Set A

a) Write a program for multilevel inheritance such that country is inherited from continent. State is inherited from country. Display the place, state, country and continent.

```
import java.io.InputStreamReader;
import java.io.BufferedReader;
import java.io.IOException;
class Continent
{
String con;
InputStreamReader i = new InputStreamReader(System.in);
BufferedReader r = new BufferedReader(i);
void con_input() throws IOException
{
System.out.println("Enter Continent Name: ");
con = r.readLine();
}
}
class Country extends Continent
{
String cou ;
void cou_input() throws IOException
{
System.out.println("Enter Country Name: ");
cou = r.readLine();
}
}
class State extends Country
{
String sta;
void sta_input() throws IOException
{
System.out.println("Enter State Name: ");
sta = r.readLine();
}
}
class Main extends State
{
String pla;
void pla_input()throws IOException
```

```
{
System.out.println("Enter Place Name : ");
pla = r.readLine();

}

public static void main( String argsp[] )throws IOException
{
Main s = new Main();
s.con_input();
s.cou_input();
s.sta_input();
s.pla_input();
System.out.println("\n\nContinent: "+s.con);
System.out.println("Country: "+s.cou);
System.out.println("State: "+s.sta);
System.out.println("Place :" + s.pla);
}
}
```

O/P

```
Enter Continent Name:
Asia
Enter Country Name:
India
Enter State Name:
Maharashtra
Enter Place Name :
Pune

Continent: Asia
Country: India
State: Maharashtra
Place :Pune
```

b) Define an abstract class Staff with protected members id and name. Define a parameterized constructor. Define one subclass OfficeStaff with member department. Create n objects of OfficeStaff and display all details.

```
import java.io.IOException;
import java.io.InputStreamReader;
abstract class Staff{
String name,address;
}
class FullTimeStaff extends Staff{
String department;
double salary;
public void accept() throws IOException{
System.out.println("Enter the name, address, department and salary: ");
BufferedReader br=new BufferedReader(new InputStreamReader(System.in));
name=br.readLine();
address=br.readLine();
department=br.readLine();
salary=Double.parseDouble(br.readLine());
}
public void display(){

System.out.println("Name: "+name);
System.out.println("Address: "+address);
System.out.println("Department: "+department);
System.out.println("Salary: "+salary);
System.out.println("----------------------");
}
}
class PartTimeStaff extends Staff{
int hours, rate;
public void accept() throws IOException{
System.out.println("Enter the name, address, No of working hours and rate per hour: ");
BufferedReader br=new BufferedReader(new InputStreamReader(System.in));
name=br.readLine();
address=br.readLine();
hours=Integer.parseInt(br.readLine());
rate=Integer.parseInt(br.readLine());
}
public void display(){
System.out.println("Name: "+name);
System.out.println("Address: "+address);
System.out.println("No of Working Hours: "+hours);
```

```
System.out.println("Rate per hour: "+rate);
System.out.println("----------------------");
}
}
public class sb1 {
public static void main(String [] args) throws IOException{
int i;
System.out.println("Select Any One: ");
BufferedReader br=new BufferedReader(new InputStreamReader(System.in));
System.out.println("1.Full Time Staff");
System.out.println("2.Part Time Satff");
int ch=Integer.parseInt(br.readLine());
switch(ch){
case 1:
System.out.println("Enter the number of Full Time Staff: ");
int n=Integer.parseInt(br.readLine());
FullTimeStaff [] l=new FullTimeStaff[n];
for(i=0;i<n;i++){
l[i]=new FullTimeStaff();
l[i].accept();
}
for(i=0;i<n;i++){
l[i].display();
}
break;
case 2:
System.out.println("Enter the number of Part Time Staff: ");
int m=Integer.parseInt(br.readLine());
PartTimeStaff [] h=new PartTimeStaff[m];
for(i=0;i<m;i++){
h[i]=new PartTimeStaff();

h[i].accept();
}
for(i=0;i<m;i++){
h[i].display();
}
break;
}
}
```

}

OUTPUT
Select Any One:
1.Full Time Staff
2.Part Time Satff
1
Enter the number of Full Time Staff:
2
Enter the name, address, department and salary:
Rohit
Pune
AB
19000
Enter the name, address, department and salary:
Karan
Mumbai
BA
18000
Name: Rohit
Address: Pune
Department: AB
Salary: 19000.0

Name: Karan
Address: Mumbai
Department: BA
Salary: 18000.0

c) Define an interface “Operation” which has methods area(),volume().Define a constant PI having a value 3.142.Create a class cylinder which implements this interface (members – radius, height) Create one object and calculate the area and volume.

```
import java.io.*;
interface Operation
```

```
{
final static float pi=3.142f;
void area();
void volume();
}
class Cylinder implements Operation
{
double radius,height;
void input() throws Exception
{
BufferedReader br = new BufferedReader(new InputStreamReader(System.in));
System.out.print("\n Enter the radius and height=");
radius=Double.parseDouble(br.readLine());
height=Double.parseDouble(br.readLine());
}
public void area()
{
double a=(2*pi*radius*height)+(2*pi*radius*radius);
System.out.println("the area of cylinder is " +a);
}
public void volume()
{
double v=pi*radius*radius*height;
System.out.println("the volume of cylinder is "+v);
}
}
class slipno11a
{
public static void main(String args[]) throws Exception
{
Cylinder C1=new Cylinder();
C1.input();
C1.area();

C1.volume();
}
}
```

d) Write a program to find the cube of given number using function interface.

```
import java.util.Scanner;

public class FindingCube {
   public static void main(String args[]){
      int n = 5;
      System.out.println("Enter a number ::");
      Scanner sc = new Scanner(System.in);
      int num = sc.nextInt();
      System.out.println("Cube of the given number is
"+(num*num*num));
   }
}
```

```
OUTPUT

Enter a number ::
5
Cube of the given number is 125
```

