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 with out presenting the details.

The differenence between data abstraction and Procedural abstraktion are.

Data abstraction	procedural 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	1) Procedural abstraction are normally characterized in a programming language as function / Sub-function or procedur abstraction.
2) Data abstraction refers to defining the behaviour of the data structure.	2) In procedural abstraction, methods are used to capture the procedural Patterns, abstracting over behaviour.
3. Data abstraction also includes various data types provided by programming languages DBMS. (or) language APIs	3) In this abstraction, one Class call methods of another class without knowing implementation detai

```
Public  class  quadrilateral {
      Protected  int  x1, x2, x3, x4,  y1, y2 ,  y3, y4;
      Protected  void Set coordinate (int a, int b, int c, int d,
      inte,  int f,  int g,  int h)
      {
          x1=a;
          y1 = b;
          x2=c;
          y2= d;
          x3 = e;
          y3 = f;
          x4 = g ;
          y4 = h;
      }
  }
  Public  class   square extends  quadrilateral
  {
   Square (int a, int b, int c, int d,  int e,  int f,  int g,  int h)
   {
     Set co-ordinate. (a,b,c,d,e,f,g,h);
   }
   intarea( )
   {
     int d = (int) Math. sqrt ((x1-x2) * (x1-x2) +  (y1-y2) * (y1-y2)
     return  d* d ;
   }
   }
```

```
Public class Rectangle extends Quadrilateral
{
 Rectangle (int a, int b, int c, int d, int e, int f, int g, 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 (int a, int b, int c ,int d, int e, int f, int g ,int h,
 int height)        int
 {
  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, 10, 20, 20, 10, 20);
Reclange rec = new rectangle(10, 10, 30, 10, 30, 20, 10, 20);
Parallelogram Para = new Parallelogram(10, 10, 30, 10, 20, 20,020,);
System. out. print In ("Area of squareis" + sq.area());
System.out. Print In ("Area of rectangle is" + rec.area());
System. out. print In ("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 overlooding 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 student Data( );
    System . out. print ln ("student Name is" + myobj. stuNam
    System. out. Print ln ("student ID is" + my. 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 intnum;
    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. Print ln (" value of mystr: " + mystr);
    }
}
```

```
void display () {
    system. out. print In (" 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 ();
  }
}
```

Out put :-

```
Bname = Java programming
Price = 1000

discount = 20
 Price = 980
```

Out put:-

```
Book name : Java programming
Price     : 980
```

4) ~~To~~ che

write a program to accept a word check and print whether the word is a palan 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. sub string (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");
}
}
```

~~Outp~~ **Input:**

Enter a string to reverse : MALAYALAM

Output:-

Palindrome.