

Experiment No : 3

Title: Write a program to implement CRUD operation in JDBC.

Theory :

A) JDBC

JDBC stands for Java Database connectivity.

JDBC is an API to connect and execute the query with the database. It is a part of Java SE (Standard Edition). JDBC API to connect uses JDBC drivers to connect with the database.

Before, JDBC, ODBC API was the database API to connect and execute the query with the database. But ODBC API uses ODBC driver which is written in C language (i.e. platform dependent & unsafe). That is why Java has defined its own API that uses JDBC driver written in Java.

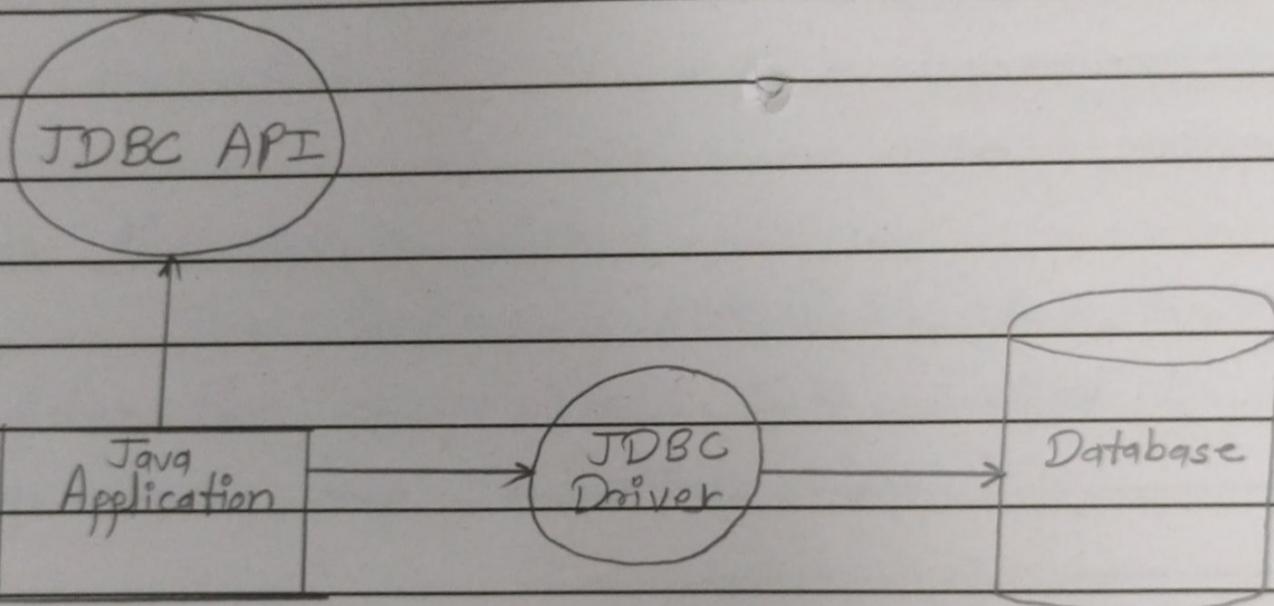
B) API

~~API~~ Stands for Application Programming Interface. It is a document that contains the description of all the features of a product or software. It represents classes and Interfaces that software programs can follow to communicate with each other.

other. An API can be created for applications libraries, operating system, etc.

c] JDBC Driver:

JDBC driver is a software component that enables java application to interact with the database.



There are 4 types of JDBC drivers:

- 1] JDBC - ODBC bridge driver
- 2] Native - API driver (partially Java driver)
- 3] Native - Protocol driver (fully Java driver)
- 4] Thin driver (fully Java driver).

D] Database Connectivity steps.

There are 5 steps to connect any Java application with the database using JDBC.

- 1] Register the driver class
- 2] Create Connection.
- 3] Create Statement
- 4] Execute queries.
- 5] Close connection.

1] Register the Driver class.

The `forName()` method of class is used to register the driver class. This method is used to dynamically load the driver class.

* Syntax :- `public static void forName(String className)`
`throws ClassNotFoundException.`

2] Create the Connection object.

The `getConnection()` method of ~~DriverManager~~ class is used to establish connection with the database.

* Syntax :- 3] `public static Connection getConnection(String url)` throws `SQLException.`

2] `public static Connection getConnection(
String url, String name, String password)
throws SQLException.`

3] Create the Statement object

The `createStatement()` method of `Connection` interface is used to create statement. The object of statement is responsible to execute queries with the database.

