Topic: Introduction

SUBTOPICS:

1) *IntroDUCtion to Programming LangUages*
2) *Need to learn Programming LangUAges*
3) *Concept of Assembler, Compiler, Interpreter*
4) *C vs C++ vs Java*
5) *What is Java*
6) *History of Java*
7) *JDK,JRE,JVM*
8) *How To set Path*
9) *Installation of Eclipse*

C/W ASSIGNMENTS:

TIP: TRAINERS WILL ASSIST FOR THESE QUESTIONS.

1) Installation of Eclipse.
2) How to Use Notepad/Eclipse Editor
3) How to set path.

H/W Assignments:

TIP: TRAINERS WILL NOT ASSIST FOR THESE QUESTIONS.

1) Installation of Eclipse.
2) How to set path.

Interview QUEstions:

1) What are Programming languages?
2) What is the difference between compiler and interpreter?
3) What are the differences between C, C++ and Java?
4) What do you know about Java?
5) When and by whom was Java Developed?
6) What is the difference between JDK, JRE, and JVM?

Topic: Basics Of Java

SUBTOPICS:

1) *FeatUREs of Java*
2) *What is a program*
3) *Comments, Data Types*
4) *Literals, Identifiers*
5) *Operators*
6) *Program stRUCtURE*
7) *Hello world program*

C/W Assignment:
TIP: TRAINERS WILL ASSIST FOR THESE QUESTIONS.

1. Write a program to print 'Hello' on screen and then print your name on a separate line.
2. Write a program to two numbers and perform sum of two numbers.
3. Write a program to calculate Simple Interest.
4. Write a program to swap two variables
5. Write a program to convert days into years, weeks and days.{Hint: Input-373 days Output-1Year,1Weak,1day}
6. Write a program to find Compound Interest.
   Here **P** is principal amount. **R** is the annual interest rate. **t** is the time.
   n is the number of times that interest is compounded per unit t, for example if interest is compounded monthly and t is in years then the value of n would be 12. If interest is compounded quarterly and t is in years then the value of n would be 4.
   e.g P = 2000.
   R = 8/100 = 0.08 (decimal).
   n = 12.
   t = 5.
   Compound Interest = 2000 (1 + 0.08 / 12) (12 * 5) – 2000 = $979.69
7. Find the output of following series **(Feb Monthly)**

```
int k = 2;
```

System.out.println(k++ - ++k + k-- - k++ + ++k -k-- + --k + k+ k--- k + --k+ k++);

H/W Assignment:

TIP: TRAINERS WILL NOT ASSIST FOR THESE QUESTIONS.

1) Write a program to divide two numbers and print on the screen.
2) Write a program to print the sum (addition), multiply, subtract, divide and remainder of two numbers
3) Write a program to print the area and perimeter of a circle.
4) Write a program to print the area and perimeter of a rectangle
5) Write a program to find the area of an equilateral triangle.
6) Write a program to convert Celsius into Fahrenheit and viceversa.
7) Write a program to display total Marks and average of 6 subjects.

Interview QUEstions:

1) What gives Java its 'write once and run anywhere' nature?
2) Why is Java platform independent?
3) Explain the structure of a program.
4) Why comments are used in a program?
5) What are data types?
6) What are variables? What are the rules to name a variable?
7) What are keywords? Name few.
8) What are identifiers and literals?
9) What are operators?
10) Name different types of operators.
11) Explain public static void main (String args []).
12) Can we execute a program without main () method?
13) What are the types of relational operators in Java?
14) What are the logical operators in Java?
15) What are called as Arithmetic operators?
16) State the name of / and % operator and explain how will you use this?
17) Which are the two relational operators that are called asequality operators? Give an example.
18) How will you represent increment and decrement operators?
19) What is a ternary operator? Give an example.
20) State the use of instance of operator. Give an example.
21) Discuss the significance of the Java language.
22) Elaborate briefly upon the evolution of Java.
23) Compare in brief C/C++, C#, and Java.
24) Elaborate on the main features of Java.

Topic: Control Statements

SUb-Topics:

1. *Types of Control statements*
2. *IntroDUCtion to Conditional Statements*
3. *Use of Scanner class.*
4. *Conditional statements:*
5. *If*
6. *If-else*
7. *Nested if-else*
8. *If-else if*
9. *Switch*
10. *Ternary operator*

C/W Assignment:

TIP: TRAINERS WILL ASSIST FOR THESE QUESTIONS.

1. How to accept different types of data using Scanner class.
2. Write a program to input a number from the user and display the corresponding day of theweek.
3. Write a program to input basic salary of an employee and calculate its Gross salary according to following:

   Basic Salary <= 10000: HRA = 20%, DA =80%

   Basic Salary <= 20000 : HRA = 25%, DA=90%

   Basic Salary > 20000 : HRA = 30%, DA =95%
4. Consider a situation below of the electricity unit charges. Now input electric units by the user and calculate total electricity bill according to the given condition.

   For first 50 units Rs. 0.50/unit

   For next 100 units Rs.0.75/unit

   For next 100 units Rs. 1.20/unit

   For unit above 250 Rs.1.50/unit

   An additional surcharge of 20% is added to the bill

H/W Assignment:

TIP: TRAINERS WILL NOT ASSIST FOR THESE QUESTIONS.

1) Write a program to display maximum among three numbers.
2) Write a program to display whether a number is even or odd.
3) Write a program to display whether a number is negative, positive or zero.

4) Write a program to display maximum number and minimum number between two numbers.
5) Write a program to input an alphabet and display whether it is a vowel or a consonant.
6) Write a program to display whether a character is an uppercase or lowercase alphabet.
7) Write a program to display whether the triangle is equilateral, isosceles or scalene triangle.
8) Write a program to display and calculate profit or loss by a suitable example.
9) Write a program to develop a simple calculator application and perform some basic operations
10) Write a program to display if a character is an alphabet, number or special character.
11) Write a program to display if the entered year is a leap year or not.
12) Write a program to input marks of five subjects by the user. Now calculate sum and percentage of the marks. Find the grade according to following:

a. Percentage >= 90% : Grade A
b. Percentage >= 80% : Grade B
c. Percentage >= 70% : Grade C
d. Percentage >= 60% : Grade D
e. Percentage >= 40% : Grade E
f. Percentage < 40% : Grade F

Interview QUEstions:

1) What are control statements?
2) What are conditional statements?
3) Explain different types of conditional statements.
4) What is the difference between if else if and switch?
5) Explain the use of break.
6) What is ternary operator? Give an example.
7) What are called Decision statements in Java?
8) How will you legally define "if else" statement. Give an example.
9) What do the break and continue statements do?

Topic: Iterations

Sub-Topics:

1) *IntroDUCtion to Iterations*
2) *While*
3) *Do-while*
4) *For*
5) *Break*
6) *ContINUe*

C/W Assignment:

Tip: Trainers will assist for these questions.

1) Write a program to display the Fibonacci series.
2) Write a program to calculate and print the power of a number i.e a2 =a*a.
3) WRITE A PROGRAM to print following Pattern

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

4) WRITE A PROGRAM to print followingPattern

```
1 2 3 45
2 3 4 5
3 4 5
45
5
45
3 4 5
2 3 4 5
1 2 3 45
```

5) WRITE A PROGRAM to print:

ABCDEFGFEDCBA

ABCDE FEDCBA

ABCDE EDCBA

ABCD DCBA

ABC CBA

AB BA

A A

6)Write a program which prints 33 to 999. The numbers should be displayed as:

i. For multiples of 3 print "PINK" instead of the number

ii. For the multiples of five print "YELLOW".

iii. For numbers which are multiples of both three and five print "PINK &YELLOW".

Also print count of how many times "PINK" was printed, "YELLOW" was printed and "PINK & YELLOW "was printed.

H/W Assignment:

Tip: Trainers will not assist for these questions.

1) Write a program to display 1 to 10 by implementing different loops.

