*[Font/size: DejaVu Sans Mono/12] [ ForCode Font/size: Consolas/11] Date: 25/2/2025 (Day-1)*

**Summary of CoreJava:**

1. Java Programming Components (Java Alphabets)

2. Java Programming Concepts

3. Object Oriented Programming features

**1. Java Programming Components (Java Alphabets)**

(a) Variables

(b) Methods

(c) Constructors

(d) Blocks

(e) Class

(f) Interface

(g) Abstract Class

**2.Java Programming Concepts**

(a) Object Oriented Programming

(b) Exception Handling Process

(c) Java Collection Framework

(d) Multi-Threading Concept

(e) File Storage in Java

(f) Networking in Java

**3.Object Oriented Programming features**

(a) Class

(b) Object

(c) Abstraction

(d) Encapsulation

(e) Polymorphism

(f) Inheritance

**Note:**

* Using CoreJava Components, Concepts and Construction rules we can develop
* NonServer-Applications (which means Stand-Alone-Applications)

**Define Stand-Alone-Application?**

* The Application which is installed in one Computer and performs actions in the same computer, is known as Stand-Alone-Application or NonServer-Application.

FAQ

**Define Server based Applications?**

* The Applications which are executed in server-environment are known as Server based Applications.
* These Server based applications are categorized into two types:

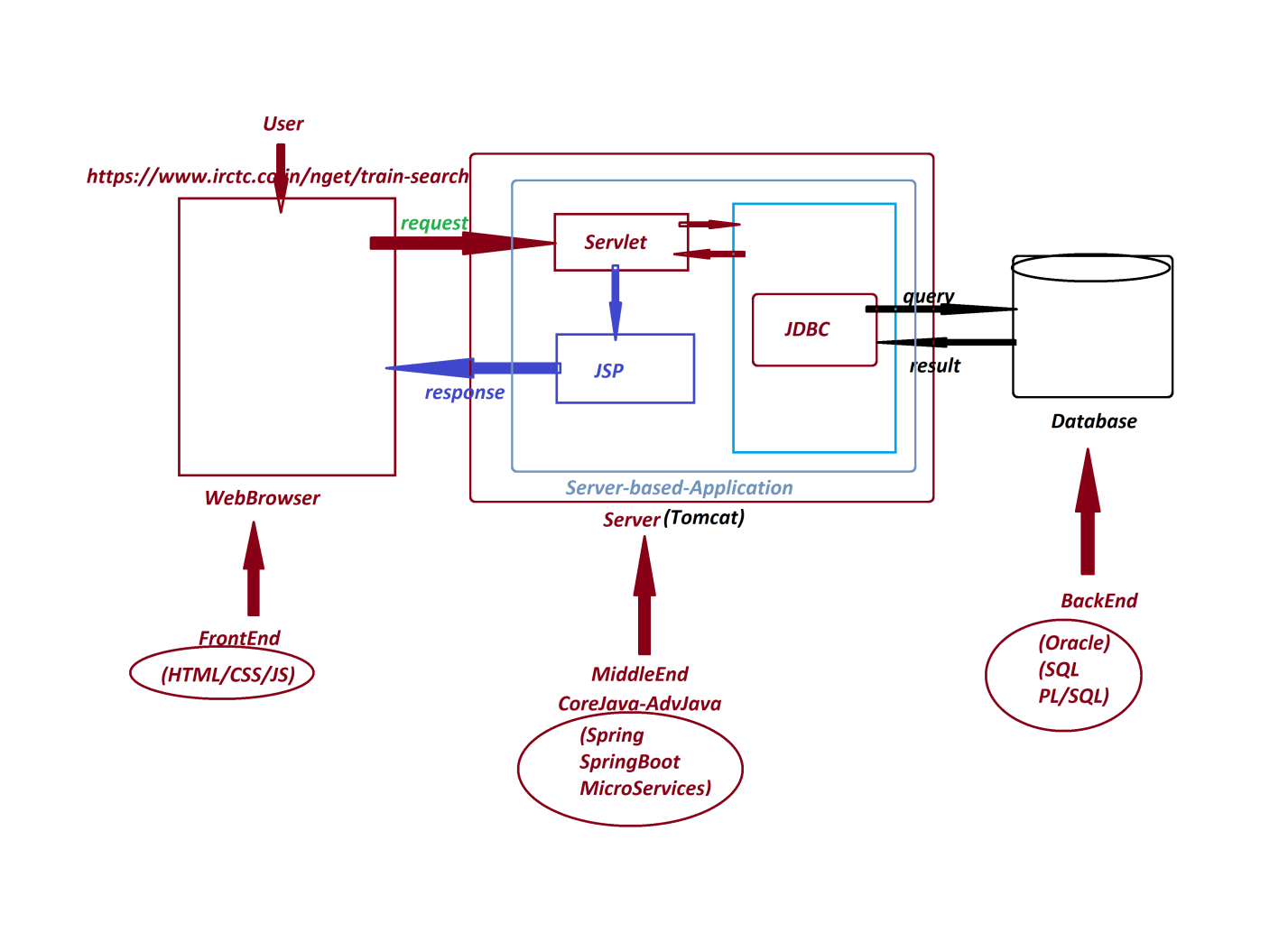
*1. Web Applications*

*2. Enterprise Applications*

**1. Web Applications:**

* The Applications which are constructed using AdvJava technologies like JDBC, Servlet and JSP are known as Web Applications.
* These Web Applications are available in 3-tier Architecture.

***Diagram:***



**2. Enterprise Applications:**

* The Applications which are executed in distributed environment and depending on the features like "Security", "Load Balancing" and "Clustering" are known as Enterprise Applications or Enterprise Distributed Applications.
* Enterprise Applications are available in n-tier Architecture

*Ex: Java-Frameworks*

Java-Tools

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**JDBC:(Part-1)**

* JDBC stands for ***'Java DataBase Connectivity***' and which is used to interact with database product.

-----

FAQ

##### Define Storage?

* The memory location where the data is available for access is known as Storage.

-----

**Types of Storages:**

* According to Java Application development, the storages are categorized into four types:

***1. Field Storage***

***2. Object Storage***

***3. File Storage***

***4. Database Storage***

**1. Field Storage:**

* The memory generated to hold single data value is known as Field Storage.
* When we use Primitive datatypes like byte, short, int, long, float, double, char and boolean will generate Field Storages.

**2. Object Storage:**

* The memory generated to hold group values is known as Object-Storage.
* when we use Non- Primitive datatypes like Class, Interface, Array and Enum will generate Object Storage.