* Syntax :- `public Statement createStatement()
throws SQLException.`

4] Execute the query

The `executeQuery()` method of `Statement` interface is used to execute queries to the database.

* Syntax :- `public ResultSet executeQuery (String sql)
throws SQLException.`

5] Close the Connection. The `close()` method of `Connection` interface is used to close the connection.

* Syntax :- `public void close() throws SQLException.`

Experiment No. 4.

Title :- Create Exam Registration form using JDBC Connectivity.

Theory :- Example of Registration form in servlet
Here, we are using oracle 10g database. so, you need to create a table first.

```
CREATE TABLE "REGISTERUSER"  
("NAME" VARCHAR 2 (4000),  
"PASS" VARCHAR 2 (4000),  
"EMAIL" VARCHAR 2 (4000),  
"COUNTRY" VARCHAR 2 (4000),  
)
```

hn = op;

To create the registration page in servlet, we can separate the database logic from the servlet. But here, we are mixing the database logic in the servlet only for simplicity of the program.

Example of Registration form in servlet. In this example, we have created the three pages.

register.html

Register.java

web.xml

register.html :-

In this page, we have getting input from the user using text fields and combobox. The information entered by the user is forwarded to Register servlet, which is responsible to store the data into the database.

Register.java :-

This servlet class receives all the data entered by user and stores it into the database. Here, we are performing the database logic. But you may separate it, which will be better for the web application.

Web.xml file :-

This is the configuration file, providing information about the servlet.

above part

Experiment No. 5

Title :- Write a program for creating Edit Menu for Notepad using frame.

Theory :-

A] Introduction to swing :-

Java swing is a part of java foundation classes (JFC) that is used to create window-based applications. It is built on top of AWT (Abstract Window Toolkit) API and entirely written in java, swing provides platform independent and lightweight components. The `java.awt.swing` package provides classes for java swing API such as JButton, JTextField etc.

B] Difference between AWT and swing :-

Java AWT

Java Swing

- | | |
|---|--|
| i] AWT components are platform dependent. | ii] Swing components are platform independent. |
| iii] AWT components are heavy weight. | iv] Swing components are light weight. |
| v] AWT doesn't support pluggable look & feel. | vi] Swing supports pluggable look and feel. |

- iv] AWT provides less components than swing.
- v] Swing provides more power components such as tasks lists, scroll planes, cardpans scroll etc.
- v] AWT doesn't follow MVC (MultiView Controller) where model represents data, view represents., presentation and controller acts as an interface bet'n model & view.
- v] Swing follows MVC.

c] Commonly used methods of components class

Method	Description
1] public void add(Component c)	1] add a component on component.
2] public void setLayout(Layout Manager)	2] set the layout manager for the components.
3] public void setSize(int width, int height)	3] set size of the component.
4] public void setVisible(boolean b)	4] sets the visibility of the end. It is used by default.

i] JFrame class :- The javax.swing.JFrame class is a type of container which inherits the Java.awt.Frame class. JFrame works like the main window where components like Labels, buttons, etc. are added to create a GUI.

* Constructors

i] `JFrame()` :- It constructs a new frame that is initially visible.

ii] `JFrame(GraphicsConfiguration gc)` :-
It creates a frame in the specified graphic configuration of a screen device and a black title.

iii] `JFrame(String title, GraphicsConfiguration gc)` :-

It creates a JFrame with the specified graphics Configuration of a screen device.

iv] ~~`JFrame(String title)`~~ :-

It creates a new, initially invisible frame with the specified title.

* Useful methods.

1] Protected void addImpl(Component, object constraints
int index):-

Adds the specified child component.

2] Protected void frameInit():-

called by the constructors to init the
Frame properly.

3] void setIconImage(Images image):-

If sets the image to be displayed as
the icon from this window.

4] void setMenuBar(JMenuBar menubar):-

It sets the layeredpane property.

5] void setLayeredPane(JLayeredPane layeredpane):-

It sets the layerpane property.

6] JRootPane getRootPane():-

It returns the rootpane object
for this frame.

Experiment No. 6

Title :- Write a program for creating simple servlet with JDBC.

Theory :- Steps to create a servlet example. steps to create the servlet using Tomcat server.

Create a directory structure.

Create a Servlet.

Compile the Servlet.

Create a deployment descriptor.

