

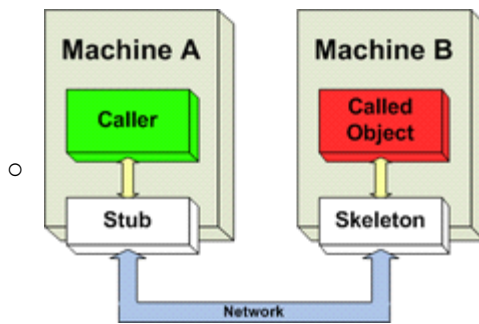
# Advance Java - April 2019

04 April 2020 14:30

Q1) Answer the following (any eight) : [8×2=16]

1. What is jdbc-api
  - The Java Database Connectivity (JDBC) API provides universal data access from the Java programming language
  - Using the JDBC API, you can access virtually any data source, from relational databases to spreadsheets and flat files.
  - JDBC technology also provides a common base on which tools and alternate interfaces can be built.
2. What is Servlet Config ?
  - ServletConfig is an object containing some initial parameters or configuration information created by Servlet Container and passed to the servlet during initialization.
  - ServletConfig is for a particular servlet, that means one should store servlet specific information in web.xml and retrieve them using this object.
  - Example:  
Suppose, one is building a job portal and desires to share different email ids (which may get change over time) to recruiter and job applicant.  
So, he decides to write two servlets one for handling recruiter's request and another one for the job applicant.
3. What is accept() method in networking ?
  - The accept() method of ServerSocket class is used to accept the incoming request to the socket.
  - To complete the request, the security manager checks the host address, port number, and localport.
  - Syntax:
    - public Socket accept ()
4. What is sleep() method ?
  - Thread.sleep() method can be used to pause the execution of current thread for specified time in milliseconds.
  - The argument value for milliseconds can't be negative, else it throws IllegalArgumentException.
5. Give syntax of loading Driver Manager.
  - The DriverManager class acts as an interface between user and drivers.
  - It keeps track of the drivers that are available and handles establishing a connection between a database and the appropriate driver.
  - Example  

```
Class.forName("com.mysql.jdbc.Driver");  
onnection con=null;  
con=DriverManager.getConnection("jdbc:mysql://localhost/student");
```
6. Define Port.
  - The port number is used to uniquely identify different applications. It acts as a communication endpoint between applications.
  - The port number is associated with the IP address for communication between two applications.
7. What is yield() method ?
  - yield() basically means that the thread is not doing anything particularly important and if any other threads or processes need to be run, they should run. Otherwise, the current thread will continue to run.
  - Syntax:
    - public static native void yield()
8. What is Stub and skeleton ?



- To be short, stub and skeleton are counterparts in a web service setup. Skeleton belongs to service provider side and stub belongs to receiver side. At lower level stub and skeleton communicate with each other.
- From client side the business objects communicates with stub objects and stub takes the responsibility from the message and invoke the web service. Once the invoking is done, at service provider side, skeleton is the parallel object for stub and it receives the request message and understands it and passes on the information to service side business objects.

9. What is Scriptlet tag ?

- In JSP, java code can be written inside the jsp page using the scriptlet tag.
- A scriptlet tag is used to execute java source code in JSP. Syntax is as follows:
- Syntax:
  - `<% java source code %>`

10. What is builder tool ?

- The primary purpose of beans is to enable the visual construction of applications.
- These tools are referred to as visual application builders, or builder tools for short.
- Typically such tools are GUI applications, although they need not be.
- There is usually a palette of components available from which a program designer can drag items and place them on a form or client window.

