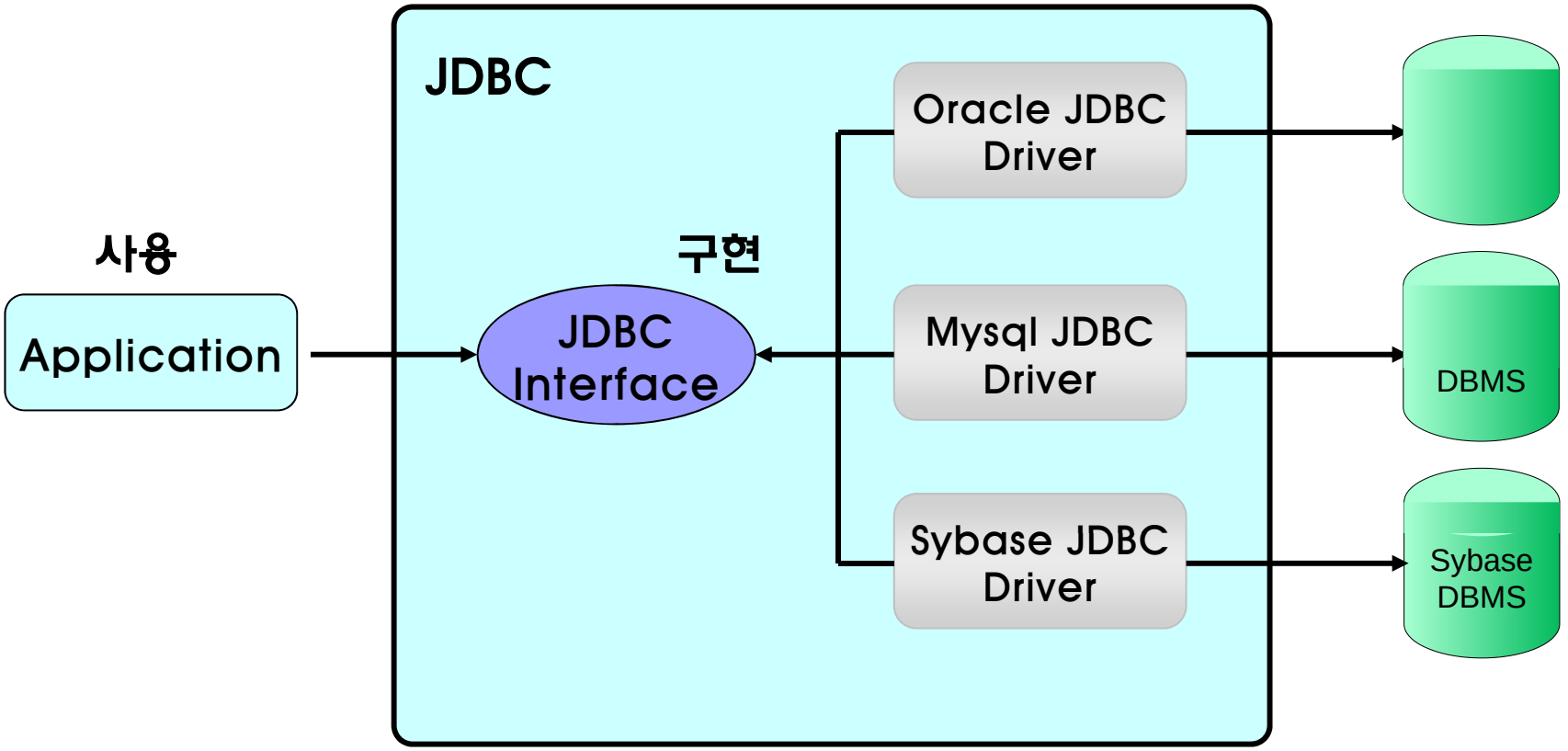
Java Programming with JDBC

학습 목표

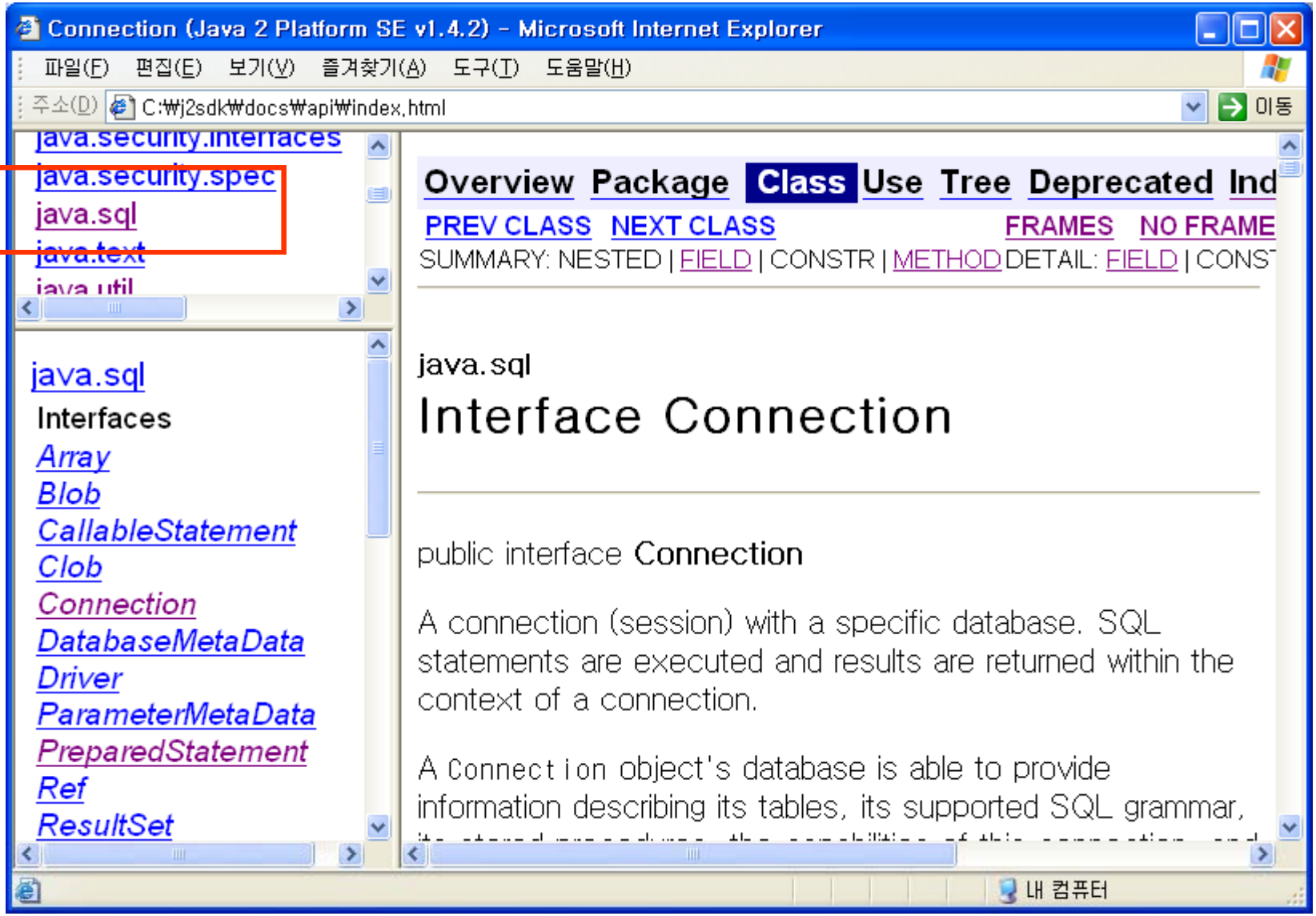
1. JDBC 개요
2. JDBC Coding 절차
3. SELECT / UPDATE
