JDBC (Java DataBase Connectivity)

JDBC = similar to ODBC (Open DataBase Connectivity)

It acts like a wrapper to let you feed SQL requests to the server.

∴ It is an Java's API to deal with structured data

What does JDBC do

1) It establishes a connection
2) Sends SQL statements
3) Process the results

eg:
```
Connection con = DriverManager.getConnection(
        "jdbc:odbc:wombat", "login", "password");
Statement s = con.createStatement();
ResultSet rs = s.executeQuery("SELECT a, b, c
                               FROM Table1");
while (rs.next())
{
    int x = getInt("a");
    String s = getString("b");
    float f = getFloat("c");
```

JDBC versus ODBC

→ ODBC is not appropriate for direct use with JAVA since it's build in C.

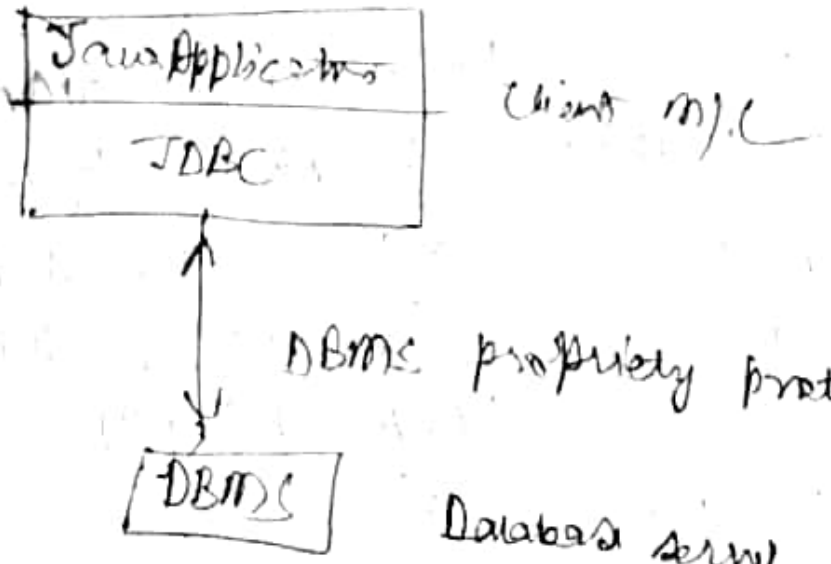
→ It's not feasible to translate ODBC API to Java API

→ ODBC is difficult to learn.

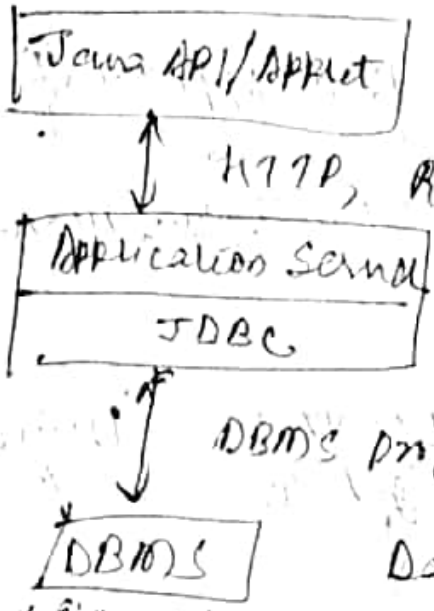
Hence one must use JDBC-ODBC bridge to connect to database, instead of ODBC, while working with JAVA API

Connectivity Model

→ 2-Tier Model



3-Tier Architecture.



JDBC drivers (driver: translates the API calls into operations for a specific data source)