Q2) Answer the following (any four) : [4×4=16]

1. Explain difference between Statements and Prepared Statement.

Statement	PreparedStatement	CallableStatement
It is used to execute normal SQL queries.	It is used to execute parameterized or dynamic SQL queries.	It is used to call the stored procedures.
It is preferred when a particular SQL query is to be executed only once.	It is preferred when a particular query is to be executed multiple times.	It is preferred when the stored procedures are to be executed.
You cannot pass the parameters to SQL query using this interface.	You can pass the parameters to SQL query at run time using this interface.	You can pass 3 types of parameters using this interface. They are – IN, OUT and IN OUT.
This interface is mainly used for DDL statements like CREATE, ALTER, DROP etc.	It is used for any kind of SQL queries which are to be executed multiple times.	It is used to execute stored procedures and functions.
The performance of this interface is very low.	The performance of this interface is better than the Statement interface (when used for multiple execution of same query).	The performance of this interface is high.

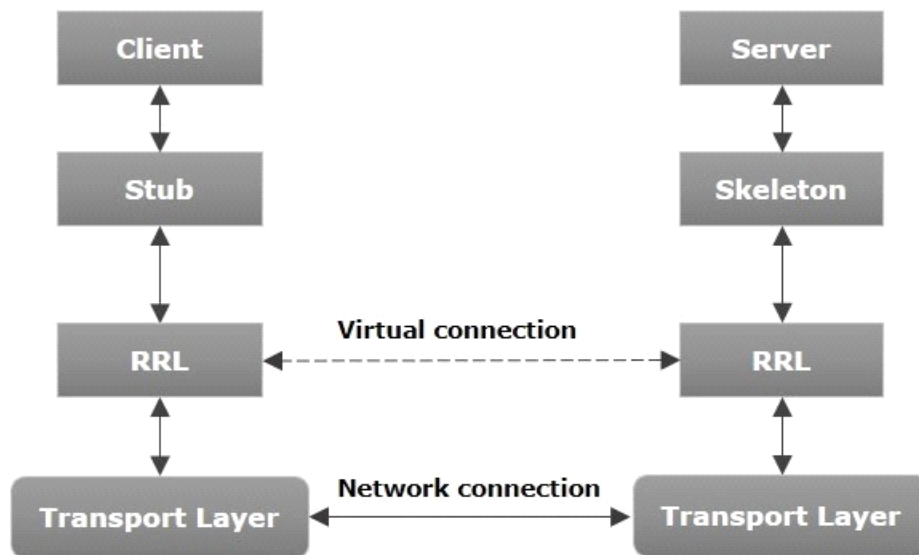
2. What is Thread ? Explain different ways to implement thread in program.

- Thread:
  - A thread is actually a lightweight process.
  - Unlike many other computer languages, Java provides built-in support for multithreaded programming.
  - A multithreaded program contains two or more parts that can run concurrently.
  - Each part of such a program is called a thread and each thread defines a separate

path of the execution. Thus, multithreading is a specialized form of multitasking.

- There are two ways to create a thread:
  - By extends Thread class (java.lang.Thread class)
    - Create a thread by a new class that extends Thread class and create an instance of that class. The extending class must override run() method which is the entry point of new thread.
  - By implement Runnable interface.(java.lang.Runnable interface)
    - The easiest way to create a thread is to create a class that implements the runnable interface. After implementing runnable interface , the class needs to implement the run() method, which is **public void run()**
    - run() method introduces a concurrent thread into your program. This thread will end when run() returns.
    - You must specify the code for your thread inside run() method.
    - run() method can call other methods, can use other classes and declare variables just like any other normal method.

3. Explain RMI Architecture with a suitable diagram



- In an RMI application, we write two programs, a server program (resides on the server) and a client program (resides on the client).
  - Components of this architecture:
    - **Stub** – A stub is a representation (proxy) of the remote object at client. It resides in the client system; it acts as a gateway for the client program.
    - **Skeleton** – This is the object which resides on the server side. stub communicates with this skeleton to pass request to the remote object.
    - **RRL(Remote Reference Layer)** – It is the layer which manages the references made by the client to the remote object.
    - **Transport Layer** – This layer connects the client and the server. It manages the existing connection and also sets up new connections.
4. Write a JDBC Program to delete the record of employee using command line argument .
- <https://codesdaddy.com/slip-no-27-q1-write-a-jdbc-program-to-delete-the-details-of-given-employee-eno-ename-salary-accept-employee-id-through-command-line/>
  - <https://www.includehelp.com/java/delete-a-particular-record-using-jdbc-in-java.aspx>
5. Write a multithreading program in Java using Runnable interface to draw temple flag on an applet container.
- <https://javapracticalbca.blogspot.com/2017/04/write-multithreading-program-in-java.html>