Start the server and deploy the application. These steps are required for all the servers.

The Servlet example can be created by three ways:-

By implementing servlet interface,

By inheriting GenericServlet class, (or)

By inheriting HttpServlet class.

The mostly used approach is by extending HttpServlet because it provides http request specific method such as doGet(), doPost(), doHead() etc.

Here, we are going to use apache tomcat server in their example. The steps are as follows:

Create a directory structure.

Create a servlet.

Compile the servlet.

Create a deployment descriptor.

Start the server and deploy the project Access the servlet.

1] Create a directory structures.

The directory structure defines that where to put the different types of files so that web container may get the information and respond to the client.

The sun Microsystem defines a unique standard to be followed by all the server vendors. Let's see the directory structure that must be followed to create the servlet. The web.xml file must be under the WEB-INF folder.

2] Create a servlet.

There are three ways to create the servlet.

By implementing the Servlet interface.

By inheriting the GenericServlet class.

By inheriting the HttpServlet class.

The HttpServlet class is widely used to create the servlet because it provides methods to handle http

requests such as doGet(), doPost, doHead(), etc.

3] Compile the Servlet

For compiling the services, jar file is required to be loaded. Different servers provide different jar files:

Jar file server

1] Servlet-api.jar Apache Tomcat

2] Weblogic.jar weblogic.

3] javadk.jar Glassfish

4] javaee.jar JBoss.

4] Create the deployment descriptor (web.xml file)

The deployment descriptor is an xml file, from which Web container gets the information about the servlet to be invoked.

There are many elements in the web.xml file. Here is given some necessary elements to run the simple servlet program.

5] Start the Server and deploy the project.

To start Apache Tomcat server, double click on the startup.bat file under apache-tomcat/bin directory.

Practical No.-7

Title :- Create Employee information form using JSP.

Theory :-

A] Introduction to JSP :-

JSP stands for Java Server Pages, it is used to create web application just like servlet-technology. It can be thought of as an extension to servlet because, it provides functionality more than servlet such as expression language, JSTL, etc.

A JSP page contains / consists HTML tags and JSP tags. The JSP pages are easier to maintain than servlet because we can separate design and development.

B] Advantages of JSP over servlet :-

1] Extension to servlet

2] Easy to maintain

3] fast development : No need to recompile and redeploy.

4] Less code than servlet

Q) Life Cycle of JSP Page:- The JSP pages follows these phases:

- 1] Translation of JSP Page.
- 2] Compilation of JSP page.
- 3] Class loading (the classloader loads the class)
- 4] Instantiation (object of Generated servlet is created).
- 5] Initialization (the container invokes `jspInit()`)
- 6] Request processing (the container invokes `-jspService()`)
- 7] Destroy (the container invokes `jspDestroy()`)