4. Statement/ PreparedStatement

JDBC (Java Database Connectivity)

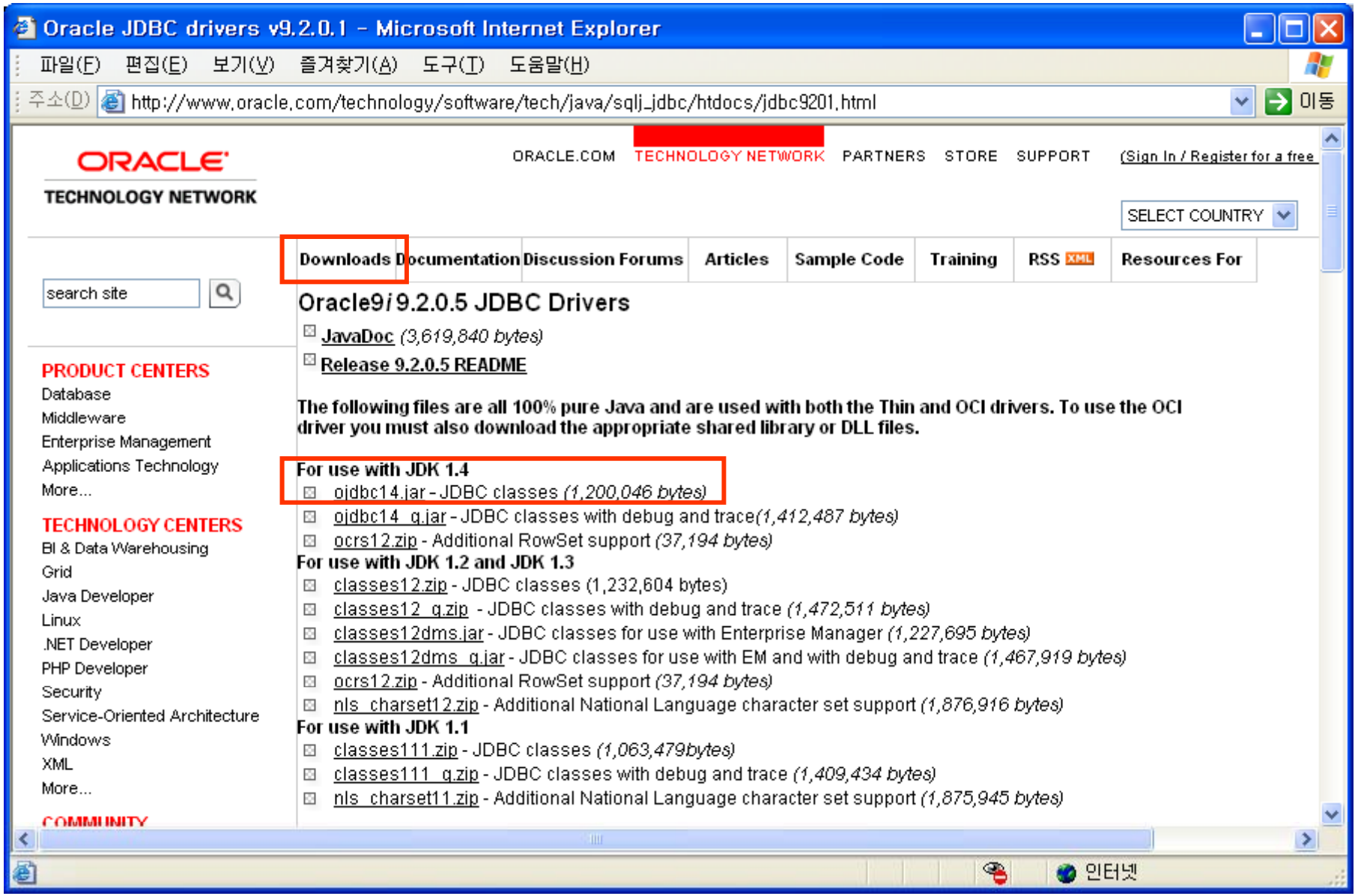
❑ 자바 언어에서 Database에 접근할 수 있게 해주는 Programming API



