

Lesson 01 Demo 03

Performing CRUD Operations

Objective: To perform create, read, update, and delete operations on the created database for managing customer records effectively

Tool required: Eclipse IDE

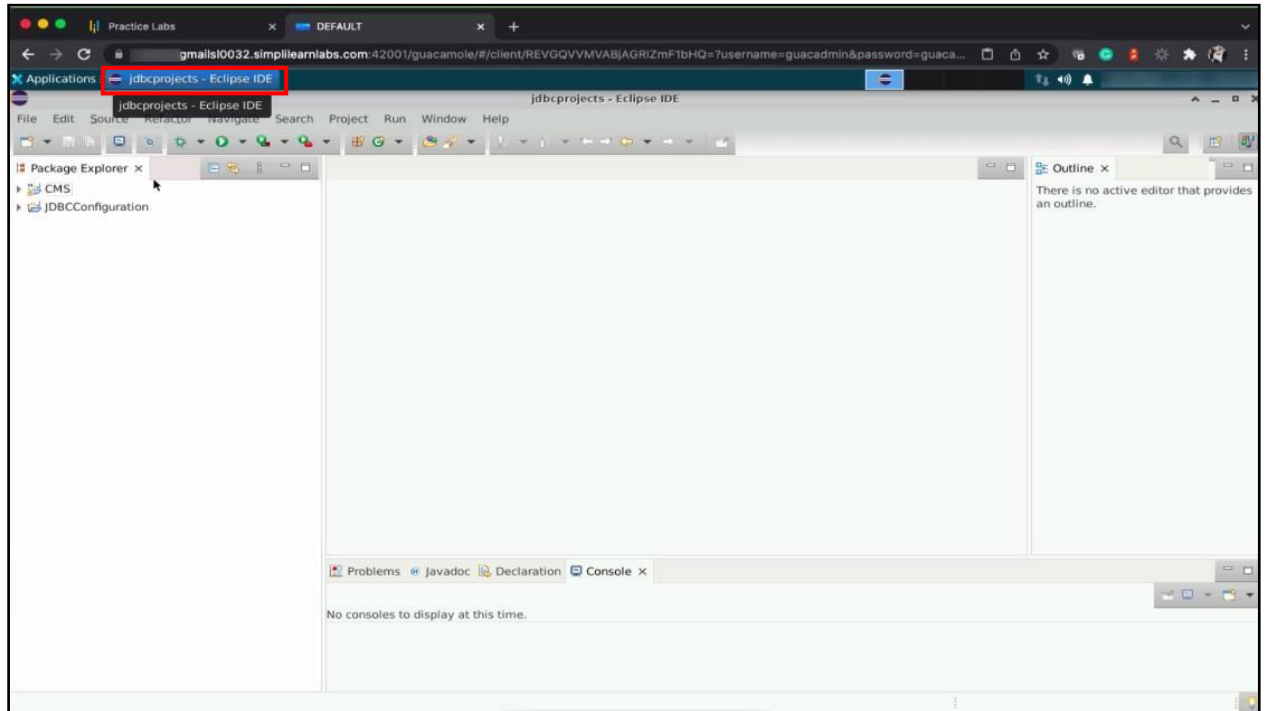
Prerequisites: Lesson 01 Demo 02

Steps to be followed:

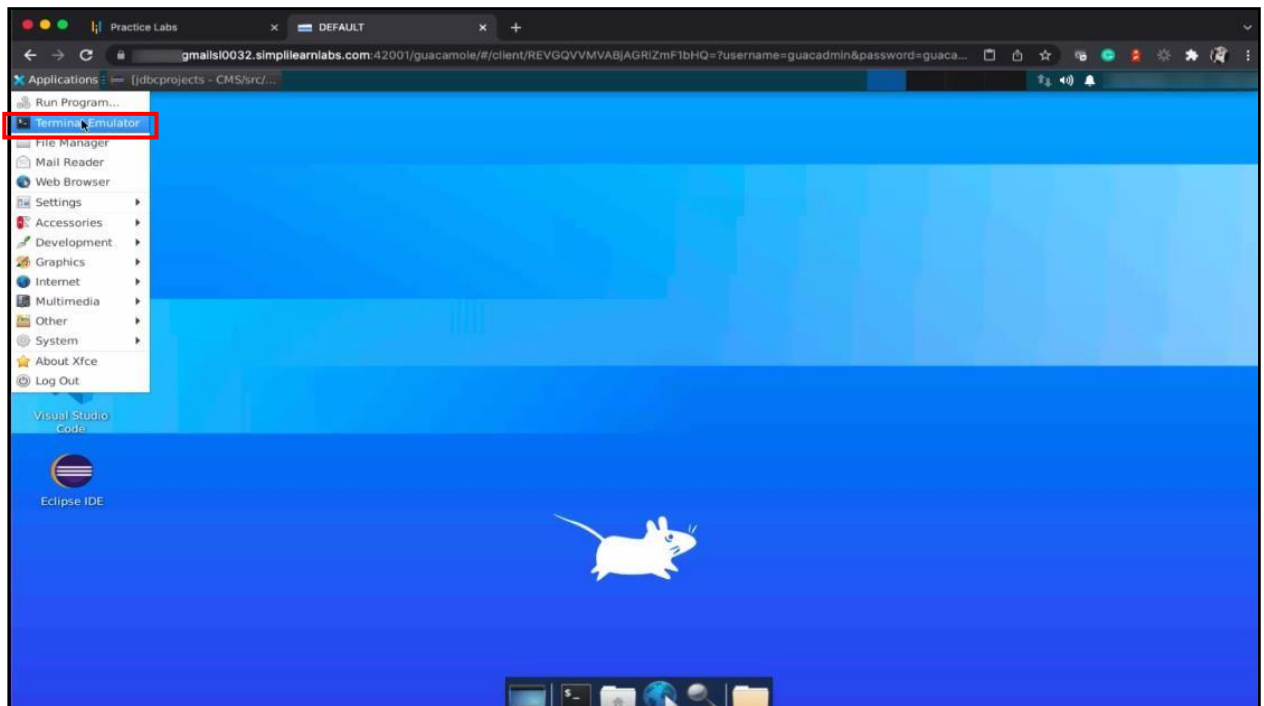
1. Open the Terminal Emulator
2. Write an insert operation in Eclipse IDE
3. Create an SQL query for the insert operation
4. Write an update operation
5. Perform the getallcustomer operations
6. Perform the delete operation

Step 1: Open the Terminal Emulator

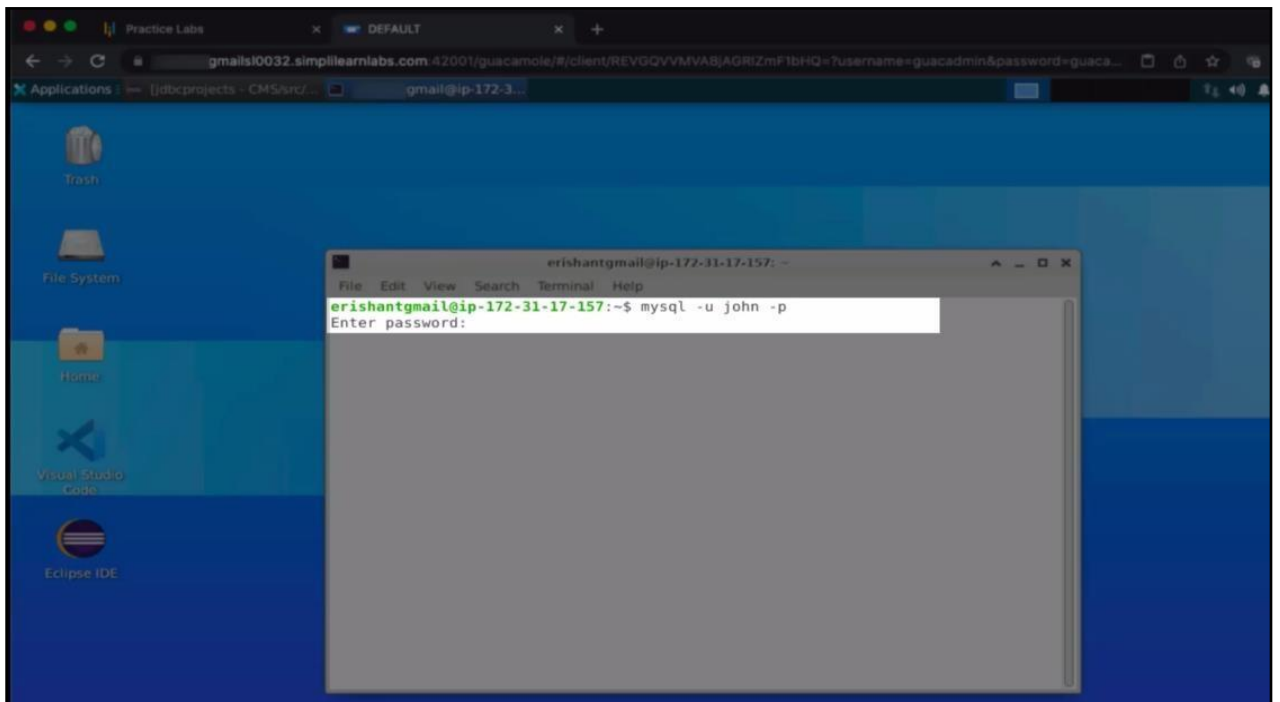
1.1 Open Eclipse IDE



1.2 Open the Terminal Emulator

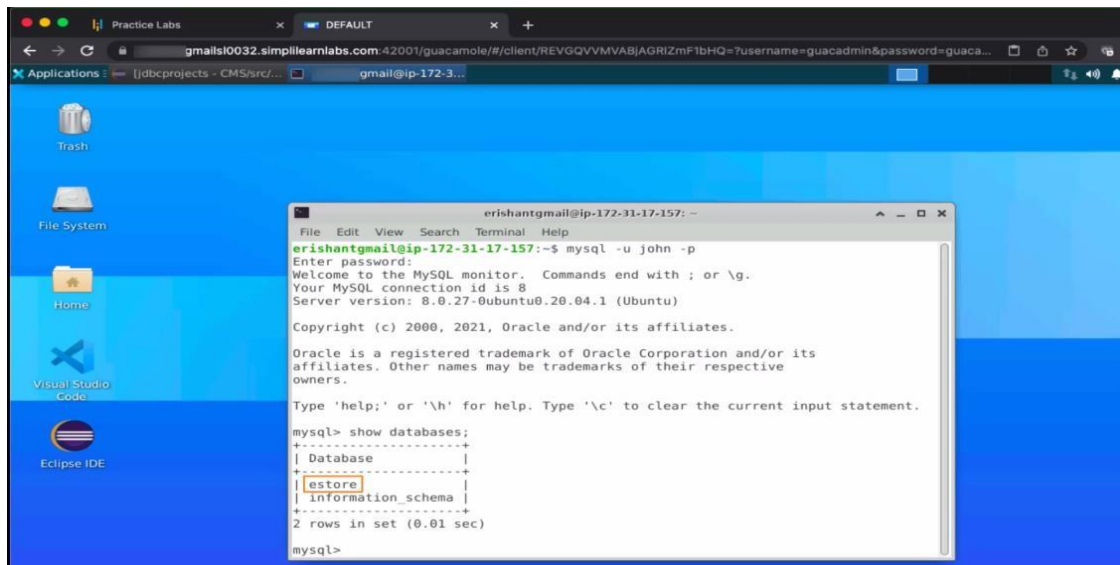


1.3 Log in to MySQL using the command `mysql -u john -p`

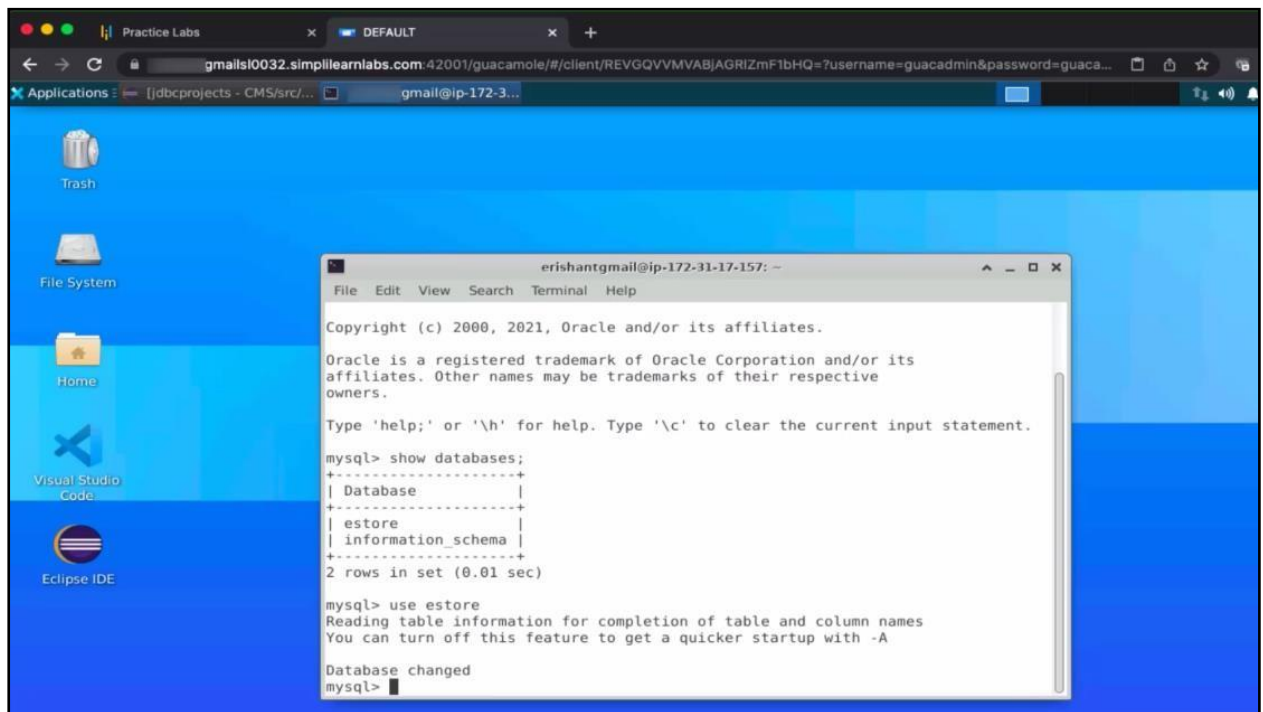


Note: A user named **John** has already been created for the database.