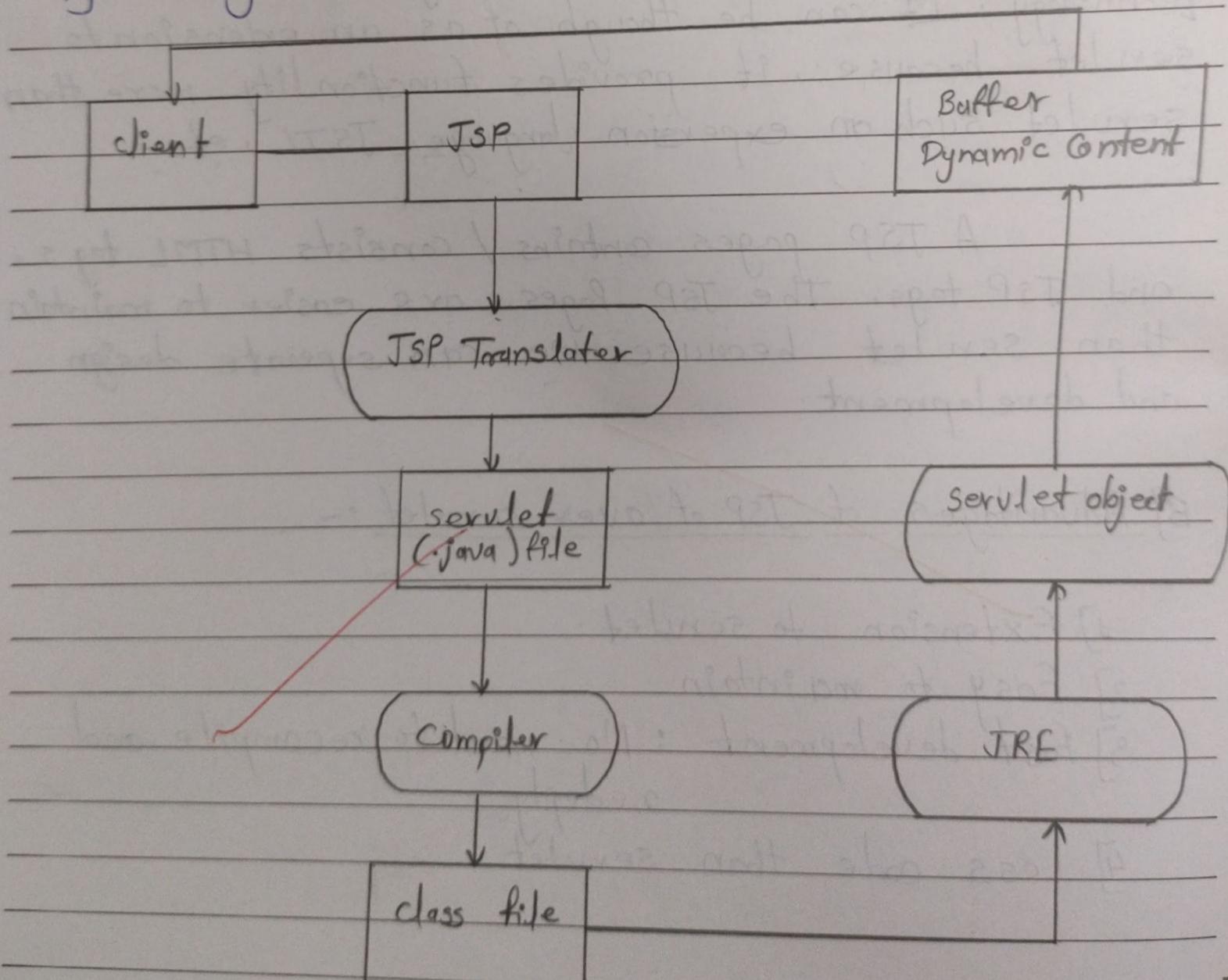


fig. Life cycle of JSP Page.

D) JSP Scripting elements :-

Java code can be written inside the JSP page using scripting elements. These are three types of scripting elements.

- 1] Scriptlet tag.
- 2] expression tag.
- 3] declaration tag.

1] Scriptlet tag :- A scriptlet tag is used to execute Java source code in JSP.

*Syntax :- `<% Java source code %>`

2] Expression tag :- The code placed within expression tag is written to the output stream of the response so no need to write `out.print()` to write data.

*Syntax :- ~~`<% = Statement %>`~~

3] Declaration tag :- Declaration tag is used to declare fields and methods.

The code written inside declaration tag is placed outside the declaration tag is placed outside the service () method.

* Syntax :- ~~`<%! field or method declaration %>`~~

Practical No - 8

Title :- Write a program for implementing concept of MVC Architecture.

Theory :-

A) MVC Architecture :- MVC stands for view controller. It is a design pattern that separates the business logic, presentation logic and data. Controller acts as an interface between View and Model. Controller intercepts all the incoming requests.

Model represents the state of the application i.e. data. It can also have business logic.

View represents the presentation i.e. UI (User Interface).