2) Write a program to display table of a number.

3) Write a program to find if given number is prime or not.

4) Write a program to find factorial of a number.

5) Write a program to count number of digits of a number.

6) Write a program to find sum of all digits of a numberentered by the user.

7) Write a program to display even and odd numbers between a range entered by the user.

8) Write a program to check and display if a given number is palindrome or not.

9) Write a program to display elements between 100 to 200 (both numbers excluded) ending with seven. {Hint: output-107,117,127….}

10) Write a menu driven program to find all prime, even and odd numbers between 1 to 100

11) Write a program to print following Pattern

*

* *

* * *

* * * *

* * * * *

12) Write a program to generate a following triangle. 1

1 2

1 2 3

1 2 3 4

1 2 3 4 5

13) Write a program to print the following pattern:.

1

2 2

3 3 3

4 4 4 4

5 5 5 5 5

14) Write a program to print following Pattern

1

2 1

3 2 1

4 3 2 1

5 4 3 2 1

15) Write a program to print following Pattern

1

2 3

4 5 6

7 8 9 10

11 12 13 14 15

16) Write a program to print following Pattern

1 0 1 0 1

0 1 0 1 0

1 0 1 0 1

0 1 0 1 0

1 0 1 0 1

17) Write a program in Java to print the Floyd's Triangle.

1

0 1

1 0 1

0 1 0 1

1 0 1 0 1

18) Write a program to generate following pattern.

*

***

*****

****

****

****

*****

***

*

19) Write a program to print following Pattern

1

1 0

1 0 1

1 0 1 0

1 0 1 0 1

20) Write a program to display the pattern

1

2 1 2

3 2 1 2 3

4 3 2 1 2 3 4

21) Given a number, the task is to check if it is Kaprekar number or not. A Kaprekar number is a number whose square when divided into two parts and such that sum of parts is equal to the original number.

22) Write a program to print the following pattern: **(Feb Monthly).**

```
1
1 1
1   2  1
1 3 3  1
1 4 6 4  1
```

Good To Have:

1) Write a program to print the first 15 numbers of the Pell series. In mathematics, the Pell numbers are an infinite sequence of integers. The sequence of Pell numbers startswith 0 and 1, and then each Pell number is the sum of twice the previous Pell number and the Pell number before that.: The first few terms of the sequence are : 0, 1, 2, 5, 12, 29, 70, 169, 408, 985, 2378, 5741, 13860,… (Feb Monthly).

2) Write a program to check whether a number is a Harshad Number or not.

In recreational mathematics, a harshad number in a given number base, is an integer that is divisible by the sum of its digits when written in that base.

Example: Number 200 is a Harshad Number because the sum of digits 2 and 0 and 0 is 2(2+0+0) and 200 is divisible by 2. Number 171 is a Harshad Number because the sum of digits 1 and 7 and 1 is 9(1+7+1) and 171 is divisible by 9.

- .**(Jun Monthly).**

3) Write a program to display the following pattern 1

```
1 2
1 2 3
1 2 3 4
1 2 3 4 5
1 2 3 4 5 6
1 2 3 4 5 6 7
1 2 3 4 5 6
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
```

Interview QUestions:

1) What are different types of loops?
2) What is the difference between while and do-while loop?
3) What are the looping constructs in Java?
4) Can you create a 'for 'loop without any conditional expressions?

Topic: OOPs

Sub-Topics:

2) *IntroDUCtion*
3) *Classes &Objects*
4) *Creation of class and conventions for creating a class*
5) *Elements of classes*
6) *Local, instance and static variables*
7) *Creating objects*
8) *IntroDUCtion to OOPs methodologies*
9) *Wrapper classes*

C/W Assignment:

Tip:Trainers will assist for these questions.

1) Write a program to display how to create a class and create different elements of a class (data members and member functions etc).Also create objects of that class for accessing different elements to explain the concept of classes and objects.
2) Create a class AdditionDemo having 3 instance variables number1 ,number2 and result.
    1) Create 4 methods as a) addition b) subtraction c) multiplication d) division.
    2) Calculate different operations as per the methods determined above. Create objects of AdditionDemo from main method of another class Addition.
3) Write a program to show the implementation and use of local, instance and static variables in different context.

H/W Assignment:

TIP: TRAINERS WILL NOT ASSIST FOR THESE QUESTIONS.

1) Let us Assume and do the programming: An organization provides Diwali bonus of 35% to their employees. *If the* year of service of that employee is more than 5 years and gives Diwali bonus of 15% to the employees if the year of service is less than 5 years. Now Create a class and its respective methods to enter the data from the user and calculate total salary of the employee

2) Assume another company which is a laptop manufacturer company needs to develop laptopswhich does the following: On unlocking thescreen it will display a "WELCOME" message first, After " welcome " message displays ⟶

"Enter Option:"

1. Add-1
2. Subtract-2
3. Multiply-3
4. Quit-4

The user should be allowed to enter an option. If the user enters 1, a message needs to be displayed,

3) "Enter two numbers to be added".

a. The user should be allowed to enter two numbers (In two separate lines).

b. Based on the numbers entered, the program should add and display the result as below

c. "The result is<result>"

d. After the result is displayed, the program should loop back and ask for the next menu entry. If the user enters 4, the program should quit. (The program needs to be executed and do either one of the options until the kid enters theoption4)

Interview QUEstions:

1) What is the difference between object oriented programming language and object based programming language?
2) What are the Oops methodologies?
3) What is a Class?
4) What is an Object?
5) What is Scanner class?
6) What is new?
7) What is the purpose of wrapper classes?
8) What are the wrapper classes available in Java?
9) What do you mean by autoboxing and auto-unboxing?

Topic: Access Modifiers

SUb-Topics:

1) *IntroDUCtion to access modifiers*
2) *PUBlic*
3) *Private*
4) *DefaULt*
5) *Protected*

C/W ASSIGNMENTS:

1. Problem Statement:

2. Follow the instRUCtions:

a) *Create a class EmployeeDemo*

b) *Create 4 variables with the modifier as emp_id(protected),emp_name(pUBlic),emp_salary(private),emp _dept(deaUlt).*

c) *Create 4 methods with the signatUREs as*

PUBlic void doPUBlic(),defaUlt void doDefaULt(),protected void doProtected(),private void doPrivate().

d) *Initialize these variables by entering data from the User and display the data of the employee.*

e) *Access all the variables from these 4 methods to check the visibility and scope of variables.*

f) *Perform the above tasks in same package,same class and in different package in different class.*

Topic: Methods

SUb-Topics:

1) *IntroDUCtion*
2) *StRUCtURE of method*
3) *Non-parameterised method with no retURN Type*
4) *Non-parameterised method with retURN Type*
5) *Parameterised method with no retURN Type*
6) *Parameterised method with retURN Type*
7) *Conventions in methods*
8) *Method overloading*
9) *Static methods*

C/W Assignment:

Tip:Trainers will assist for these questions.

1) Write a program to create a class Student and do the following:
   - Create a method to input data (rollNo, Name, contactNo, Total marks)
   - Create another method to display the data of Student class.
   - Create object of Student class and access these methods main method of a new class – StudentDemo.java.
2) Write a program to show method overloading by performing following steps:
   Create a class to print the area of a square, a rectangle and a triangle. The class has3 methods with the same name but different number of parameters. The method for printing area of rectangle has two parameters which are length and breadth respectively, for printing the area of triangle method has 3 parameters and while the other method for printing area of square has one parameter which is side of square.
3) Write a program to illustrate the concept of copying objects using constructors.
4) Give a simple displaying the Bank Account Management demo, take suitable variables:

5) Write a program and perform the following steps: Create a class AccountManagement containing following methods: insertData() to insert account details of customers, displayData() to display account details depositAmount() to deposit amount of customer

withdrawAmount() to withdraw amount

accountBalance() to checkbalance in

customer's account.

The methods should execute as per their specification.