Q3) Answer the following (any four) : [4×4=16]

1. Explain various components of JSP ?
  - **Directives:**

- A directives tag always appears at the top of your JSP file. It is global definition sent to the JSP engine. Directives contain special processing instructions for the web container. You can import packages, define error handling pages or the session information of the JSP page. Directives are defined by using `<%@ and %>` tags.
- Syntax -  
`<%@ directive attribute="value" %>`

○ **Tags:**

- Basically JSP tags define java code which is to be executed before the output of the JSP program to sent to the browser. A JSP program consists of a combination of HTML tags and JSP tags. JSP tags are embedded into the HTML components of JSP programs.
- **JSP Tags begins with <% and ends with %>**
- There are 5 types of Tags in JSP program:
  - **Comment tag** : This tag opens with `<% --` and ends with `--%>`
  - **Declaration statement tags** : Declaration tags in JSP function as identification containers for the functions, methods and variables in JSP pages. Because these tags identify rather than generate output, you will most often find declaration tags working in combination with expression or scriptlet tags. Syntax options include the simple `"<%! jsp declaration %>"`
  - **Expression tag** : Expression tags signal JSP to convert a Java statement – also called an expression – into a string and display the output. Syntax options include the simple `"<%= Java statement %>"`
  - **Directive tag** : Directives – or message tags – are instructional tags that contain two parts: type and attribute. Type can be "page," which gives page-specific processing directions, "Include," which provides specific file names or "Tag Library," which identifies the tag library you want to use on the current page. Syntax options include the simple `"<%@ dir-type dir-attr %>`
  - **Scriptlet tag** : Scriptlet tags allow you to embed any valid Java source code in JSP server pages. The code within the tags executes in consecutive order on the server side and is available for client access through a Web browser.

○ **Scripting Elements:**

- JSP Expressions: It is a small java code which you can include into a JSP page. The syntax is `"<%= some java code %>"`
- JSP Scriptlet: The syntax for a scriptlet is `"<% some java code %>"`. You can add 1 to many lines of Java code in here.
- JSP Declaration: The syntax for declaration is `"<%! Variable or method declaration %>"`, in here you can declare a variable or a method for use later in the code.

- **JSP Expressions:**

Using the JSP Expression you can compute a small expression, always a single line, and get the result included in the HTML which is returned to the browser. Using the code we have previously written, let's explore expressions.

- **Code**

The time on the server is `<%= new java.util.Date() %>`

- **Output**

The time on the server is Thursday January 21 07:21:43 GMT 2016.

- **Explanation**

Here the `"new java.util.Date()"` is processed into the actual date and time shown through HTML on the browser. Let's explore expressions through a couple of more examples.

- **JSP Scriptlets:**

This JSP Scripting Element allows you to put in a lot of Java code in your HTML

code. This Java code is processed top to bottom when the page is the processed by the web server. Here the result of the code isn't directly combined with the HTML rather you have to use "out.println()" to show what you want to mix with HTML. The syntax is pretty much the same only you don't have to put in an equal sign after the opening % sign.

▪ **JSP Declarations:**

The declarations come in handy when you have a code snippet that you want executed more than once. Using the declaration, you can declare the method in the beginning of the code and then call the same method whenever you need in the same page.

