**Practical 2.4**

**Aim:**

Add a new Server in 2.3 to read the data from the database and display it on output screen of client.

**Program code:**

**Student.java**

**import** java**.**io**.\*;**

//Student implements Serializable to convert its object into byte stream.

class Student **implements** Serializable**{**

String enrollno**;**

String name**;**

public void setEnrollno**(**String enrollno**){**

**this.**enrollno **=** enrollno**;**

**}**

public void setName**(**String name**){**

**this.**name **=** name**;**

**}**

public String getEnrollno**(){**

**return** enrollno**;**

**}**

public String getName**(){**

**return** name**;**

**}**

**}**

**RemoteInterface1.java**

**import** java**.**rmi**.\*;**

public interface RemoteInterface1 **extends** Remote

**{**

public boolean insertInDB**(**String enroll**,** String name**)throws** Exception**;**

**}**

**ServerImplements1.java**

**import** java**.**rmi**.\*;**

**import** java**.**rmi**.**server**.\*;**

**import** java**.**lang**.**String**;**

**import** java**.**sql**.\*;**

public class ServerImplements1 **extends** UnicastRemoteObject **implements** RemoteInterface1 **{**

// JDBC driver name and database URL

static final String JDBC\_DRIVER **=** "org.postgresql.Driver"**;**

static final String DB\_URL **=** "jdbc:postgresql://127.0.0.1:5433/postgres"**;**

// Database credentials

static final String USER **=** "postgres"**;**

static final String PASS **=** "12345"**;**

public ServerImplements1**()throws** Exception **{**

**super();**

**}**

public boolean insertInDB**(**String enroll**,** String name**)** **{**

Connection conn **=** **null;**

Statement stmt **=** **null;**

System**.**out**.**println**(**enroll **+** name**);**

**try{**

//STEP 2: Register JDBC driver

Class**.**forName**(**JDBC\_DRIVER**);**

//STEP 3: Open a connection

System**.**out**.**println**(**"Connecting to selected database..."**);**

conn **=** DriverManager**.**getConnection**(**DB\_URL**,** USER**,** PASS**);**

System**.**out**.**println**(**"Connected database successfully..."**);**

//STEP 4: Execute a query

System**.**out**.**println**(**"Inserting data in Table 'studentinfo' of Database 'postgres'..."**);**

stmt **=** conn**.**createStatement**();**

String sql **=** "INSERT INTO studentinfo(enrollno, name) VALUES ('"**+**enroll**+**"', '"**+**name**+**"')"**;**

stmt**.**executeUpdate**(**sql**);**

System**.**out**.**println**(**"Data Inserted successfully..."**);**

**}** **catch(**SQLException se**)** **{**

//Handle errors for JDBC

se**.**printStackTrace**();**

**}** **catch(**Exception e**)** **{**

//Handle errors for Class.forName

e**.**printStackTrace**();**

**}finally{**

//finally block used to close resources

**try{**

**if(**stmt**!=null)**

stmt**.**close**();**

**}** **catch(**SQLException se2**)** **{**

**}**// nothing we can do

**try{**

**if(**conn**!=null)**

conn**.**close**();**

**}** **catch(**SQLException se**)** **{**

se**.**printStackTrace**();**

**}**//end finally try

**}**//end try

System**.**out**.**println**(**"Goodbye!"**);**

**return** **true;**

**}**

**}**

**Server1.java**

**import** java**.**rmi**.\*;**

**import** java**.**net**.\*;**

public class Server1

**{**

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

**{**

**try**

**{**

ServerImplements1 s1**=new** ServerImplements1**();**

Naming**.**rebind**(**"SERVICE1"**,**s1**);**

System**.**out**.**println**(**"Server 1 Started "**);**

**}**

**catch(**Exception e**)**

**{**

System**.**out**.**println**(**e**.**getMessage**());**

**}**

**}**

**}**

**RemoteInterface2.java**

**import** java**.**rmi**.\*;**

public interface RemoteInterface1 **extends** Remote

**{**

public boolean insertInDB**(**String enroll**,** String name**)throws** Exception**;**

**}**

**ServerImplements2.java**

**import** java**.**rmi**.\*;**

**import** java**.**rmi**.**server**.\*;**

**import** java**.**lang**.**String**;**

**import** java**.**sql**.\*;**

**import** java**.**util**.\*;**

public class ServerImplements2 **extends** UnicastRemoteObject **implements** RemoteInterface2 **{**

// JDBC driver name and database URL

static final String JDBC\_DRIVER **=** "org.postgresql.Driver"**;**

static final String DB\_URL **=** "jdbc:postgresql://127.0.0.1:5433/postgres"**;**