H/W Assignment:

TIP: TRAINERS WILL NOT ASSIST FOR THESE QUESTIONS.

1) Write a program and perform the following:

a) Define class "ROOM".

b) Define data Members as :

i. Length

ii. Width

iii. Height

c) Define constructors as per requirement.

d) Define methods as :

i. Float whiteWashingArea() to compute the area to be whitewashed.

ii. Int whiteWashingCost() to compute the cost of whitewashing at the rate of Rs.80 per sq.ft

iii. Int flooringCost() to compute the cost of flooring at the rate of Rs200/-sq.ft for geometric flooring and at the rate of Rs100 /-sq.ft for cement flooring.

iv. Test this class by creating an object for the class Room and compute the cost for respective methods.

2) Create one class Cube having instance variables (height, width, depth). Add one method to calculate volume of the cube with return type void.

3) Write a progam to create Calculator class which have methods addition(int num1,int

num2),subtraction(int num1,intnum2), multiplication(int num1, int num2), division(int num1, int num2) with return type double .Create a menu driven program and do perform these operations of a calculator by creatingan object of this class and execute these methods from main method of another class.

4) Define class "Triangle".
   a) Define data Members as :
      i. Side1
      ii. Side2
      iii. Side3
      iv. Angle1,Angle2,Angle3
   b) Define constructors as per requirement.
   c) Define methods as :
      i.trianglePerimeter()
      ii.triangleArea()
      iii.isosceles()
      iv.equilateral()
      v.rightAngled()

Test this class by creating an object for the class triangle.

5) Create 4 overloaded methods for "test ()" and invoke all versions of the overloaded methods.
   a. Create another class Overload.java which has a main method to call the overloaded methods inOverloadDemo.java
6) Perform the following: Class Name:-Calculator

   Method Name:- CalculateSum
   Method Description:-Calculates the sum of two
   Numbers Argument:-int number1, int number
   Return Type:- int – Sum
   Logic:-Calculate the sum of the two numbers number1 and number2
   and return the sum.

   Method Name:-Calculate Difference
   Method Description:-Calculates the difference between
   two numbers Argument:-int number1 , int number2
   Return Type:-int – difference
   Logic:-Calculate the difference between the numbers number1 and number2

and return the difference.

7) Perform thefollowing:

   Class Name:-MessagePrinter

   Method Name:-printMessage Method Description:-Prints the message Argument:- String name

   Return Type:-Void

   Logic:-Print the message using the console output command.

8) Write a program to do the following:
   Create a class "Square".
   Create a method "calculateArea", with length as an argument,
   Now calculate the area and return area. Create another class "SquareDemo"in which main method should invoke the Square class method by passing a value for the length.

Interview QUEstions:

- What are methods?
- What is meant by MethodOverloading?
- What are Method Overloading rules?
- Is java Pass by Reference or Pass byValue?

Topic: Constructors

Sub-Topics:

1) *IntroDUCtion*
2) *StRUCtURE and Use of constRUCtors*
3) *Difference between methods &constRUCtors*
4) *Parameterized constRUCtors*
5) *Non-Parameterized constRUCtors*
6) *ConstRUCtor overloading*
7) *Use of this*
8) *Inner Classes*

C/W Assignment:

TIP: TRAINERS WILL ASSIST FOR THESE QUESTIONS.

1) Create a class Vehicle with member variables: String Color, int wheelCount ,int gearsCount. Initialize these variables by giving values. Create another constructor which takes 2 arguments(Color and gearsCount), calls the default constructor using this () and has a SOP in it displaying the color, number of wheels in the Vehicle and number of gears in the vehicle. In main method, create an object of type Vehicle by using default constructor. Note the output. Create another object of type Vehicle by using the parameterized constructor. Note the sequence of data indicating that inner most constructors are called first.
2) Create a class Rectangle with two instance variables: length and width. Create a constructor initialing the instance variables.Subsequently, two objects of this class are created and then the methods rectangleArea() and rectanglePerimeter() are invoked.
3) Create a class Test with constructors to initialize the variables and methods to perform the following tasks. Give appropriate arguments to methods. Methods should perform following programs:
    a. Even odd
    b. Factorial of a number using do-while loop.
    c. Find sum of all digits of a number
4) Write a demo program for different types of Inner Classes.

H/W Assignment:

TIP: TRAINERS WILL NOT ASSIST FOR THESE QUESTIONS.

1) Create class Employee with constructors (default and parameterized), methods (1 with return type (calculating salary), 1 without return type (displaying employeedata)).
2) Create a class named 'Rectangle 'with two data members- length and breadth and a method to calculate the area which is 'length*breadth'. The class has three constructors which are:

1 - having no parameter - values of both length and breadth are assignedzero.

2 - Having two numbers as parameters - the two numbers are assigned as length and breadth respectively.

3 - Having one number as parameter - both length and breadth are assigned that number.

Now, create objects of the 'Rectangle' class having none, one and two parameters and print their areas.

3) Create a class Bank .Initialize an instance variable " amount" with an initial amount of Rs.5000 and assume you have to add some more amount to it. Now make two constructors of this class as follows:

1 - without any parameter - no amount will be added to the Bank

2 - having a parameter which is the amount that will be added to Bank Create object of the 'AddAmount' class and display the final amount in Bank

4) Create a class named 'Programming'. While creating an object of the class, if nothing is passed to it, then the message "I want to learn language" should be printed. If some String is passed it, then in place of " " the name of that String variable should be printed. For example, while Creating object if we pass "Java", then " I want to learn Java" should be printed.

5) Create a class ShapeCircle.java and do the following steps:

   a) Add an instance float variable pi and create two overloaded constructors. **Constructor 1**- with a float argument name radius. The constructor should initialize the class variable radius with the method argument radius. The instance variable and the method argument should be named same as "radius".
   b) **Constructor 2**- with two float arguments radius and pi. Default the class pi value to
   3.5 and set the instance variable with the radius method argument.
   c) The constructor "constructor 2" should be invoked from a main method

from class, Area.java.

In Circle.java, invoke the Constructor 2 created in the previous step from Constructor 1.

6) Create two methods and calculate area and circumference of a Circle In the Circle.javaclass, create two methods as listed below

   a. Method 1 – calculate CircleArea should accept the float radius as parameter and calculate the area (pi*r*r). It should return the result value to the main method where it should be printed in theconsole.

   b. Method 2 – calculate Circumference should accept float radius as parameter and calculate the circumference (2 * pi * r). It should return the result value to the main method where it should be printed in theconsole.

Call these two methods from the main method in Circle.java by passing appropriate parameters.

7) Write a program to demonstrate different types of Inner Classes .Create class College as a Outer Class and Department as a Inner Class. Use appropriate Variables and Methods.

8) Create a class Employee with int id and String name as member variables. Initialize these variables using getter and setter methods by taking data from the user. Create object of this class and access these methods from the main method of another class. Also provide different values to observe the changes.

Interview QUEstions:

1) What are constructors?
2) What is the difference between methods andconstructors?
3) Explain default constructors.
4) Can a class have multiple constructors?
5) What are the rules to define a constructor?
6) Explain the use of 'this' keyword.
7) What is an Inner class?
8) What are the types of classes available inJava?
9) Write two lines of code which will instantiate the inner class from the outerclass.
10) Write two lines of code and explain how you will implement an anonymous innerclass.
11) Explain about Static Nested classes.
12) What are the valid modifiers of an inner class?
13) How will you define a constructor? Give anexample.
14) What is the benefit of reference variable? Give an example.
15) What are the possible access modifiers for a constructor?

Topic: Inheritance

SUb-Topics:

1) *IntroDUCtion*
2) *Single inheritance*
3) *MULtilevel inheritance*
4) *MULtiple inheritance*
5) *Hierarchical inheritance*
6) *Hybrid inheritance*
7) *Use of SUper,final*

C/W Assignment:

TIP: TRAINERS WILL ASSIST FOR THESE QUESTIONS.