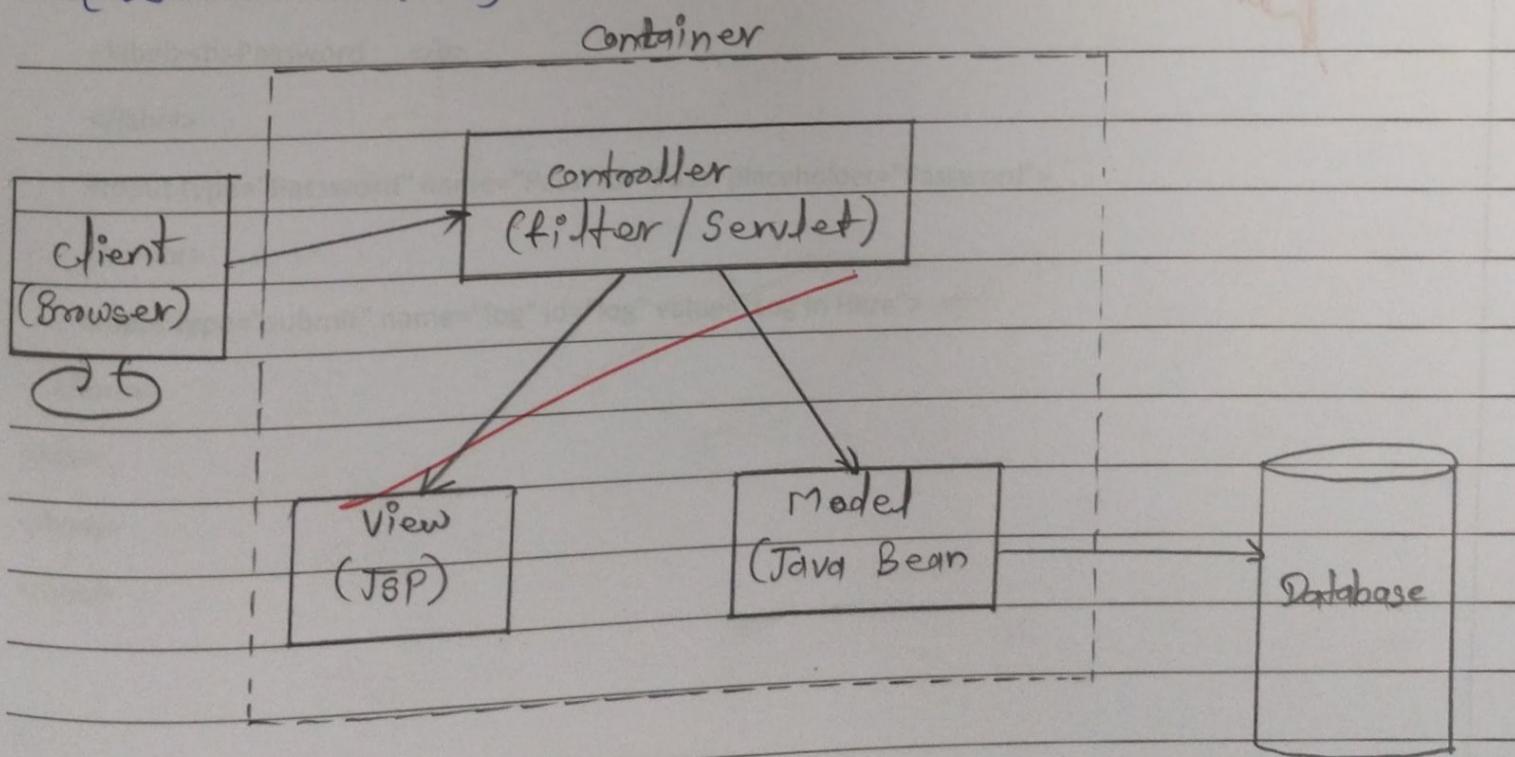


fig. MVC Architecture

B] Advantages of MVC Architecture :-

- 1] Multiple developers can work with the three layers (Model, view, controllers) simultaneously.
- 2] Offers improved scalability, that supplements the ability to the application to grow.
- 3] Easy to maintain the layer application.
- 4] A model can be reused by multiple views which provides reusability of code!
- 5] Extending & testing of the application becomes easy.

Author

Practical No - 9.

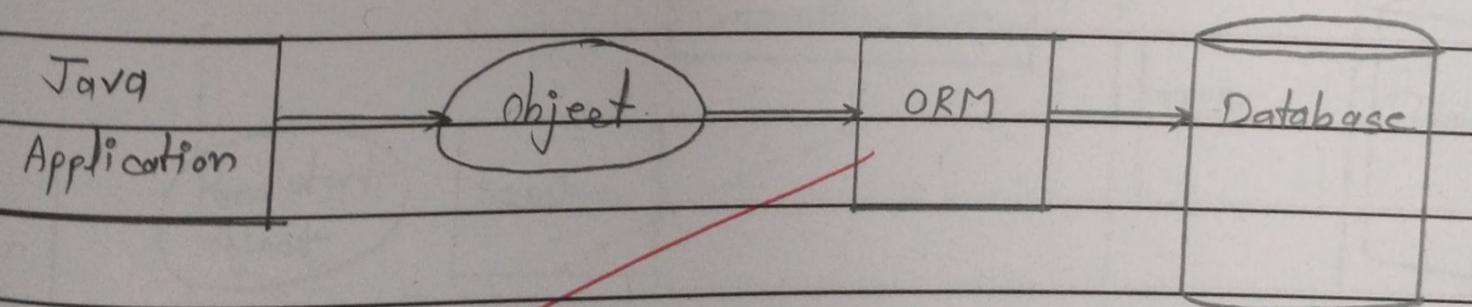
Title :- Write a program for implementing concept of Hibernate, stubs, spring.