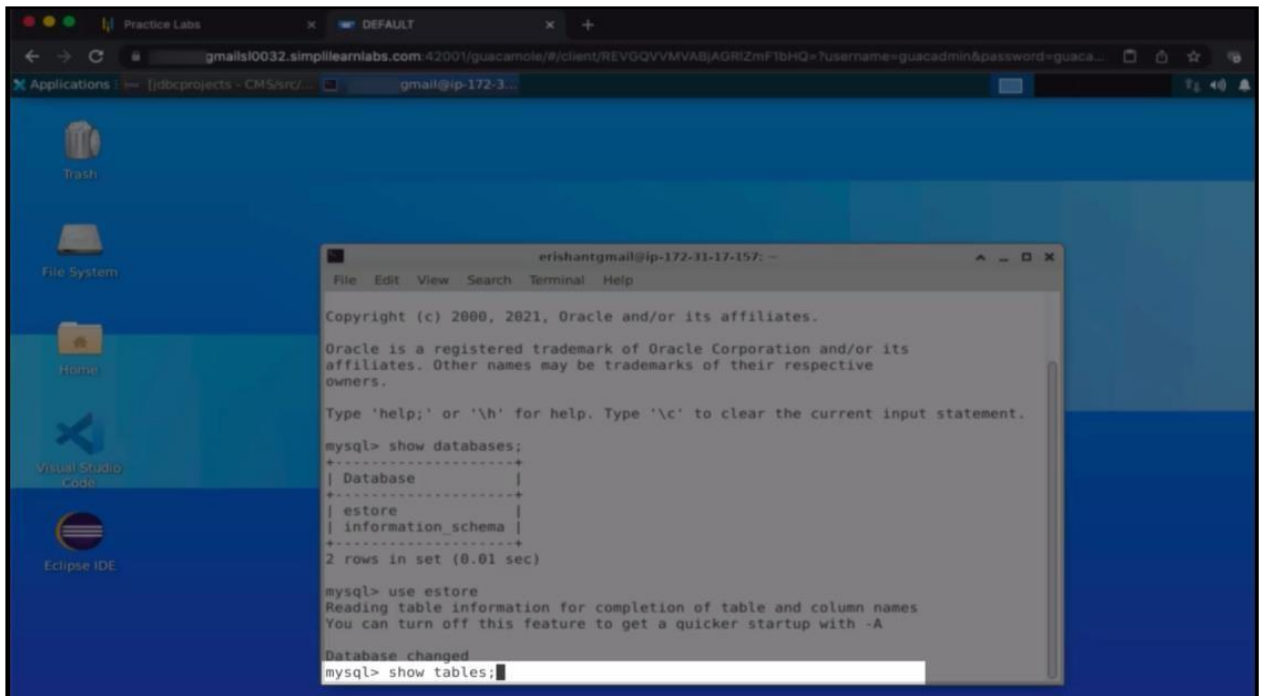
1.4 Type **show databases;** and list all the databases available



1.5 Type **use estore;** and change the database to **estore** database



1.6 Type **show tables;** to list the tables available in the **estore** database



```

erishantgmail@ip-172-31-17-157: ~
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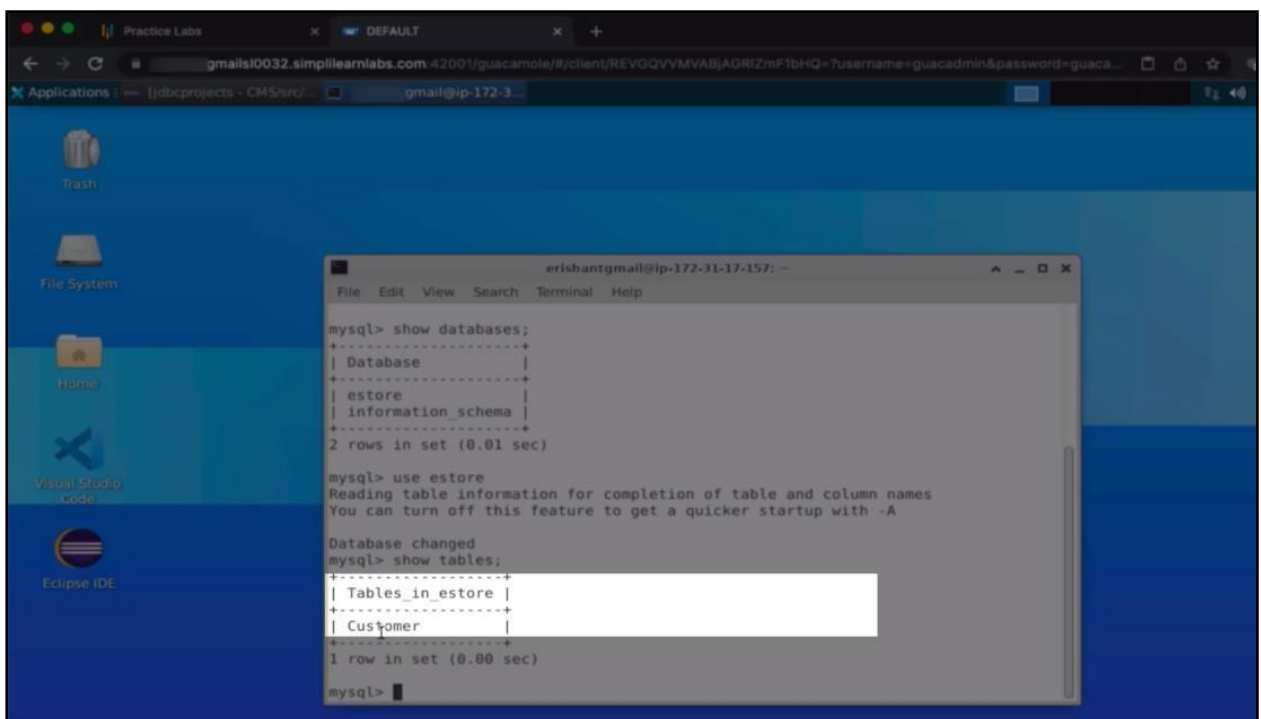
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show databases;
+-----+
| Database |
+-----+
| estore   |
| information_schema |
+-----+
2 rows in set (0.01 sec)

mysql> use estore
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> show tables;

```



```

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mysql> show databases;
+-----+
| Database |
+-----+
| estore   |
| information_schema |
+-----+
2 rows in set (0.01 sec)

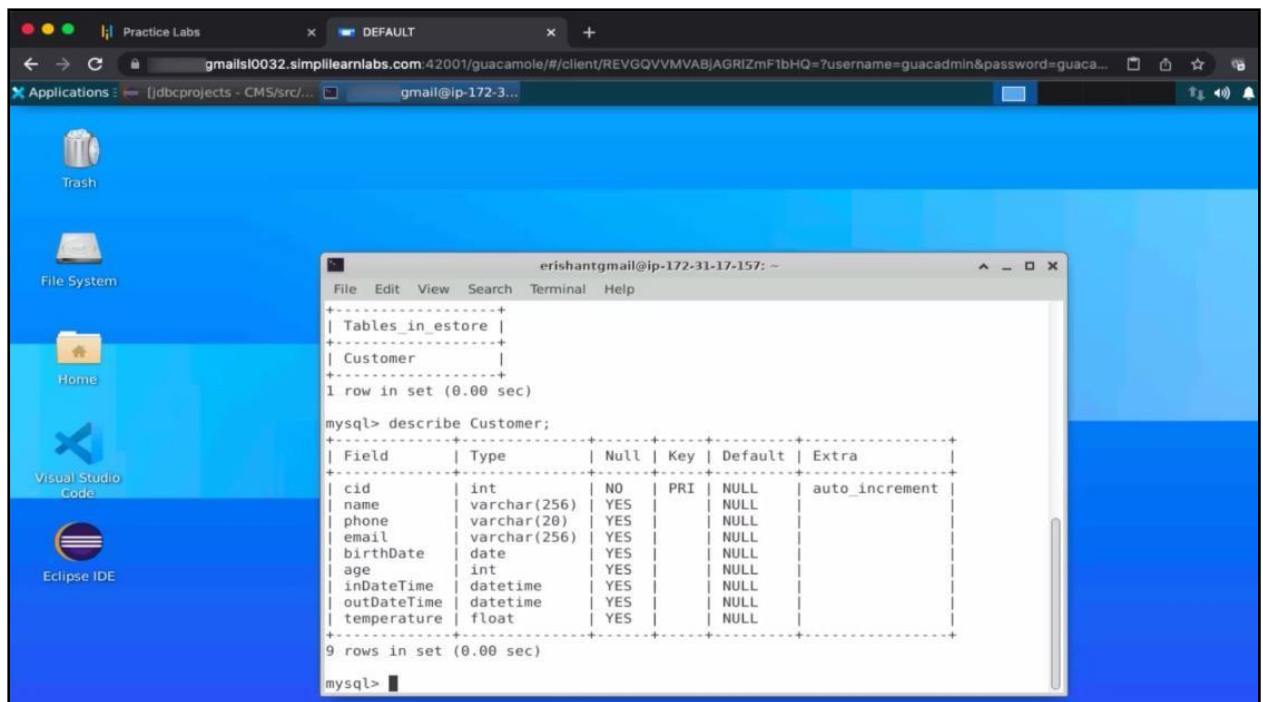
mysql> use estore
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> show tables;
+-----+
| Tables_in_estore |
+-----+
| Customer         |
+-----+
1 row in set (0.00 sec)

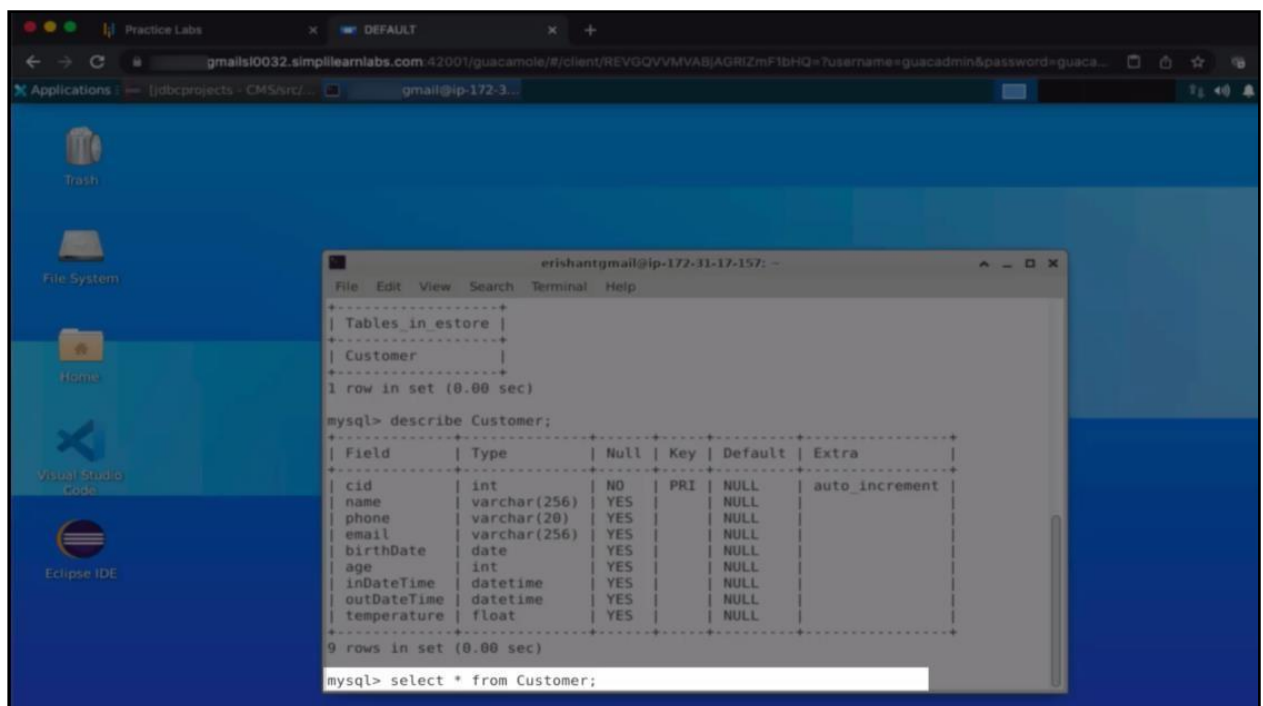
mysql>

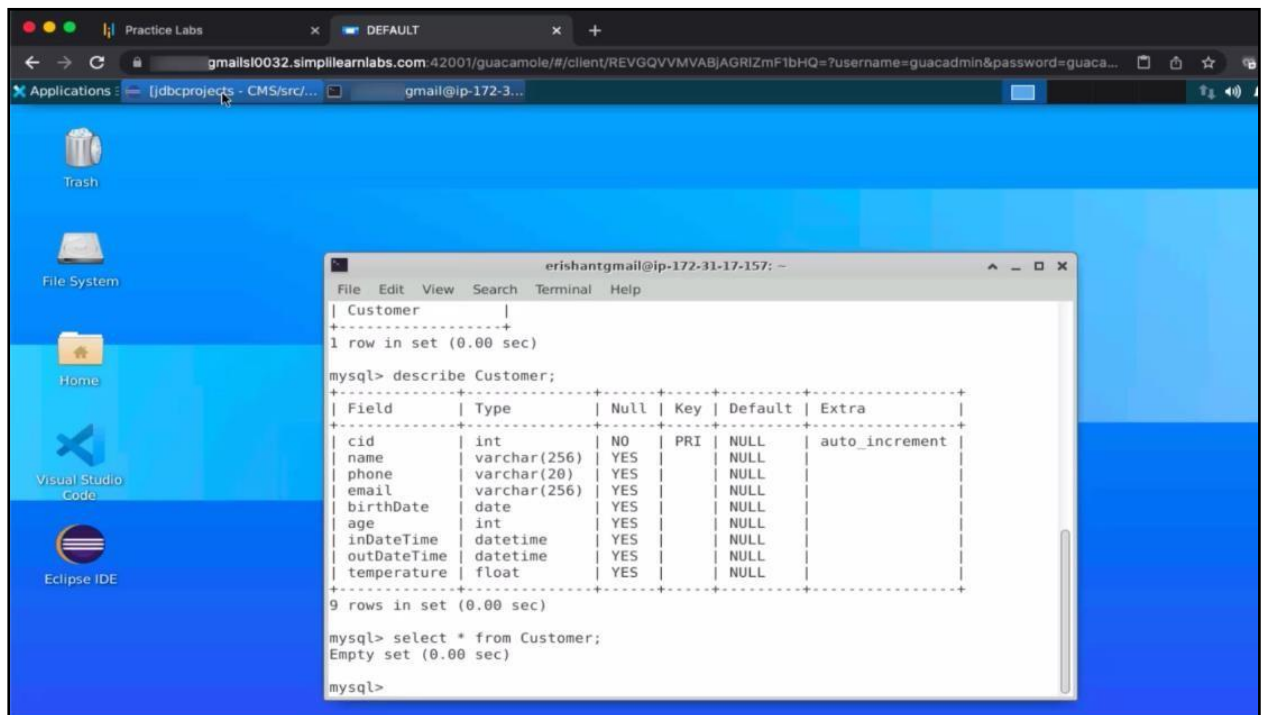
```

1.7 Type **describe Customer;** to get detailed information on the table



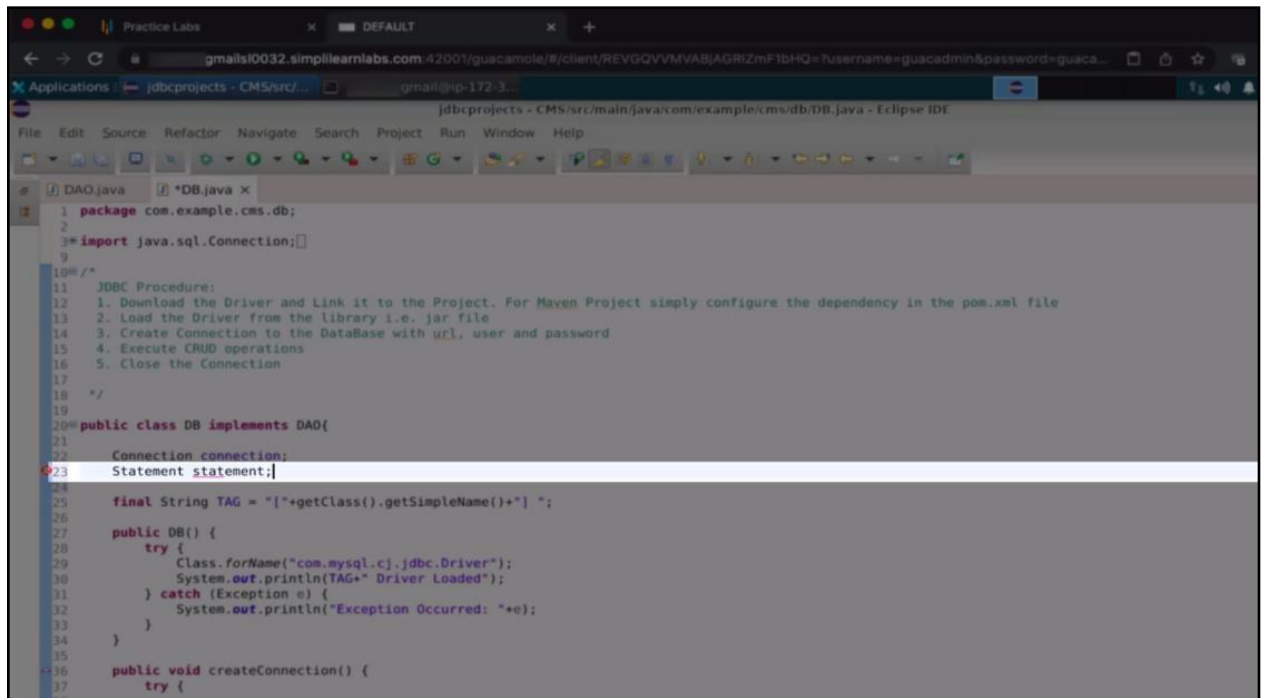
1.8 Type **select * from Customer;** to select data from the table