1) Create a class Test1 with two instance variables num1 and num2.Create another class Test2 which is inheriting Test1.Apart from inheriting class Test1,Test2 declares another variable num3.Here an object of class Test2 will have the instance variables num1 and num2due to the concept of inheritance. Within the main() of class Test2Demo create an object of class Test2 and assign the values to the instance variables and display them displaying the concept

of inheritance.

2) Write a program displaying different types of inheritance.
3) Write a program to do the following as per steps:

a) Create a class Test.

i. Create a method display1() which prints a message "GOOD MORNING".

ii. Create another method display2() which prints a message "GOOD AFTERNOON".

b) Create new class TestingInheritance which inherits class Test.

i) Create a method display3() which prints a message "GOOD EVENING".

c) Create a class TestingDemo

i) Create object of class TestingInheritance and call all of the methods inherited from class Test illustrating the concept of inheriting methods in a class.

4) Using the above example illustrate the concept of method overriding.
5) Illustrate the concept of super and final using suitable examples.

6) Show use of Multi Level Inheritance in case of library Management Syste**m (Feb Monthly).**

H/W Assignment:
TIP: TRAINERS WILL NOT ASSIST FOR THESE QUESTIONS.

1) Create a class named 'Worker' having the following members: Sname, Sage, Sphone number ,Saddress, Ssalary.It also has a method named 'displaySalary' which displays the salary of the members. Two classes 'Employee' and 'Manager' inherit the 'Worker' class. The 'Employee' and 'Manager' classes have data members 'Work specialization' and 'department' respectively. Now, assign name, age, phone number, address and salary to an employee and a manager by making an object of both of these classes and print the same.
2) Define a class named Vehicle as described below:
    i) Data Members:
        a. vehicle name
        b. vehicle model number
        c. vehicle price
        d. service station name
    ii) Methods:
    a. Constructor
    b. Display() method to display all the details of class Vehicle.
    iii) Define another class named Bike that extends the class Vehicle.
    a. Data Members: discountRate
    b. Constructor
    c. Methods:display() to display bike name,bike model number,bike price,service station name,discount rate.
    d. Discount() method to compute the discount.

iv) Create an object for the class Bike and test it.

1. Define a class named Square as shown below:

i) Data Member: side

ii) Methods: area()

iii)Constructor.

iv) Define another class Rectangle that extends class Square

a. Data Member: length,breadth

b. Constructor.

c. Methods: area()

v) Define one more class named Triangle that extends the class Rectangle

a. Data Member: side1,side2,side3

b. Constructor

c. Methods: area()

vi) Create objects for the classes Square,rectangle and Triangle.Test them.

3) Test Examples of Multilevel Inheritance.

4) WRITE A PROGRAM for Department class having departmentName and HOD name as instance variables,a constructor to initialize the variables and showDepartmentDetails() to display the details.Create StaffMember class having MemberName and MemberQualification as instance variables.Create the constructor and showstaffMemberDetails() method to display the details.

Create the objects for the classes Department and staffMember.Test them.

5) Explain one example of hierarchical Inheritance.

6) Write a program to show the implementation of finalkeyword.

7) Problem Statement on above scenario

a. Create a class Employee with the following instance variables.

Instance variables	Data type
employeeId	Long
employeeName	String
employee Address	String
employee Phone	Long
basicSalary	Double
specialAllowance	double default value- 250.80
Hra	double, default value- 1000.50

b. Create an overloaded constructor in the employee class, which takes the below constructor parameters and initializes them to their respective instance variables.

Constructor parameter	Instance Variable
Id	employeeId
Name	employeeName
Address	employeeAddress
Phone	employeePhone

c. Create a method calculateSalary in which the basic salary needs to becalculated as below. salary = basicSalary + (basicSalary *specialAllowance/100) +(basicSalary *hra/100); The calculated salary shouldbedisplayed in theconsole.
NOTE: salary is a local variable.

d. Create the sub classes Manager and Trainee with base class Employee. Create overloaded constructors which takes the below parameters and initializes them to the irrespective variables in the super class

Constructor parameter	Instance Variable
Id	employeeId
Name	employeeName
Address	employeeAddress
Phone	employeePhone
Salary	basicSalary

e. Create a class "TrainersActivity.java" with a main method which performs the below functions

8) Problem Statement on above scenario
   a) Add a method called calculateTransportAllowance in Employee class which shouldcalculate the transport allowance by calculating 10% (default allowance)ofthe salary. Print the salary after calculating.
   transportAllowance = 10/100*basicSalary.
   b) Fora manager, the transportation allowance is 15%ofthe basic salary. So

override the calculate Transport Allowance method in Manager class which should calculate the transport allowance as 15%ofthe base salary. Print the salary after calculating transport Allowance = 15*basicSalary /100.

c) Fora trainee, the transport allowance is same as the default allowance; the method calculate Transport Allowance in the base class can beused.

d) Invoke the calculate Transport Allowance for the manager and trainee class in the main method ofTrainersActivity.java.

Interview QUEstions:

1) Explain difference between single and multilevel inheritance.
2) Why java does not support multiple inheritance?
3) What is final?
4) What is hierarchal inheritance?
5) What do you understand by the keyword super?
6) What are the benefits of inheritance?
7) Write a code that uses inheritance concept.
8) What are the types of inheritance relationships
9) Is it possible to extend more than one class? State the reasons.
10) How does a subclass call a constructor defined. in its super class?
11) In what order are constructors called in a: class hierarchy?.

Topic: Containment

SUBTOPICS:

1) Introduction
2) Using Accessors and Mutators
3) Using constructors

C/W Assignment:

TIP: TRAINERS WILL ASSIST FOR THESE QUESTIONS.

1. Write a program to illustrate the concept of containment:
    a) Create a class Address with the following:
        i) Data Members: streetNo.,city, state, country.
        ii) Constructor with arguments to initialize the variables.
    b) Create class Person with the following:
        i) Data Members:PName, PAdhaarNo.,PJobName,PJobId,PJobLocation
        ii) Constructor with args to initialize the variables.
        iii)Create Address object as a member of Person class.
        iv)Create method displayPersonDetails() to display the details of person.
    c) Create a class college
        i) Data Members: collegeName,Address collegeAddress.
        ii) Constructor with arguments to initialize thevariables
        iii)Create method displayCollegeDetails() to display the details of college
    d) Create a class Staff
        i) Data Members: employeeName,Address employeeAddress.
        ii) Constructor with arguments to initialize the variables
        iii)Create method displayStaffDetails() to display the details of staff

H/W Assignment:

TIP: TRAINERS WILL NOT ASSIST FOR THESE QUESTIONS.

1. Write a program to illustrate the concept of containment:
    a) Create a class Author with the following:
        i) Data Members: authorName,age,place.
        ii) Constructor with arguments to initialize thevariables.
        iii)Use getter methods to get values.
    b) Create class Book with the following:
        i) Data Members:name,price,Author author(object)
        ii) Constructor with args to initialize the variables.
        iii)Create method showDetails() to display the details.

Topic: Abstraction& Interfaces

SUb-Topics:

1) *IntroDUCtion*
2) *Abstract methods*
3) *StRUCtURE& need of abstract classes*
4) *Abstract classes*
5) *StRUCtURE& need of interfaces*
6) *Difference between abstract classes &interfaces*
7) *Extending Interfaces*
8) *Interface Java 8 featURES.*
9) *Packages*

C/W Assignment:

TIP: TRAINERS WILL ASSIST FOR THESE QUESTIONS.

1) Define an abstract class named Shape that contains an empty method named numberOfSides().Define three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class. Shape. Each one of the classes contains only the method numberOfSides() that displays the number of given geometrical figure.
Demonstrate how the trapezoid, triangle and hexagon classes can be instantiated and their methods can be tested.

