

1. What is data abstraction? Differentiate data and procedural abstractions. write inheritance and hierarchy for the Super class Quadrilateral, Parallelogram, Square and Rectangle. Calculate area of square, rectangle and parallelogram.

A) Data abstraction refers to providing only essential information to the outside world and hiding their back ground details. i.e; to represent the needed information in program without presenting the details.

The difference between data abstraction and procedural abstraction are.

#### Data abstraction

- 1) Data abstraction... in this form of abstraction, instead of just focusing on operations, we focus on data first and then the operations that manipulate the data.
- 2) Data abstraction refers to defining the behaviour of the data structure.
3. Data abstraction also includes various data types provided by programming languages DBMS, (or) language APIs

#### procedural abstraction

- 1) Procedural abstraction are normally characterized in a programming language as function / sub-function or procedure abstraction.
- 2) In procedural abstraction, methods are used to capture the procedural patterns, abstracting over behaviour.
- 3) In this abstraction, one class call methods of another class without knowing implementation detail

```
public class Quadrilateral {
```

```
    protected int x1, x2, x3, x4, y1, y2, y3, y4;
```

```
    protected void setCoordinate (inta, intb, intc, intd,  
    inte, intf, intg, int h)
```

```
    {
```

```
        x1 = a;
```

```
        y1 = b;
```

```
        x2 = c;
```

```
        y2 = d;
```

```
        x3 = e;
```

```
        y3 = f;
```

```
        x4 = g;
```

```
        y4 = h;
```

```
    }
```

```
}
```

```
public class square extends Quadrilateral
```

```
{
```

```
    square (inta, intb, intc, intd, inte, int f, intg, int h)
```

```
    {
```

```
        set co-ordinate (a,b,c,d,e,f,g,h);
```

```
    }
```

```
    int area()
```

```
    {
```

```
        int d = (int) Math.sqrt ((x1-x2) * (x1-x2) + (y1-y2) * (y1-y2))
```

```
        return d * d;
```

```
    }
```

```
}
```



public class Rectangle extends Quadrilateral

```
{
    Rectangle (inta, intb, intc, intd, inte, intf, intg, int h)
{
    set co-ordinate (a,b,c,d,e,f,g,h);
}
int area()
{
    int d1 = (int) Math.sqrt((x1-x2)*(x1-x2) + (y1-y2)*(y1-y2));
    int d2 = (int) Math.sqrt((x1-x4)*(x1-x4) + (y1-y4)*(y1-y4));
    return d1 * d2;
}
}
```

public class Parallelogram extends Quadrilateral

```
{
    private int height;
    Parallelogram (inta, intb, intc, intd, inte, intf, intg, int h,
    int height)
{
    set co-ordinate (a,b,c,d,e,f,g,h)
    this.height = height;
}
int area()
{
    int d1 = (int) Math.sqrt((x1-x2)*(x1-x2) + (y1-y2)*(y1-y2));
    return d1 * height;
}
}
```

public class Test Quadrilateral

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

```
square sq = new square(10, 10, 20, 16, 20, 20, 10, 20);
```

```
Rectangle rec = new rectangle(10, 10, 30, 16, 30, 20, 10, 20);
```

```
Parallelogram Para = new parallelogram(10, 10, 30, 16, 20, 20, 0, 20, 0);
```

```
System.out.println("Area of square is" + sq.area());
```

```
System.out.println("Area of rectangle is" + rec.area());
```

```
System.out.println("Area of Parallelogram is" + Para.area());
```

```
}
```

```
}
```

Out put:

Area of Square is 100

Area of rectangle is 200

Area of Parallelogram is 160



2) what is the 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?

A) The purpose of constructor is to initialize the object of a class while the purpose of a method is to perform a task by executing java code. Constructors cannot be abstract, final, static and Synchronised while methods can be.

Constructor overloading is having more than one constructor with different parameters list, in such a way so that each constructor performs a different task.

Constructor overloading Program:-

```
class Student Data
```

```
{
```

```
    private int StuID;
```

```
    private String stuName;
```

```
    Student Data ()
```

```
{
```

```
        StuID = 100
```

```
        Stu Name = "New student";
```

```
    } stu;
```

```
    Student Data ( int num1, String str, int num2)
```

```
{
```

```
        StuID = num1;
```

```
        Stu Name = str;
```

```
}
```

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

```
{
```

```
    studentData myObj = new studentData();
```

```
    System.out.println ("student Name is" + myObj.stuName);
```

```
    System.out.println ("student ID is" + myObj.stuID);
```

```
}
```

```
}
```

Output:-

Student Name is New student

Student ID is 100

Static members belong to the class instead of a specific instance, this means if you make a member static, you can access it without object.

i) class Java Example {

```
    static int num;
```

```
    static String mystr;
```

```
    static {
```

```
        num = 97;
```

```
        mystr = "static keyword in java";
```

```
    }
```

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

```
    {
```

```
        System.out.println ("value of num: " + num);
```

```
        System.out.println ("value of mystr: " + mystr);
```

```
    }
```

```
}
```



out put :-

(4)

value of n num: 97

value of myst: static keyword in java

Nested static class:-

A static class i.e; created inside a class is called static nested class in java. It cannot access non-static data members and methods. It can be accessed by outer class name.

Program:-

```
class TestOuter1 {  
    static int data = 30;  
    static class inner  
    {  
        void msgC()  
        {  
            System.out.println("data is " + data);  
        }  
    }  
    public static void main (String args[])  
    {  
        TestOuter1 innerObj = new TestOuter1().innerC();  
        obj.msgC()  
    }  
}
```

Output:-

data is 30

```

3) import java.util. scanner;
   public class Book Fair {
       string Bname;
       double Price;

       Scanner sc = new Scanner (System.in);

       Public Book Fair()
       {
           Bname = " ";
           Price = 0;
       }

       void Input()
       {
           Bname = sc. nextline();
           Price = sc. next double();
       }

       void Calculate ()
       {
           if (Price <= 1000)
           {
               double discount = (Price/100) * 2;
               Price = Price - discount;
           }
           else if (Price > 1000 && Price <= 3000)
           {
               double discount = (Price/100) * 10;
               Price = Price - discount;
           }
           elseif (Price > 3000)
           {
               double discount = (Price/100) * 15;
           }
           Price = Price - discount;
       }
   }

```



```
void display () {
```

```
    system.out.println (" Book name: " + Book  
                           name + '\n' + "Price: "  
                           + Price);
```

```
}
```

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

```
{
```

```
    Book Fair obj = new Book Fair();
```

```
    obj.input();
```

```
    obj.calculate();
```

```
    obj.display();
```

```
}
```

```
}
```

Output:-

Bname = Java Programming

Price = 1000

discount = 20

Price = 980

Output:-

Book name : Java Programming

Price : 980

4)

To che

write a program to accept a word check and print whether the word is a palam drome (or) only special word

A.

```
import java.util.*;
```

```
public class Main
```

```
{
```

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

```
{
```

```
    System.out.println ("Hello World");
```

```
    String original, reverse = "";
```

```
    Scanner sc = new Scanner (System.in);
```

```
    System.out.print ("enter a string to reverse");
```

```
    original = sc.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 word");
else
    System.out.println ("None");
}
}

```

~~Exmp~~ Input:

Enter a string to reverse : MALAYALAM

Output:-

Palindrome.