Step 2: Write an insert operation in Eclipse IDE

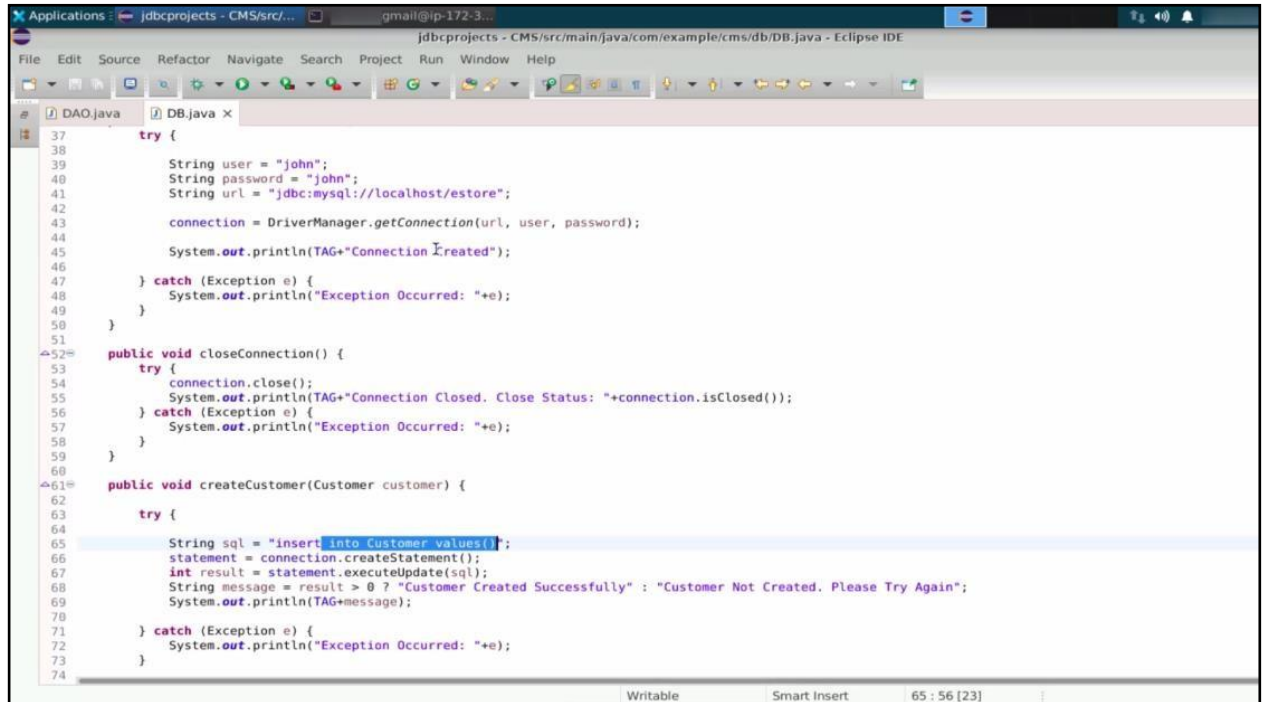
2.1 Handle exception errors by typing the API call statement using the **Statement** object



```
1 package com.example.cms.db;
2
3 import java.sql.Connection;
4
5
6
7
8
9
10 /**
11  * JDBC Procedure:
12  * 1. Download the Driver and Link it to the Project. For Maven Project simply configure the dependency in the pom.xml file
13  * 2. Load the Driver from the library i.e. jar file
14  * 3. Create Connection to the DataBase with url, user and password
15  * 4. Execute CRUD operations
16  * 5. Close the Connection
17  */
18
19
20 public class DB implements DAO{
21
22     Connection connection;
23     Statement statement;
24
25     final String TAG = "["+getClass().getSimpleName()+"] ";
26
27     public DB() {
28         try {
29             Class.forName("com.mysql.cj.jdbc.Driver");
30             System.out.println(TAG+" Driver Loaded");
31         } catch (Exception e) {
32             System.out.println("Exception Occurred: "+e);
33         }
34     }
35
36     public void createConnection() {
37         try {
```

2.2 Type the insert operation inside the **try-catch** block:

String sql = "insert into Customer values()"



The screenshot shows the Eclipse IDE interface with the file `DB.java` open. The code is as follows:

```
37     try {
38
39         String user = "john";
40         String password = "john";
41         String url = "jdbc:mysql://localhost/estore";
42
43         connection = DriverManager.getConnection(url, user, password);
44
45         System.out.println(TAG+"Connection Created");
46
47     } catch (Exception e) {
48         System.out.println("Exception Occurred: "+e);
49     }
50 }
51
52 public void closeConnection() {
53     try {
54         connection.close();
55         System.out.println(TAG+"Connection Closed. Close Status: "+connection.isClosed());
56     } catch (Exception e) {
57         System.out.println("Exception Occurred: "+e);
58     }
59 }
60
61 public void createCustomer(Customer customer) {
62     try {
63
64         String sql = "insert into Customer values()";
65         statement = connection.createStatement();
66         int result = statement.executeUpdate(sql);
67         String message = result > 0 ? "Customer Created Successfully" : "Customer Not Created. Please Try Again";
68         System.out.println(TAG+message);
69
70     } catch (Exception e) {
71         System.out.println("Exception Occurred: "+e);
72     }
73 }
74 }
```

The status bar at the bottom indicates "Writable", "Smart Insert", and "65 : 56 [23]".

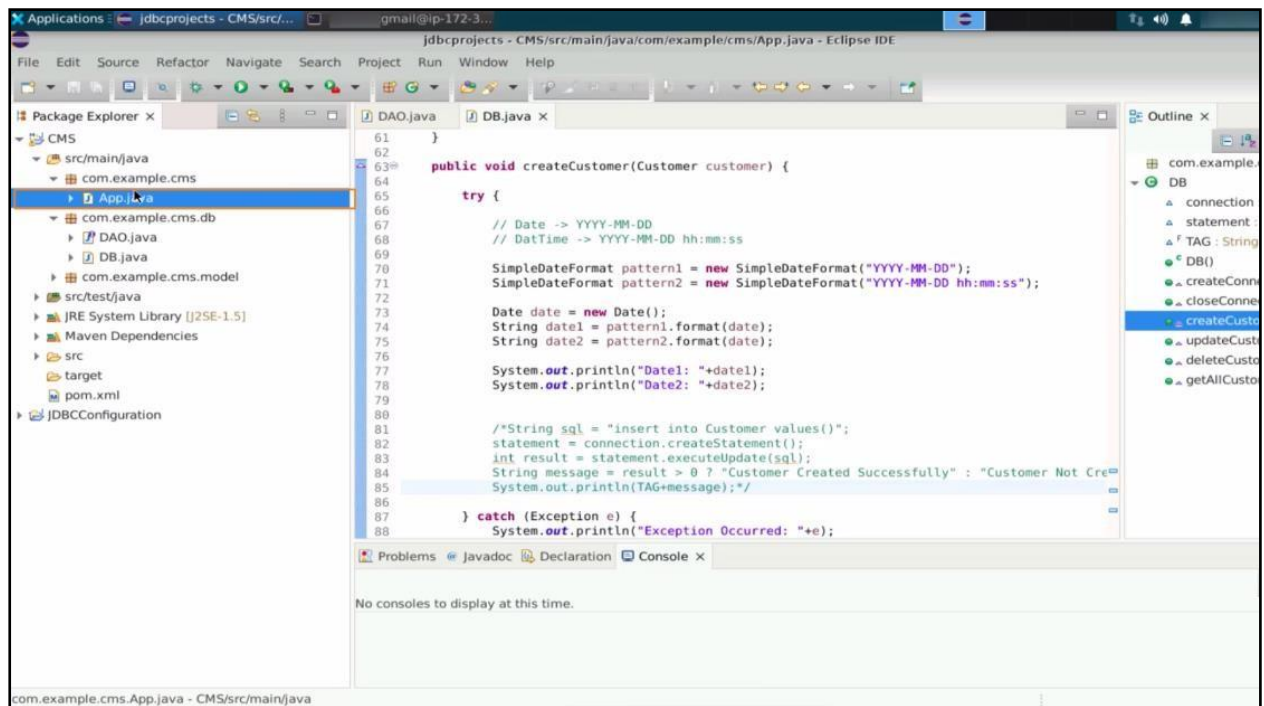
2.3 Create a simple **date** format API from line 65

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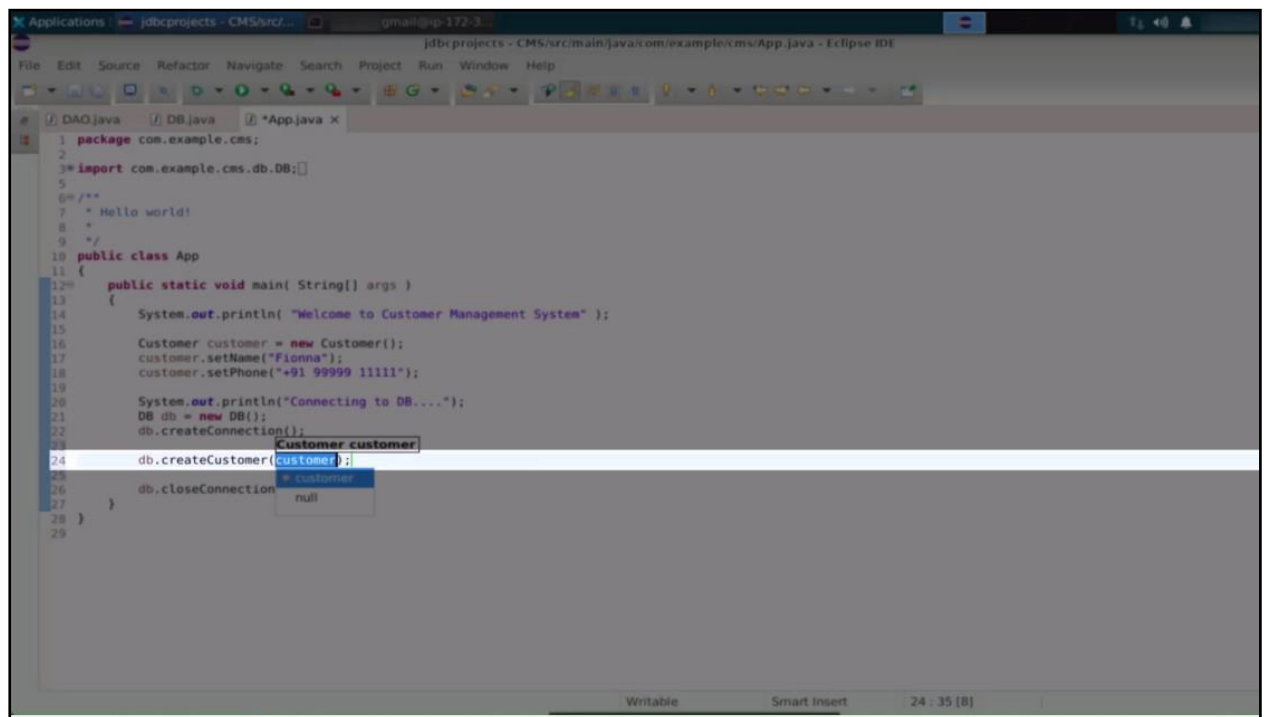
jdbcpjprojects - CMS/src/...  gmail@ip-172-3...
jdbcpjprojects - CMS/src/main/java/com/example/cms/db/DB.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help

DAO.java DB.java x
52 }
53
54 public void closeConnection() {
55     try {
56         connection.close();
57         System.out.println(TAG+"Connection Closed. Close Status: "+connection.isClosed());
58     } catch (Exception e) {
59         System.out.println("Exception Occurred: "+e);
60     }
61 }
62
63 public void createCustomer(Customer customer) {
64     try {
65         // Date -> YYYY-MM-DD
66         // DateTime -> YYYY-MM-DD hh:mm:ss
67
68         SimpleDateFormat pattern1 = new SimpleDateFormat("YYYY-MM-DD");
69         SimpleDateFormat pattern2 = new SimpleDateFormat("YYYY-MM-DD hh:mm:ss");
70
71         Date date = new Date();
72         String date1 = pattern1.format(date);
73         String date2 = pattern2.format(date);
74
75         System.out.println("Date1: "+date1);
76         System.out.println("Date2: "+date2);
77
78         String sql = "insert into Customer values()";
79         statement = connection.createStatement();
80         int result = statement.executeUpdate(sql);
81         String message = result > 0 ? "Customer Created Successfully" : "Customer Not Created. Please Try Again";
82         System.out.println(TAG+message);
83     } catch (Exception e) {
84         System.out.println("Exception Occurred: "+e);
85     }
86 }
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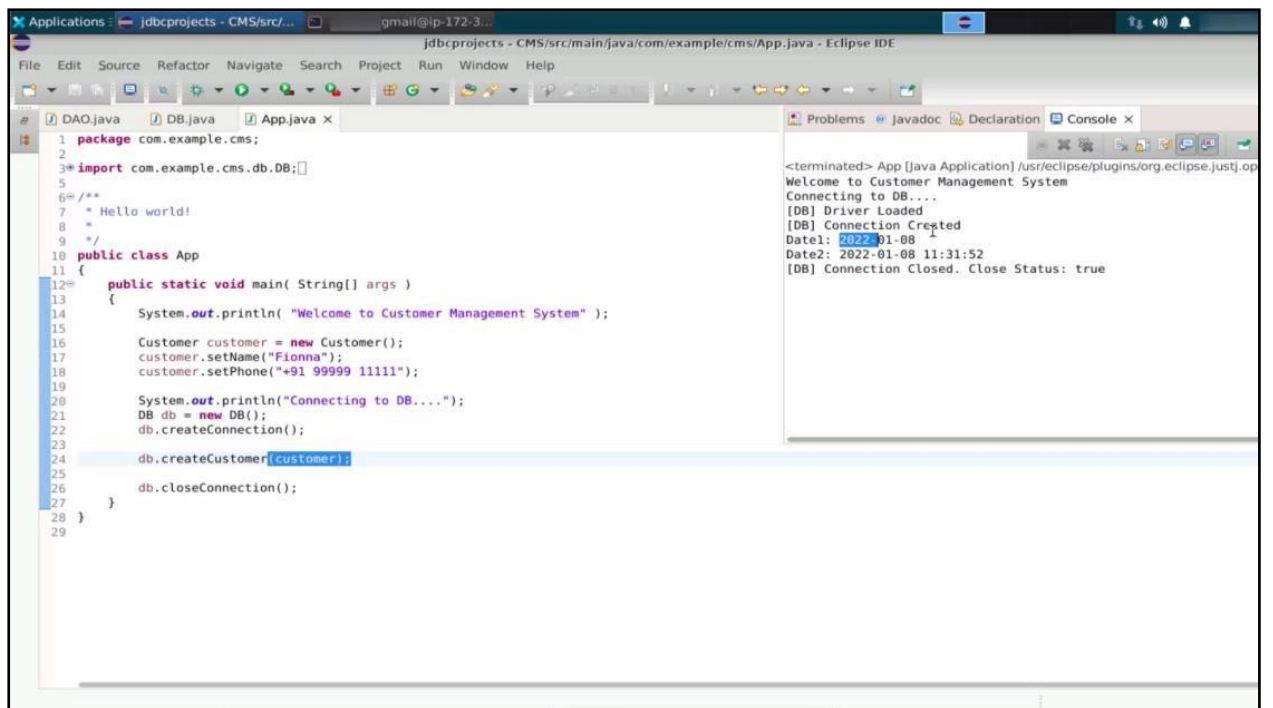
2.5 Navigate to the App.java file



2.6 Call the db.createCustomer() method



2.7 Run the code to get the output as **Connection Created** and the dates



The screenshot shows the Eclipse IDE with a Java project named 'jdbcprojects'. The main editor displays the file 'App.java' with the following code:

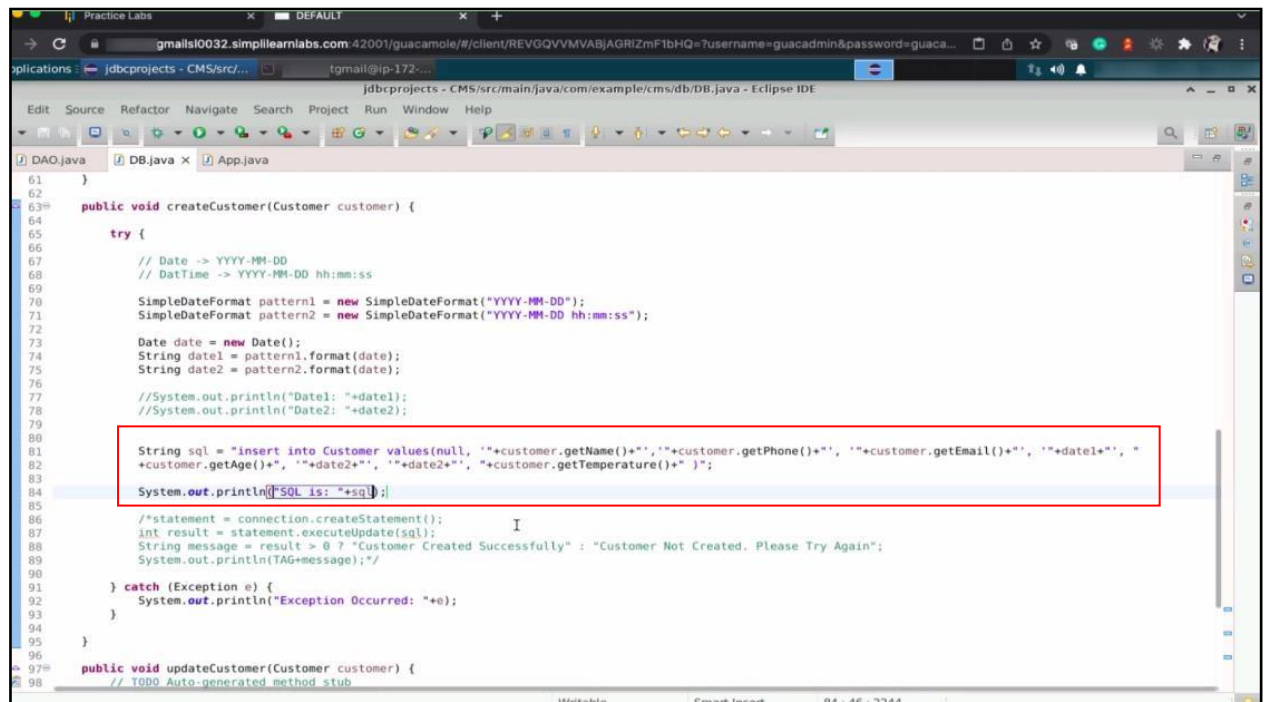
```
1 package com.example.cms;
2
3 import com.example.cms.db.DB;
4
5
6 /**
7  * Hello world!
8  *
9  */
10 public class App
11 {
12     public static void main( String[] args )
13     {
14         System.out.println( "Welcome to Customer Management System" );
15
16         Customer customer = new Customer();
17         customer.setName("Fionna");
18         customer.setPhone("+91 99999 11111");
19
20         System.out.println("Connecting to DB...");
21         DB db = new DB();
22         db.createConnection();
23
24         db.createCustomer(customer);
25
26         db.closeConnection();
27     }
28 }
29
```

The right-hand side of the IDE shows the 'Console' tab with the following output:

```
<terminated> App [Java Application] /usr/eclipse/plugins/org.eclipse.justj...
Welcome to Customer Management System
Connecting to DB...
[DB] Driver Loaded
[DB] Connection Created
Date1: 2022-01-08
Date2: 2022-01-08 11:31:52
[DB] Connection Closed. Close Status: true
```

Step 3: Create a SQL query for the insert operation

3.1 Create a SQL query to perform the insert operation and enter details into the Customer table

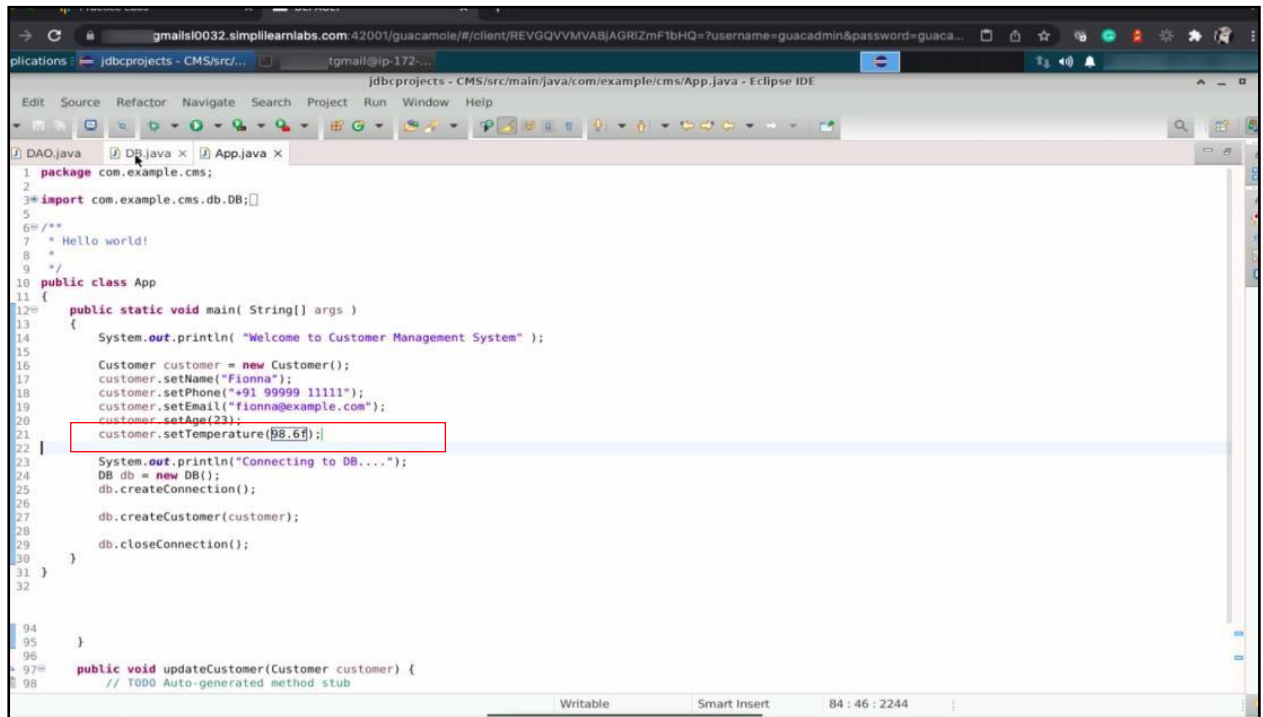


```

61 }
62
63 public void createCustomer(Customer customer) {
64     try {
65         // Date -> YYYY-MM-DD
66         // DateTime -> YYYY-MM-DD hh:mm:ss
67
68         SimpleDateFormat pattern1 = new SimpleDateFormat("YYYY-MM-DD");
69         SimpleDateFormat pattern2 = new SimpleDateFormat("YYYY-MM-DD hh:mm:ss");
70
71         Date date = new Date();
72         String date1 = pattern1.format(date);
73         String date2 = pattern2.format(date);
74
75         //System.out.println("Date1: "+date1);
76         //System.out.println("Date2: "+date2);
77
78         String sql = "insert into Customer values(null, "+customer.getName()+", "+customer.getPhone()+", "+customer.getEmail()+", "+date1+", "
79         +customer.getAge()+", "+date2+", "+date2+", "+customer.getTemperature()+")";
80
81         System.out.println("SQL is: "+sql);
82
83         //statement = connection.createStatement();
84         int result = statement.executeUpdate(sql);
85         String message = result > 0 ? "Customer Created Successfully" : "Customer Not Created. Please Try Again";
86         System.out.println(TAG+message);
87
88     } catch (Exception e) {
89         System.out.println("Exception Occurred: "+e);
90     }
91 }
92
93 public void updateCustomer(Customer customer) {
94     // TODO Auto-generated method stub
95 }
96
97
98

```

3.2 Return to the **App.java** file and add more attributes like **age** and **temperature**



```

1 package com.example.cms;
2
3 import com.example.cms.db.DB;
4
5
6 /**
7  * Hello world!
8  */
9
10 public class App
11 {
12     public static void main( String[] args )
13     {
14         System.out.println( "Welcome to Customer Management System" );
15
16         Customer customer = new Customer();
17         customer.setName("Fionna");
18         customer.setPhone("+91 99999 11111");
19         customer.setEmail("fionna@example.com");
20         customer.setAge(23);
21         customer.setTemperature(98.6f);
22
23         System.out.println("Connecting to DB...");
24         DB db = new DB();
25         db.createConnection();
26
27         db.createCustomer(customer);
28
29         db.closeConnection();
30     }
31 }
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```


3.3 Save and run the code

```

1 package com.example.cms;
2
3 import com.example.cms.db.DB;
4
5
6 /**
7  * Hello world!
8  *
9  */
10 public class App
11 {
12     public static void main( String[] args )
13     {
14         System.out.println( "Welcome to Customer Management System" );
15
16         Customer customer = new Customer();
17         customer.setName("Fionna");
18         customer.setPhone("+91 99999 11111");
19         customer.setEmail("fionna@example.com");
20         customer.setAge(23);
21         customer.setTemperature(98.6f);
22
23         System.out.println("Connecting to DB...");
24         DB db = new DB();
25         db.createConnection();
26
27         db.createCustomer(customer);
28
29         db.closeConnection();
30     }
31 }
32

```

The SQL statement will be printed as written in the print statement.

```

-terminated> App [Java Application] Aus/eclipse/plugins/org.eclipse.justi.openjdk.hotspot.jre.full/linux.x86_64_16.0.2.v20210721-1149/jre/bin/java (Jan 8, 2022, 11:38:08 AM - 11:38:09 AM)
Welcome to Customer Management System
Connecting to DB...
[DB] Driver Loaded
[DB] Connection Created
SQL is: insert into Customer values(null, 'Fionna', '+91 99999 11111', 'fionna@example.com', '2022-01-08', 23, '2022-01-08 11:38:09', '2022-01-08 11:38:09', 98.6 )
[DB] Connection Closed. Close Status: true

```

3.4 Navigate to the **DB.java** file and uncomment the connection string part to establish a connection to the database for further operations:

```

61 }
62
63 public void createCustomer(Customer customer) {
64     try {
65         // Date -> YYYY-MM-DD
66         // DateTime -> YYYY-MM-DD hh:mm:ss
67
68         SimpleDateFormat pattern1 = new SimpleDateFormat("YYYY-MM-DD");
69         SimpleDateFormat pattern2 = new SimpleDateFormat("YYYY-MM-DD hh:mm:ss");
70
71         Date date = new Date();
72         String date1 = pattern1.format(date);
73         String date2 = pattern2.format(date);
74
75         //System.out.println("Date1: "+date1);
76         //System.out.println("Date2: "+date2);
77
78         String sql = "insert into Customer values(null, '"+customer.getName()+"', '"+customer.getPhone()+"', '"+customer.getEmail()+"', '"+date1+"', "
79             +customer.getAge()+"', '"+date2+"', '"+customer.getTemperature()+"' )";
80
81         System.out.println("SQL is: "+sql);
82
83         statement = connection.createStatement();
84         int result = statement.executeUpdate(sql);
85         String message = result > 0 ? "Customer Created Successfully" : "Customer Not Created. Please Try Again";
86         System.out.println(TAG+message);
87     } catch (Exception e) {
88         System.out.println("Exception Occurred: "+e);
89     }
90 }
91
92 public void updateCustomer(Customer customer) {
93     // TODO Auto-generated method stub
94 }
95
96
97
98

```

3.5 Run the code and observe the output **Customer Created Successfully** confirming the successful creation of the customer.

```

1 package com.example.cms;
2
3 import com.example.cms.db.DB;
4
5
6 /**
7  * Hello world!
8  *
9  */
10 public class App
11 {
12     public static void main( String[] args )
13     {
14         System.out.println( "Welcome to Customer Management System" );
15
16         Customer customer = new Customer();
17         customer.setName("Fionna");
18         customer.setPhone("+91 99999 11111");
19         customer.setEmail("fionna@example.com");
20         customer.setAge(23);
21         customer.setTemperature(98.6f);
22
23         System.out.println("Connecting to DB....");
24         DB db = new DB();
25         db.createConnection();
26
27         db.createCustomer(customer);
28
29         db.closeConnection();
30     }
31 }
32

```

```

<terminated> App [Java Application] /usr/eclipse/plugins/org.eclipse.justj.openjdk.hotspot...
Welcome to Customer Management System
Connecting to DB....
[DB] Driver Loaded
[DB] Connection Created
SQL is: insert into Customer values(null, 'Fionna', '+91 99999 11111', 'fio...
[DB] Customer Created Successfully
[DB] Connection Closed. Close Status: true

```

3.6 Go to the terminal and run the select command:
select * from Customer;

```

package com.example.cms;

import com.example.cms.db.DB;

/**
 * Hello world!
 */
public class App {
    public static void main(String[] args) {
        System.out.println("Hello World!");
        Customer customer = new Customer();
        customer.setName("Fionna");
        customer.setPhone("+91 99999 11111");
        customer.setEmail("fionna@example.com");
        customer.setAge(23);
        customer.setTemperature(98.6);

        System.out.println("Customer created successfully");
        DB db = new DB();
        db.createConnection();
        db.createCustomer(customer);
        db.closeConnection();
    }
}

```

```

mysql> describe Customer;
+-----+
| Field | Type | Null | Key | Default | Extra |
+-----+
| cid   | int  | NO   | PRI | NULL    | auto_increment |
| name  | varchar(256) | YES | | NULL    |
| phone | varchar(20) | YES | | NULL    |
| email | varchar(256) | YES | | NULL    |
| birthDate | date | YES | | NULL    |
| age   | int   | YES | | NULL    |
| inDateTime | datetime | YES | | NULL    |
| outDateTime | datetime | YES | | NULL    |
| temperature | float | YES | | NULL    |
+-----+
9 rows in set (0.00 sec)

mysql> select * from Customer;
Empty set (0.00 sec)

mysql> select * from Customer;

```

You can view the inserted data in the table **Customer**

```

package com.example.cms;

import com.example.cms.db.DB;

/**
 * Hello world!
 */
public class App {
    public static void main(String[] args) {
        System.out.println("Hello World!");
        Customer customer = new Customer();
        customer.setName("Fionna");
        customer.setPhone("+91 99999 11111");
        customer.setEmail("fionna@example.com");
        customer.setAge(23);
        customer.setTemperature(98.6);

        System.out.println("Customer created successfully");
        DB db = new DB();
        db.createConnection();
        db.createCustomer(customer);
        db.closeConnection();
    }
}

```

```

mysql> select * from Customer;
Empty set (0.00 sec)

mysql> select * from Customer;
+-----+
| cid | name | phone | email | birthDate | age | inDa |
+-----+
| 1 | Fionna | +91 99999 11111 | fionna@example.com | 2022-01-08 | 23 | 2022-01-08 11:38:57 |
+-----+
1 row in set (0.00 sec)

mysql>

```

3.7 Insert another record in the Customer table using the `set()` operation

```

1 package com.example.cms;
2
3 import com.example.cms.db.DB;
4
5
6 /**
7  * Hello world!
8  */
9
10 public class App
11 {
12     public static void main( String[] args )
13     {
14         System.out.println( "Welcome to Customer Management System" );
15
16         Customer customer = new Customer();
17         customer.setName("John");
18         customer.setPhone("+91 99999 22222");
19         customer.setEmail("john@example.com");
20         customer.setAge(23);
21         customer.setTemperature(98.2f);
22
23         System.out.println("Connecting to DB...");
24         DB db = new DB();
25         db.createConnection();
26
27         db.createCustomer(customer);
28
29         db.closeConnection();
30     }
31 }
32

```

3.8 Run the code to get the output as **Customer Created Successfully**

```

1 package com.example.cms;
2
3 import com.example.cms.db.DB;
4
5
6 /**
7  * Hello world!
8  */
9
10 public class App
11 {
12     public static void main( String[] args )
13     {
14         System.out.println( "Welcome to Customer Management System" );
15
16         Customer customer = new Customer();
17         customer.setName("John");
18         customer.setPhone("+91 99999 22222");
19         customer.setEmail("john@example.com");
20         customer.setAge(23);
21         customer.setTemperature(98.2f);
22
23         System.out.println("Connecting to DB...");
24         DB db = new DB();
25         db.createConnection();
26
27         db.createCustomer(customer);
28
29         db.closeConnection();
30     }
31 }
32

```

```

<terminated> App [Java Application] /usr/eclipse/plugins/org.eclipse.justi.openjdk.hotspot.jre.full/bin/linux64/eclipse
Welcome to Customer Management System
Connecting to DB...
[DB] Driver Loaded
[DB] Connection Created
SQL is: insert into Customer values(null, 'John', '+91 99999 22222', 'john@example.com', 23, 98.2)
[DB] Customer Created Successfully
[DB] Connection Closed. Close Status: true

```

3.9 Return to the terminal and rerun the select command: `select * from Customer;`

```

package com.example.cms;
import com.example.cms.db.DB;

/**
 * Hello world!
 */
public class App
{
    public static void main(
    {
        System.out.println("
        Customer customer = ne
        customer.setName("John
        customer.setPhone("+91
        customer.setEmail("joh
        customer.setAge(23);
        customer.setTemperature

        System.out.println("Co
        DB db = new DB();
        db.createConnection();
        db.createCustomer(cust
        db.closeConnection();
    }
}

```

```

erishant@gmailip-172-31-17-157: ~
File Edit View Search Terminal Help
+-----+-----+-----+-----+-----+-----+
| age | int | YES | NULL |
| inDateTime | datetime | YES | NULL |
| outDateTime | datetime | YES | NULL |
| temperature | float | YES | NULL |
+-----+-----+-----+-----+-----+
9 rows in set (0.00 sec)

mysql> select * from Customer;
Empty set (0.00 sec)

mysql> select * from Customer;
+-----+-----+-----+-----+-----+-----+
| cid | name | phone | email | birthDate | age | inDa
| teTime | outDateTime | temperature |
+-----+-----+-----+-----+-----+
| 1 | Fiona | +91 99999 11111 | fionna@example.com | 2022-01-08 | 23 | 2022
-01-08 11:38:57 | 2022-01-08 11:38:57 | 98.6 |
+-----+-----+-----+-----+-----+
1 row in set (0.00 sec)

mysql> select * from Customer;

```

You will see another record is inserted in the table.