2) Declare an abstract class Vehicle with an abstract method named numWheels().Provide the two subclasses Car and Truck each one of which implements this method. Create instances of these two subclasses and demonstrate the use of the numWheels() method.

3) Write a program to create and use classes from different Packages.

H/W Assignment:

TIP: TRAINERS WILL NOT ASSIST FOR THESE QUESTIONS.

1. A VotingApp needs to develop an onlineapplication for two types of users, Adults and children. Both of these users should be able to register an account. Any user who is less than 12 years of age will be registered as a child and they cannot go for voting, whereas an adult can butonly once.
Note: In future, more users/roles might be added to the App where similar rules will been forced. Develop Interfaces and classes for the categories mentioned above.
a. Create an interface VotingApp with the following methods declared
Method Name:
registerUser
requestVotingNumber

The methods in the Kids class should perform the following logic.

i. registerUser : if age < 12, a message displaying "You have successfullyregistered under Kids" should be displayed in the console.

If(age>12), a message displaying, "You have not successfully registered" should be displayed in the console.

e. requestVotingNumber: if voting Type is "Kids", a message displaying "Sorry cannot go for voting because Age must be greater than 12 to vote" should be displayed in the console

The methods in the Adult class should perform the following logic.

i registerUser : if age > 12, a message displaying" You have successfully registered under an Adult" should be displayed in the console.

If age<12, a message displaying, "You have not successfully registered under an Adult" should be displayed in the console.

ii requestVotingNumber: if voting Type is "Adult", a message displaying "Your voting Id will be generated within a day "should be displayed in theconsole.

else, a message displaying, "Oops, you are not" should be displayed in the console.

f. Create a class "VotingAppDemo.java" with a main method which performs the functions

2. WRITE A PROGRAM to create Package arithmetic having classes Addition, Subtraction, Division ,Multiplication with appropriate methods .Use this Classes outside the package.

Interview QUEstions:

1. What do understand by abstraction?
2. What are abstract classes and abstract methods?
3. Explain interfaces?
4. How multiple Trainers is achieved using interfaces?
5. What is the difference between abstract class and aninterface?
6. Does an abstract class contain non-abstract methods?
7. Can we use default when we override methods of aninterface?
8. Can an abstract method have a body?

Topic: Arrays

Sub-Topics:

1. *IntroDUCtion*
2. *Declaration, initialization of array*
3. *Single dimensional array*
4. *for each*
5. *Operations on array: searching, sorting*
6. *Two-dimensional array*
7. *Array of objects*

C/W Assignment:

Tip:Trainers will assist for these questions.

1. Write a program to calculate sum and average of arrayelements
2. Write a program to perform binary search.
3. Write a program sort array elements in using selection sort.
4. Write a program to arrange the elements of an given array of integers where all positive integers appear before all the negative integers.
5. Write a program to find transpose of a matrix.
6. Number of unique pairs in an array. Give nan array of N elements, that ask is to find all the unique pairs that can be formed using the elements of a given array.**(March Monthly).**

   Examples: Input: arr[] = {1, 1, 2}

   Output: 4

   (1, 1), (1, 2), (2, 1), (2, 2) are the only possible pairs.

   Input: arr[] = {1, 2, 3}

   Output: 9
7. Write a program to implement stack methods using array. (Jun Monthly)

H/W Assignment:

Tip:Trainers will not assist for these questions.

1) Write a program to find the index of an array element.
2) Write a program to test if an array contains a specific value
3) Write a program to remove a specific element from an array
4) Write a program to copy an array by iterating the array.
5) Write a program to find and display reverse of an array using third variable.

6) Write a program to find and display reverse of an array without using third variable.
7) Write a program sort array elements in ascending order using bubble sort.
8) Write a program to find the second largest element in an array

10) Write a program to find maximum element in a matrix.
11) Write a program to remove the duplicate elements of a given array and return the new length of the array.
12) Write a program to put even and odd elements of array in two separate arrays.
13) Write a program to create an array of its anti-diagonals from a given square matrix.
14) Write a program to test the equality of two arrays

15) Write a program to print all the LEADERS in the array.

Note: An element is leader if it is greater than all the elements to its right side

16) Write a program to get the difference between the largest and smallest values in an array of integers.
17) Write a program to replace 0's with 1's. e.g array is [0,1,0,1,0,1,0,1,0,1,0,1,0].
18) Write a program to separate even and odd numbers of an given array of integers. Put all even numbers first, and then odd numbers.

19) Write a program to display data in 2D array.

20) Write a program calculate the average of the inner elements of an array

21) Write a program to print the addition of two matrices.

22) Write a program to calculate the subtraction and multiplication of two matrices entered by the user.
23) Write a program to display outer elements of a matrix. i.e 2d array of size 6 x 6.

24) Write a program to rotate an array to the left.
25) Write a program to create Student class having rollno, name, marks. Create 10 objects . Using Array of Objects display information of student who got highest marks .
26) Given an integer array and size of subarray, find the first subarray with leasts average in single loop. Print first index of subarray and average. (**Mindstix**)

Method signature Find Firstsub(int arr[], int arr_len, int sub_arr_len)

{

//Your code

}

Example:

Input:

int arr={3,7,90,20,5,50,40}, k=3

Find Firstsub(arr,7

Output:

Index:3 Avg:25

27) Given 2 character arrays s1 and s2 and another empty character array s3.

Populate s3 by interleaving characters from both s1 and s1(**Mindstix**)

Method signature

Void interleaved (char[] s1, char[]s2, char[]s1, int s1_len, int s2_len)

{

// Your Code

}

Example:

S1={'a','b','c','d'};

S2={'w','x','y','z'};

Output:

S1={'a','w''b','x''c','y','d','z'}.

28) Write a program or function to find saddle point of a matrix. Your program should take input matrix from the user, display the matrix and find the saddle point of that matrix. Saddle point of a matrix is an element in the matrix which is smallest in its row and largest in its column. A matrix can have many or no saddle points. For example,

6	3	1
9	7	8
2	4	5

In this matrix, 7 is the saddle point. Because it is the smallest in its row (2nd row) and largest in its column (2nd column).

29) Given an array of N distinct integer and a sum value S.

30) Write a program to find out count of triplets with sum smaller than given

sum value.
Examples:
Array=[5,1,3,4,7
] S=12.
Output :4
Explaination: Below are triplets with sum less than 12
(1,3,4),(1,3,5),(1,3,7),(1,4,5)

31) Write a program to find sum of diagonal elements of a matrix.
32) Write a program of how to pass array as a parameter to method in java?
33) Write a program to take 10 integer inputs from user and print the number of positive numbers, number of negative numbers, number of odd numbers number of even numbers
34) Write a program to merge two arrays into third array.
35) Find the minimum distance between 2 seeds(m and n) provided in an integer array arr[] of given length. Array can contain duplicates and negative integers. Assume that both m and n are different and be present inarr[].
Method Signatue
FindMinDist(int arr[],int arr_length,int m,int n)
{

//your code here
}

Constraints:
Do not use any additional data structures. You may use as many as primitive variables.

Good To Have:

1. Write a program to find all the unique triplets such that sum of all the three elements is equal to a specified number.**(April Monthly).**
Input-2.
Output- [[1,5,-4],[-2,5,-1]]
Reason: 1+5-4=**2**& -2+5-1=2 2 is Target ...
2. Write a program to Find unique Pair Of Integers in Array whose Sum is Given Number Given array : [2, 4, 3, 5, 6, -2, 4, 7, 8, 9]
Given sum : 7
Integer numbers, whose sum is equal to value : (2, 5) (4, 3) (-2, 9) . .**(April Monthly).**
3. Split array arr[] into strictly increasing and decreasing sequences in single loop and without changing the original order.
Method Signature void splitArray(int arr[]
{
//Your code goes here
}
Example 1 Input: aryl]_ [5, 1, 3, 6, 8, 2, 9, 0, 10]
Output: [1, 3, 6, 8, 9, 10] [5, 2, 0]

Example 2 Input: arr[j = [1, 2, 4, 0, 2]
Output: -1
//No such sequences possible.