*Date: 26/2/2025 (Day-2)*

Example

|  |
| --- |
| class Addition  {  static int a;      int b;      void add()      {         int c = a+b:        Sop(c);      }  }  Addition ad = new Addition();  ad.a = 12;  ad.b = 13;  ad.add();  Addition ob2 = ad; |
| Diagram |

FAQ

**What is the difference b/w**

**(i) Object**

**(ii) Object reference**

**(iii) Object reference Variable**

**(i) Object:**

* The memory generated to hold instance members of Class is known as Object. It is created using the new keyword.

|  |
| --- |
| class Book {  String title;  double price;  }  public class ObjectExample {  public static void main(String[] args) {  Book b1 = new Book(); // Object creation  }  }  ------------------------------------------------------  -> Here, **new Book();** creates an **object** in memory. |

**(ii) Object reference:**

* The address location where the Object is created is known as Object reference.

|  |
| --- |
| class Book {  String title;  double price;  }  public class ObjectReferenceExample {  public static void main(String[] args) {  Book b1 = new Book(); // 'b1' holds the reference of the object  System.out.println(b1); // Prints memory address (hashcode) of the object  }  }  -> Here, b1 is storing the **reference** (memory location) of the object. |

**(iii) Object reference Variable:**

* The Nonprimitive-data-type variable which is holding Object reference is known as Object reference Variable or Object name.

|  |
| --- |
| class Book {  String title;  double price;  }  public class ObjectReferenceVariableExample {  public static void main(String[] args) {  Book b1 = new Book(); // 'b1' is an Object Reference Variable  Book b2; // Declaring an Object Reference Variable without initializing  b2 = b1; // Assigning reference of 'b1' to 'b2'    System.out.println("b1 reference: " + b1);  System.out.println("b2 reference: " + b2);  }  }  /\*\* OUTPUT  b1 reference: Book@5e91993f  b2 reference: Book@5e91993f  \*/  -> Here, b1 and b2 are **Object Reference Variables** that hold the same **Object Reference**. |

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**List of Objects generated from CoreJava:**

1. User defined Class Objects

2. String-Objects

3. WrapperClass-Objects

4. Array-Objects

5. Collection<E>-Objects

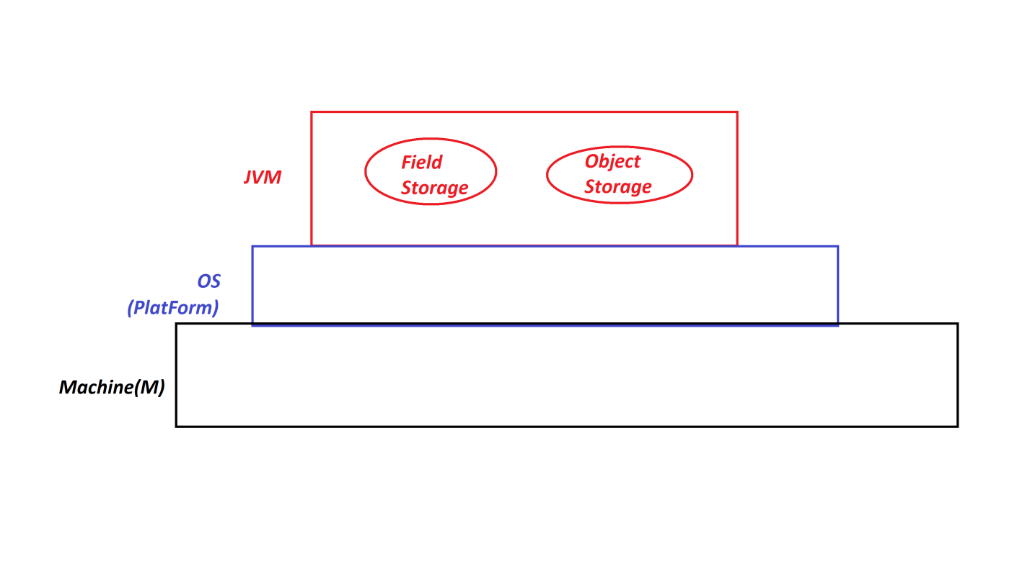
6. Map<K, V>-Objects

7. Enum<E>-Objects

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***Note:***

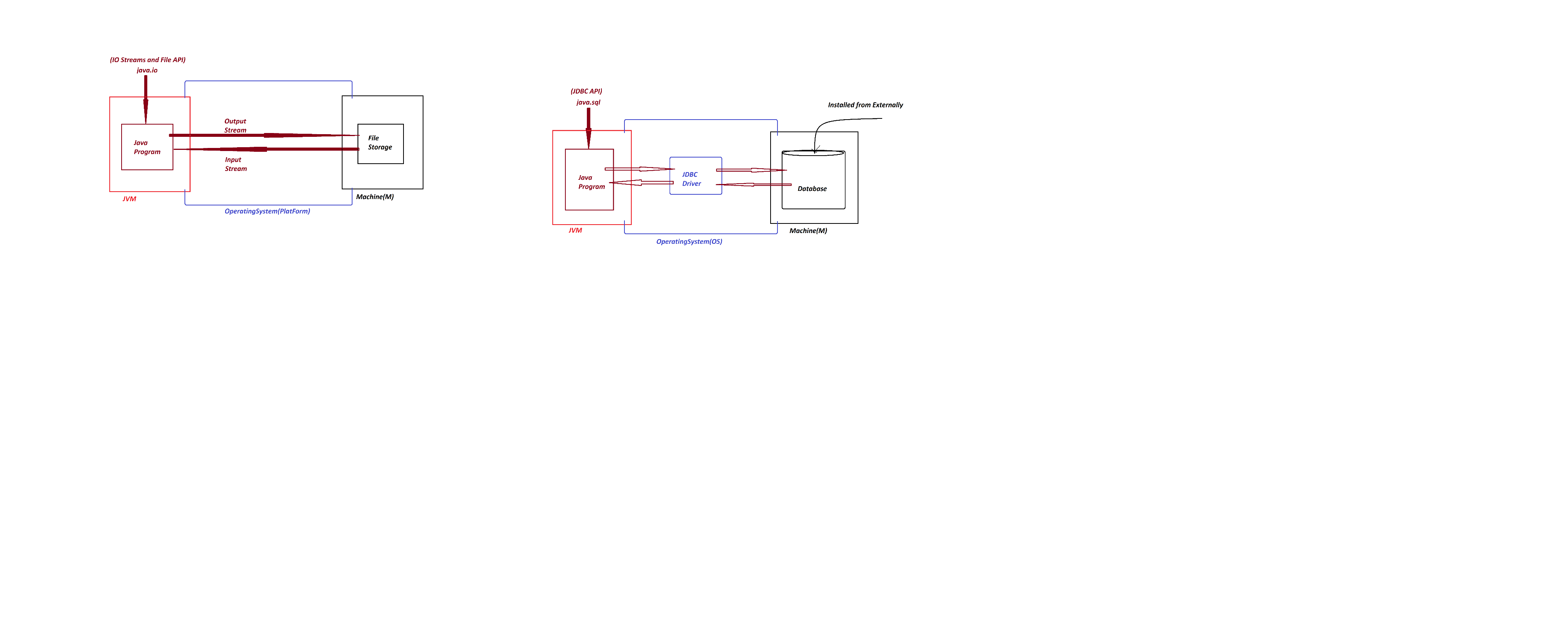
* The Field and Object Storages which are generated part of JVM while Application execution will be destroyed automatically when JVM Shutdowns.
* when we want to have permanent storage for Applications, then we have to take the support of any one of the following:
* File Storage
* Database Storage



*Date: 27/02/2025 (Day-2)*

**3. File Storage:**

* The smallest permanent storage of Computer System which is 'controlled and managed' by the Operating System is known as File Storage.
* In the process of establishing communication b/w Java-Program and File-Storage, the Java-Program must be Constructed using 'Classes and Interfaces' available from 'java.io' package (IO Streams and File API)



**Disadvantages of File Storage:**

(a) Data redundancy

(b) Data Inconsistency

(c) Difficulty in accessing data

(d) Limited data sharing

(e) File System corruption

(f) Security Problems

-----

*(a) Data redundancy:*

* Same information will be duplicated in different files known as Data redundancy. (data duplication)

-----

*(b) Data Inconsistency:*

* data can be inconsistent due to data redundancy

-----

*(c) Difficulty in accessing data:*

* Difficulty in accessing data, because the data is available in scattered form and there is no quering process.