```

package com.example.cms;
import com.example.cms.db.DB;

/**
 * Hello world!
 */
public class App
{
    public static void main(
    {
        System.out.println("
        Customer customer = ne
        customer.setName("John
        customer.setPhone("+91
        customer.setEmail("joh
        customer.setAge(23);
        customer.setTemperature

        System.out.println("Co
        DB db = new DB();
        db.createConnection();
        db.createCustomer(cust
        db.closeConnection();
    }
}

```

```

erishant@gmailip-172-31-17-157: ~
File Edit View Search Terminal Help
+-----+-----+-----+-----+-----+-----+
| 1 | Fiona | +91 99999 11111 | fionna@example.com | 2022-01-08 | 23 | 2022
-01-08 11:38:57 | 2022-01-08 11:38:57 | 98.6 |
+-----+-----+-----+-----+-----+
1 row in set (0.00 sec)

mysql> select * from Customer;
+-----+-----+-----+-----+-----+-----+
| cid | name | phone | email | birthDate | age | inDa
| teTime | outDateTime | temperature |
+-----+-----+-----+-----+-----+
| 1 | Fiona | +91 99999 11111 | fionna@example.com | 2022-01-08 | 23 | 2022
-01-08 11:38:57 | 2022-01-08 11:38:57 | 98.6 |
| 2 | John | +91 99999 22222 | john@example.com | 2022-01-08 | 23 | 2022
-01-08 11:39:52 | 2022-01-08 11:39:52 | 98.2 |
+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)

mysql>

```


Step 4: Write an update operation

4.1 Write an update operation in the **try-catch** block

```

91 } catch (Exception e) {
92     System.out.println("Exception Occurred: "+e);
93 }
94
95
96
97 public void updateCustomer(Customer customer) {
98     try {
99
100         String sql = "update Customer set name = '"+customer.getName()+"', phone = '"+customer.getPhone()+"', email = '"+customer.getEmail()
101         + "', birthDate = '"+customer.getBirthDate()+"', age = '"+customer.getAge()+"', intime = '"+customer.getInDate()+"', outtime = '"+customer.getOutDate()+"'
102         + " where cid = "+customer.getCid();
103
104         System.out.println("SQL is: "+sql);
105
106         //statement = connection.createStatement();
107         int result = statement.executeUpdate(sql);
108         String message = result > 0 ? "Customer Updated Successfully" : "Customer Not Updated. Please Try Again";
109         System.out.println(TAG+message);
110
111     } catch (Exception e) {
112         System.out.println("Exception Occurred: "+e);
113     }
114 }
115
116
117 public void deleteCustomer(int cid) {
118     // TODO Auto-generated method stub
119
120
121
122 public ArrayList<Customer> getAllCustomers() {
123     // TODO Auto-generated method stub
124     return null;
125
126
127
128
129

```

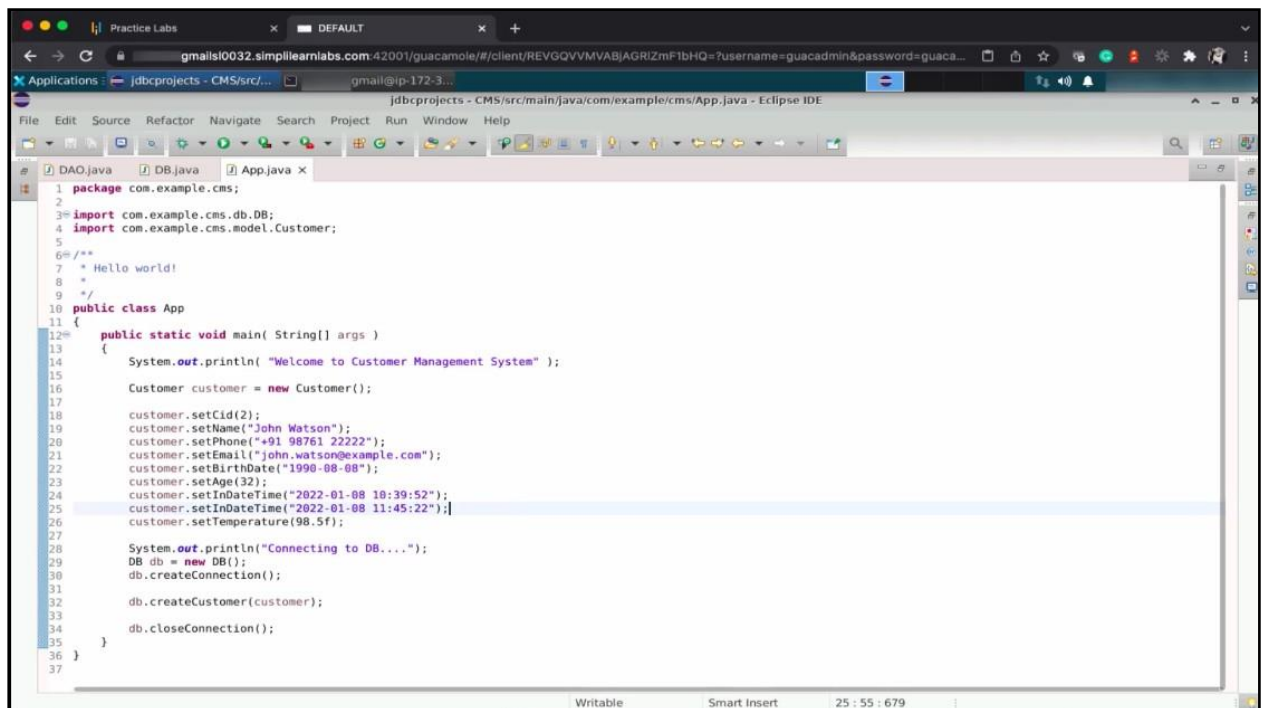
4.2 Return to the **App.java** file and set the **customer id**

```

5
6 /**
7  * Hello world!
8  *
9  */
10 public class App
11 {
12     public static void main( String[] args )
13     {
14         System.out.println( "Welcome to Customer Management System" );
15
16         Customer customer = new Customer();
17         Integer cid
18         customer.setCid(2);
19         customer.setName("John");
20         customer.setPhone("+91 99999 22222");
21         customer.setEmail("john@example.com");
22         customer.setAge(23);
23         customer.setTemperature(98.2f);
24
25         System.out.println("Connecting to DB...");
26         DB db = new DB();
27         db.createConnection();
28
29         db.createCustomer(customer);
30
31         db.closeConnection();
32     }
33 }
34

```

4.3 Update all the details of customers using the `set()` method

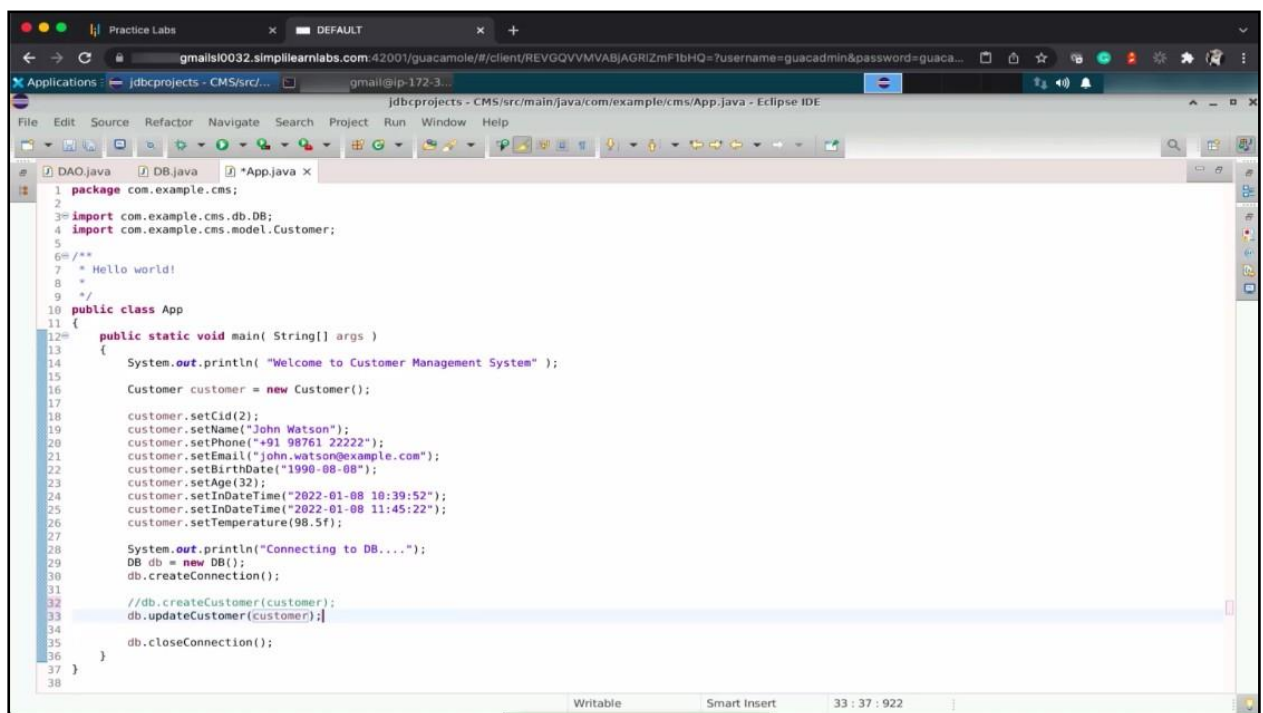


```

1 package com.example.cms;
2
3 import com.example.cms.db.DB;
4 import com.example.cms.model.Customer;
5
6 /**
7  * Hello world!
8  */
9
10 public class App
11 {
12     public static void main( String[] args )
13     {
14         System.out.println( "Welcome to Customer Management System" );
15
16         Customer customer = new Customer();
17
18         customer.setCid(2);
19         customer.setName("John Watson");
20         customer.setPhone("+91 98761 22222");
21         customer.setEmail("john.watson@example.com");
22         customer.setBirthDate("1990-08-08");
23         customer.setAge(32);
24         customer.setInDate("2022-01-08 10:39:52");
25         customer.setInDateTime("2022-01-08 11:45:22");
26         customer.setTemperature(98.5f);
27
28         System.out.println("Connecting to DB...");
29         DB db = new DB();
30         db.createConnection();
31
32         db.createCustomer(customer);
33
34         db.closeConnection();
35     }
36 }
37

```

4.4 Write the `db.updateCustomer()` method for updating details



```

1 package com.example.cms;
2
3 import com.example.cms.db.DB;
4 import com.example.cms.model.Customer;
5
6 /**
7  * Hello world!
8  */
9
10 public class App
11 {
12     public static void main( String[] args )
13     {
14         System.out.println( "Welcome to Customer Management System" );
15
16         Customer customer = new Customer();
17
18         customer.setCid(2);
19         customer.setName("John Watson");
20         customer.setPhone("+91 98761 22222");
21         customer.setEmail("john.watson@example.com");
22         customer.setBirthDate("1990-08-08");
23         customer.setAge(32);
24         customer.setInDate("2022-01-08 10:39:52");
25         customer.setInDateTime("2022-01-08 11:45:22");
26         customer.setTemperature(98.5f);
27
28         System.out.println("Connecting to DB...");
29         DB db = new DB();
30         db.createConnection();
31
32         //db.createCustomer(customer);
33         db.updateCustomer(customer);
34
35         db.closeConnection();
36     }
37 }
38

```

4.5 Save and run the code

```

1 package com.example.cms;
2
3 import com.example.cms.db.DB;
4 import com.example.cms.model.Customer;
5
6 /**
7  * Hello world!
8  */
9
10 public class App
11 {
12     public static void main( String[] args )
13     {
14         System.out.println( "Welcome to Customer Management System" );
15
16         Customer customer = new Customer();
17
18         customer.setCid(2);
19         customer.setName("John Watson");
20         customer.setPhone("+91 98761 22222");
21         customer.setEmail("john.watson@example.com");
22         customer.setBirthDate("1990-08-08");
23         customer.setAge(32);
24         customer.setInDateTime("2022-01-08 10:39:52");
25         customer.setInDateTime("2022-01-08 11:45:22");
26         customer.setTemperature(98.5f);
27
28         System.out.println("Connecting to DB....");
29         DB db = new DB();
30         db.createConnection();
31
32         //db.createCustomer(customer);
33         db.updateCustomer(customer);
34
35         db.closeConnection();
36     }
37 }
38

```

You will see that the customer details are updated.

```

<terminated> App [java Application] has/clipse/plugins/org.eclipse.justi.openjdk.hotspot.jre.full/linux.x86_64_16.0.2.v20210721-1149/ref/bin/java (Jan 8, 2022, 11:48:17 AM - 11:48:18 AM)
Welcome to Customer Management System
Connecting to DB...
[DB] Driver Loaded
[DB] Connection Created
SQL is: update Customer set name = 'John Watson',phone = '+91 98761 22222', email = 'john.watson@example.com', birthDate = '1990-08-08', age = 32, intime = '2022-01-08 11:45:22'
[DB] Connection Closed. Close Status: true

```


4.6 Return to the **DB.java** file and uncomment the connection string statement

```

79
80
81 String sql = "insert into Customer values(null, '"+customer.getName()+"', '"+customer.getPhone()+"', '"+customer.getEmail()+"', '"+date1+"', "
82 +customer.getAge()+"', '"+date2+"', '"+date2+"', '"+customer.getTemperature()+"')";
83
84 System.out.println("SQL is: "+sql);
85
86 Statement = connection.createStatement();
87 int result = statement.executeUpdate(sql);
88 String message = result > 0 ? "Customer Created Successfully" : "Customer Not Created. Please Try Again";
89 System.out.println(TAG+message);
90
91 } catch (Exception e) {
92     System.out.println("Exception Occurred: "+e);
93 }
94
95
96
97 public void updateCustomer(Customer customer) {
98     try {
99
100 String sql = "update Customer set name = '"+customer.getName()+"', phone = '"+customer.getPhone()+"', email = '"+customer.getEmail()
101 +", birthDate = '"+customer.getBirthDate()+"', age = '"+customer.getAge()+"', intime = '"+customer.getInDateTime()+"', outtime = '"+customer.getOutDateTime()
102 +"' where cid = '"+customer.getCid()+'";
103
104 System.out.println("SQL is: "+sql);
105
106 statement = connection.createStatement();
107 int result = statement.executeUpdate(sql);
108 String message = result > 0 ? "Customer Updated Successfully" : "Customer Not Updated. Please Try Again";
109 System.out.println(TAG+message);
110
111 } catch (Exception e) {
112     System.out.println("Exception Occurred: "+e);
113 }
114
115
116

```

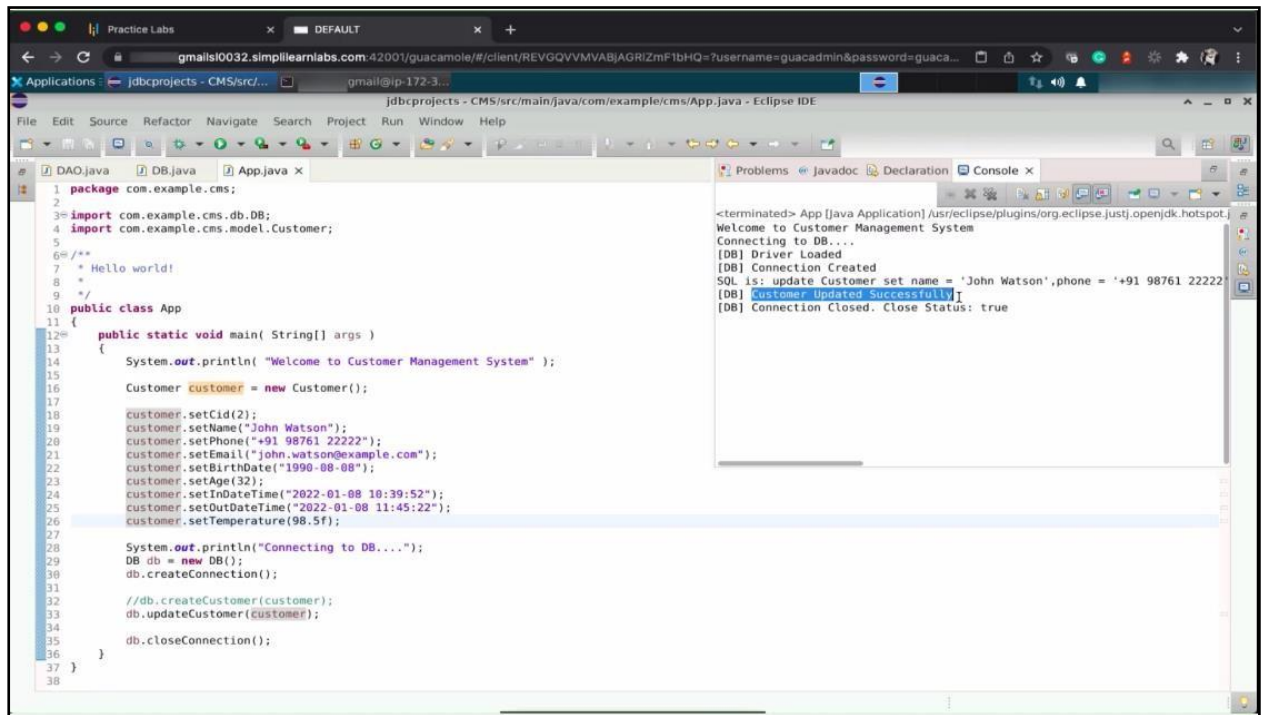
4.7 Save and run the code