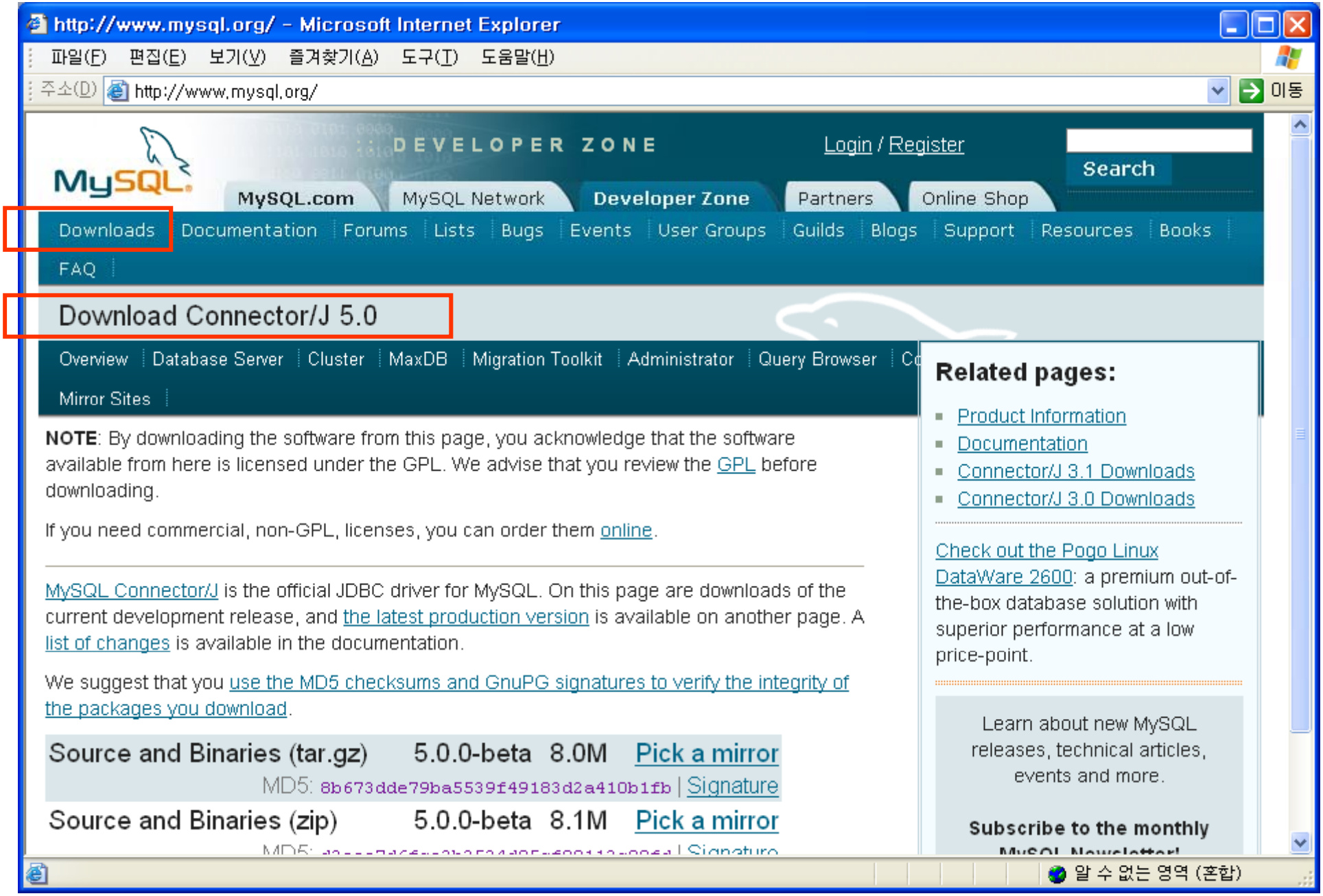
JDBC API


Connection (Java 2 Platform SE v1.4.2) - Microsoft Internet Explorer
파일(F) 편집(E) 보기(V) 즐겨찾기(A) 도구(T) 도움말(H)
주소(D) C:₩j2sdk₩docs₩api₩index.html
이동
java.security.interfaces
java.security.spec
java.sql
java.text
java.util
java.sql
Interfaces
Array
Blob
CallableStatement
Clob
Connection
DatabaseMetaData
Driver
ParameterMetaData
PreparedStatement
Ref
ResultSet
Overview Package Class Use Tree Deprecated Ind
PREV CLASS NEXT CLASS FRAMES NO FRAME
SUMMARY: NESTED | FIELD | CONSTR | METHOD DETAIL: FIELD | CONS
java.sql
Interface Connection
public interface Connection
A connection (session) with a specific database. SQL statements are executed and results are returned within the context of a connection.
A Connection object's database is able to provide information describing its tables, its supported SQL grammar,
내 컴퓨터

JDBC Driver Download – Oracle (www.oracle.com)