-----

*(d) Limited data sharing:*

* Limited data sharing because data in scattered form.

-----

*(e) File System corruption:*

* File System can be Corrupted due to fragmentation or metadata corruption.

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*(f)Security Problems:*

* File System will have Security Problems.

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***Note***

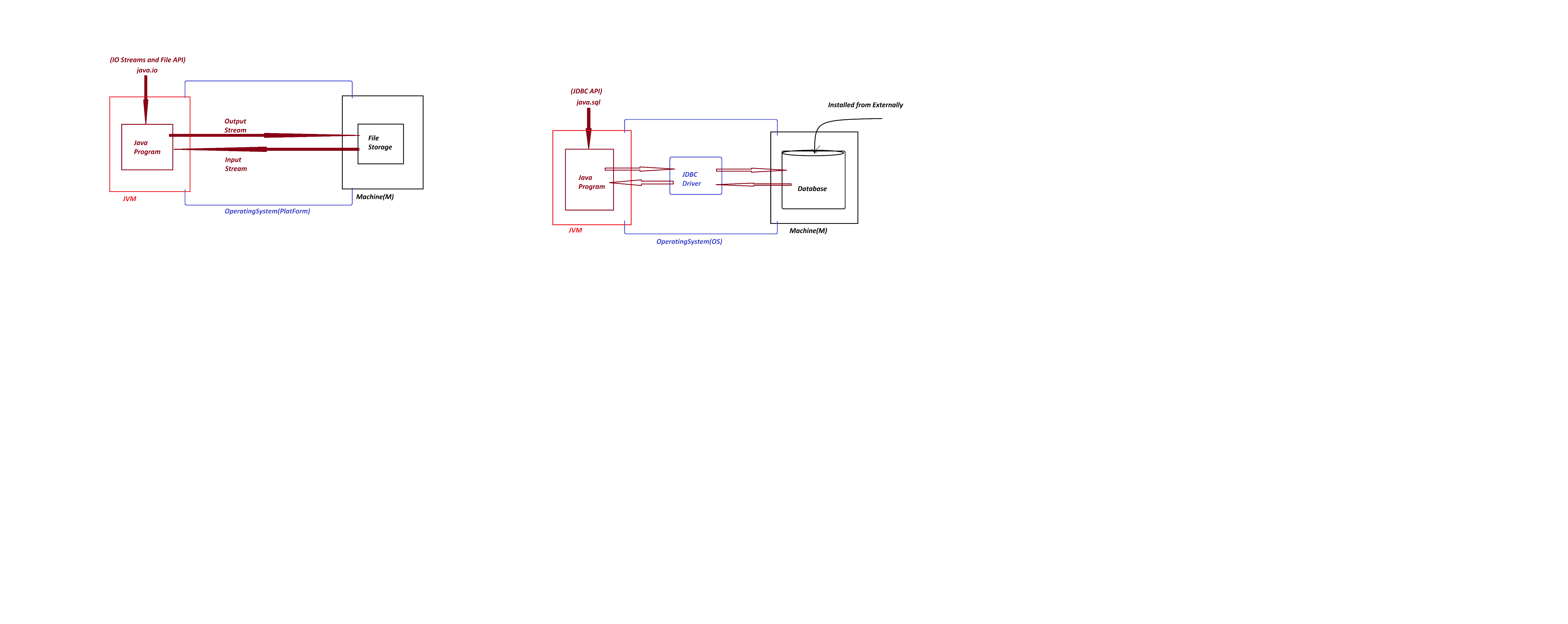
* Because of disadvantages in File-Storage, the File-Storage cannot be taken as major backend for Java-Applications.
* To Overcome all disadvantages of File-Storage, we use Database Storage.

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**4. Database Storage:**

* The largest permanent storage of Computer System, which is installed from externally is known as Database Storage.
* In the process of establishing Communication b/w Java-Program and Database-Product, the Java-Program must be constructed using 'Classes and Interfaces' from 'java.sql' package (JDBC API) and the Java-Program must take the support of JDBC-Driver



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FAQ

#### Define 'driver'?

* The small s/w program which is used to establish communication b/w two end-points is known as 'driver'.
* *Ex: Audio drivers, Video drivers, N/W drivers*

-----

***FAQ***

#### Define JDBC driver?

* The driver which is used to establish communication b/w Java-Program and DB-Product is known as JDBC driver.

**Types of drivers:**

* According Vendor the JDBC drivers are categorized into four types:

*1. JDBC-ODBC bridge driver (Type-1 driver)*

*2. Native API driver (Type-2 driver)*

*3. Network Protocol driver (Type-3 driver)*

*4. Thin driver (Type-4 driver)*

-----

***Note***

* According to realtime application development, we use only 'Thin driver'

*Date: 28/02/2025 (Day-4)*

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**Creating System Environment ready to execute JDBC Applications:**

***step-1*** : Download and Install Database Product(Oracle)

***step-2*** : Perform Login process to Database Product

* DB UserName : system
* DB Password : tiger

***step-3*** : Create table with name Customer72

(phno, cid, name, city, mid) Primary Key : phno

*SQL> create table Customer72(*

*phno number(15),*

*cid varchar2(15),*

*name varchar2(15),*

*city varchar2(15),*

*mid varchar2(25),*

*primary key(phno)*

*);*

-----

***step-4*** : Insert min 5 Customer details from SQL-Command-Line

insert into Customer72 values(9898981234,'HM9898981234','Alex','Hyd','a@gmail.com');

insert into Customer72 values(7676761234,'HM7676761234','Raj','Hyd','rj@gmail.com');

insert into Customer72 values(8686861234,'HM8686861234','Ram','Hyd','rm@gmail.com');

-----

*SQL> Select \* from Customer72;*

*PHNO CID NAME CITY MID*

*---------------------------------------------------------------------------------*

*9898981234 HM9898981234 Alex Hyd a@gmail.com*

*7676761234 HM7676761234 Raj Hyd rj@gmail.com*

*8686861234 HM8686861234 Ram Hyd rm@gmail.com*

-----

***step-5***  :

* Copy DB-Jar file from "lib" folder of Oracle to User defined folder(on Desktop)

**C:\oraclexe\app\oracle\product\11.2.0\server\jdbc\lib**

ojdbc6.jar - Oarcle11

FAQ

#### Define JAR?

#### JAR stands for 'Java Archive' and which is compressed format of more number of Class files.

***Note***

* This DB-Jar file will provide JDBC drivers.