```

1 package com.example.cms;
2
3 import com.example.cms.db.DB;
4 import com.example.cms.model.Customer;
5
6 /**
7  * Hello world!
8  *
9  */
10 public class App
11 {
12     public static void main( String[] args )
13     {
14         System.out.println( "Welcome to Customer Management System" );
15
16         Customer customer = new Customer();
17
18         customer.setCid(2);
19         customer.setName("John Watson");
20         customer.setPhone("+91 98761 22222");
21         customer.setEmail("john.watson@example.com");
22         customer.setBirthDate("1990-08-08");
23         customer.setAge(32);
24         customer.setInDateTime("2022-01-08 10:39:52");
25         customer.setOutDateTime("2022-01-08 11:45:22");
26         customer.setTemperature(98.5f);
27
28         System.out.println("Connecting to DB...");
29         DB db = new DB();
30         db.createConnection();
31
32         //db.createCustomer(customer);
33         db.updateCustomer(customer);
34
35         db.closeConnection();
36     }
37 }
38

```

After the update operation is completed successfully, the output **Customer Updated Successfully** will be shown.



The screenshot shows the Eclipse IDE with a Java project named 'jdbcpjprojects'. The main file is 'App.java', which contains the following code:

```

1 package com.example.cms;
2
3 import com.example.cms.db.DB;
4 import com.example.cms.model.Customer;
5
6 /**
7  * Hello world!
8  *
9  */
10 public class App
11 {
12     public static void main( String[] args )
13     {
14         System.out.println( "Welcome to Customer Management System" );
15
16         Customer customer = new Customer();
17
18         customer.setCid(2);
19         customer.setName("John Watson");
20         customer.setPhone("+91 98761 22222");
21         customer.setEmail("john.watson@example.com");
22         customer.setBirthDate("1990-08-08");
23         customer.setAge(32);
24         customer.setInDateTime("2022-01-08 10:39:52");
25         customer.setOutDateTime("2022-01-08 11:45:22");
26         customer.setTemperature(98.5f);
27
28         System.out.println("Connecting to DB...");
29         DB db = new DB();
30         db.createConnection();
31
32         //db.createCustomer(customer);
33         db.updateCustomer(customer);
34
35         db.closeConnection();
36     }
37 }
38

```

The console output on the right shows the following messages:

```

<terminated> App [Java Application] /usr/eclipse/plugins/org.eclipse.justj.openjdk.hotspot...
Welcome to Customer Management System
Connecting to DB...
[DB] Driver Loaded
[DB] Connection Created
SQL is: update Customer set name = 'John Watson',phone = '+91 98761 22222'
[DB] Customer Updated Successfully
[DB] Connection Closed. Close Status: true

```

4.8 Return to the terminal and run the **select** command:
select * from Customer

The screenshot shows the Eclipse IDE with the `App.java` file open. The code defines a `Customer` object and sets its attributes. A terminal window is open, showing the execution of MySQL commands. The first command is `mysql> describe Customer;`, which returns a table of column details. The second command is `mysql> select * from Customer;`, which returns 2 rows of data.

```

1 package com.example.cms;
2
3 import com.example.cms.db.DB;
4 import com.example.cms.model.Customer;
5
6 /**
7  * Hello world!
8  */
9
10 public class App
11 {
12     public static void main( String[] args )
13     {
14         System.out.println( "Welcome to Customer Management System" );
15
16         Customer customer = new Customer();
17
18         customer.setCid(2);
19         customer.setName("Leo");
20         customer.setPhone("91 98761 54452");
21         customer.setEmail("leo@example.com");
22         customer.setBirthDate("1990-08-08");
23         customer.setAge(32);
24         customer.setInDateTime("2022-01-08 10:39:52");
25         customer.setOutDateTime("2022-01-08 11:45:22");
26         customer.setTemperature(99.5f);
27
28         System.out.println("Connecting to DB...");
29         DB db = new DB();
30         db.createConnection();
31
32         db.createCustomer(customer);
33         //db.updateCustomer(customer);
34
35         db.closeConnection();
36     }
37 }

```

Field	Type	Null	Key	Default	Extra
cid	int	NO	PRI	NULL	auto_increment
name	varchar(256)	YES		NULL	
phone	varchar(20)	YES		NULL	
email	varchar(256)	YES		NULL	
birthDate	date	YES		NULL	
age	int	YES		NULL	
inDateTime	datetime	YES		NULL	
outDateTime	datetime	YES		NULL	
temperature	float	YES		NULL	

4.9 Insert one more customer detail by updating the details and running the code again in the **App.file** file

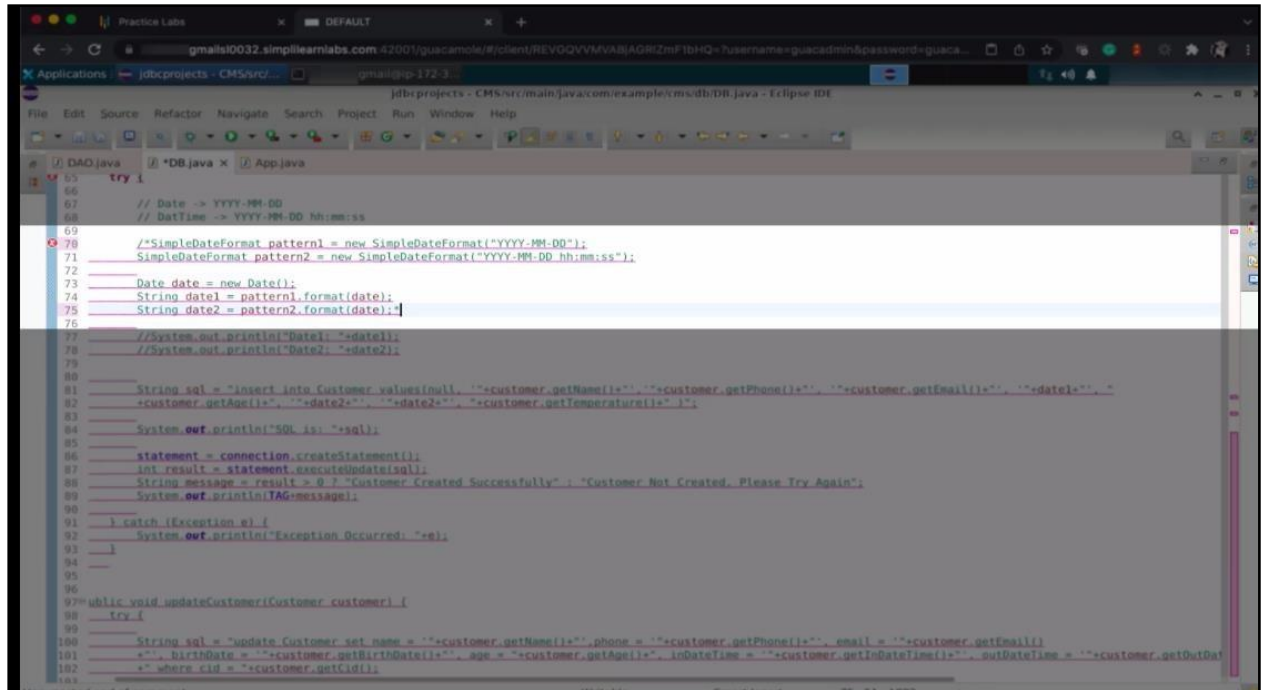
The screenshot shows the Eclipse IDE with the `App.java` file open. The code defines a `Customer` object and sets its attributes. The `main` method is updated to include the new customer details.

```

1 package com.example.cms;
2
3 import com.example.cms.db.DB;
4 import com.example.cms.model.Customer;
5
6 /**
7  * Hello world!
8  */
9
10 public class App
11 {
12     public static void main( String[] args )
13     {
14         System.out.println( "Welcome to Customer Management System" );
15
16         Customer customer = new Customer();
17
18         customer.setCid(2);
19         customer.setName("Leo");
20         customer.setPhone("91 98761 54452");
21         customer.setEmail("leo@example.com");
22         customer.setBirthDate("1990-08-08");
23         customer.setAge(32);
24         customer.setInDateTime("2022-01-08 10:39:52");
25         customer.setOutDateTime("2022-01-08 11:45:22");
26         customer.setTemperature(99.5f);
27
28         System.out.println("Connecting to DB...");
29         DB db = new DB();
30         db.createConnection();
31
32         db.createCustomer(customer);
33         //db.updateCustomer(customer);
34
35         db.closeConnection();
36     }
37 }

```

4.10 Return to the **DB.java** file and comment on the date format code to prevent potential errors in the future if the entered format doesn't match the expected format

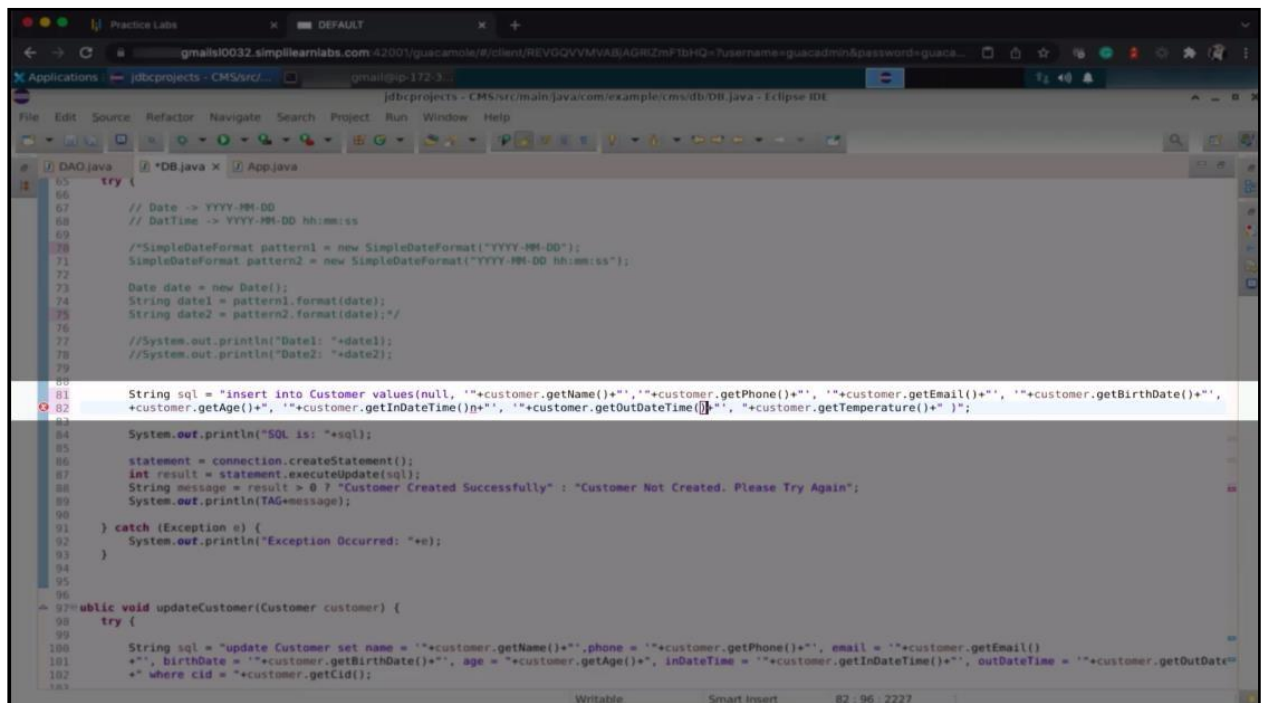


```

65 try {
66     // Date -> YYYY-MM-DD
67     // DateTime -> YYYY-MM-DD hh:mm:ss
68
69     // SimpleDateFormat pattern1 = new SimpleDateFormat("YYYY-MM-DD");
70     // SimpleDateFormat pattern2 = new SimpleDateFormat("YYYY-MM-DD hh:mm:ss");
71
72     Date date = new Date();
73     String date1 = pattern1.format(date);
74     String date2 = pattern2.format(date);
75
76     //System.out.println("Date1: "+date1);
77     //System.out.println("Date2: "+date2);
78
79     String sql = "insert into Customer values(null, '"+customer.getName()+"', '"+customer.getPhone()+"', '"+customer.getEmail()+"', '"+date1+"', "
80     +customer.getAge()+"', '"+date2+"', '"+date2+"', '"+customer.getTemperature()+"')";
81
82     System.out.println("SQL is: "+sql);
83
84     statement = connection.createStatement();
85     int result = statement.executeUpdate(sql);
86     String message = result > 0 ? "Customer Created Successfully" : "Customer Not Created. Please Try Again";
87     System.out.println(TAG+message);
88
89     } catch (Exception e) {
90         System.out.println("Exception Occurred: "+e);
91     }
92
93
94
95
96
97 public void updateCustomer(Customer customer) {
98     try {
99
100         String sql = "update Customer set name = '"+customer.getName()+"', phone = '"+customer.getPhone()+"', email = '"+customer.getEmail()
101         +"' , birthDate = '"+customer.getBirthDate()+"', age = '"+customer.getAge()+"', inDateTime = '"+customer.getInDateTime()+"', outDateTime = '"+customer.getOutDat
102         e+"' where cid = '"+customer.getCid()";
103

```

4.11 Change the query as shown:

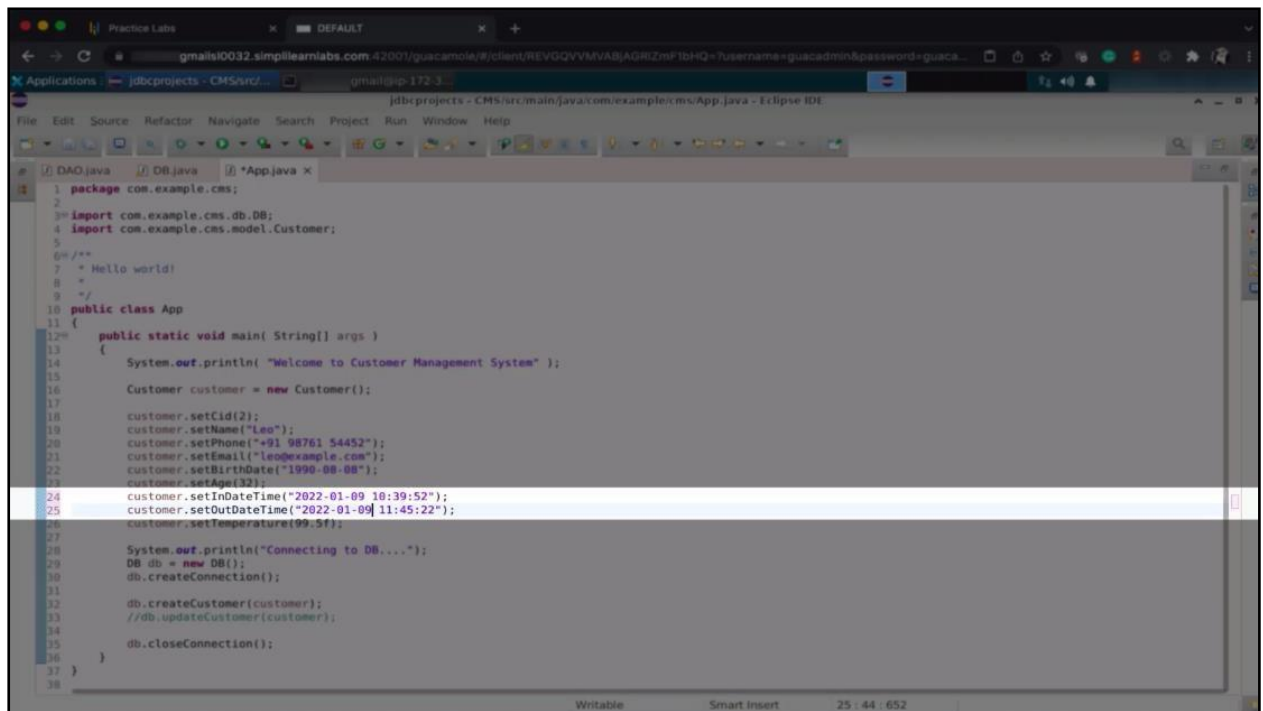