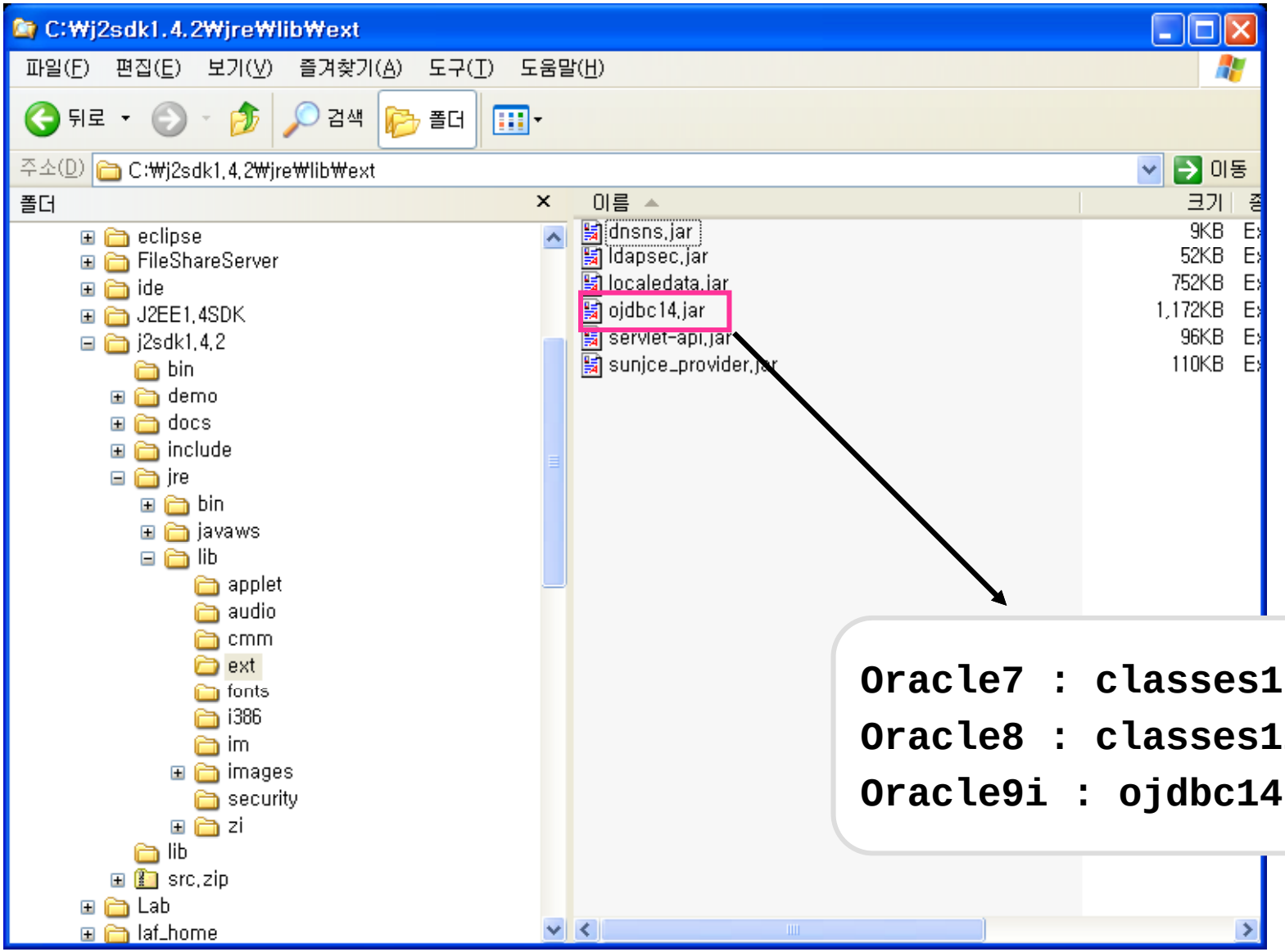


JDBC Driver Download – MySql (www.mysql.org)

