

1.) what is data abstraction? Differentiate between data and Procedural abstraction. write inheritance hierarchy for the super class Quadrilateral, parallelogram, square and rectangle. calculate area of square, rectangle and parallelogram.

Ans.) Abstraction is the process of hiding certain details and showing only essential information to the user. Abstraction can be achieved with either abstract classes or interfaces. Abstraction can be defined in two ways i.e., Data Abstraction and Procedural abstraction.

Data Abstraction:- In data abstraction the abstraction process is more focussed on the data than the operating and procedures (methods). Data abstraction follows the object orientation principle. Example of the data abstraction is queue data and the associated operators add() and delete(). The advantage of data abstraction is that data and the associated operations get specified together.

Procedural Abstraction:- This mechanism abstraction for operations and its procedure as well. Procedural abstraction are normally characterized in a programming language as "function", "Sub-function" or "Procedure". Example for the procedural abstraction is the debit, credit operations in which the procedure and operations performed during transaction (debit, credit,) is completely abstracted from this users.

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Hierarchy Inheritance

```
import java.util.Scanner;  
class QuadrilateralTest {  
    double x;  
    double y;  
    Scanner sc = new Scanner (System.in);  
}  
class Parallelogram extends QuadrilateralTest {  
    double a=60; // default angle  
    public void input() {  
        System.out.println ("Enter the side1 value of  
Parallelogram");  
        x = sc.nextDouble();  
        System.out.println ("Enter the side2 value of  
Parallelogram");  
        y = sc.nextDouble();  
    }  
    public double area() {  
        System.out.println ("Area is calculated when angle  
is " + a + "°")  
        return a*x*y;  
    }  
    public double area() {  
        System.out.println ("Area is calculated when angle  
is " + a + "°")  
        a = sc.nextDouble();  
        System.out.println ("Enter the new angle of Parallelogram");  
    }  
}
```

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```
class Rectangle extends Quadrilateral Test {  
    public void input() {  
        System.out.println ("Enter the side 1 of the  
        Rectangle ");  
        x = sc.nextDouble();  
        System.out.println ("Enter the side 2 of Rectangle ");  
        y = sc.nextDouble();  
    }  
    public double area() {  
        return x * y;  
    }  
}  
  
class Square extends Quadrilateral Test {  
    public void input() {  
        System.out.println ("Enter the side value of the  
        square ");  
        x = sc.nextDouble();  
    }  
    public double area() {  
        return x * x;  
    }  
}
```

```
public class Quadrilateral {  
    public static void main (String args[]) {  
        Parallelogram ob1 = new Parallelogram ();  
        Rectangle ob2 = new Rectangle ();  
        Square ob3 = new Square ();
```

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```

ob1.input();
System.out.println("In Area of parallelogram "+ob1.area());
ob2.input();
System.out.println("In Area of Rectangle "+ob2.area());
ob3.input();
System.out.println("In Area of square "+ob3.area());
}

```

3

2) what is importance of constructor ? write a java program to perform constructor overloading . describe the usage of static members and nesting members with suitable example programs in java .

Sol) In Java, constructor is used to initialize objects . which are called when the instance of object is created . Constructor is a special type of method . The main advantage of a constructor is that it can provide a fully initialized object . when values of instance variables inside a constructor is passed , during object creation itself the variables get initialized .

Constructor overloading can be performed by constructors , different number of times with no. of parameters included in it .

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Eg:-

Public class Bank {

String name, account id, branch;

Public Bank() { }

Public Bank (String name, String account id) { }

this.name = name;

this.accountid = accountid;

}

Public Bank (String name, String account id, String branch) { }

this.name = name;

this.accountid = accountid;

this.branch = branch;

}

Public void display () { }

System.out.println (name + " " + accountid + " " + branch);

}

}

Public class Account {

Public static void main (String args[]) { }

Bank ac1 = new Bank (C1, A1234, null);

Bank ac2 = new Bank (C2, A125X, Buntus);

ac1.display(); ac2.display(); }

Output:- C1, A1234, null

C2, A125X, Buntus

Static members :- In Java static members are those which belongs to the class and you can access these members without instantiating the class (These are constants).

The static keywords can be used with methods, fields.