```

155 try {
156     // Date -> YYYY-MM-DD
157     // DateTime -> YYYY-MM-DD hh:mm:ss
158
159     SimpleDateFormat pattern1 = new SimpleDateFormat("YYYY-MM-DD");
160     SimpleDateFormat pattern2 = new SimpleDateFormat("YYYY-MM-DD hh:mm:ss");
161
162     Date date = new Date();
163     String date1 = pattern1.format(date);
164     String date2 = pattern2.format(date);
165
166     //System.out.println("Date1: "+date1);
167     //System.out.println("Date2: "+date2);
168
169     String sql = "insert into Customer values(null, '"+customer.getName()+"', '"+customer.getPhone()+"', '"+customer.getEmail()+"', '"+customer.getBirthDate()+"',
170     +customer.getAge()+", '"+customer.getInDateTime()+", '"+customer.getOutDateTime()+"', '"+customer.getTemperature()+" )";
171
172     System.out.println("SQL is: "+sql);
173
174     statement = connection.createStatement();
175     int result = statement.executeUpdate(sql);
176     String message = result > 0 ? "Customer Created Successfully" : "Customer Not Created. Please Try Again";
177     System.out.println(TAG+message);
178
179 } catch (Exception e) {
180     System.out.println("Exception Occurred: "+e);
181 }
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```

4.12 Return to the **App.java** and change the **setInDateTime** and the **setOutDateTime**



```

1 package com.example.cms;
2
3 import com.example.cms.db.DB;
4 import com.example.cms.model.Customer;
5
6 /**
7  * Hello world!
8  *
9  */
10 public class App
11 {
12     public static void main( String[] args )
13     {
14         System.out.println( "Welcome to Customer Management System" );
15
16         Customer customer = new Customer();
17
18         customer.setCid(2);
19         customer.setName("Leo");
20         customer.setPhone("+91 98761 54452");
21         customer.setEmail("leo@example.com");
22         customer.setBirthDate("1990-08-08");
23         customer.setAge(32);
24         customer.setInDateTime("2022-01-09 18:39:52");
25         customer.setOutDateTime("2022-01-09 11:45:22");
26         customer.setTemperature(99.5f);
27
28         System.out.println("Connecting to DB...");
29         DB db = new DB();
30         db.createConnection();
31
32         db.createCustomer(customer);
33         //db.updateCustomer(customer);
34
35         db.closeConnection();
36     }
37 }
38

```


4.13 Save and run the code

```

1 package com.example.cms;
2
3 import com.example.cms.db.DB;
4 import com.example.cms.model.Customer;
5
6 /**
7  * Hello world!
8  *
9  */
10 public class App
11 {
12     public static void main( String[] args )
13     {
14         System.out.println( "Welcome to Customer Management System" );
15
16         Customer customer = new Customer();
17
18         customer.setCid(2);
19         customer.setName("Leo");
20         customer.setPhone("+91 98761 54452");
21         customer.setEmail("leo@example.com");
22         customer.setBirthDate("1990-08-08");
23         customer.setAge(32);
24         customer.setInDateTime("2022-01-09 10:39:52");
25         customer.setOutDateTime("2022-01-09 11:45:22");
26         customer.setTemperature(99.5f);
27
28         System.out.println("Connecting to DB....");
29         DB db = new DB();
30         db.createConnection();
31
32         db.createCustomer(customer);
33         //db.updateCustomer(customer);
34
35         db.closeConnection();
36     }
37 }

```

You can see the output as **Customer Created Successfully**.

```

<terminated> App [Java Application] /usr/eclipse/plugins/org.eclipse.justj.openjdk.hotspot...
Welcome to Customer Management System
Connecting to DB....
[DB] Driver Loaded
[DB] Connection Created
SQL is: insert into Customer values(null, 'Leo','+91 98761 54452', 'leo@ex
[DB] Customer Created Successfully
[DB] Connection Closed. Close Status: true

```

4.14 Go to the terminal and run the **select** command:
select * from Customers;

```

package com.example.cms;
import com.example.cms.db.DB;
import com.example.cms.model.Customer;

/**
 * Hello world!
 */
public class App {
    public static void main(String[] args) {
        System.out.println("Hello World!");

        Customer customer = new Customer();
        customer.setCid(2);
        customer.setName("Leo");
        customer.setPhone("+91 98761 54452");
        customer.setEmail("leo@example.com");
        customer.setBirthDate("1990-08-08");
        customer.setAge(32);
        customer.setInDateTime("2022-01-08 10:39:52");
        customer.setOutDateTime("2022-01-08 11:45:22");
        customer.setTemperature(99.5);

        System.out.println("Customer Data:");
        DB db = new DB();
        db.createConnection();
        db.createCustomer(customer);
        //db.updateCustomer(customer);
    }
}

```

```

mysql> select * from Customer;
+----+-----+-----+-----+-----+-----+-----+
| cid | name  | phone | outDateTime | email | temperature | birthDate |
+----+-----+-----+-----+-----+-----+-----+
| 1 | Fionna | +91 99999 11111 | 2022-01-08 11:38:57 | fionna@example.com | 98.6 | 2022-01-08 |
| 2 | John Watson | +91 98761 22222 | 2022-01-08 10:39:52 | john.watson@example.com | 98.5 | 1990-08-08 |
+----+-----+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)

mysql> select * from Customer;

```

You can see the updated data in the table:

```

package com.example.cms;
import com.example.cms.db.DB;
import com.example.cms.model.Customer;

/**
 * Hello world!
 */
public class App {
    public static void main(String[] args) {
        System.out.println("Hello World!");

        Customer customer = new Customer();
        customer.setCid(2);
        customer.setName("Leo");
        customer.setPhone("+91 98761 54452");
        customer.setEmail("leo@example.com");
        customer.setBirthDate("1990-08-08");
        customer.setAge(32);
        customer.setInDateTime("2022-01-08 10:39:52");
        customer.setOutDateTime("2022-01-08 11:45:22");
        customer.setTemperature(99.5);

        System.out.println("Customer Data:");
        DB db = new DB();
        db.createConnection();
        db.createCustomer(customer);
        //db.updateCustomer(customer);
    }
}

```

```

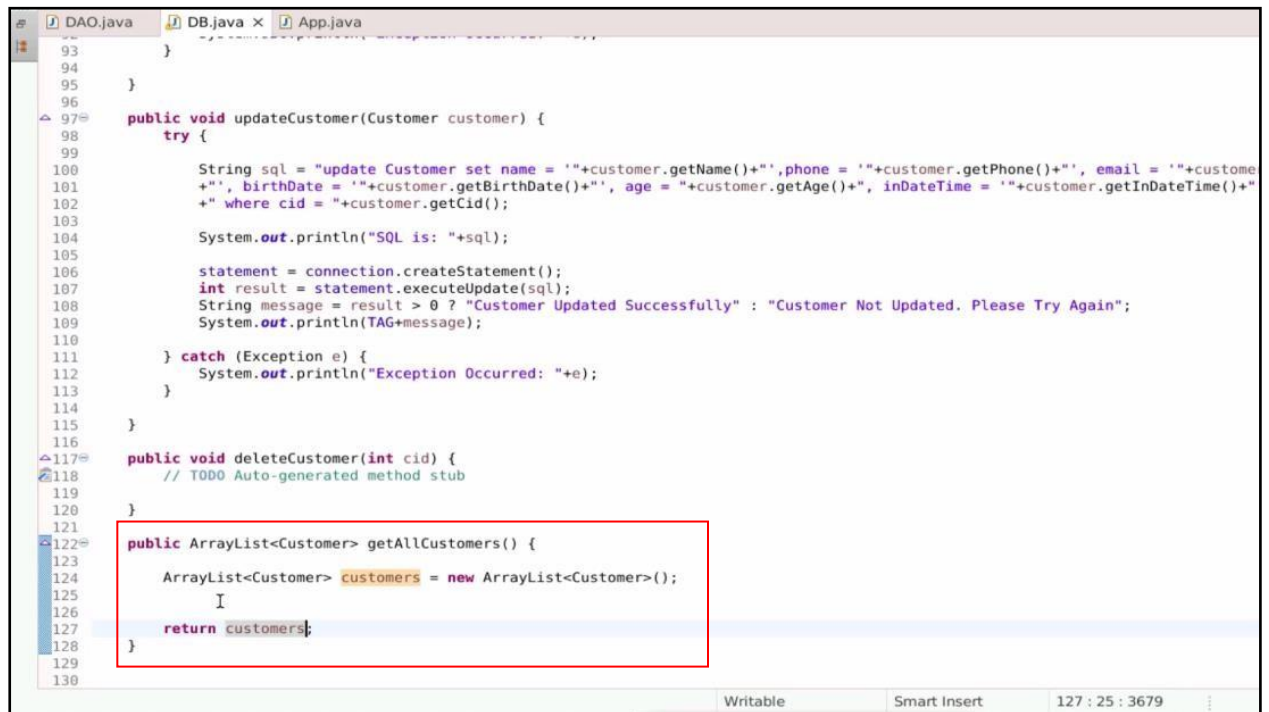
mysql> select * from Customer;
+----+-----+-----+-----+-----+-----+-----+
| cid | name  | phone | outDateTime | email | temperature | birthDate |
+----+-----+-----+-----+-----+-----+-----+
| 1 | Fionna | +91 99999 11111 | 2022-01-08 11:38:57 | fionna@example.com | 98.6 | 2022-01-08 |
| 2 | John Watson | +91 98761 22222 | 2022-01-08 10:39:52 | john.watson@example.com | 98.5 | 1990-08-08 |
| 3 | Leo | +91 98761 54452 | 2022-01-09 10:39:52 | leo@example.com | 99.5 | 1990-08-08 |
+----+-----+-----+-----+-----+-----+-----+
3 rows in set (0.00 sec)

mysql>

```

Step 5: Perform the getAllcustomer operations

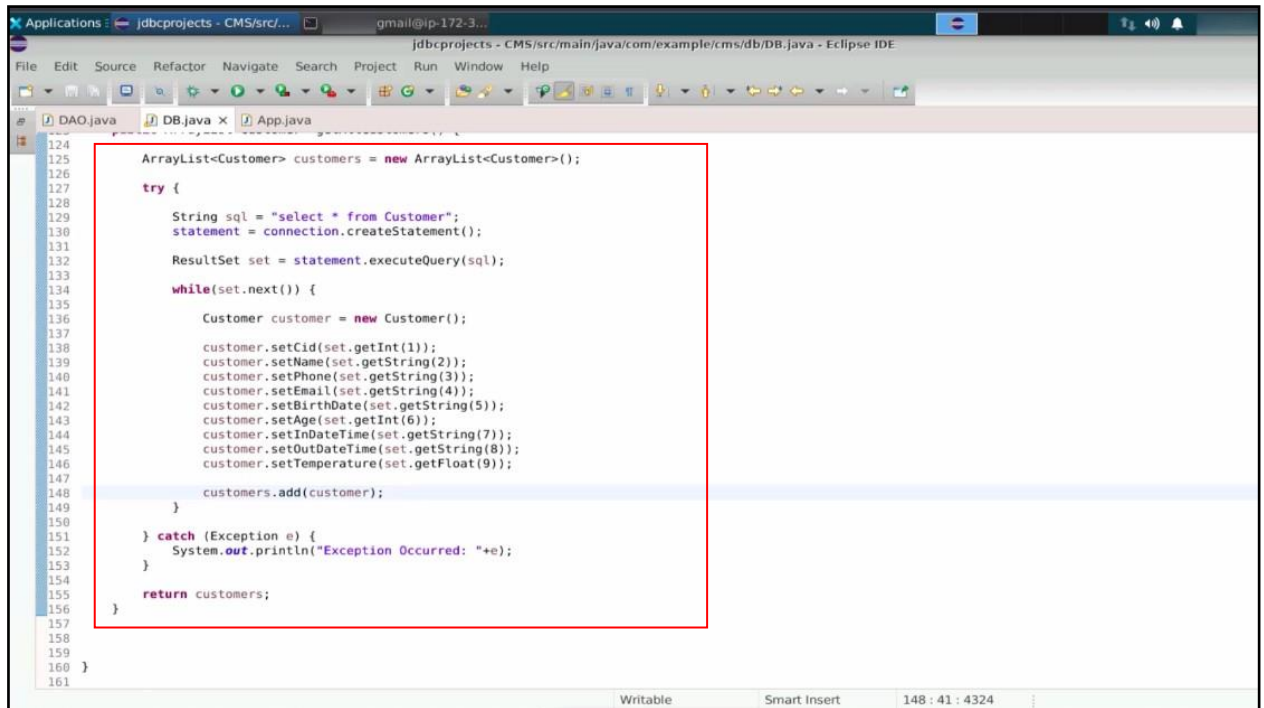
5.1 Use the `getAllCustomers()` method to fetch details of all the customers



```
93     }
94
95     }
96
97     public void updateCustomer(Customer customer) {
98         try {
99
100             String sql = "update Customer set name = '"+customer.getName()+"', phone = '"+customer.getPhone()+"', email = '"+customer
101             + "', birthDate = '"+customer.getBirthDate()+"', age = '"+customer.getAge()+"', inDateTime = '"+customer.getInDateTime()+"
102             +" where cid = '"+customer.getCid()+'";
103
104             System.out.println("SQL is: "+sql);
105
106             statement = connection.createStatement();
107             int result = statement.executeUpdate(sql);
108             String message = result > 0 ? "Customer Updated Successfully" : "Customer Not Updated. Please Try Again";
109             System.out.println(TAG+message);
110
111         } catch (Exception e) {
112             System.out.println("Exception Occurred: "+e);
113         }
114     }
115
116
117     public void deleteCustomer(int cid) {
118         // TODO Auto-generated method stub
119     }
120
121
122     public ArrayList<Customer> getAllCustomers() {
123         ArrayList<Customer> customers = new ArrayList<Customer>();
124         I
125         return customers;
126     }
127
128
129
130
```

Writable Smart Insert 127 : 25 : 3679

5.2 Enclose the select **statement** and connection string within a **try-catch** block to manage any potential exceptions

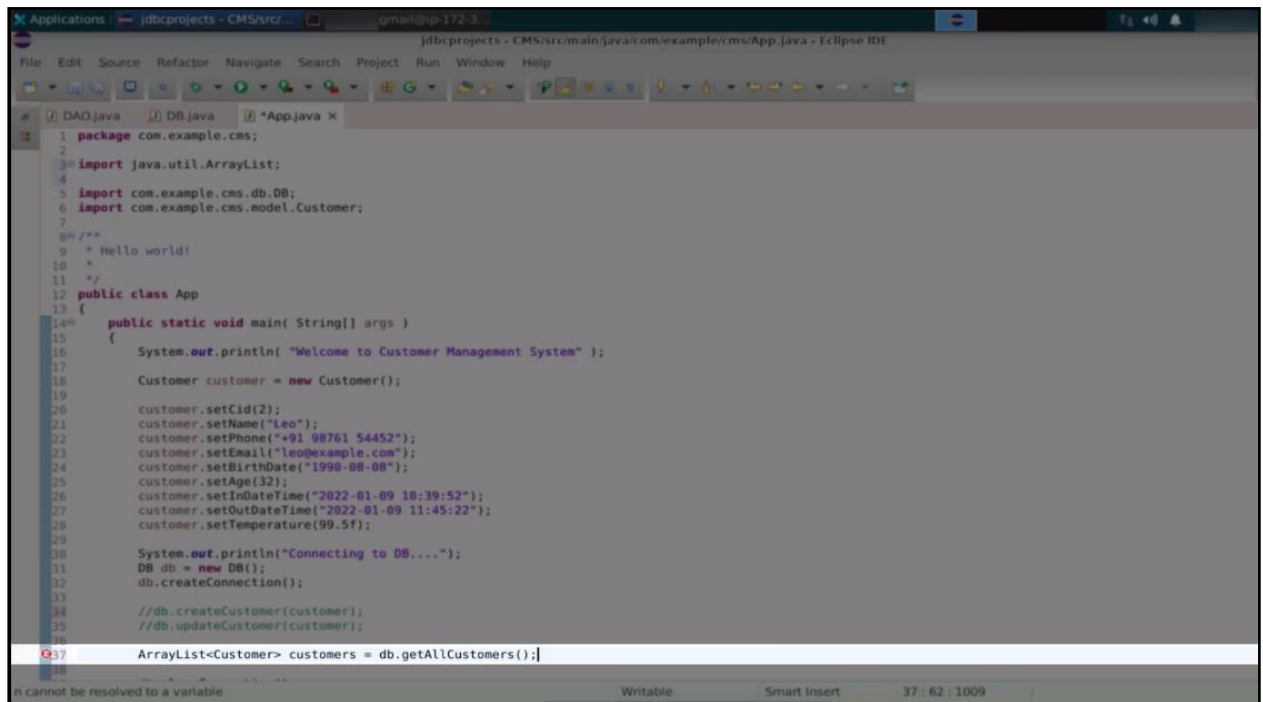


```
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```