Interview QUEstions:

1. What are arrays?
2. What is one dimensional array?
3. How to create and access elements in java?
4. What are two dimensional arrays?
5. What are applications of an array?
6. What are advantages & disadvantages of arrays?

Topic: Strings

SUb-Topics:

1) IntroDUCtion

2) ImmUTableStrings

3) Methods of strings

4) String bUFferclass

5) Methods of String BUFfer

6) String bUIlder

7) Methods of String BUIlder

8) String vs String bUFfer vs String BUIlder

C/W Assignment:

Tip:Trainers will assist for these questions.

1) Write a program to create strings using new and using literal.

2) Write a program to get the character at the given index within the String.

3) Write a program to compare two strings lexicographically.

4) Write a program to compare two strings lexicographically, ignoring casedifferences.

5) Write a program to concatenate a given string to the end of another string

6) Write a program to compare a given string to the specified character sequence.

7) Write a program to compare a given string to the specified stringbuffer.

8) Write a program to test methods of StringBuffer.

9) Write a program to test methods of StringBuilder.

H/W Assignment:

TIP: TRAINERS WILL ASSIST FOR THESE QUESTIONS.

1) Write a program to create a new String object with the contents of a character array

2) Write a program to check whether a given string ends with the contents of another string.

3) Write a program to check whether two String objects contain the same data

4) Write a program to compare a given string to another string, ignoring case considerations.

5) Write a program to get the index of all the characters of thealphabet.

6) Write a program to get the last index of a string within astring.

7) Write a program to get the length of a given string.

8) Write a program to replace all the 'd' characters with 'f' characters.

9) Write a program to check whether a given string starts with the contents of another string.

10) Write a program to create a character array containing the contents of a string.

11) Write a program to convert all the characters in a string to lowercase.

12) Write a program to convert all the characters in a string to uppercase.

13) Write a program to remove a specified character from a given string.

14) Write a program to test if a given string contains only digits

15) Write a program to return a string with the characters of the index position 0,1,2, 5,6,7, ... from a given string.

16) Write a program to return the sum of the digits present in the given string. If there is no digits the sum return is 0.

17) Write a program to count and print all the duplicates in the input string.

18) Write a program to reverse every word in a string using methods.

19) Write a program to find the maximum occurring character in a string.

20) Write a program to print after removing duplicates from a given string.

21) Write a program to find Length of the longest substring without repeating characters.

22) Write a program to find the second most frequent character in a given string.

23) Write a program to trim any leading or trailing whitespace from a given string.

24) Write a program to find frequency of character in a string

25) Write a program to get lowest frequency of a character in a string.

26) Write a program to repeat each of the character twice in a given string.

27) Write a program to convert all the characters in a string to lowercase.

28) Write a program to delete all extra blank spaces in a string by the user.

29) Write a program to sort in ascending and descending order by length of the given array of strings.

30) Add 10 StringBuffer objects in an Array , Count no. Of Palindrome Strings, Display in Ascending order such Strings

31) Exchange Cipher (String & char)This simple cipher exchanges 'A' and 'Z', 'B' and 'Y', 'C' and 'X', and so on. Write a program called Exchange Cipher that prompts user for a plaintext string consisting of mix-case letters only. Your program shall compute the cipher text; and print the cipher text in uppercase. For examples, Enter a plaintext string: abcXYZ The cipher text string is: ZYXCBA **(March Monthly)**

32) Problem Statement1:

Write a program which creates a String "Welcome to Java World" and performs the following Returns the character at 5^{th} position and display it.Compares the above String with "Welcome" lexicographically ignoring case differences and display the result. Concatenates "- Let us learn" to the above string and display it.

Returns the position of the first occurrence of character 'a' and display it. Replaces all the occurrences of 'a' character with the new 'e' and display it. Returns string between 4^{th} position and 10^{th} position and display it.

33) Write a program to sort numbers in a String. Display the result as a String. E.g. if number in String is "43521" result is: "12345". **(April Monthly)**

34) Write a program to find largest & smallest word in a string.

35) Write a program to delete all extra spaces in string.

Interview QUEstions:

1) What are Strings in Java? Is string a data type?
2) What are different ways to create string objects?
3) What is String pool?
4) What do you mean by mutable and immutable strings?
5) Why String Buffer is called mutable?
6) Can you create mutable string objects?
7) What is the difference between String Buffer and String Builder class?
8) Why String Buffer and String Builder classes are introduced in java when there already exist string class to represent the set of characters?
9) What are the various ways of assigning a string literal to a String variable?
10) Which method is used to append a string literal to a String variable?
11) What are the most widely used methods of String class?
12) When will you use String class and when will you use String Buffer?
13) How will you add string to a String Buffer? Give an example.
14) Which class is preferred: String Buffer or String Builder? Why?
15) Is it possible to invoke chained methods in Java? If so, how will you invoke?
16) Can you point out the main difference between C/C++ strings and Java strings?
17) Can the contents of strings in Java be changed?

Topic: Exception Handling

SUb-Topics:

1) *IntroDUCtion*
2) *Types of Exceptions*
3) *Using try-catch*
4) *MULtiple catch claUSes*
5) *Exception Hierarchy*
6) *RUntime stack Mechanism*
7) *DefaULt Exception handler*
8) *Types of exceptions*
9) *Checked exceptions*
10) *Unchecked exceptions*
11) *Creating own exceptions*
12) *Throws vs Throw*
13) *Use of throw, throws &finally*

C/W Assignment:

TIP: TRAINERS WILL ASSIST FOR THESE QUESTIONS.

1) Show Example of runtime stack mechanism using Arithmetic Exception.
2) Show Example of run time stack mechanism using Arithmetic Exception and handle it using try catch.
3) Write a program to display an example to check if an unchecked Exception is propagated in calling stack
4) Write a program to display and explain the use of finally.
5) Display an example of checked exception and simultaneously use multiple catch block.
6) Write a program to display the concept of throw and throws using checked exceptions.
7) Write a program to display the concept of throw and throws using unchecked exception.
8) Write a program to display the concept of throw by creating a user defined exception and use trycatch to handle the exception.

H/W Assignment

Tip:Trainers will not assist for these questions.

1) Write a program to display an example of how to generate any Exception
2) Write a program to display example where only try and finally block is used.
3) Write a program to display any one Exception and catch that Exception using try catch.
4) Write a program to check and display if we can write an empty catch block?
5) Write a program to generate and handle ArrayIndexOutOfBound Exception using try catch.
6) Write a program to display a message if main method throws an exception.
7) Write a program to display and check if checked Exception is propagated in calling stack.

8) Create a class, *Demo* with a method, *division* with two int parameters
a. Dividend b. Divisor
This method should divide the dividend by divisor and return the result.
This method should also throw an *Arithmetic Exception* to the calling method.
Step 2: Create a class, *Throws Demo* with a main method
The main method should invoke the division method in *Demo class*
The main method should also *catch* the *Arithmetic Exception* thrown by the division method and print the Exception "Arithmetic Exception is Thrown"
The try/catch block should also have a finally block which prints a message "The result is"<Result>
Step 1:Inthe Demo class division method perform the following logic.

a. If Divisor is zero throw a *Arithmetic Exception* with message "Divisor cannot be zero"
b. This method should throw this *Arithmetic Exception.*
c. Step 2: The exception thrown needs to be handled in *Throws Demo.*
d. The main method should *catch* the *Arithmetic Exception* thrown by the division method and print the Exception and print the message in the exception Object.
e. The try/catch block should also have a finally block which prints a message "The result is"

9) A shopping portal provides users to register their profile. During registration the system needs to validate the user age above 18 and should be placed in India. If not the system should throw an appropriate error.

a. Create a user defined exception classes named "*InvalidCoUNtryException*" & "*InvalidAgeException*"

b. Overload the respective constructors.
c. Create a main class "User Registration" , add the following method,

i. *registerProfile* -The parameter are String userName , int age, String country.
ii. Add the following logic

d. if country is not equal to "India" throw a InvalidCountryException with error If age < 18 throw a InvalidAgeException with error message" User is a Minor".

e. Invoke the method register Profile from the main method with the data specified and see how the program behaves:

10) Create a menu driven program Try Catch demo

i) Try Multi Catch
ii) Try Finally
iii) Try Catch Finally
iv) Throw
v) Throws

Interview QUEstions:

1) What is an Exception?
2) What is the difference between error and exception?
3) What is the use of the finally block? Is finally block in java guaranteed to be called? When finally block is not called?
4) What do you mean by Checked Exceptions?
5) Explain Runtime Exceptions?