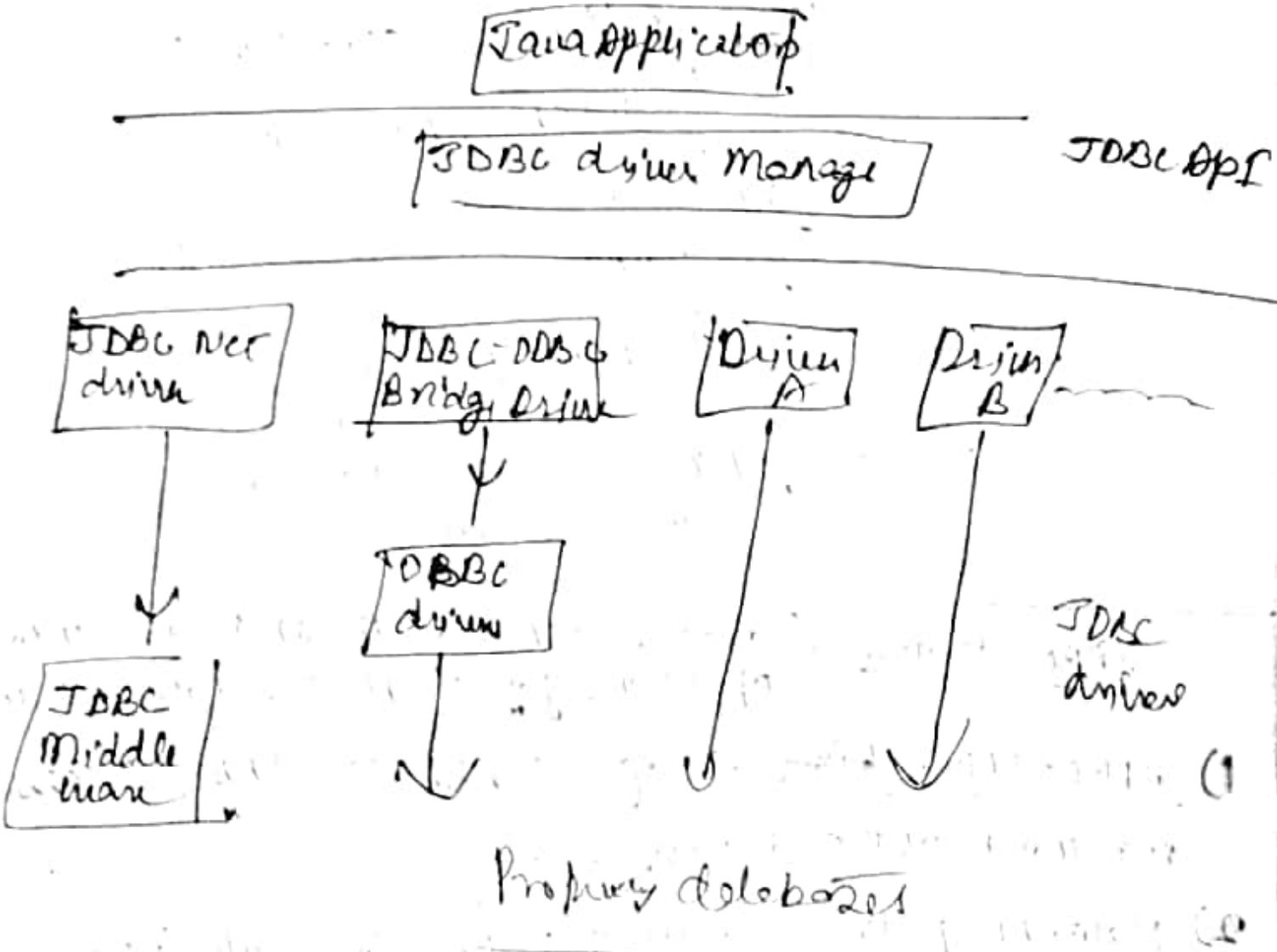
1) JDBC-ODBC bridge: provides JDBC access via most ODBC drivers.

2) Native API partly-Java driver: used for Oracle, Sybase, Informix, DB2 or other DBMS

3) Net protocol all Java driver: translates JDBC calls into a DBMS-independent net protocols, which is translated to a DBMS protocol by a server.

4) Native-protocol all Java driver: converts JDBC calls into the network protocol used by DBMS's directly.

JDBC Architecture



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Essential JDBC prg (Steps Imp)

Steps to be followed while building a JDBC application

1. java.sql.* pkg is imported
2. load and register the driver
3. connection is established to a database
4. Create a statement (SQL query)
5. If the statement is simple one (eg: CREATE TABLE) then simply exe it, otherwise receive the result of the query in a ResultSet & process it one tuple at a time.
6. Close the statement
7. Commit the transaction in the connection & close the connection

How to load a JDBC driver

complete pkg name of the driver

```
try {
    Class.forName("sun.jdbc.odbc.
                   JdbcOdbcDriver");
}
catch (Exception e)
{
    System.err.println("Unable to load driver");
}
```

Establishing a Connection

→ You establish connection by calling DriverManager.getConnection()

```
Try {
    Connection c;
    String db = "jdbc:odbc:DemoDataSource";
    String username = "";
    String pswd = "";
    c = DriverManager.getConnection(db, username, pswd);
    S.o.p("connected to database");
}
catch (SQLException e)
{
    S.o.p(e.getMessage());
    S.o.p(e.getSQLState());
    S.o.p(e.getErrorCode());
```

Create A Statement

your query is executed by object of Statement class

eg: Statement S = C.CreateStatement();

Execute the Statement

Execution is done by calling Statement.executeQuery() method. The executeQuery() method takes SQL query as an argument and returns the result of the query in a ResultSet object.

eg: ResultSet obj = S.executeQuery("SELECT e.Name, e.Salary" + " " + "FROM Emp e" + " " + "WHERE e.Dept = 'Toys'");

Process the ResultSet

The ResultSet consists of tuples and returns one tuple at a time when the next() fun" is applied.

```
eg: int count=0; double payroll=0.0;
    String name; double salary=0.0;
    while (obj.next()) ← till 'true'
    {
      name = obj.getString("Name");
      salary = obj.getInt("Salary");
      S.o.p (name + salary);
```

count = count + 1;
payroll = payroll + salary;
}

Close the statement

s.close();

Close the Connection

c.commit(); → to commit all transaction done in this connection.
c.close();