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***step-6*** : Find the PortNo and ServiceName of Database Product(Oracle) PortNo and ServiceName is available from 'tnsnames.ora' file of 'Admin' folder of network

**C:\oraclexe\app\oracle\product\11.2.0\server\network\ADMIN**

*PortNo : 1521*

*ServiceName : XE (Express Edition)*

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***Steps used to establish communication to Database product:***

*step-1* : Loader driver

*step-2* : Creating Connection to Database Product

*step-3* : preparing JDBC-statement

*step-4* : Executing the query

*step-5* : Closing the connection from Database

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**JDBC API:**

* 'java.sql' package is known as JDBC-API and which provide 'classes and Interfaces' to Construct JDBC-Applications.
* 'Connection' is a Normal interface from java.sql package and which is root of JDBC API.
* The following are some important methods of 'Connection' interface:

1. createStatement()

2. prepareStatement()

3. prepareCall()

4. getAutoCommit()

5. setAutoCommit()

6. setSavepoint()

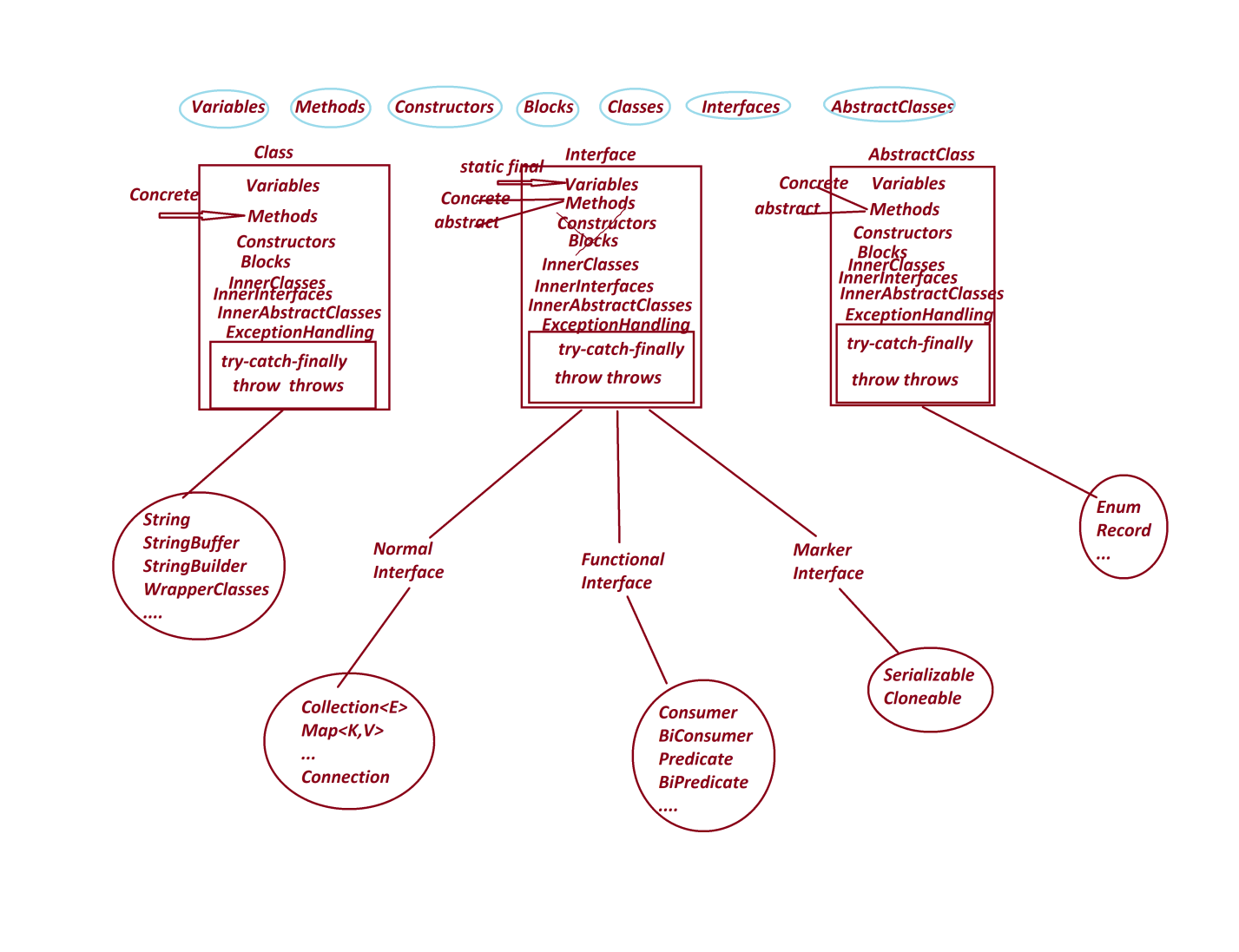
7. releaseSavepoint()

8. commit()

9. rollback()

10. close()

---------------------------------------------------------------------

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*Date: 03/03/2025 (Day-5)*

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**Application Development design Models:**

**Model-1 : Interface with Implementation class with name.**

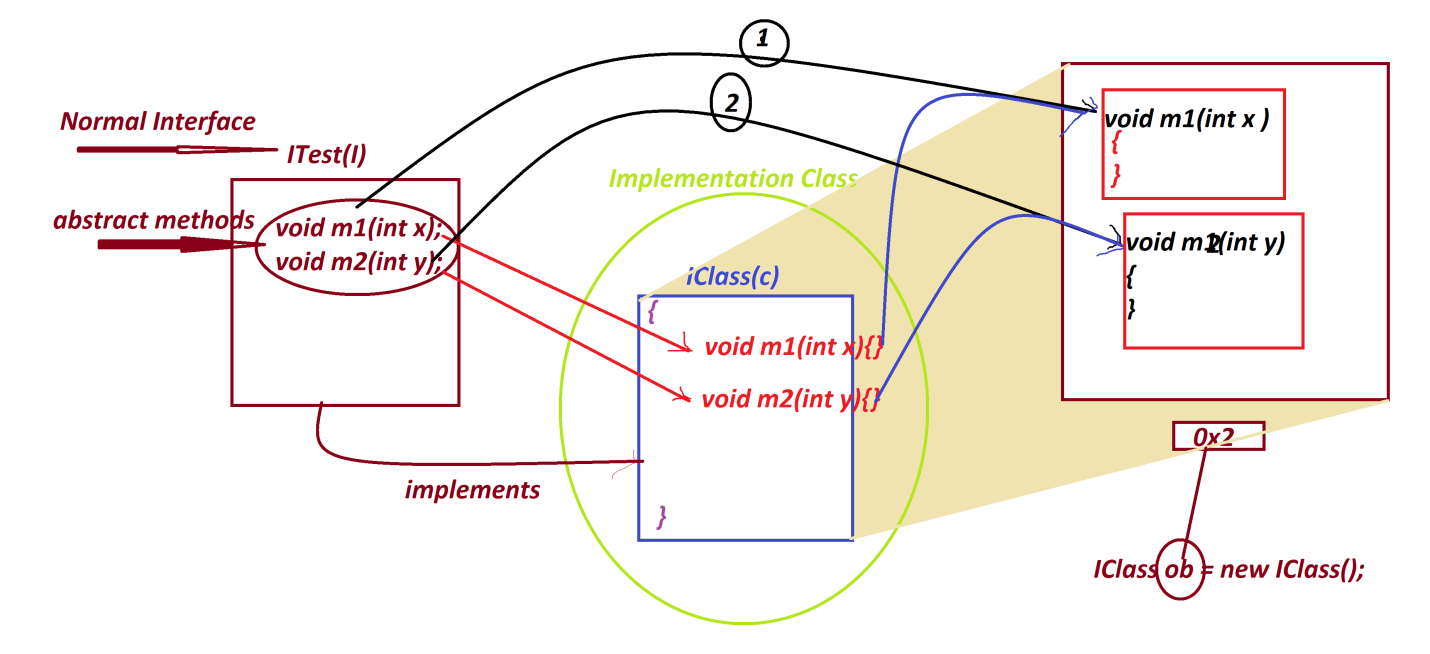
#### Model-2 : Interface without Implementation Class\_Name