Theory :-

A] Hibernate framework :- Hibernate is a Java framework that simplifies the development of Java application to interact with the database. It is an open source light-weight, ORM (Object Relational Mapping) tool.

B] ORM Tool

An ORM tool simplifies the data creation, data manipulation and data access. It is a programming technique, that maps the object to the data stored in the database.



C] JPA

Java persistent API (JPA) is a Java specification that provides certain functionalities & standards to ORM tools. javax.persistence package contains it.

3] Need of Hibernate framework

i] Hibernate overcomes the database dependency found in the JDBC.

ii] changing of the databases cost a lot working on JDBC, hibernate overcomes this problem with flying ~~columns~~ colors.

iii] Hibernate strengthens the object level relationship.

4] Hibernate Architecture

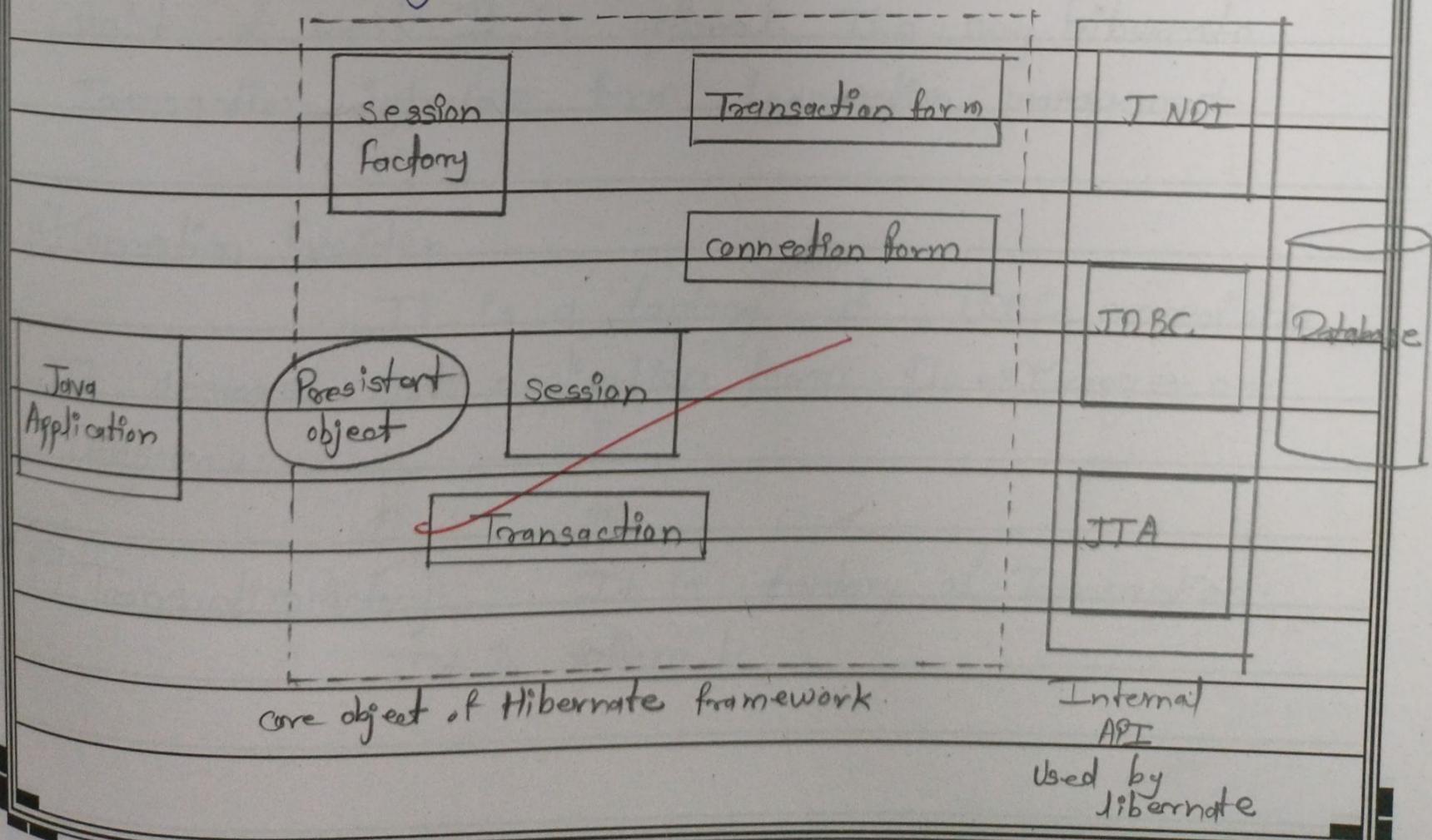
The hibernate architecture is categorized in four layers.