Set B

a) Create an abstract class “order” having members id,description.Create two subclasses “Purchase Order” and “Sales Order” having members customer name
and Vendor name respectively.Define methods accept and display in all cases. Create 3 objects each of Purchase Order and Sales Order and accept and display Details.

```
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;
abstract class Order{
String id,description;
}
class PurchaseOrder extends Order{
String Customername,Vendorname;
public void accept() throws IOException{
System.out.println("Enter the id,description,names of customers and vendors: ");
BufferedReader br=new BufferedReader(new InputStreamReader(System.in));
```

```
id=br.readLine();
description=br.readLine();
Customername=br.readLine();
Vendorname=br.readLine();
}
public void display(){
System.out.println("id: "+id);
System.out.println("Description: "+description);
System.out.println("Customername: "+Customername);
System.out.println("Vendorname: "+Vendorname);
System.out.println("----------------------");
}
}
class SalesOrder extends Order{
String Customername,Vendorname;
public void accept() throws IOException{
System.out.println("Enter the id,description,names of customers and vendors: ");
BufferedReader br=new BufferedReader(new InputStreamReader(System.in));
id=br.readLine();
description=br.readLine();
Customername=br.readLine();
Vendorname=br.readLine();
}
public void display(){
System.out.println("id: "+id);
System.out.println("Description: "+description);
System.out.println("Customername: "+Customername);
System.out.println("Vendorname: "+Vendorname);
System.out.println("----------------------");
}
}
public class Main {
public static void main(String [] args) throws IOException{

int i;
System.out.println("Select Any One: ");
BufferedReader br=new BufferedReader(new InputStreamReader(System.in));
System.out.println("1.Purchase Order");
System.out.println("2.Sales Order");
int ch=Integer.parseInt(br.readLine());
```

```
switch(ch){
case 1:
System.out.println("Enter the number of purchase Orders: ");
int n=Integer.parseInt(br.readLine());
PurchaseOrder [] l=new PurchaseOrder[n];
for(i=0;i<n;i++){
l[i]=new PurchaseOrder();
l[i].accept();
}
for(i=0;i<n;i++){
l[i].display();
System.out.println ("Object is created");
}
break;
case 2:
System.out.println("Enter the number of sales orders: ");
int m=Integer.parseInt(br.readLine());
SalesOrder [] h=new SalesOrder[m];
for(i=0;i<m;i++){
h[i]=new SalesOrder();
h[i].accept();
}
for(i=0;i<m;i++){
h[i].display();
System.out.println(" Object is created ");
}
break;

}
}
}
```

OUTPUT

```
Select Any One:
1.Purchase Order
2.Sales Order
1
Enter the number of purchase Orders:
2
Enter the id,description,names of customers and vendors:
```

```
1
Soap
Rahul
Gajni
Enter the id,description,names of customers and vendors:
2

Handwash
prince
abhishek
id: 1
Description: Soap
Customername: Rahul
Vendorname: Gajni
----------------------
Object is created
id: 2
Description: Handwash
Customername: prince
Vendorname: abhishek
----------------------
Object is created
```

b) Write a program to using marker interface create a class product(product_id, product_name, product_cost, product_quantity) define a default and parameterized
constructor. Create objects of class product and display the contents of each object
and Also display the object count.

```
import java.util.*;
interface ProductMarker
{
}
class Product implements ProductMarker
{
int id;
```

```
String name;
int cost;
int quantity;
int count;
Product(){
id=0;
name=" ";
cost=0;
quantity=0;
}
Product(int id, String name, int cost, int quantity){
this.id=id;
this.name=name;
this.cost=cost;
this.quantity=quantity;
this.count++;
}
}
public class Products
{
public static void main(String[] args)
{
int count=0;
Scanner a = new Scanner(System.in);
System.out.println("How many product ?");
int number = a.nextInt();

System.out.println("\n");
Product products[] = new Product[number];
System.out.println("Enter Product data");
for(int k=0; k<number; k++)
{
System.out.println("Product Id ");
int id =a.nextInt();
System.out.println("Product name ");
String name = a.next();
System.out.println("Product cost ");
int cost = a.nextInt();
System.out.println("Product qantity ");
int quantity = a.nextInt();
```

```
System.out.println("\n");
products[k] = new Product(id, name, cost, quantity);
count++;
}
//Testing for marker interface
if(products[0] instanceof ProductMarker){
System.out.println("Class is using ProductMarker");
}
System.out.println(" Product details\n");
for(Product product:products)
{
System.out.println("Product Id " + product.id);
System.out.println("Product name " + product.name);
System.out.println("Product cost " + product.cost);
System.out.println("Product qantity " + product.quantity);
System.out.println("\n");
}
System.out.println("Total object is "+count);
}
}
```

OUTPUT

```
How many product ?
2

Enter Product data
Product Id
1
Product name
XtraPen
Product cost
5
Product qantity
5

Product Id
2
Product name
XtraPencil
```

Product cost
2
Product qantity
4

Class is using ProductMarker
Product details
Product Id 1
Product name XtraPen
Product cost 5
Product qantity 5

Product Id 2
Product name XtraPencil
Product cost 2
Product qantity 4

Total object is 2