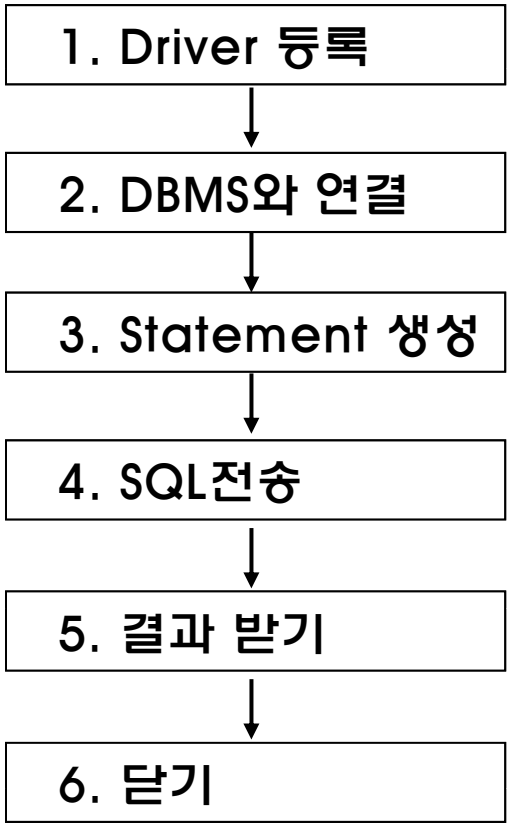


JDBC Driver

❑ *JAVA_HOME* \jre\lib\ext 에 driver를 추가해야 함 : ojdbc14.jar

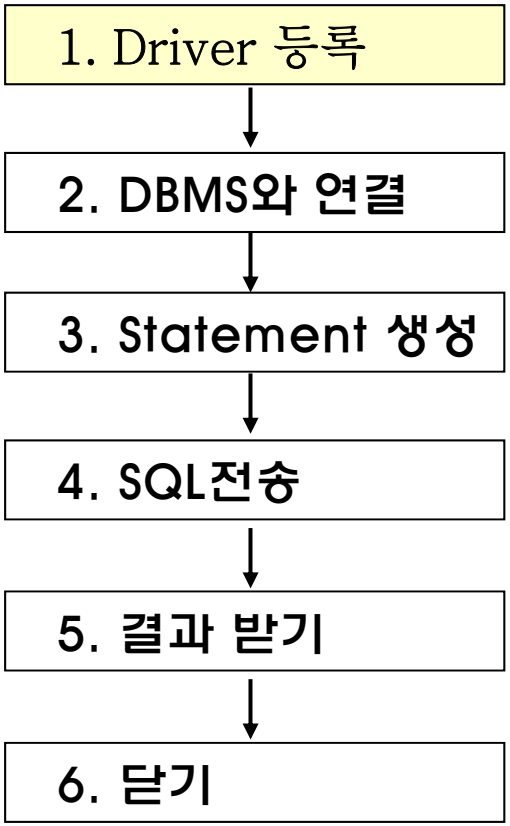


JDBC - JDBC Coding 절차



JDBC – JDBC Coding 절차

1. DriverManager에 해당 DBMS Driver 등록



DriverManager

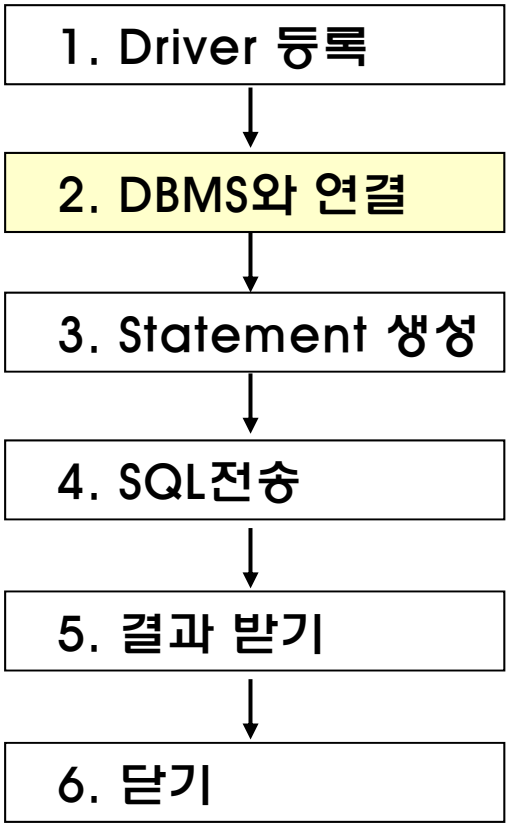
```
Class.forName( "oracle.jdbc.driver.OracleDriver“ );
```

cf)

```
Class.forName( “com.microsoft.jdbc.sqlserver.SQLServerDriver” );

Class.forName( "org.gjt.mm.mysql.Driver“ );
```

JDBC – JDBC Coding 절차

2. 해당 Driver로부터 Connection instance를 획득



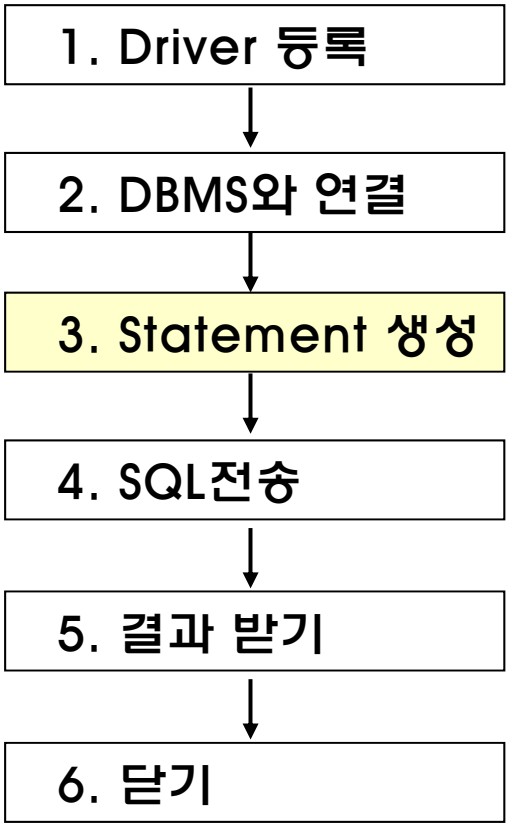
DriverManager Connection

```
public static Connection getConnection( String url,
                                        String user,
                                        String password )
throws SQLException
```

```
Connection conn =
    DriverManager.getConnection(
        "jdbc:oracle:thin:@192.168.0.200:1521:VCC",
        "SEXXXXX",
        "SEXXXXX" );
```