i] Java application layer.

ii] Hibernate framework layer.

iii] Backhand api layer

iv] Database layer.



* Elements of Hibernate Architecture :-

1] Session factory .

It is a factory of session and client of ConnectionProvider. It holds second level cache (optional) data.

2] Session

The Session object provides an interface between the application and the data stored in the database.

3] Transaction

The transaction object specifies the atomic unit of work. It is optional. The org.hibernate.Transaction interface form Transaction management.

4] Connection Provider

It is a factory of JDBC connections. It abstracts the application from Diver Manager or Data source.

5] Transactionfactory

It is factory of Transaction. It is optional.

Practical No 10.

Title :- Write a program for implementing concept of Maven project.

Theory :-

A) Maven

Maven is a powerful project management tool that is based on POM (Project Object Model). It is used for project build dependency and documentation.

The Maven project is developed by Apache Software foundation where it was formerly a part of the Jakarta project. Maven dynamically downloads Java libraries and Maven plug-ins from one or more.

Maven can also help to build and manage projects written in C#. Ruby, Scala and other languages.

B) Maven Repository

A maven repository is a directory of package JAR file with pom.xml file. Maven searches for dependencies in the repositories.

There are 3 types of maven repositories :

- 1] Local Repository
- 2] Central Repository
- 3] Remote Repository

1] Maven Local Repository :- It is located in our local system. It is created by the maven when we run any maven command.

By default maven local repository is, `%userHome%/.m2` directory.

2] Maven central Repository :-

It is located on the web. It has been created by the apache maven community itself. The path of central repository is : <https://repo1.maven.org/maven2/>.

3] Maven Remote Repository :-

It is located on the web. Most of libraries can be missing from the central repository so we need to define remote repository in `pom.xml` file.

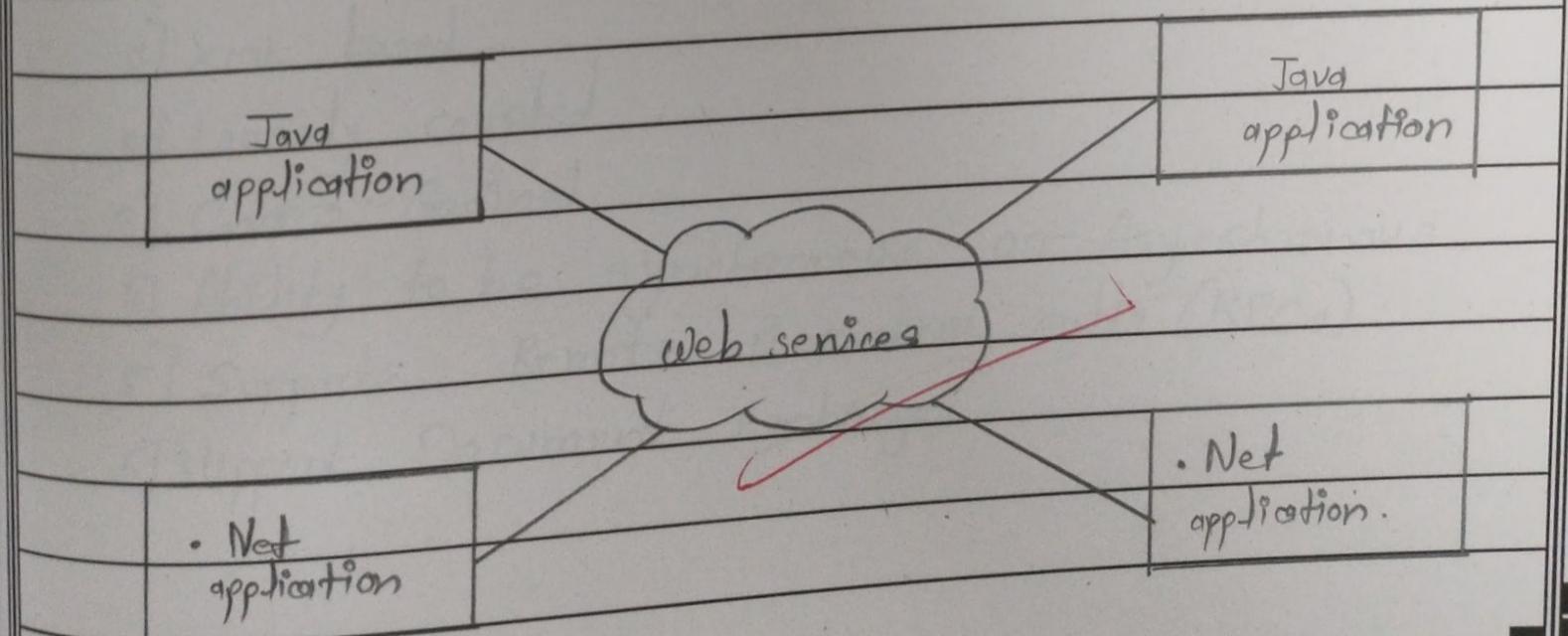
Practical No - 11.