6) Which are the two subclasses under Exception class?
7) When throws keyword is used?
8) What things should be kept in mind while creating your own exceptions in Java?
9) What are the exception handling keywords in java?
10) What is an Exception Hierarchy?
11) Which is the parent class of Exception?
12) In which package throwable interface is present?
13) How does Default Exception Handler works.
14) What are different types of exceptions?
15) What are unchecked exceptions?
16) What is the difference between checked and unchecked exceptions?
17) Explain fully checked exceptions?
18) What are partially unchecked exceptions?
19) What is the main use of keyword throw?
20) What is the use of the finally block?
21) How will you define Exception Handling?
22) What are the different types of Exceptions?
23) How will you handle Exception in Java?
24) Write a compilable code using "try"," catch", and" finally"?
25) What is the use of "finally" clause? Give an example.
26) What are the exception types that can be thrown using the "throw" keyword?
27) How will you write a compilable code block using "throw" keyword?
28) Give a one line definition of an exception. What do you mean by checked and unchecked exceptions?
29) Which class is at the top of the exception hierarchy?

Topic: Multithreading

SUb-Topics:

1) IntroDUCtion

2) Thread lifecycle

3) Creation of threads Using class

4) Creation of thread Using interface

5) Creating mULtiple threads

6) Thread scheDULer

7) Synchronization

8) Thread priorities

9) Garbage Collection

10) Daemon Thread

C/W Assignment:

Tip: Trainor's will assist for these questions.

1) Write a program to create 2 threads by extending the thread class and then run them concurrently
2) Write a program to create three threads using the Runnable interface and then running them concurrently
3) Write a program to explain the concept of priorities of a thread. Also show how to set and get priorities of a thread.
4) Write a program to explain the concept of sleep method by an appropriate example.
5) Write a program to explain and display the concept of daemonthread.
6) Write a program to give the implementation of a thread and pausing of a thread tillcompletion of main thread using yield ().
7) Write a program to display that main thread calls join() and wait for the child thread to get executed first and then gets completed by writing two threads main and child thread
8) Write a program to illustrate an example of deadlock.
9) Write a program to show the concept of synchronization by this simple example: Thread1 consumes biscuits from a box, Thread2 produces fixed number of biscuits at a time say 20. Write a program in which Thread1 checks for sufficient biscuits in box, it waits for Thread2 to produce if sufficient biscuits are not available in the box and then consumes given number of biscuits. Thread2 will notify Thread1 after it finishes producing biscuits.
10) Create a class Item which has sell and buy method when one thread is updating the item the other thread should not execute on same item.**(April Monthly)**.

H/W Assignment:

TIP: TRAINERS WILL NOT ASSIST FOR THESE QUESTIONS.

1) Write a program to extend class Thread and create thread also implement runnable interface and create thread execute threads simultaneously.
2) Write a program in which first thread displays days of a week. Second thread display table of 5.Third thread displays Fibonacci series by creating 3 threads.

3) Write a program to create thread1 which displays numbers 1 to 10. thread2 displays alphabets A to Z. Display that alphabets are printed first and then numbers are printed.

Hint: Use join().

4) Write a program to display a synchronized method and 2 threads in which the threads are trying to update same thread. See how the synchronization works.

5) Write a program to check and display if threads Thread1 and Thread2 are accessing static synchronized method concurrently.

6)Create Circle class having set Radius(),area(). One thread is calling set Radius(),another thread is calling area(). Using wait () and notify () implements this program.

Interview QUEstions:

1) What is multithreading?
2) Explain the life cycle of a thread.
3) What is the difference between multi-processing and multithreading?
4) What are the different ways to create a thread?
5) What are the advantages of multithreading?
6) What is thread scheduler?
7) What is synchronization?
8) What do you understand by Garbage collection?
9) How will you define Garbage Collection?
10) When does the garbage collection get executed?
11) Is there any chance that the Java application can throw "out

of memory" error? Why?

12) Explain with a code sample when an object is ready for garbage collection.
13) What are the situations in which JVM triggers garbage collection?
14) What are the lines of code you need to write to programmatically trigger garbage collection?
15) What are the concepts that come to your mind about finalize()method?
16) How will you define a Thread?

17) How will you create Threads in Java? What are the methods of Thread class that are mainly used to manage threads?

18) How does a thread get executed in Java?

19) What are the thread states?

20) Write a compilable Java code that creates a child thread using "Thread" class.

21) What are the methods of Objects that are used while managing threads?

22) Is it possible to create more than one thread in a Java application? If so, how will the threads communicate with each other?

23) How will you define Synchronization?

24) How will you make a thread to pause for ten minutes?

25) How will you use the "synchronized" keyword? Give code examples.

26) What happens when a synchronized method is invoked?

27) How will you make the thread to wait and start its execution a gain so that certain process gets executed?

- Write a Java code and implement "wait" and "notify" methods.

28) What are the methods that belong to "Runnable" interface?

29) What is the use of join () and yield ()methods?

Topic: Collections -list

SUb-Topics:

1)IntroDUction

2)Lists

3)Array List- IntroDUction

4)ConstRUCtors & methods of Array List

5)Linked List-IntroDUction

6)ConstRUCtors & methods of Linked List

7)Difference between Array List & Linked List

8)Vector–IntroDUction

9)ConstRUCtors & Methods of Vectors

10) Stack-IntroDUction

11) ConstRUCtors & Methods of Vectors

12) CURSors- IntroDUCtion

13) ENUMeration

14) ConstRUCtors & Methods of ENUmeration

15) Limitations of ENUMeration

16) Iterator- IntroDUCtion

17) ConstRUCtors & Methods of Iterator

18) Limitations of Iterator

19) List Iterator

20) ConstRUCtors & Methods of List Iterator

21) Difference between ENUMeration, Iterator and ListIterator

C/W Assignment:

TIP: TRAINERS WILL ASSIST FOR THESE QUESTIONS.

1) Write a program to create a new array list, add some colors (string) and print out the collection

2) Write a program to iterate through all elements in a array list.

3) Write a program to insert an element into the array list at the first position.

4) Write a program to retrieve an element (at a specified index) from a given array list.

5) Write a program to update specific array element by given element.

6) Write a program to remove the third element from a array list.

7) Write a program to shuffle elements in a array list.

8) Write a program to sort a given array list.

9) Write a program to reverse elements in a array list.

10) Write a program to copy one array list into another.

H/W Assignment:

Tip: Trainers will not assist for these questions.