JDBC - JDBC Coding 절차

3. Connection instance로부터 Statement instance획득

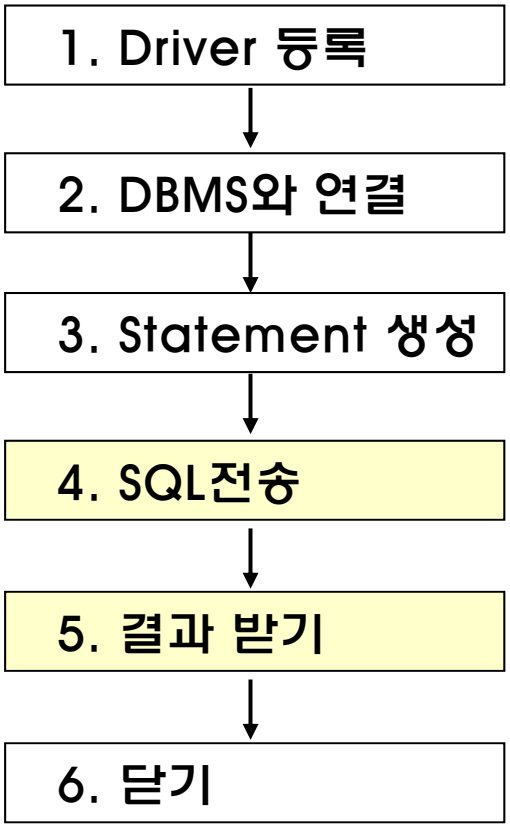


DriverManager Connection Statement

```
Statement stmt = conn.createStatement();
```

JDBC – JDBC Coding 절차

4. Statement method를 이용하여 SQL 실행
5. 실행후 결과를 ResultSet(SELECT) 혹은 int형 변수(DML)로 받아 처리



DriverManager → Connection → Statement → ResultSet

Select

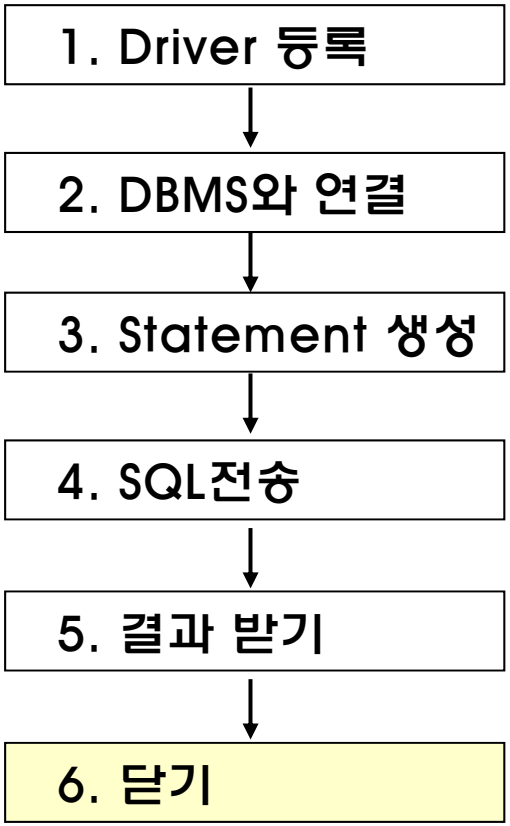
```
String query = "SELECT ID, LAST_NAME FROM EMP";
ResultSet rset = stmt.executeQuery( query );
while ( rset.next() ) {
    System.out.println( rset.getString( "ID" ) + "\t" +
                        rset.getString( 2 ) );
}
```

DML

```
String query = "UPDATE EMP  " +
               "  SET LAST_NAME  =  'KIM'  "+
               "  WHERE  ID =  '100000'  ";
int result = stmt.executeUpdate( query );
```

JDBC - JDBC Coding 절차

6. 사용한 자원 반납



Select

```
rset.close();
stmt.close();
conn.close();
```

DML

```
stmt.close();
conn.close();
```

JDBC – SELECT

```
package jdbc;

import java.sql.*;

public class EmpList {

    public static void main( String[] args )
                        throws SQLException, ClassNotFoundException  {
        Connection conn = null;
        Statement stmt = null;
        ResultSet rset = null;
        String url = "jdbc:oracle:thin:@192.168.0.200:1521:VCC";
        String query = null;

        // 1. DBMS Driver 로딩
        Class.forName( "oracle.jdbc.driver.OracleDriver“ );

        // 2. Connection 객체 획득
        conn = DriverManager.getConnection( url , “SEXXXXX" , “SEXXXXX“ );

        // 3. Statement 객체 생성
        stmt = conn.createStatement();

        // 4. SQL 실행
        query =  "SELECT ID    "          +
                 "         ,LAST_NAME "    +
                 " FROM EMP " ;
```