**(Anonymous InnerClass as Implementation)**

**------**

**Model-1 : Interface with Implementation class with name.**

***Diagram:***

******

***ProjectName : CoreJava\_Model\_1***

|  |
| --- |
| ***//P1 : ITest.java***  **package p1;**  **public interface ITest**  **{**  **public abstract void m1(int x);**  **public abstract void m2(int y);**  **}**  ***//p1 : IClass.java***  **package p1;**  **public class IClass implements ITest**  **{**  **public void m1(int x)**  **{**  **System.out.println("\*\*\*\*\*Implemented m1(x)\*\*\*\*\*\*");**  **System.out.println("The value x:"+x);**  **}**    **public void m2(int y)**  **{**  **System.out.println("\*\*\*\*\*Implemented m2(xy\*\*\*\*\*\*");**  **System.out.println("The value y:"+y);**  **}**  **}** |

***p2 : DemoModel1.java(MainClass)***

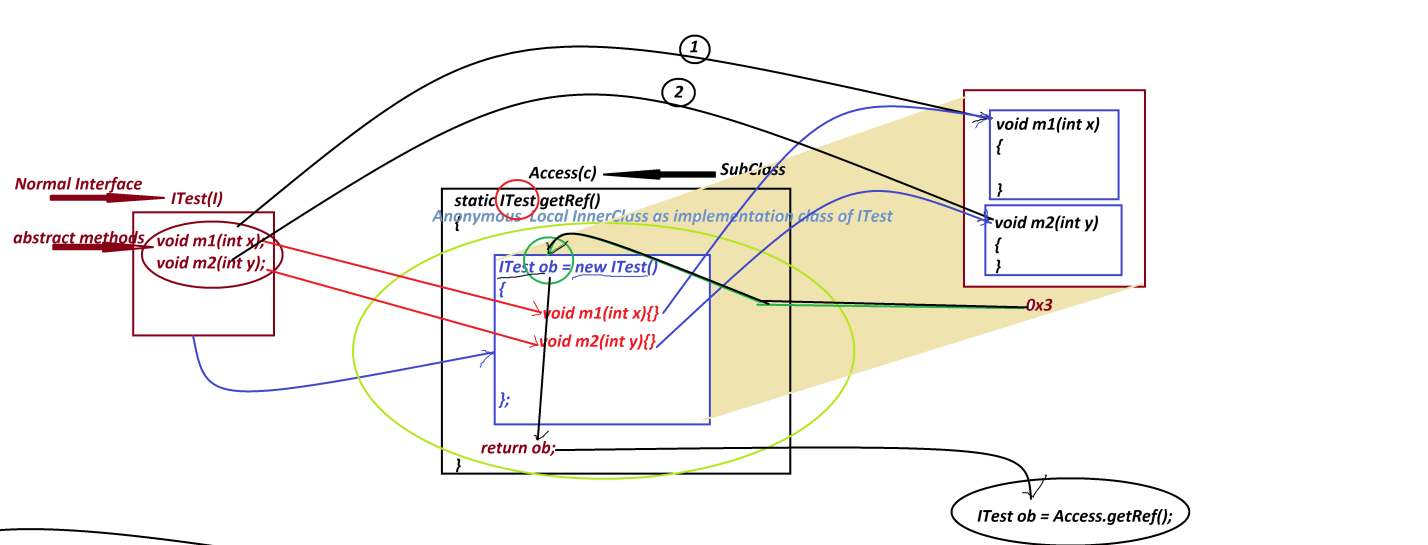
|  |
| --- |
| **package p2;**  **import p1.\*;**  **public class DemoModel1**  **{**  **public static void main(String[] args)**  **{**  **IClass ob = new IClass();//Implementation Object**  **ob.m1(11);**  **ob.m2(23);**  **}**  **}** |
| ***o/P:***  ***\*\*\*\*\*Implemented m1(x)\*\*\*\*\*\****  ***The value x:11***  ***\*\*\*\*\*Implemented m2(xy\*\*\*\*\*\****  ***The value y:23*** |

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***Model-2 : Interface without Implementation Class\_Name***

***(Anonymous InnerClass as Implementation)***

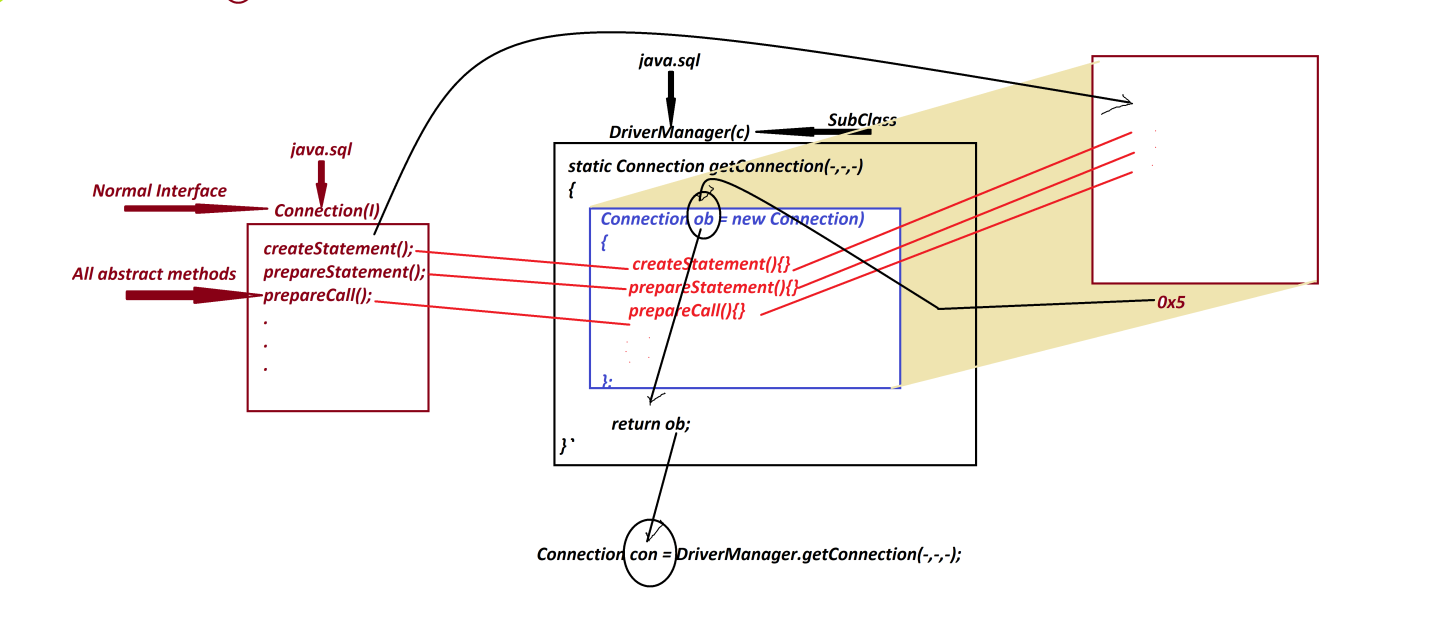
Diagram

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***ProjectName : CoreJava\_Model\_2***

|  |
| --- |
| ***p1 : ITest.java***  **package p1;**  **public interface ITest**  **{**  **public abstract void m1(int x);**  **public abstract void m2(int y);**  **}**  ***p1 : Access.java***  **package p1;**  **public class Access**  **{**  **public static ITest getRef()**  **{**  **ITest ob = new ITest()**  **{**  **public void m1(int x)**  **{**  **System.out.println("\*\*\*\*\*Implemented m1(x)\*\*\*\*\*");**  **System.out.println("The value x:"+x);**  **}**  **public void m2(int y)**  **{**  **System.out.println("\*\*\*\*\*Implemented m2(y)\*\*\*\*\*");**  **System.out.println("The value y:"+y);**  **}**  **};**  **return ob;**  **}//OuterClass static method**  **}//OuterClass** |
| ***p2 : DemoModel2.java(MainClass)***  ***package p2;***  ***import p1.\*;***  ***public class DemoModel2***  ***{***  ***public static void main(String[] args)***  ***{***  ***ITest ob = Access.getRef();//Creating and Accessing Implementation Object***  ***ob.m1(11);***  ***ob.m2(12);***  ***}***  ***}*** |
| ***o/p:***  ***\*\*\*\*\*Implemented m1(x)\*\*\*\*\****  ***The value x:11***  ***\*\*\*\*\*Implemented m2(y)\*\*\*\*\****  ***The value y:12*** |