▪ The syntax is simple:

```
<%!  
//declare a variable or a method  
%>
```

2. What is JAR file ? Explain steps to create it

a. **Jar file :**

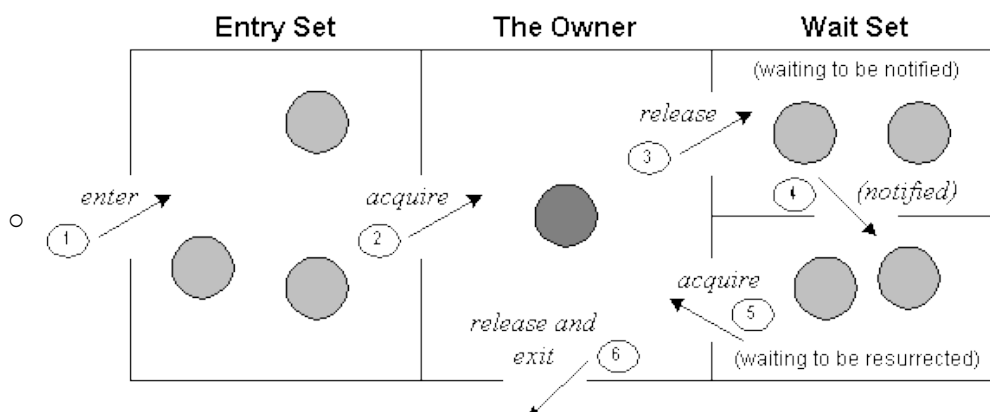
- A Java class can be stored in a jar (Java Archive) file.
- The classes in a jar file are stored in a compressed format, much like a zip file.
- A jar file is a portable container of classes.
- JAR file is a file that contains compressed version of .class files, audio files, image files or directories.
- you can use jar file for tasks such as lossless data compression, archiving, decompression, and archive unpacking.
- The package **java.util.zip** contains classes for jar files.

b. **Steps to create a Jar file :**

- To create a .jar file , we can use jar cf command in the following way:
  - jar cf jarfilename inputfiles
  - Here, cf represents create the file. For example , assuming our package pack is available in C:\helloworld\hello.class, to convert it into a jar file into the pack.jar , we can give the command as:  
C:\helloworld\> jar cf pack.jar hello.class
- To view a .jar file , we can use jar tf command in the following way:
  - jar tf jarfilename
  - Here , tf represents table view of file contents. For example, to view the contents of our pack.jar file , we can give the command as:  
C:\helloworld\> jar tf pack.jar hello.class

3. Explain Inter Thread Communication in Multithreading. **4.5**

- **Inter-thread** communication or **Co-operation** is all about allowing synchronized threads to communicate with each other.



- The point to point explanation of the above diagram is as follows:

- a. Threads enter to acquire lock.
  - b. Lock is acquired by on thread.
  - c. Now thread goes to waiting state if you call wait() method on the object. Otherwise it releases the lock and exits.
  - d. If you call notify() or notifyAll() method, thread moves to the notified state (runnable state).
  - e. Now thread is available to acquire lock.
  - f. After completion of the task, thread releases the lock and exits the monitor state of the object.
- Cooperation (Inter-thread communication) is a mechanism in which a thread is paused running in its critical section and another thread is allowed to enter (or lock) in the same critical section to be executed.
  - It is implemented by following methods of Object class:
    - wait()
    - notify()
    - notifyAll()
  - **wait() method :**
    - The wait() method is defined in the Object class
    - Causes current thread to release the lock and wait until either another thread invokes the notify() method or the notifyAll() method for this object, or a specified amount of time has elapsed.
    - wait() can only be invoked from within synchronized code
    - It should always be wrapped in a try block as it throws IO Exceptions.
    - There are three wait() methods :
      - wait()
      - wait(long timeout)
      - wait(long timeout, int nanos)
    - Timeout is measured in milliseconds
    - Nanos is measured in nanoseconds
  - **notify() and notifyall() :**
    - They notify() and notifyall() methods are defined in the Object Class.
    - They can only be used within synchronized code
    - notify() wakes up the single thread which is waiting on the object's lock.
    - If there is more than one thread waiting , the choice is arbitrary i.e. there is no way to specify which waiting thread should be re-awakened
    - notifyall() wakes up ALL waiting threads; the scheduler decides which one will run
    - Only notifications that occur after a thread has moved to wait state will effect; it earlier notifies are irrelevant .
4. Write a JDBC Program to Insert the record into patient table (use prepared Statement).
    - <https://www.includehelp.com/java/insert-a-record-with-preparedstatement-using-jdbc.aspx>
  5. Write a JSP Program to accept user and check whether it is prime or not
    - <http://www.asterixsolution.com/blog/jsp-prime-number-program.html>