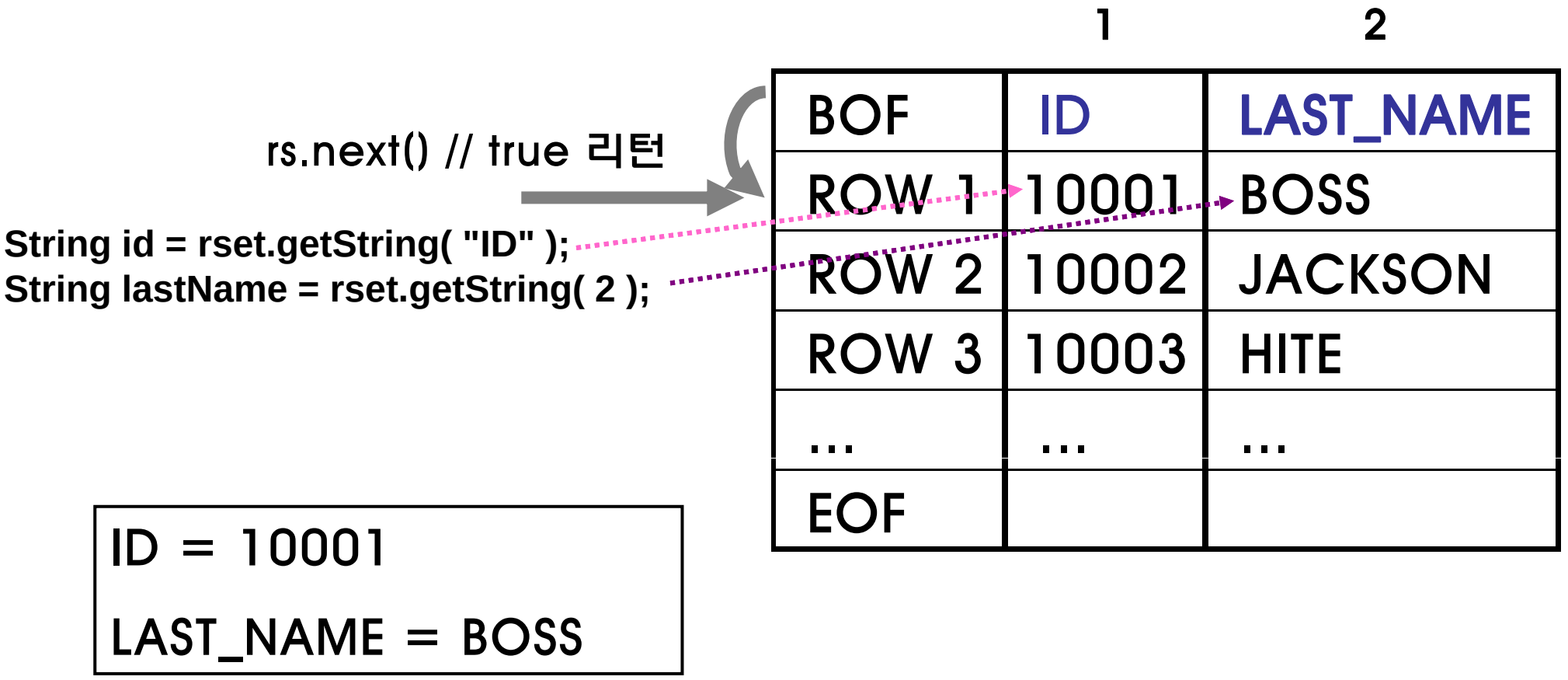
JDBC – SELECT

```
        rset = stmt.executeQuery( query.toString() );

        System.out.println( "ID\t\t\tLAST_NAME\n“ );
        System.out.println( "========================================= \n“ );

        // 5. ResultSet을 이용한 결과 처리
        while( rset.next() ){
            System.out.println( rset.getString( "ID“ ) + "\t\t\t" +
                    rset.getString( 2 ) );
        }

        // 6. 사용할 Resource 반납
        rset.close();
        stmt.close();
        conn.close();
    }
}
```