***Diagram representing generating 'Connection' implementation Object:***

******

*Date: 04/03/2025 (Day-6)*

***Note***

* we use **getConnection()** - method is from 'DriverManager' to create implementation Object for 'Connection' interface, because **getConnection()**- method internally holding 'Anonymous Local InnerClass as implementation class of Connection interface' and which generate Connection-Implementation Object.

------

**Method Signature of getConnection():**

**public static java.sql.Connection getConnection**

**(java.lang.String, java.lang.String, java.lang.String)**

**throws java.sql.SQLException;**

-----

Syntax

**Connection con = DriverManager.getConnection("DB-URL","DB-UName","DB-PWord");**

*DB-URL => jdbc:oracle:thin:@localhost:1521:XE*

*DB-UName => system*

*DB-PWord => tiger*

**Connection con = DriverManager.getConnection**

**("jdbc:oracle:thin:@localhost:1521:xe","system","tiger");**

-----

***\*imp***

**JDBC statements:**

* JDBC statements will specify the type of operation to be performed on DB Product.
* These JDBC statements are categorized into three types:

**1. Statement**

**2. PreparedStatement**

**3. CallableStatement**

**1. Statement:**

* 'Statement' is an interface from java.sql package and which is used to execute normal queries without IN-Parameters.

(Normal queries means Create, Insert, Select, Update and delete)

* we use **createStatement()**-method from 'Connection' interface to create implementation object for 'Statement' interface, because this **createStatement()** -method internally holding 'Anonymous Local InnerClass as implementation class of Statement-Interface' and which generate Statement-Object.

**Method Signature of createStatement();**

**public abstract java.sql.Statement createStatement() throws java.sql.SQLException;**

***Syntax***

**Statement stm = con.createStatement();**

* The following are two important methods of 'Statement' interface:

(a) **executeQuery()**

(b) **executeUpdate()**

**(a) executeQuery():**

* executeQuery()- method is used to execute select-queries Method
* **Signature of** **executeQuery()**:

**public abstract java.sql.ResultSet executeQuery(java.lang.String)**

**throws java.sql.SQLException;**

***Syntax***

**ResultSet rs = stm.executeQuery("select-query");**

**(b)** **executeUpdate():**

* executeUpdate()-method is used to execute NonSelect-Queries.\
* ***Method Signature of*** **executeUpdate**:

public abstract int executeUpdate(java.lang.String) throws java.sql.SQLException;

* *Syntax*

**int k = stm.executeUpdate("NonSelect-Query");**

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**Creating JDBC Application Using IDE Eclipse:**

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**step-1** : Open IDE Eclipse, while opening name the WorkSpace and click 'Launch'

-----

**step-2** : Create Java Project

-----

**step-3** : Add DB-Jar file to Java-Project through 'Build path' RightClick on Project-> Build Path -> Configure Build Path -> Libraries -> select 'Classpath' and click 'Add External JARs' -> Browse and select DB-Jar file from user defined folder-> Open-> Apply -> Apply and Close.

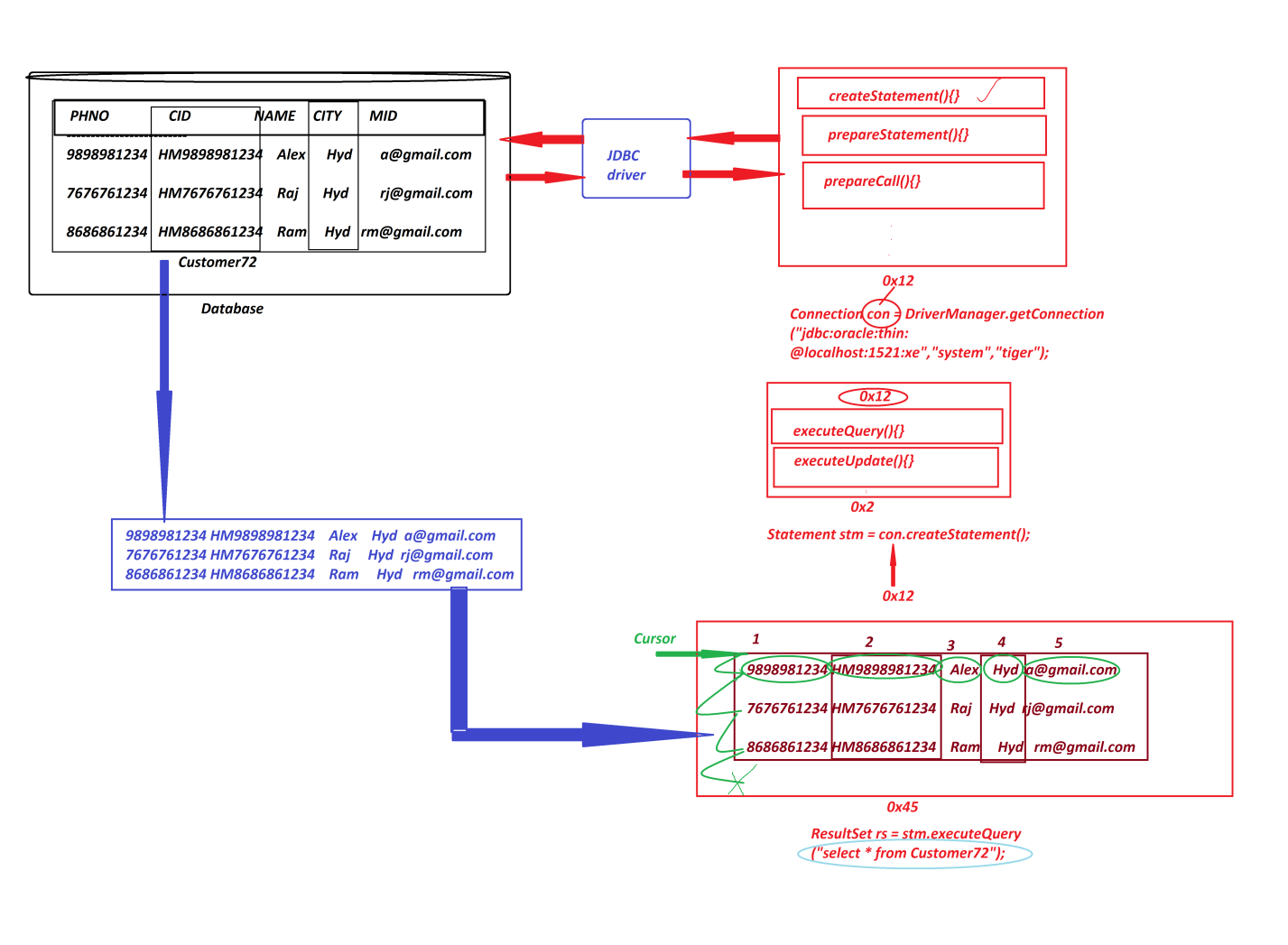
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**step-4** : Create package in 'src'

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**step-5** : Create class(JDBC Program) in package and write JDBC-code to display all Customer details.