Q4) Answer the following (any four) : [4×4=16]

1. Explain different types of servlet with an example. **3.9\***

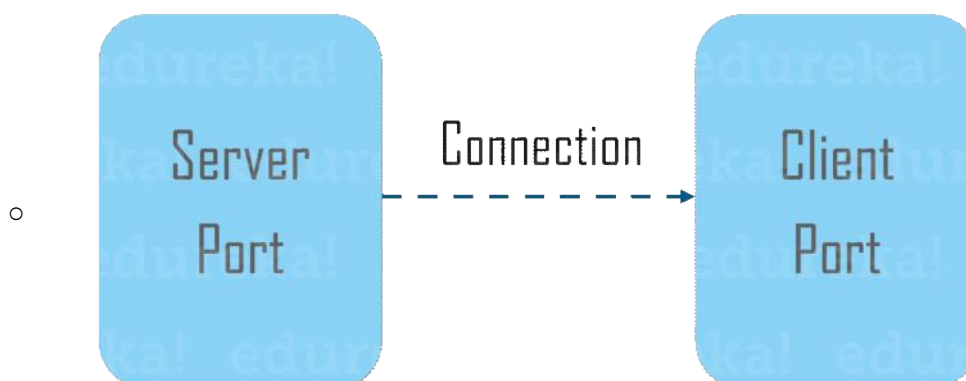
### Difference between Servlet and CGI

SERVLET	CGI(COMMON GATEWAY INTERFACE)
Servlets are portable and efficient.	CGI is not portable
In Servlets, sharing of data is possible.	In CGI, sharing of data is not possible.
Servlets can directly communicate with the web server.	CGI cannot directly communicate with the web server.
Servlets are less expensive than CGI.	CGI are more expensive than Servlets.
Servlets can handle the cookies.	CGI cannot handle the cookies.

- There are two servlet types, generic and HTTP:
  - a. Generic servlets are sub classes of `javax.servlet.GenericServlet` . The `service()` method needs to be implemented to handle client requests.
  - b. HTTP servlets are sub classes of `javax.servlet.HttpServlet`. It has built-in HTTP protocol support. The `doGet` and `doPost` methods are used to handle client requests (GET or POST requests).
- For both servlet types, we can implement the constructor method `init()` and the destructor method `destroy()` to initialize or deallocate resources.
- All servlets must implement a `service()` method, which is responsible for handling servlet requests. For generic servlets, simply override the `service` method to provide routines for handling requests.
- HTTP servlets provide a `service` method that automatically routes the request to another method in the servlet based on which HTTP transfer method is used. So, for HTTP servlets, override `doPost()` to process POST requests, `doGet()` to process GET requests, and so on.