Eg:-

```
public class myclass {
```

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

```
        public static int data = 60; // static variable  
        static {
```

//static block

```
        System.out.println ("static block");  
    }
```

}

```
    public static void sample () {
```

//static method
 System.out.println ("static method");

}

}

Nested members :- The classes within the another class are called nested classes they are of two types (static and non-static)

Eg:-

```
public class myclass {
```

```
    public static class sample1 {
```

```
        System.out.println ("nested static class");
```

```
    private class sample2 {
```

```
        System.out.println ("inner-class");
```

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

3) Define a class named Bookfair with the following description.

Instance variables / data members :

String Bname - stores the name of the book.

double Price - stores the Price of the book.

Member methods .

i) Bookfair() - Default constructor to initialize data members.

ii) void input() - To input and store the name and the Price of the book.

iii) void calculate() - To calculate the Price after discount.

Discount is calculated based on the following data.

Price

Less than or equal to Rs 1000

Discount

2% of Price

more than Rs 1000 and less than or equal to
Rs 3000

10% of Price

more than Rs 3000

15% of Price

iv) void display() - To display the name and Price of the book after discount.

write a main method to create an object of the class and the above member methods.

A) Program :-

```
import java.util.Scanner;
class Bookfair {
    String Bname;
    double Price;
    Scanner sc = new Scanner(System.in);
    public Bookfair() {}
```

```
Public BookFais (String Bname, double Price) {  
    this.Bname = Bname;  
    this.Price = Price;  
}
```

```
Public void Input() {  
    System.out.println ("Enter Book name : ");  
    Bname = sc.nextLine();  
    System.out.println ("Enter Book Price : ");  
    Price = sc.nextDouble();
```

```
}  
Public void calculate() {  
    if (Price <= 1000.00) {  
        Price = Price - (Price * 0.02);  
    }
```

```
else if (Price > 1000.00 && Price <= 3000.00) {  
    Price = Price - (Price * 0.1);  
}
```

```
else {  
    Price = Price - (Price * 0.15);  
}
```

```
}  
Public void display() {  
    System.out.println ("Name of the book = " + Bname);  
    System.out.println ("Price of the book after discount  
    = " + Price);  
}
```

Public class Bkfair {

 Public static void main (String args []) {

 Bookfair book1;

 book1 = new Bookfair ();

 book1. InPut ();

 book1. display ();

2
2

Output 1 :-

Enter Book name :

royal

Enter Book Price :

2322

Name of the book = royal

Price of the book after discount = 2089.8

Output 2 :-

Enter Book name :

The Holister

Enter Book Price :

678

Name of the book = The Holister

Price of the book after discount = 664.44

Output 3 :-

Enter Book name :

Four Brothers

Enter Book Price

4554

Name of the book = Four Brothers

Price of the book after discount = 3870.9

4) Special words are those words which starts and ends with the same letter.

Examples:-

EXISTENCE

COMIC

WINDOW

Palindrome words are those words which read the same from left to right and vice-versa

Examples:-

MALAYALAM

MADAM

LEVEL

ROTATOR

CIVIC

All Palindrome are special words, but all special words are not Palindrome. Write a Program to accept a word check and Point whether the word is a palindrome or any special word.

A) Program :-

```
import java.util.*;
public class words
{
    public static void main (String [] args)
    {
        String original , reverse = "";
        Scanner in = new Scanner (System.in);
        System.out.println ("Enter a string to reverse : ");
        original = in.nextLine();
        int length = original.length();
        for (int i = length - 1 ; i >= 0 ; i--)
            reverse = reverse + original.charAt(i);
    }
}
```

```

System.out.println ("Reverse of the string: " + Reverse);
if (original.equals (reverse) && (original.substring (0,1).equals
(original.substring (length - 1))))
    System.out.println ("Palindrome");
else if (original.substring (0,1).equals (original.substring (length - 1)))
    System.out.println ("Special number");
else
    System.out.println ("None");
}
}

```

Output 1 :-

Enter a string to reverse :

MADAM

Reverse of the string : MADAM

Palindrome

Output 2 :-

Enter a string to reverse :

comic

Reverse the string : c~~o~~moc

Output 3 :-

Enter a string to reverse :

ROTATOR

Reverse of the string : ROTATOR

Palindrome.