**======**

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|  |
| --- |
| DBCon1.java **-----------**  **package test;**  **import java.sql.\*;**  **public class DBCon1**  **{**  **public static void main(String[] args)**  **{**  **try**  **{**  **//step-1 : Loader driver**  **Class.forName("oracle.jdbc.driver.OracleDriver");**  **//step-2 : Creating Connection to Database Product**  **Connection con = DriverManager.getConnection**  **("jdbc:oracle:thin:@localhost:1521:xe",**  **"system","tiger");**  **//step-3 : preparing JDBC-statement**  **Statement stm = con.createStatement();**  **//step-4 : Executing the query**  **ResultSet rs = stm.executeQuery("select \* from Customer72");**  **while(rs.next())**  **{**  **System.out.println(rs.getLong(1)+"\t"**  **+rs.getString(2)+"\t"+**  **rs.getString(3)+"\t"+**  **rs.getString(4)+"\t"+**  **rs.getString(5));**  **}//end of loop**  **//step-5 : Closing the connection from Database**  **con.close();**  **}//end of try**  **catch(Exception e)**  **{**  **e.printStackTrace();**  **}**  **}**  **}** |

*Date: 05/03/2025 (Day-7)*

***Note***

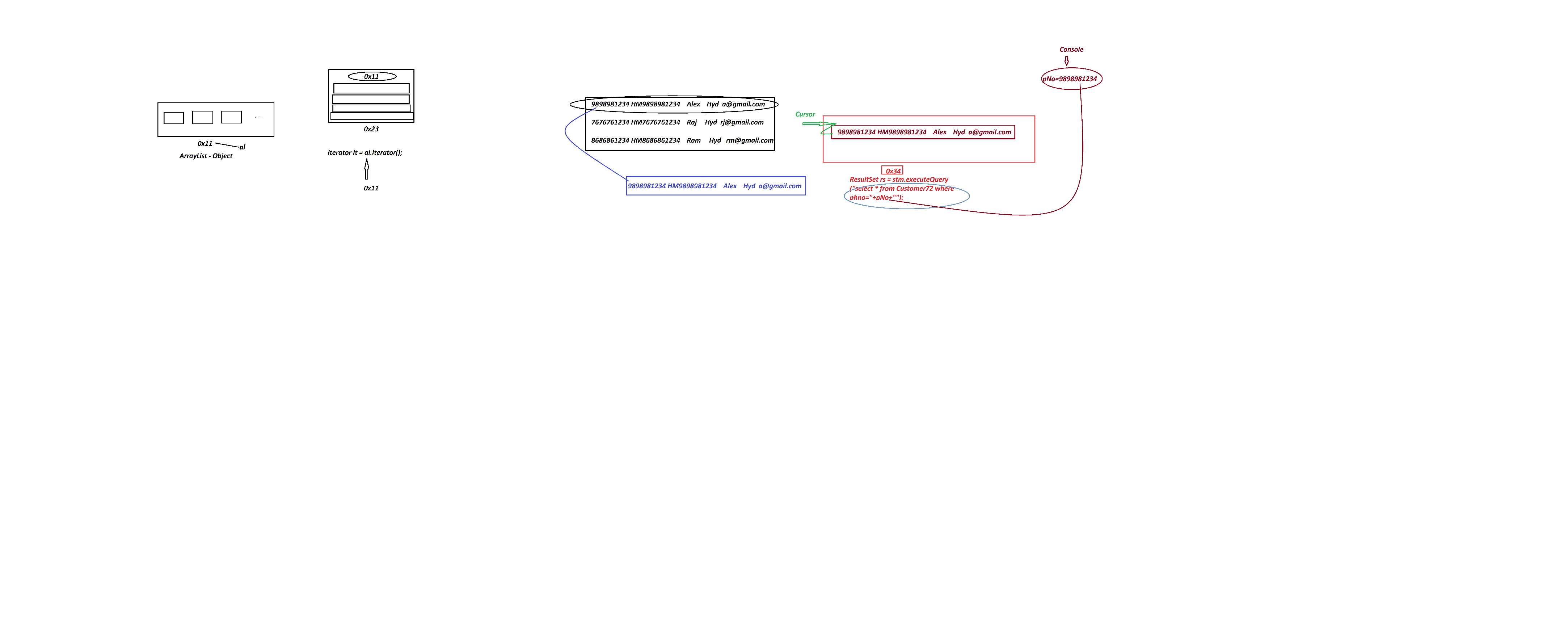
1. **'forName()'** method is from java.lang.Class and which is used to load the class at runtime or execution time, in this process the class is not identified by the Compiler at compilation stage.
2. **executeQuery()** -method will create implementation object for 'ResultSet-Interface' and the object will hold the result generated from select-queries,and the method also generate one cursor pointing before the first row.
3. we use **'next()'** method to move the cursor on ResultSet-object and which generate boolean result***.***

-----

Example

Q. Construct JDBC Application to display Customer details based on PhoneNo.

*Diagram*



***Program-* DBCon2.java**

|  |
| --- |
| package test;  import java.sql.\*;  import java.util.\*;;  public class DBCon2  {  public static void main(String[] args)  {          Scanner s = new Scanner(System.in);          try(s;)          {           Class.forName("oracle.jdbc.driver.OracleDriver");           Connection con = DriverManager.getConnection           ("jdbc:oracle:thin:@localhost:1521:xe","system","tiger");           Statement stm = con.createStatement();           System.out.println("Enter the Cust-PhoneNo to display details:");           long pNo = s.nextLong();           ResultSet rs = stm.executeQuery           ("select \* from Customer72 where phno="+pNo+"");           if(rs.next()) {           System.out.println(rs.getLong(1)+"\t"           +rs.getString(2)+"\t"           +rs.getString(3)+"\t"           +rs.getString(4)+"\t"           +rs.getString(5));           }else {           System.out.println("Invalud Cust-PhNo....");           }           con.close();          }//end of try          catch(Exception e)          {           e.printStackTrace();          }  }  } |
| o/P:  **Enter the Cust-PhoneNo to display details: 9898981234**  **9898981234 HM9898981234 Alex Hyd a@gmail.com** |

Example

Q. Construct JDBC Application to read Customer details from Console and insert into Customer72

Table (Insert Operation)

#### Program : DBCon3.java

|  |
| --- |
| package test;  import java.sql.\*;  import java.util.\*;  public class DBCon3 {  public static void main(String[] args) {         Scanner s = new Scanner(System.in);         try(s;){         Class.forName("oracle.jdbc.driver.OracleDriver");          Connection con = DriverManager.getConnection          ("jdbc:oracle:thin:@localhost:1521:xe","system","tiger");          Statement stm = con.createStatement();          System.out.println("Enter the Cust-PhoneNO:");          long phNo = Long.parseLong(s.nextLine());          String custId = "HM"+phNo;          System.out.println("Enter the Cust-Name:");          String name = s.nextLine();          System.out.println("Enter the Cust-City:");          String city = s.nextLine();          System.out.println("Enter the Cust-MailId:");          String mId = s.nextLine();          int k = stm.executeUpdate          ("insert into Customer72 values("+phNo+",'"+custId+"','"+name+"','"+city+"','"+mId+"')");          if(k>0) {          System.out.println("Customer details added Successfully...");          }          con.close();         }catch(Exception e) {         e.printStackTrace();         }  }  } |
| o/p:  Enter the Cust-PhoneNO: 4545451234  Enter the Cust-Name: RTER  Enter the Cust-City: Hyd  Enter the Cust-MailId: r@gmail.com  Customer details added Successfully... |