### 2. Explain Socket and Server Socket. **2.10\***

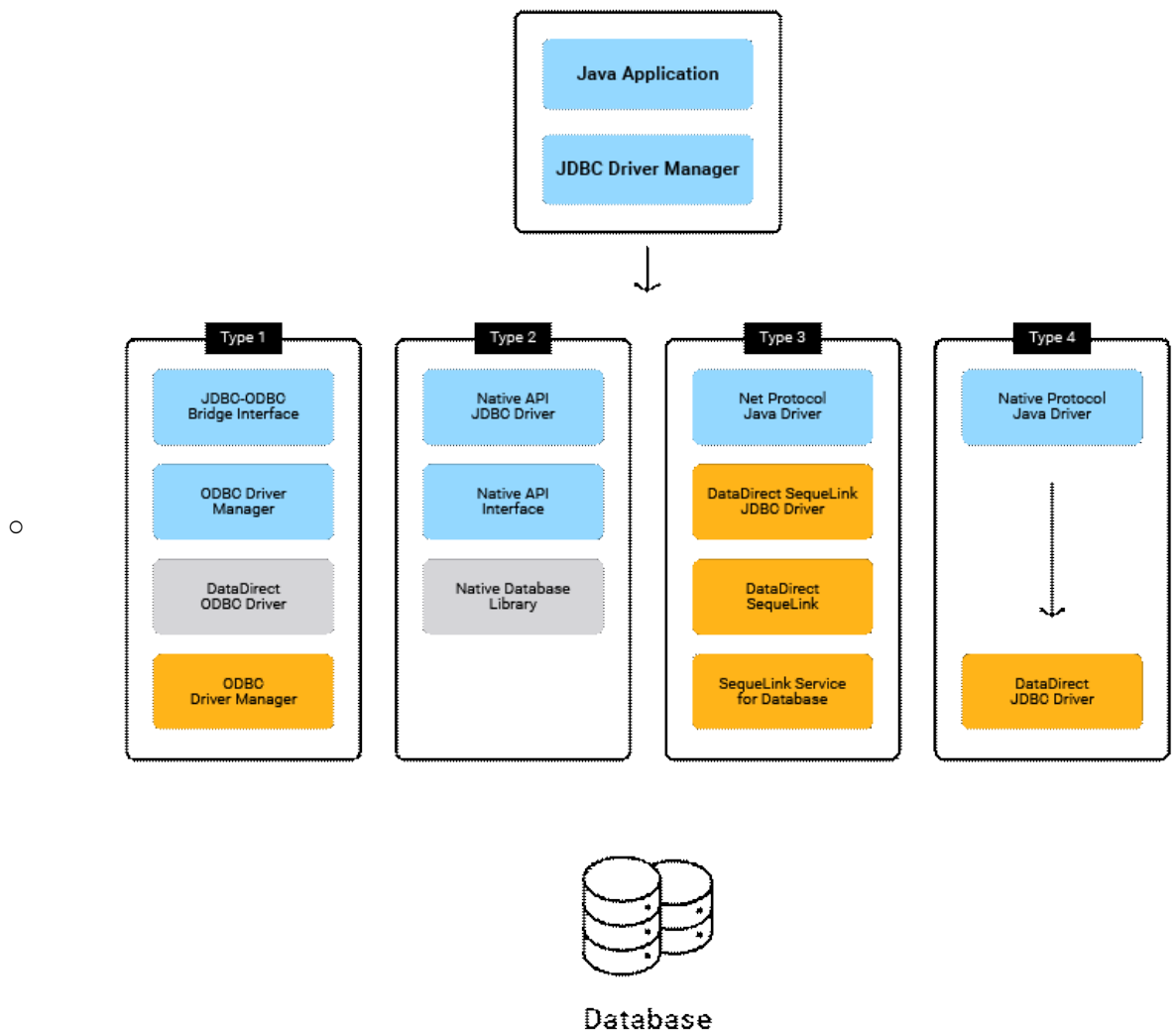
- A socket in Java is one endpoint of a two-way communication link between two programs running on the network. A socket is bound to a port number so that the TCP layer can identify the application that data is destined to be sent to.