1) Write a program to extract a portion of a array list.
2) Write a program to compare two array lists
3) Write a program to join two array lists.
4) Write a program to clone an array list to another array list.
5) Write a program to append the specified element to the end of a linked list.
6) Write a program to iterate through all elements in a linked list.
7) Write a program to iterate through all elements in a linked list starting at the specified position.
8) Write a program to iterate a linked list in reverse order.
9) Write a program to insert elements into the linked list at the first and last position.
10) Write a program to insert the specified element at the front of a linked list.
11) Write a program to insert the specified element at the end of a linked list.
12) Write a program to insert some elements at the specified position into a linked list
13) Write a program to get the first and last occurrence of the specified elements in a
14) linked list
15) Write a program to display the elements and their positions in a linked list.
16) Write a program to remove a specified element from a linked list
17) Write a program to remove first and last element from a linked list.
18) Write a program to remove all the elements from a linked list.
19) Write a program to shuffle the elements in a linked list.
20) Write a program to join two linked lists.
21) Write a program to clone an linked list to another linked list.
22) Write a program to remove and return the first element of a linked list.
23) Write a program to retrieve but does not remove, the first element of a linked list.
24) Write a program to retrieve but does not remove, the last element of a linked list.
25) Write a program to check if a particular element exists in a linked list.
26) Write a program to convert a linked list to array list.
27) Write a program to compare two linked lists.
28) Write a program to replace an element in a linked list.

Interview QUEstions:

1) Explain Collections hierarchy?
2) Explain Difference between Vector and Array List?

3) What is the difference between array and arraylist?

4) How to sort array list?
5) How to create and initialize array list?

6) What is a linkedlist?
7) How to reverse a linkedlist
8) What is singly linkedlist?
9) What is the difference between Array and linkedlist?
10) Which collection would you choose if you want no duplicates and if objectsare not stored in an order?
11) How will you use the Comparator interface in your class file?
12) What are the activities that can be performed in collection API?
13) In collection, which method is used to remove the head of the queue?
14) Which collection class method is not synchronized but allows
15) growing or shrinking its size and provides indexed access to its elements?
16) How will you extract elements from a collection with out knowing
17) how the collection is implemented?
18) What are the different Collection Interfaces in Java collection framework? Distinguish them.
19) What is Hashtable? What is its significance in Java?

Topic: Collections Set

SUb-Topics:

1) *intro**DUC**tion*

2) *Hash Set-declaration, constr**UC**tors ,methods*

3) *Sorted Set*

4) *Tree Set*

5) *Linked Hash Set*

C/W Assignment:

Tip:Trainers will assist for these questions.

1) Write a program to append the specified element to the end of a hash set
2) Write a program to iterate through all elements in a hashlist.
3) Write a program to get the number of elements in a hash set.
4) Write a program to empty an hash set.
5) Write a program to test a hash set is empty or not.
6) Write a program to clone a hash set to another hash set.
7) Write a program to convert a hash set to an array.
8) Write a program to convert a hash set to a tree set.

H/W Assignment :

Tip:Trainers will not assist for these questions.

1) Write a program to compare two hash set.
2) Write a program to compare two sets and retain elements which are same on bothsets.
3) Write a program to remove all of the elements from a hash set.
4) Write a program to create a new tree set, add some colors (string) and print out the tree set.
5) Write a program to iterate through all elements in a tree set.
6) Write a program to add all the elements of a specified tree set to another treeset.
7) Write a program to create a reverse order view of the elements contained in a given tree set.
8) Write a program to get the first and last elements in a tree set.
9) Write a program to clone a tree set list to another tree set.
10) Write a program to get the number of elements in a tree set.
11) Write a program to find the numbers less than 7 in a tree set.
12) Write a program to get the element in a tree set which is greater than or equal to the given element.

13) Write a program to get the element in a tree set which is less than or equal to the given element.
14) Write a program to get the element in a tree set which is strictly greater than or equal to the given element
15) Write a program to get an element in a tree set which is strictly less than the given element.
16) Write a program to retrieve and remove the first element of a tree set.
17) Write a program to retrieve and remove the last element of a tree set.
18) Write a program to remove a given element from a tree set
19) Write a program to convert a hash set to a List/ArrayList.

Topic: Queue

SUb-Topics:

*1) intro**DUC**tion*

*2) **QUEUE***

*3) Priority QUEUE-declarations, constr**UC**tors, methods*

C/W Assignment:

Tip:Trainers will assist for these questions.

1) Write a program to create a new priority queue and print out the elements of the priority queue.
2) Write a program to iterate through all elements in priority queue.
3) Write a program to add all the elements of a priority queue to another priorityqueue
4) Write a program to insert a given element into a priority queue.

H/W Assignment:

Tip:Trainers will not assist for these questions.

1) Write a program to remove all the elements from a priority queue.
2) Write a program to count the number of elements in a priority queue.
3) Write a program to compare two priority queues.
4) Write a program to retrieve the first element of the priority queue.
5) Write a program to convert a priority queue to an array containing all of the elements of the queue.
6) Write a program to change priorityQueue to maximum priorityqueue.

Interview Questions:

1) Explain Difference between HashMap and HashTable?
2) Explain Difference between Iterator andList Iterator?
3) Why Map interface does not extend Collection interface?
4) How HashSet store elements?
5) Difference between iterator and ListIterator?
6) Can a null element added to a TreeSetorHashSet?
7) What are Identity HashMap and Weak HashMap?
9) How to make a collection readonly?
10) How to make a collection thread safe?
11) What is difference between fail-fast andfail-safe?
12) What is Comparable and Comparatorinterface?

Topic: Collections Sorting

SUb-Topics:

1) *IntroDUCtion*
2) *Sorting in collection*
3) *String objects*
4) *User-defined class objects*
5) *Comparable interface*
6) *Comparator interface*
7) *Comparable vs Comparator*

C/W Assignment:

TIP: TRAINERS WILL ASSIST FOR THESE QUESTIONS.

1) Write a program to create a class Employee with appropriate data members. Display and explain the Comparator implementations for each Employee attribute.

2) Create an arraylist and add members and then sort arraylist of employees in ascending order of their salaries and display names in descending order if their salaries are same.

H/W Assignment:

Tip:Trainers will not assist for these questions.

1) Explain and display the use comparator by a suitable example.

2) Write a program to sort the elements of arrayList which contains String objects. Print the same Array List with and without using sort().

3) Write a program to create class Student having name, rollNo ,marks as variables .Create and add 8 Students .Display the data of students performing sorting depending on name and salary.**(March Monthly)**.

Topic: Collections Map

SUb-Topics:

1) *intrODUCtion*
2) *Methods-PUT, PUT All, get etc.*
3) *Hash Map*
4) *Sorted Map*
5) *Tree Map*

C/W Assignment:

TIP: TRAINERS WILL ASSIST FOR THESE QUESTIONS.

1) Write a program to associate the specified value with the specified key in a HashMap.
2) Write a program to count the number of key-value (size) mappings in a map
3) Write a program to copy all of the mappings from the specified map to another map.
4) Write a program to remove all of the mappings from a map

H/W Assignment:

TIP: TRAINERS WILL NOT ASSIST FOR THESE QUESTIONS.

1) Write a program to check whether a map contains key-value mappings (empty) or not.
2) Write a program to test if a map contains a mapping for the specified key.
3) Write a program to test if a map contains a mapping for the specified value.
4) Write a program to create a set view of the mappings contained in a map.
5) Write a program to get the value of a specified key in a map.
6) Write a program to get a set view of the keys contained in this map.
7) Write a program to get a collection view of the values contained in this map.
8) Write a program to associate the specified value with the specified key in a Tree Map
9) Write a program to search a key in a Tree Map.
10) Write a program to copy a Tree Map content to another Tree Map.
11) Write a program to get all keys from the given a Tree Map.
12) Write a program to search a value in a Tree Map.
13) Write a program to delete all elements from a given Tree Map.
14) Write a program to sort keys in Tree Map by using comparator.
15) Write a program to get a key-value mapping associated with the greatest key and the least key in a map.
16) Write a program to get a key-value mapping associated with the greatest key less than or equal to the given key.
17) Write a program to get the greatest key less than or equal to the given key.
18) Write a program to get a reverse order view of the keys contained in a given map.

19) Write a program to get the first (lowest) key and the last (highest) key currently in a map.

Interview QUEstions:

1) Why we use map interface?
2) What are the main classes implementing Map interface?
3) How Hash map works?
4) When to use Hash Map or Tree Map?