// Database credentials

static final String USER **=** "postgres"**;**

static final String PASS **=** "12345"**;**

public ServerImplements2**()throws** Exception **{**

**super();**

**}**

public ArrayList**<**Student**>** selectFromDB**()** **{**

ArrayList**<**Student**>** data **=** **new** ArrayList**<**Student**>();**

//Student is another class;

Connection conn **=** **null;**

Statement stmt **=** **null;**

//String[] data = new String[2];

**try{**

//STEP 2: Register JDBC driver

Class**.**forName**(**JDBC\_DRIVER**);**

//STEP 3: Open a connection

System**.**out**.**println**(**"Connecting to selected database..."**);**

conn **=** DriverManager**.**getConnection**(**DB\_URL**,** USER**,** PASS**);**

System**.**out**.**println**(**"Connected database successfully..."**);**

//STEP 4: Execute a query

System**.**out**.**println**(**"Fetching data from Table 'studentinfo' of Database 'postgres'..."**);**

stmt **=** conn**.**createStatement**();**

String sql **=** "SELECT enrollno, name FROM studentinfo"**;**

ResultSet rs **=** stmt**.**executeQuery**(**sql**);**

System**.**out**.**println**(**"Data Inserted successfully..."**);**

**while(**rs**.**next**()){**

String enrollno **=** rs**.**getString**(**"enrollno"**);**

String name **=** rs**.**getString**(**"name"**);**

Student student **=** **new** Student**();**

student**.**setEnrollno**(**enrollno**);**

student**.**setName**(**name**);**

//data[0] = enrollno;

//data[1] = name;

data**.**add**(**student**);**

**}**

**}** **catch(**SQLException se**)** **{**

//Handle errors for JDBC

se**.**printStackTrace**();**

**}** **catch(**Exception e**)** **{**

//Handle errors for Class.forName

e**.**printStackTrace**();**

**}finally{**

//finally block used to close resources

**try{**

**if(**stmt**!=null)**

stmt**.**close**();**

**}** **catch(**SQLException se2**)** **{**

**}**// nothing we can do

**try{**

**if(**conn**!=null)**

conn**.**close**();**

**}** **catch(**SQLException se**)** **{**

se**.**printStackTrace**();**

**}**//end finally try

**}**//end try

System**.**out**.**println**(**"Goodbye!"**);**

**return** data**;**

**}**

**}**

**Server2.java**

**import** java**.**rmi**.\*;**

**import** java**.**net**.\*;**

public class Server2 **{**

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

**try** **{**

ServerImplements2 s2**=new** ServerImplements2**();**

Naming**.**rebind**(**"SERVICE2"**,**s2**);**

System**.**out**.**println**(**"Server 2 Started "**);**

**}** **catch(**Exception e**){**

System**.**out**.**println**(**e**.**getMessage**());**

**}**

**}**

**}**

**Client.java**

**import** java**.**rmi**.\*;**

**import** java**.**io**.\*;**

**import** java**.**util**.**Scanner**;**

**import** java**.**util**.\*;**

public class Client **{**

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

Scanner in **=** **new** Scanner**(**System**.**in**);**

String enroll**,** name**;**

**try** **{**

System**.**out**.**println**(**"Enroll no: 130050131063"**);**

String ip1**=**"rmi://localhost/SERVICE1"**;**

RemoteInterface1 s1 **=** **(**RemoteInterface1**)**Naming**.**lookup**(**ip1**);**

String ip2**=**"rmi://localhost/SERVICE2"**;**

RemoteInterface2 s2 **=** **(**RemoteInterface2**)**Naming**.**lookup**(**ip2**);**

System**.**out**.**println**(**"Enter Enrollno: "**);**

enroll **=** in**.**nextLine**();**

System**.**out**.**println**(**"Enter Name: "**);**

name **=** in**.**nextLine**();**

**if(**s1**.**insertInDB**(**enroll**,** name**)){**

System**.**out**.**println**(**"Data Inserted."**);**

**}else** **{**

System**.**out**.**println**(**"Data Not Inserted."**);**

**}**

ArrayList**<**Student**>** data **=** **new** ArrayList**<**Student**>();**

data **=** s2**.**selectFromDB**();**

System**.**out**.**println**();**

System**.**out**.**println**(**"Data fetched from database"**);**

**for(**int i **=** 0**;** i **<** data**.**size**();** i**++){**

Student student **=** **(**Student**)** data**.**get**(**i**);**

System**.**out**.**println**(**"Enrollno: "**+**student**.**getEnrollno**());**

System**.**out**.**println**(**"Name: "**+**student**.**getName**());**

**}**

//String[] data = s2.selectFromDB();

//System.out.println("Enrollno: "+data[0]);

//System.out.println("Name: "+data[1]);

**}** **catch(**Exception e**)** **{**

System**.**out**.**println**(**e**.**getMessage**());**

e**.**printStackTrace**();**

**}**

**}**

**}**

**Input Output:**