- **Socket :**
  - `public class Socket`
  - `extends Object`
  - `implements Closeable`
- This class implements client socket(also called just "sockets") A socket is a end point for communication between two machines. The actual work of the socket is

- performed by instances of SocketImpl class.
    - An application by changing the socket factory that create the socket implementation, can configure itself to create sockets appropriate to the local firewall.
  - **ServerSocket :**
    - public class ServerSocket
    - extends objects
    - implements Closeable
  - This class implents server sockets. A server socket waits for request to come in the network.
    - It performs some operation based on that request and then possible returns the result to the requester
    - The actual work of the server socket is performed by an isntance of the SocketImpl class. An application can chagne the socket factory that creates the socket implementation configure itself to create sockets appropriate to the local firewall.
3. What is beans ? Explain its advantages in breif? 5.8\*
- JavaBeans is a portable, platform-independent component model written in the Java programming language
  - The JavaBeans architecture was built through a collaborative industry effort and enables developers to write reusable components in the Java programming language.
  - Java Bean components are known as beans.
  - Beans are dynamic in that they can be changed or customized.
  - **Advantages of Java Beans :**
    - A Bean obtains all the benefits of Java's "write-once, run-anywhere" paradigm.
    - The properties, events, and methods of a Bean that are exposed to an application builder tool can be controlled.
    - A Bean may be designed to operate correctly in different locales, which makes it useful in global markets.
    - Auxiliary software can be provided to help a person configure a Bean.
    - This software is only needed when the design-time parameters for that component are being set. It does not need to be included in the run-time environment.
    - The configuration settings of a Bean can be saved in persistent storage and restored at a later time.
4. Write a Multithreading program in Java to display all the alphabets from A to Z after 3 seconds.
- <https://codesdaddy.com/slip26-q1-write-a-multithreading-program-in-java-to-display-all-the-alphabets-from-a-to-z-after-3-seconds/>
5. Explain JDBC Drivers with a suitable diagram.





**a. Type 1: JDBC-ODBC Bridge Driver**

In a Type 1 driver, a JDBC bridge is used to access ODBC drivers installed on each client machine. Using ODBC, requires configuring on your system a Data Source Name (DSN) that represents the target database.

**b. Type 2: JDBC-Native API**

In a Type 2 driver, JDBC API calls are converted into native C/C++ API calls, which are unique to the database. These drivers are typically provided by the database vendors and used in the same manner as the JDBC-ODBC Bridge. The vendor-specific driver must be installed on each client machine.

**c. Type 3: JDBC-Net pure Java**

In a Type 3 driver, a three-tier approach is used to access databases. The JDBC clients use standard network sockets to communicate with a middleware application server. The socket information is then translated by the middleware application server into the call format required by the DBMS, and forwarded to the database server.

**d. Type 4: 100% Pure Java**

In a Type 4 driver, a pure Java-based driver communicates directly with the vendor's database through socket connection. This is the highest performance driver available for the database and is usually provided by the vendor itself.

Q5) Attempt any two : [2×8=16]

1. Write a Socket program in Java to check whether given file is present on server or not, If it is present then display its content on the server's machine otherwise display error message.

Or

Write a Java program to accept file name from user, check if it is available on server machine or not, if it is available the display its contents on client machine otherwise display the message "File Not Found".

- <https://codesdaddy.com/write-a-socket-program-in-java-to-check-whether-given-file-is-present-on-server-or-not-if-it-is-present-then-display-its-content-on-the-servers-machine-otherwise-display-error-messa/>
- <https://codesdaddy.com/write-a-socket-program-in-java-to-check-whether-given-file-is-present-on-server-or-not-if-it-is-present-then-display-its-content-on-the-servers-machine-otherwise-display-error-messa/>

2. Write a JSP script to check whether given mail ID is valid or not. (Mail ID should contain one @ symbol and at least one Dot(.) symbol).

Or

Write a Servlet program to display the details of employee in tabular format. Employee table structure (eno, ename, sal, design)

- <https://codesdaddy.com/slip24-q1-write-a-jsp-script-to-check-whether-given-mail-id-is-valid-or-not-mail-id-should-contain-one-symbol-and-atleast-one-dot-symbol/>
- <https://codesdaddy.com/write-a-servlet-program-to-display-the-details-of-product-prodcode-pname-price-on-the-browser-in-tabular-format-use-database/>