JDBC – SELECT

BOF	ID	LAST_NAME
ROW 1	10001	BOSS
ROW 2	10002	JACKSON
ROW 3	10003	HITE
...	...	...
EOF		

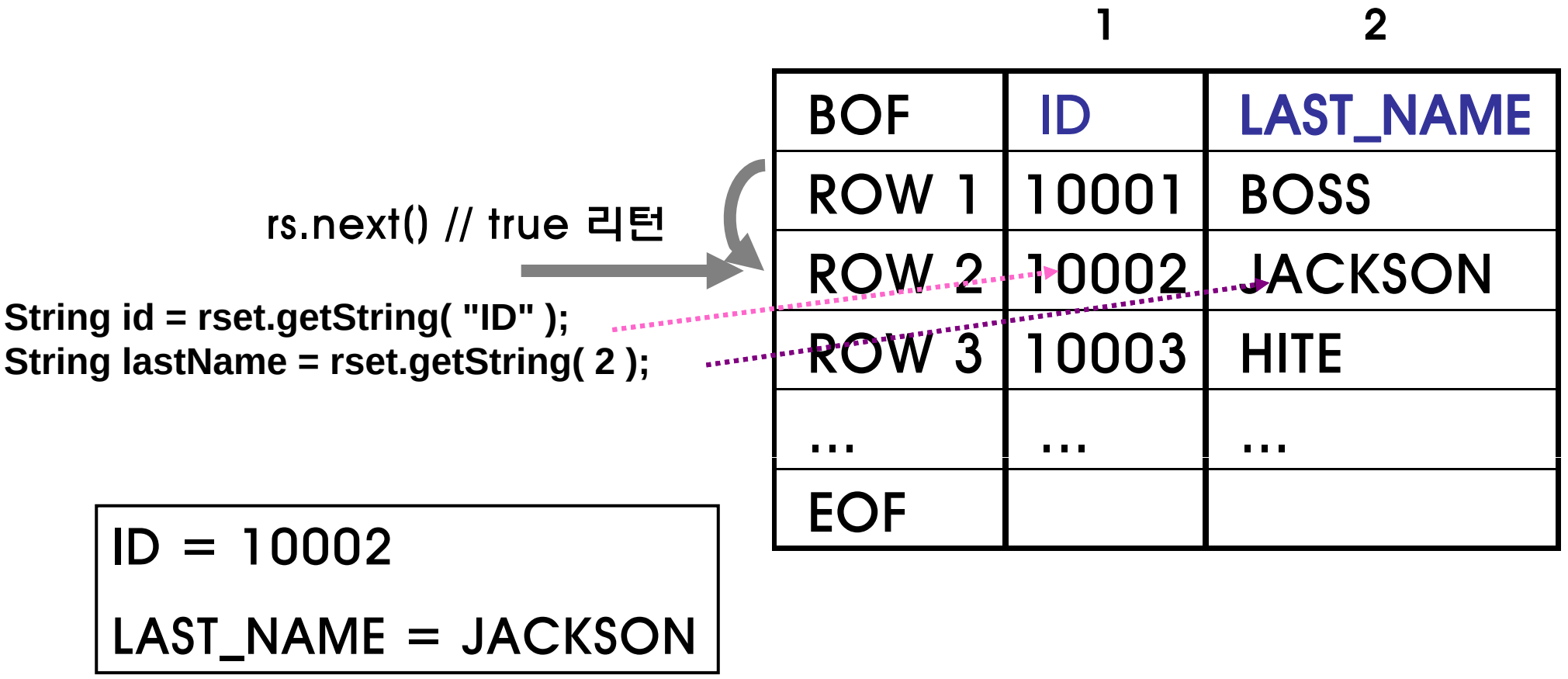
JDBC – SELECT



ID = 10001

LAST_NAME = BOSS

JDBC – SELECT



ID = 10002

LAST_NAME = JACKSON

JDBC – SELECT

BOF	ID	LAST_NAME
ROW 1	10001	BOSS
ROW 2	10002	JACKSON
ROW 3	10003	HITE
...	...	...
EOF		

JDBC – SELECT

❑ StringBuffer Class 사용

```
StringBuffer query = new StringBuffer();
try{
      // 1. DBMS Driver 로딩
      Class.forName( "oracle.jdbc.driver.OracleDriver“ );

      ....
      // 4. SQL 실행
      query.append( “SELECT ID              " )
           .append( "        , LAST_NAME " )
           .append( "FROM EMP              " );
     rs = stmt.executeQuery( query.toString() );
      ....
  } catch( ClassNotFoundException ce){
     ce.printStackTrace();
  } catch( SQLException se){
     se.printStackTrace();
  } finally {
     // 6. 사용할 Resource 반납
     try {
        rs.close();
        stmt.close();
        conn.close();
     } catch ( SQLException e ) {
        e.printStackTrace();
     }
  }
```

JDBC – SELECT

❑ Exception Handling 로직 추가

```
StringBuffer query = new StringBuffer();
try{
      // 1. DBMS Driver 로딩
      Class.forName( "oracle.jdbc.driver.OracleDriver“ );

      ….
      // 4. SQL 실행
      query.append( “SELECT ID                " )
            .append( "          , LAST_NAME " )
            .append( "FROM EMP                " );
     rs = stmt.executeQuery( query.toString() );
      ….
  } catch( ClassNotFoundException ce){
      ce.printStackTrace();
  } catch( SQLException se){
      se.printStackTrace();
  } finally {
      // 6. 사용할 Resource 반납
      try {
          rs.close();
          stmt.close();
          conn.close();
      } catch ( SQLException e ) {
          e.printStackTrace();
      }
  }
```

JDBC – UPDATE Example

```
public class UpdateTest {

    public static void main( String[] args ) throws  SQLException, ClassNotFoundException {
        Connection conn = null;
        Statement stmt = null;
        String url = "jdbc:oracle:thin:@192.168.0.200:1521:VCC";
        StringBuffer query = new StringBuffer();
        int updateCount = 0;

        Class.forName( "oracle.jdbc.driver.OracleDriver“ );
        conn = DriverManager.getConnection( url , “SEXXXXX" , “SEXXXXX" );
        conn.setAutoCommit( false );

        query.append( "UPDATE EMP                    “ )
             .append( "SET LAST_NAME = 'HITE'     “ )
             .append( "WHERE ID = '10004'          “ );
        stmt = conn.createStatement();

        updateCount = stmt.executeUpdate( query.toString() );
        System.out.println( "업데이트된 행의 갯수 : " + updateCount );

        if( updateCount == 1 ){
            conn.commit();
        }else{
            conn.rollback();
        }

        stmt.close();
        conn.close();
```

JDBC – PreparedStatement

```
public class PreparedUpdateTest {

    public static void main( String[] args ) throws SQLException, ClassNotFoundException {
        Connection conn = null;
        PreparedStatement pstmt = null;
        String url = "jdbc:oracle:thin:@192.168.0.200:1521:VCC";
        StringBuffer query = new StringBuffer();
        int updateCount = 0;

        Class.forName( "oracle.jdbc.driver.OracleDriver“ );
        conn = DriverManager.getConnection( url , “SEXXXXX" , “SEXXXXX" );
        conn.setAutoCommit( false );
        query.append( "UPDATE EMP              “ )
             .append( "SET LAST_NAME = ?    “ )
             .append( "WHERE ID = ?             “ );

        pstmt = conn.prepareStatement( query.toString() );
        pstmt.setString( 1, "HITE2" );
        pstmt.setString( 2, "10005" );

        updateCount = pstmt.executeUpdate();
        if( updateCount == 1 ){
            conn.commit();
        }else{
            conn.rollback();
        }

        pstmt.close();
        conn.close();
```

JDBC – Statement vs PreparedStatement

	Statement	PreparedStatement
장점	원하는 Query를 직접 넣어주기 때문에 직관적이고 사용하기 쉽다.	같은 Query를 반복 수행해야 하는 경우 성능이 좋다. (loop 이용이 용이)
단점	실행시마다 SQL문을 해석해서 오버헤드가 크다.	코드가 길어질 수 있다.

Sample	Statement stmt = conn.createStatement();
	
	stmt.executeUpdate("Insert into emp values ('21421', 'Kim')");
	stmt.executeUpdate("Insert into emp values ('32211', Hong)");
	
	…
		PreparedStatement pstmt = conn.preparedStatement(" Insert into emp values (?, ?) ");
		
		pstmt.setString(1, "21421");
		pstmt.setInt(2, "Kim");
		pstmt.executeUpdate();
		
		pstmt.setString(1, "32211");
		pstmt.setInt(2, "Hong");
		pstmt.executeUpdate();
		
		…