

1. What is JDBC.

Java Database Connectivity (JDBC) is an application programming interface (API) for the programming language java, which defines how a client may access a database.

It provides methods to query and update data in a database, and is oriented toward relational databases.

2. Who are DB vendors, List few.

Database vendor means the vendor contracted with the department for the purpose of developing SAP & administering the daily operation of the database.

Oracle

Microsoft

IBM

MongoDB

Google

3. What is driver software

A JDBC driver is a software component enabling a Java application to interact with a database.

To connect with individual databases, JDBC (the Java Database Connectivity API) requires drivers for each database.

The JDBC driver gives out the connection to the database & implements the protocol for transferring the Query & result between client & database.

- JDBC drivers for IBM Db2

- JDBC driver for MSSQL database.

4. Advantages of JDBC.

- It is capable of accessing any database. The only requirement for it to do so is the proper installation of all the drivers.
- It automatically creates the XML format of data from the database.
- It does not require the content to be converted.
- It provides full support to query & stored procedure.
- It provides support to both synchronous & asynchronous processing.
- It supports modules.
- With JDBC, it is possible to write a single database application that can run on different platforms & interact with different DBMS.

5. Disadvantage of JDBC.

- It is very sensitive when it comes to the drivers.

Hence it is very important to install correct drivers & to deploy them for each type of database in order to make use of it.

This is a time taking task & Challenging at times.

- It does not allow a single sequence to update & insert multiple tables.

→ Handling Exceptions with JDBC is a big issue. You need to write multiple nested try-catch blocks.

→ Performance is not good when having multiple connections.

→ It is not good for large projects.

6) what is the difference between file system & Database.

Basic	File System	DBMS
Structure.	→ The file system is software that manages & organizes the files in a storage medium within a computer.	→ DBMS is software for managing the database.
Data Redundancy	→ Redundant data can be present in a file system.	→ In DBMS there is no redundant data.
Backup & Recovery	→ It doesn't provide backup & recovery of data if it is lost.	→ It provides backup & recovery of data even if it is lost.
Query processing.	→ There is no efficient query processing in the file system.	→ Efficient query processing is there in DBMS.
Consistency	→ There is less data consistency in the file system.	→ There is more data consistency because of the process of normalization.

Complexity	It is less complex as compared to DBMS	→ It has more complexity in handling as compared to the file system.
Security Constraints	File Systems provide less security in comparison to DBMS	DBMS has more security mechanism as compared to file systems
Cost-	It is less expensive than DBMS.	It has a comparatively higher cost than a file system
Data Independence	There is no data independence	In DBMS data independence exists
User Access	Only one user can access data at a time	multiple users can access data at a time.
Meaning	The user has to write procedures for managing databases	The user not required to write procedures.
Sharing	Data is distributed in many files so, not easy to share data.	Due to centralized nature sharing is easy.
Data Abstraction	It give details of storage & representation of data.	It hides the internal details of Database
Integrity Constraints	Integrity constraints are difficult to implement.	Integrity constraints are easy to implement.
Example	cobol, c++	oracle, SQL Server.

7. List the Steps which helps to perform crud Operation on JDBC.

1. Establishing a connection :- connects you to your database.
2. Connecting with DataSource Objects :- Shows you how to connect to your database with DataSource objects, the preferred way of getting a connection to a data source.
3. Handling SQL Exceptions :- Shows you how to handle exceptions caused by database errors.
4. Setting up Tables :- describes all the db tables used in the JDBC tutorial samples & how to create & populate tables with JDBC API & SQL scripts.
5. Retrieving & modifying values from Result sets :- develop the process of configuring your database, sending queries & retrieving data from your db.
6. Close the connection.
8. Explain. Different ways to load/Register the Driver class.

1. Load / Register Drivers.

2 - A. `Class.forName("path")`
OR

2 - B. ("creating object for Driver).

