Sum of the cubes of the digits = number Eg. 153[15]

Q. 8. Write a class to enter a proverbial statement and display the frequency of each alphabet present in it. [15]

Q. 9. Write a class to accept a multi digit no.(max. 8 digits) and do the following: **[15]**

- a. print the reverse number.
- b. print the absolute difference between them.
- c. print smallest digit.

Q. 10. Write a class to input a string (combination of letters and digits) and replace the repeated characters with dollar (\$) sign. Then display both old and newly created string. **[15]**

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Question 1.

- a. What is significance of abstraction in class. Explain with example. (4)
- b. What is main method ? What is its role in java program?. (3)
- c. What is Local and global variables in Java?. (3)

Question 2.

- a. Differentiate between Operator and expression. (4)
- b. Define bytecode (2)
- c. Evaluate `Math.ceil(7.8)+Math.round(6.3)`; (1)

Question 3.

- a. What is `BufferedReader`. (2)
- b. Write a syntax of nested if-else. (1)
- c. Explain the concept of wrapper class in Java.(5)
- d. What is difference between binary search and Linear search. (2)

Question 4.

- a. Distinguish break and continue statements with example. (4)
- b. What is prototype of a method ? Explain.(2)
- c. Explain exception class.(2)
- d. Define constructor and 'static' keyword.(2)

SECTION B [60 Marks]

Answer any FOUR questions in this section. Each program should be written in such a way that it clearly depicts the logic of the problem. This should be achieved by using mnemonics and comments in the program. Give the variable list used in the program. Flowcharts and algorithms not required.

Question 5.

- 1. Primorial($p\#$) is defined to be a product of prime numbers less than or equal to p . (15)

For eg. $3\# = 2 \times 3 = 6$ $5\# = 2 \times 3 \times 5 = 30$ Design a class `primo_num` with two methods

- a. to check whether entered number is prime number or not
- b. to print the primorial of that number.

Question 6:

(a) Write a program to print following pattern (8)

```
1
0 1
1 0 1
0 1 0 ..... n
```

(b) Write a program to enter a string and print the first character of that string at last.

For eg. "deep" -> eepd
"b" -> b
"dv" -> vd (7)

Question 7.

(a) The single dimensional arrays A and B are sorted in ascending order. Create an array C to combine them into a descending order.(10)

(b) Declare a class shop with following data members. (7)

- | | |
|---------------------|---------|
| 1. Name of the item | ND |
| 2. item number | ITNo |
| 3. Balance Amount | Bal_Amt |
| 4. Type of item | TIT |

Initialize all the data members.

Question 8.

a. Write a class to enter three numbers in a function numb(). And print the numbers entered if it is possible that the addition of any two numbers give third number.(8)

For eg. numb(3,4,7) -> here 3+4=7
numb(8,5,3) -> 5+3=8
numb(8,10,2) -> 8+2=10

b. Enter two arrays of characters named Arr1 & Arr2, in alphabetical order. Print the count of the number of characters which appear in both arrays.



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Arr1 {"a", "c", "x"}

Arr2 {"b", "c", "d", "x"}) → Prints 2 (7)

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