Title :- Write a program for implementing concept of web services.

Theory :-

A] Web service. A web service can be defined by following ways:

- i] It is a client - server application or application component for communication.
- ii] The method of communication between two devices over the network.
- iii] It is a software system for the interoperable machine to machine communication.



B] Types of Web services

There are mainly two types of web services.

1] SOAP Web services.

2] RESTful Web services.

1] SOAP Web services :-

SOAP stands for simple object Access Protocol. It is a XML-based protocol for accessing web services.

2] RESTful Web Services :-

REST stands for Representational state Transfer. REST is an architectural style not a protocol.

3] Features of Web service :-

1] XML based

2] Loosely coupled

3] Goods - Grained.

4] Ability to be synchronous or Asynchronous.

5] Supports Remote Procedure calls (RPCs).

6] Support Document ~~Exchange~~.

Practical No - 12

Title :- Write a program for implementing concept of J-unit testing.

Theory :-

A] Introduction to J-Unit Testing:

It is an open-source testing framework for Java programmers. The Java programmers can create test cases and test his/her own code. It is one of the unit testing framework. current version is junit 4.

To perform unit testing, we need to create test cases. The unit test cases is a code which ensures that the program logic works as expected.

B] Types of J-Unit Testing

1] Manual Testing:-

If you execute the test cases manually without any tool support, it is known as manual testing.

2] Automated Testing:-

If you execute the test cases manually by tool support, it is known as automated testing.

c) Assert class

The org.junit.Assert class provides methods to assert the program logic.

* Methods of Assert class

1] assertEquals()

This method checks that two primitives objects are equal.

* Syntax :- void assertEquals (boolean expected, boolean actual).

2] assertTrue()

This method checks that a condition is true.

* Syntax :- void assertTrue (boolean condition).

3] assertFalse()

This method checks that a condition is false.

* Syntax :- void assertFalse (boolean condition).

4] assertNull()

This method checks that object is null.

* Syntax :- void assertNull (Object obj).

3] assertNotNull()

This method checks that object is not null.

* syntax:- void assertNotNull (Object obj).

↓
value

Practical No - 13.

Title :- Write a program for implementing concept of JAXB.

Theory :-

A] JAXB

JAXB stands for Java Architecture for XML Binding. It provides mechanisms to marshal (write) java objects into XML and unmarshal (read) XML into object. simply, we can say it is used to convert java object into XML and vice-versa.

B] features of JAXB 2.0

1] Annotation Support

JAXB 2.0 provides support to annotation so less coding is required to develop JAXB application. The ~~Jaxb. xml. bind. annotation package~~ provides classes and interfaces for ~~JAXB 2.0~~.

2] Support for all W3C XML schema features

3] It provides additional validation support by ~~TAXI~~
1.3 validation API.

c) Marshalling:

Marshalling means writing the java object into xml document. We can achieve this by using Marshaller interfaces.

d) Unmarshalling:

Unmarshalling means creating Java object again using xml file. We can achieve this by using Unmarshaller interface.

Later