`Driver driver = new Driver();`
`DriverManager.registerDriver(driver);`

3.) Establish connection.

a) - getConnection (String url, String user, String password)

Ex: Connection c = DriverManager.getConnection(url, username, password);

b). DriverManager.registerDriver(url, object);

4) Create a Statement.

A: Statement statement = Connection.createStatement();

B: Prepared Statement preparedStatement = ~~prep~~ connection.prepareStatement(query);

5). Execute Query.

return type

methods.

boolean

execute() ✓ Select.

ResultSet

executeQuery ✓ Select

int

executeUpdate() ✓ Non Select

Ex:-

for Statement:-

ResultSet rs = Statement.executeQuery();

for PreparedStatement:-

~~prep~~ ResultSet resultSet = preparedStatement.executeQuery();

6) Close Connection.

9. Explain Different ways / methods to Establish the connection.

- A). `GetConnection(String url, String user, String password);`
`GetConnection(url);`
`GetConnection(url, properties);` // Standard.
1. ex. `Connection c = DriverManager.getConnection(url, username, password);`
- B). `DriverManager.registerDriver(url, Object);`

10. what is connection.

JDBC is an application programming interface for the programming language.

A connection (1) is a session between a Java application & a database. It helps to establish connection with the database.

11. why is connection object is Singleton.

The primary purpose of a Singleton class is to restrict the limit of the no. of object creation to only one.

This often ensures that there is access control to resources, for ex. socket or dbconnection.

12) what is DriverManager.

The DriverManager provides a basic service for managing a set of JDBC drivers. As part of its initialization, the DriverManager class will attempt to load the driver classes referenced in the "JDBC drivers" system property.

This allows a user to customize the JDBC Drivers used by their applications

13) what is Properties ~~when~~

A resource bundle file / properties file is one which contains the data in the form of (key, value) pair. When we write any JDBC application, we have to specify the specific details regarding driver name, url, database user & password etc...

Ex. Connection connection = DriverManager.getConnection(url, username, password);

14) what is properties file

A resource bundle file / properties file is one which contains the data in the form of (key, value) pair.

→ Reading the data from Properties file:

To read the data from the resource bundle file we have to open the resource bundle file in a reading mode with the help of the FileInputStream class.

ex: - FileInputStream fis = new FileInputStream("connection.properties");

15-) what is Stored Procedure?

Stored Procedures are java methods published to SQL & stored in the database for general use.

A stored procedure is a group of SQL statements that form a logical unit & perform a particular task. (to execute queries)

16) what are the advantages of Stored Procedure?

- performance :- Stored procedures are compiled Once & stored in an executable form.
- Productivity & Ease of use :- you can avoid redundant coding & increase the productivity.
- Scalability :- Automatic dependency tracking for stored procedures helps in developing scalable applications.
- Maintainability :- Maintaining a procedure on the server is easier than maintaining copies on different client computers.
- Security :-
 - Network Security for the connection
 - Access & Execution control of operating system resources or of Java & user-defined class.

17) Difference Between Statement & Prepared Statement

Statement	Prepared Statement
It is used when SQL query is to be executed Only Once.	It is used when SQL query is to be executed multiple times.
You cannot pass parameters at runtime.	You can pass at runtime.
Used for create, Alter, Drop Statements.	Used for the queries which are to be executed multiple times.
Performance is very low.	Performance is better than Statement.
It is basic interface.	It extends Statement interface.

18.) what is Callable Statement ?

Callable interface is used to call the stored procedures & functions

• Callable Statement can return one result set object or multiple result set objects.
(multiple result set objects are handled using operations inherited from statement.)

19.) Explain -

1. `execute()`
2. `executeQuery()`
3. `executeUpdate()`

`execute()` : returns true if the first object that query returns is a result set object

`executeQuery` :- returns one result set object (Select)

`executeUpdate` :- Returns an integer representing the no. of rows affected by the SQL statement.
(for INSERT, DELETE, UPDATE SQL statements)

20.) why do we need to close the connection?