==========

Assignment:

DB Table : BookDetails72

            (bcode,bname,bauthor,bprice,bqty)

             primary key : bcode

program-1 : Construct JDBC Application to insert 5 book details

Program-2 : Construct JDBC Application to display all book details

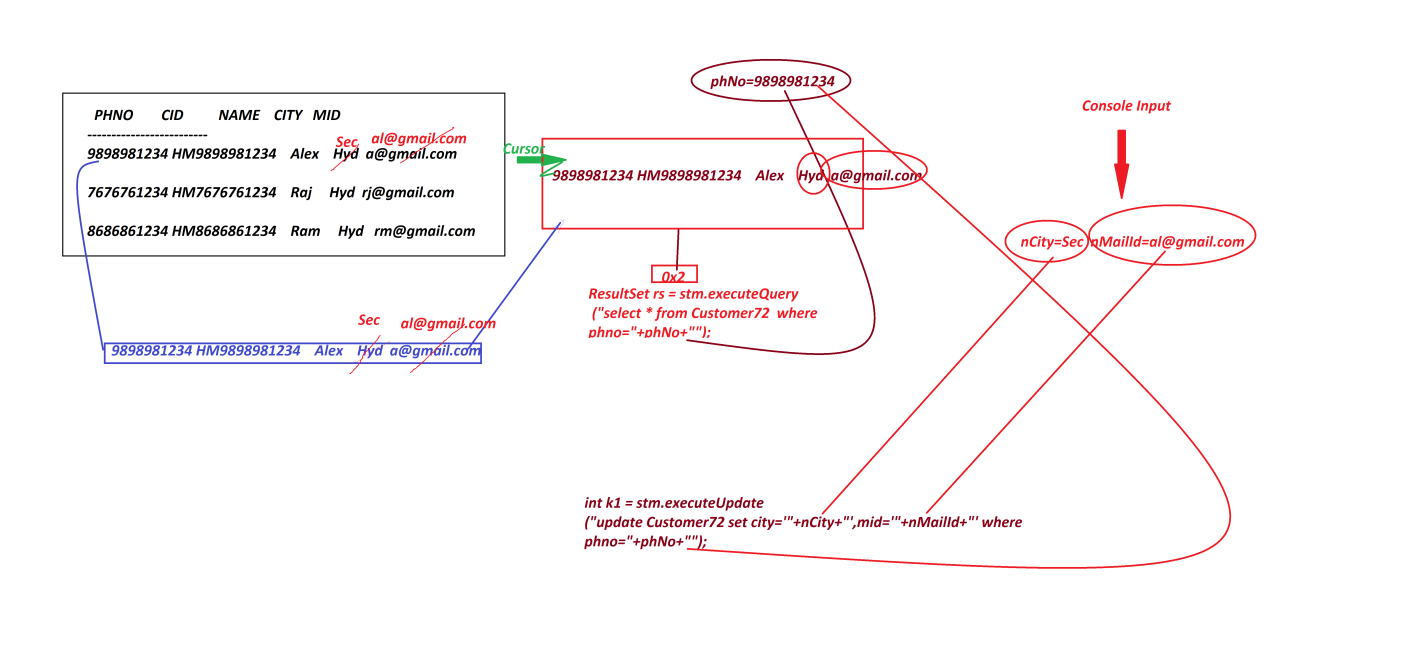
program-3 : Construct JDBC Application to display book details based on bookCode

 ----------------------------------------------------------------------------------

*Date: 06/03/2025 (Day-8)*

Example

Construct JDBC Application to perform Update and Delete Operations on Customer table.

(based Customer PhoneNo) 

o/p:(Update)

Enter the Cust-PhoneNo to perform Update/delete operation:

9898981234

\*\*\*\*\*\*\*Operation Choice\*\*\*\*\*

1.Update

2.Delete

Enter the your Choice:

1

Existing city:Hyd

Enter the new City:

Sec

Existing MailId:a@gmail.com

Enter the new MailId:

al@gmail.com

Customer Updated Successfully...

o/p:(Delete)

Enter the Cust-PhoneNo to perform Update/delete operation:

7676761234

\*\*\*\*\*\*\*Operation Choice\*\*\*\*\*

1.Update

2.Delete

Enter the your Choice:

2

Customer deleted successfully...

Example

#### Construct JDBC Application to perform the following operations

1.create

2.insert

3.update

4.delete

##### Program : DBCon5.java

**package test;**

**import java.sql.\*;**

**import java.util.\*;**

**public class DBCon5 {**

**public static void main(String[] args) {**

**Scanner s = new Scanner(System.in);**

**try(s;){**

**Class.forName("oracle.jdbc.driver.OracleDriver");**

**Connection con = DriverManager.getConnection**

**("jdbc:oracle:thin:@localhost:1521:xe","system","tiger");**

**Statement stm = con.createStatement();**

**System.out.println("Enter the query(create/insert/update/delete)");**

**String qry = s.nextLine();**

**int k = stm.executeUpdate(qry);**

**System.out.println("The value in k:"+k);**

**if(k>=0) {**

**System.out.println("Query executed Successfully...");**

**}**

**con.close();**

**}catch(SQLSyntaxErrorException sqe) {**

**System.out.println(sqe.getMessage());**

**System.out.println("Error Code:"+sqe.getErrorCode());**

**}catch(SQLIntegrityConstraintViolationException sie) {**

**System.out.println(sie.getMessage());**

**System.out.println("Error Code:"+sie.getErrorCode());**

**}catch(Exception e) {**

**e.printStackTrace();**

**}**

**}**

**}**

o/p:(Create)

Enter the query(create/insert/update/delete)

create table emp72(id varchar2(10),name varchar2(15),desg varchar2(10),primary key(id))

The value in k:0

Query executed Successfully...

o/p:(Insert)

Enter the query(create/insert/update/delete)

insert into Emp72 values('A11','Alex','SE')

The value in k:1

Query executed Successfully...

o/p:(Update)

Enter the query(create/insert/update/delete)

update Emp72 set desg='ME' where id='A11'

The value in k:1

Query executed Successfully...

o/p:(Delete)

Enter the query(create/insert/update/delete)

delete from Emp72 where id='A21'

The value in k:1

Query executed Successfully...

o/p:

Enter the query(create/insert/update/delete)

create table Emp72(id varchar2(10),name varchar2(15),desg varchar2(10),primary key(id))

Table already avilable...

Error Code:955

955 - Create

001 - Insert

=====================

Assignment:

DB Table : Product72(code,name,price,qty)

Primary key : code

Construct JDBC Application to perform the following operations based on User Choice:

1.AddProduct

2.ViewAllProducts

3.ViewProductByCode

4.UpdateProductByCode(price-qty)

5.DeleteProductByCode

6.Exit

Note:

=>repeat the above choice(operations) until we perform exit-operation

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