When you finished the task or have to close connection. Else it may lead to resource leak.

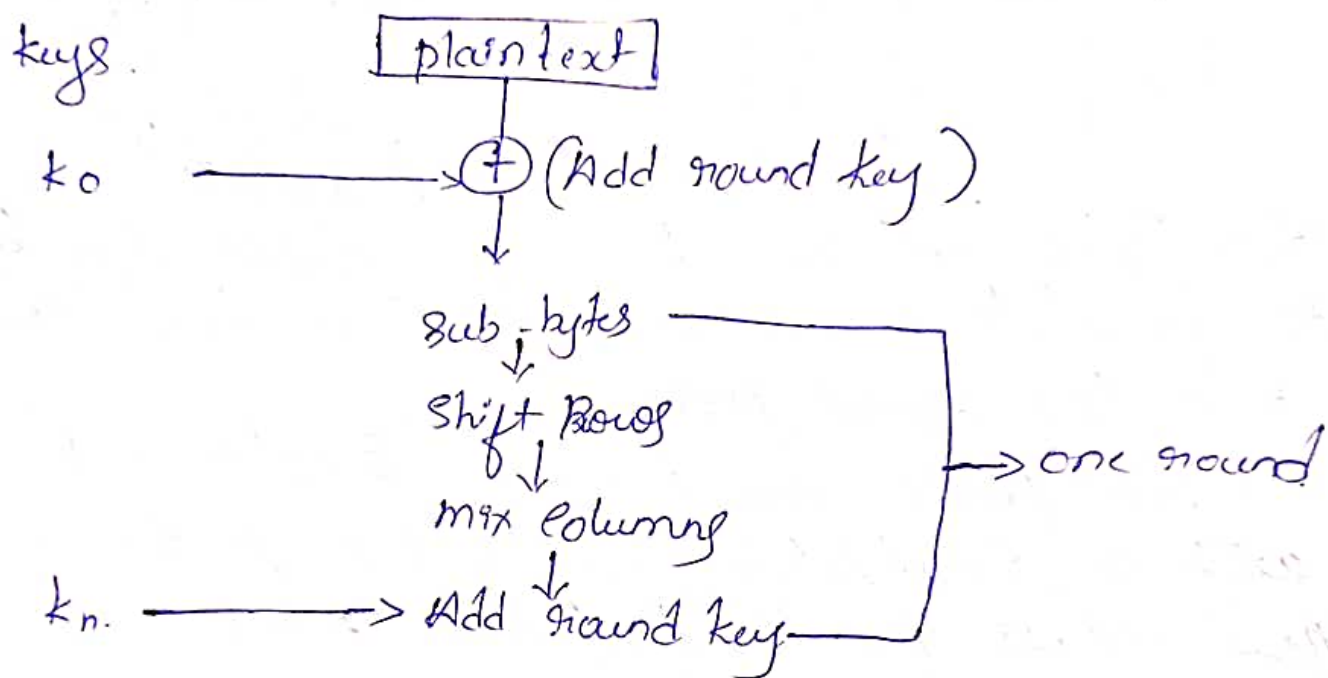
21.) what is batch execution. with example

Instead of executing a single query, we can execute a batch (group) of queries.
→ It makes the performance fast.

ex... ps. `executeBatch()`;

22. What is AES? Explain AES Algorithm.

AES (Advanced Encryption Standard) is a Specification for the Encryption & decryption algorithm that processes a block of 128 bits of data using secret keys of 128, 192 or 256 bits.



(4x4) - 16 bytes matrix (moves in row format)

k_0	k_4	k_8	k_{12}
k_1	k_5	k_9	k_{13}
k_2	k_6	k_{10}	k_{14}
k_3	k_7	k_{11}	k_{15}

The matrix shown in the image above is known as a state array.

Simultaneously, the key being used initially is expanded into $(n+1)$ keys.

128 bits \rightarrow 10 rounds

192 \rightarrow 12 rounds

256 \rightarrow 14 rounds