```
ArrayList<Customer> customers = new ArrayList<Customer>();  
try {  
    String sql = "select * from Customer";  
    statement = connection.createStatement();  
    ResultSet set = statement.executeQuery(sql);  
    while(set.next()) {  
        Customer customer = new Customer();  
        customer.setCid(set.getInt(1));  
        customer.setName(set.getString(2));  
        customer.setPhone(set.getString(3));  
        customer.setEmail(set.getString(4));  
        customer.setBirthDate(set.getString(5));  
        customer.setAge(set.getInt(6));  
        customer.setInDateTime(set.getString(7));  
        customer.setOutDateTime(set.getString(8));  
        customer.setTemperature(set.getFloat(9));  
        customers.add(customer);  
    }  
} catch (Exception e) {  
    System.out.println("Exception Occurred: "+e);  
}  
return customers;  
}
```

Writable Smart Insert 148 : 41 : 4324

5.3 Return to the **App.java** file and call the **getAllCustomers()** method



```
1 package com.example.cms;
2
3 import java.util.ArrayList;
4
5 import com.example.cms.db.DB;
6 import com.example.cms.model.Customer;
7
8 /**
9  * Hello world!
10  *
11  */
12 public class App
13 {
14     public static void main( String[] args )
15     {
16         System.out.println( "Welcome to Customer Management System" );
17
18         Customer customer = new Customer();
19
20         customer.setCid(2);
21         customer.setName("Leo");
22         customer.setPhone("+91 98761 54452");
23         customer.setEmail("leo@example.com");
24         customer.setBirthDate("1990-08-08");
25         customer.setAge(32);
26         customer.setInDateTime("2022-01-09 10:39:52");
27         customer.setOutDateTime("2022-01-09 11:45:22");
28         customer.setTemperature(99.5f);
29
30         System.out.println("Connecting to DB...");
31         DB db = new DB();
32         db.createConnection();
33
34         //db.createCustomer(customer);
35         //db.updateCustomer(customer);
36
37         ArrayList<Customer> customers = db.getAllCustomers();
38     }
39 }
```

n cannot be resolved to a variable

Writable Smart Insert 37 : 62 : 1009

5.4 Save and run the code

```

1 import com.example.cms.db.DB;
2 import com.example.cms.model.Customer;
3
4 /**
5  * Hello world!
6  */
7
8 public class App
9 {
10     public static void main( String[] args )
11     {
12         System.out.println( "Welcome to Customer Management System" );
13
14         Customer customer = new Customer();
15
16         customer.setCid(2);
17         customer.setName("Leo");
18         customer.setPhone("+91 98761 54452");
19         customer.setEmail("leo@example.com");
20         customer.setBirthDate("1990-08-08");
21         customer.setAge(32);
22         customer.setInDateTime("2022-01-09 10:39:52");
23         customer.setOutDateTime("2022-01-09 11:45:22");
24         customer.setTemperature(99.5f);
25
26         System.out.println("Connecting to DB...");
27         DB db = new DB();
28         db.createConnection();
29
30         //db.createCustomer(customer);
31         //db.updateCustomer(customer);
32
33         ArrayList<Customer> customers = db.getAllCustomers();
34         customers.forEach( cRef -> System.out.println(cRef));
35
36         db.closeConnection();
37     }
38 }

```

After running the code, the console will display the customer list as the output.

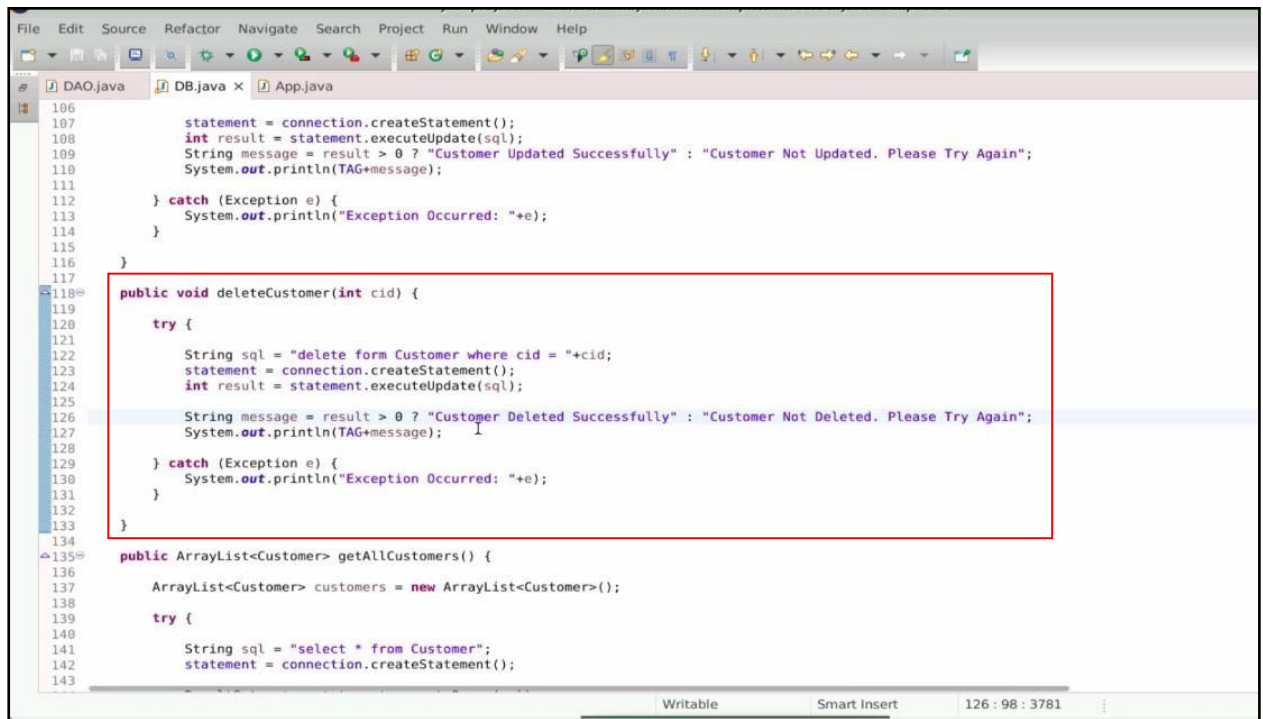
```

<terminated> App [Java Application] /usr/eclipse/plugins/org.eclipse.justj.openjdk.hotspot.jre.full.linux.x86_64_16.0.2.v20210721-1149/jre/bin/java (Jan 8, 2022, 12:00:12 PM - 12:00:13 PM)
Welcome to Customer Management System
Connecting to DB...
[DB] Driver Loaded
[DB] Connection Created
Customer [name=Fionna, phone=+91 99999 11111, email=fionna@example.com, birthDate=2022-01-08, age=23, inDateTime=2022-01-08 11:38:57, outDateTime=2022-01-08 11:38:57, temp=99.5f]
Customer [name=John Watson, phone=+91 98761 22222, email=john.watson@example.com, birthDate=1990-08-08, age=32, inDateTime=2022-01-08 10:39:52, outDateTime=2022-01-08 11:45:22, temperature=99.5f]
Customer [name=Leo, phone=+91 98761 54452, email=leo@example.com, birthDate=1990-08-08, age=32, inDateTime=2022-01-09 10:39:52, outDateTime=2022-01-09 11:45:22, temperature=99.5f]
[DB] Connection Closed. Close Status: true

```

Step 6: Perform the delete operation

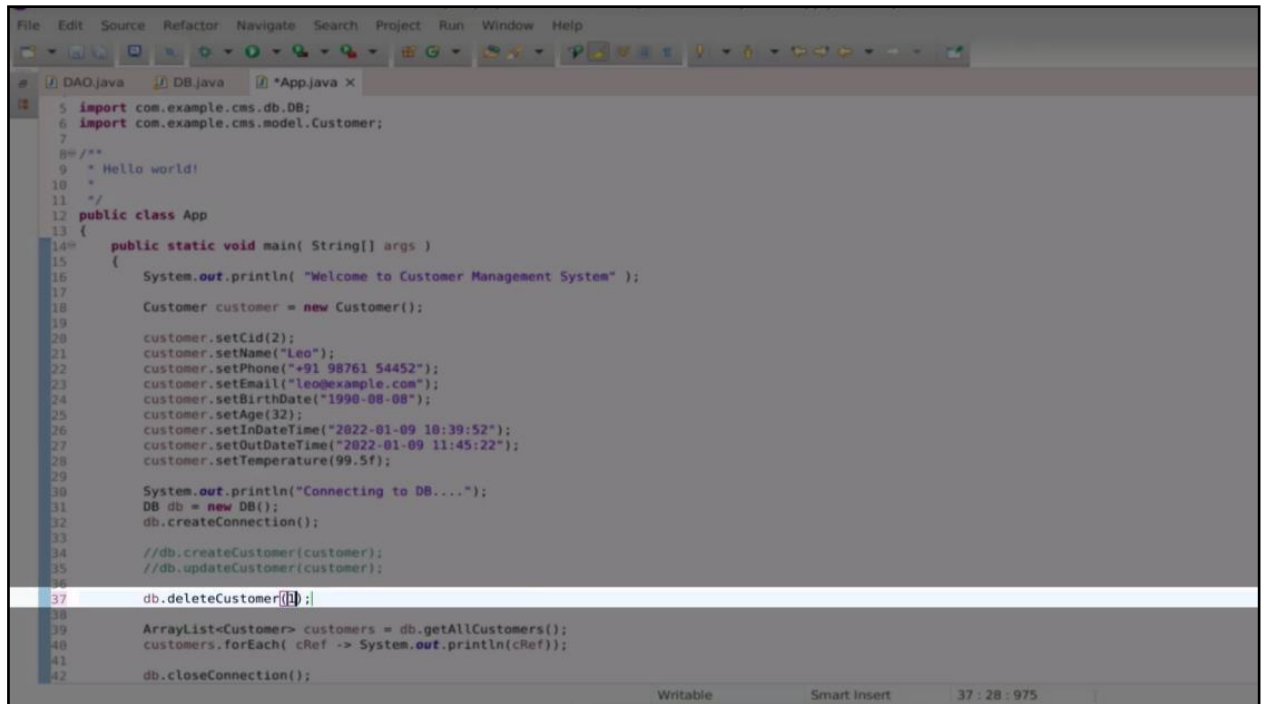
6.1 Type a delete operation inside the **try-catch** block, execute the **deleteCustomer()** method, and add a message to it



The screenshot shows an IDE with three tabs: DAO.java, DB.java, and App.java. The App.java tab is active, displaying a Java program. The code includes a try-catch block for the deleteCustomer method, which is highlighted with a red rectangle. The code is as follows:

```
106         statement = connection.createStatement();
107         int result = statement.executeUpdate(sql);
108         String message = result > 0 ? "Customer Updated Successfully" : "Customer Not Updated. Please Try Again";
109         System.out.println(TAG+message);
110     }
111     catch (Exception e) {
112         System.out.println("Exception Occurred: "+e);
113     }
114 }
115
116
117
118 public void deleteCustomer(int cid) {
119     try {
120         String sql = "delete form Customer where cid = "+cid;
121         statement = connection.createStatement();
122         int result = statement.executeUpdate(sql);
123         String message = result > 0 ? "Customer Deleted Successfully" : "Customer Not Deleted. Please Try Again";
124         System.out.println(TAG+message);
125     }
126     catch (Exception e) {
127         System.out.println("Exception Occurred: "+e);
128     }
129 }
130
131
132
133
134
135 public ArrayList<Customer> getAllCustomers() {
136     ArrayList<Customer> customers = new ArrayList<Customer>();
137     try {
138         String sql = "select * from Customer";
139         statement = connection.createStatement();
```

6.2 Return to the **App.java** file and write **db.deleteCustomer()** to call the function with the object **db**



```
File Edit Source Refactor Navigate Search Project Run Window Help
DAO.java DB.java *App.java x
5 import com.example.cms.db.DB;
6 import com.example.cms.model.Customer;
7
8 /**
9  * Hello world!
10  */
11
12 public class App
13 {
14     public static void main( String[] args )
15     {
16         System.out.println( "Welcome to Customer Management System" );
17
18         Customer customer = new Customer();
19
20         customer.setCid(2);
21         customer.setName("Leo");
22         customer.setPhone("+91 98761 54452");
23         customer.setEmail("leo@example.com");
24         customer.setBirthDate("1990-08-08");
25         customer.setAge(32);
26         customer.setInDateTime("2022-01-09 10:39:52");
27         customer.setOutDateTime("2022-01-09 11:45:22");
28         customer.setTemperature(99.5f);
29
30         System.out.println("Connecting to DB....");
31         DB db = new DB();
32         db.createConnection();
33
34         //db.createCustomer(customer);
35         //db.updateCustomer(customer);
36
37         db.deleteCustomer(db);
38
39         ArrayList<Customer> customers = db.getAllCustomers();
40         customers.forEach( cRef -> System.out.println(cRef));
41
42         db.closeConnection();
43     }
44 }
```

Writable Smart Insert 37 / 28 : 975

6.3 Save and run the code

```

File Edit Source Refactor Navigate Search Project Run Window Help
DAO.java DB.java App.java x
5 import com.example.cms.db.DB;
6 import com.example.cms.model.Customer;
7
8 /**
9  * Hello world!
10  */
11 */
12 public class App
13 {
14     public static void main( String[] args )
15     {
16         System.out.println( "Welcome to Customer Management System" );
17
18         Customer customer = new Customer();
19
20         customer.setCid(2);
21         customer.setName("Leo");
22         customer.setPhone("+91 98761 54452");
23         customer.setEmail("leo@example.com");
24         customer.setBirthDate("1990-08-08");
25         customer.setAge(32);
26         customer.setInDateTime("2022-01-09 10:39:52");
27         customer.setOutDateTime("2022-01-09 11:45:22");
28         customer.setTemperature(99.5f);
29
30         System.out.println("Connecting to DB....");
31         DB db = new DB();
32         db.createConnection();
33
34         //db.createCustomer(customer);
35         //db.updateCustomer(customer);
36
37         db.deleteCustomer(1);
38
39         System.out.println();
40
41         ArrayList<Customer> customers = db.getAllCustomers();
42         customers.forEach( cRef -> System.out.println(cRef));

```

In the output, you will encounter an error indicated by the message **Exception occurred**.

```

DAO.java DB.java App.java x
5 import com.example.cms.db.DB;
6 import com.example.cms.model.Customer;
7
8 /**
9  * Hello world!
10  */
11 */
12 public class App
13 {
14     public static void main( String[] args )
15     {
16         System.out.println( "Welcome to Customer Management System" );
17
18         Customer customer = new Customer();
19
20         customer.setCid(2);
21         customer.setName("Leo");
22         customer.setPhone("+91 98761 54452");
23         customer.setEmail("leo@example.com");
24         customer.setBirthDate("1990-08-08");
25         customer.setAge(32);
26         customer.setInDateTime("2022-01-09 10:39:52");
27         customer.setOutDateTime("2022-01-09 11:45:22");
28         customer.setTemperature(99.5f);
29
30         System.out.println("Connecting to DB....");
31         DB db = new DB();
32         db.createConnection();
33
34         //db.createCustomer(customer);
35         //db.updateCustomer(customer);
36
37         db.deleteCustomer(1);
38
39         System.out.println();
40
41         ArrayList<Customer> customers = db.getAllCustomers();
42         customers.forEach( cRef -> System.out.println(cRef));

```

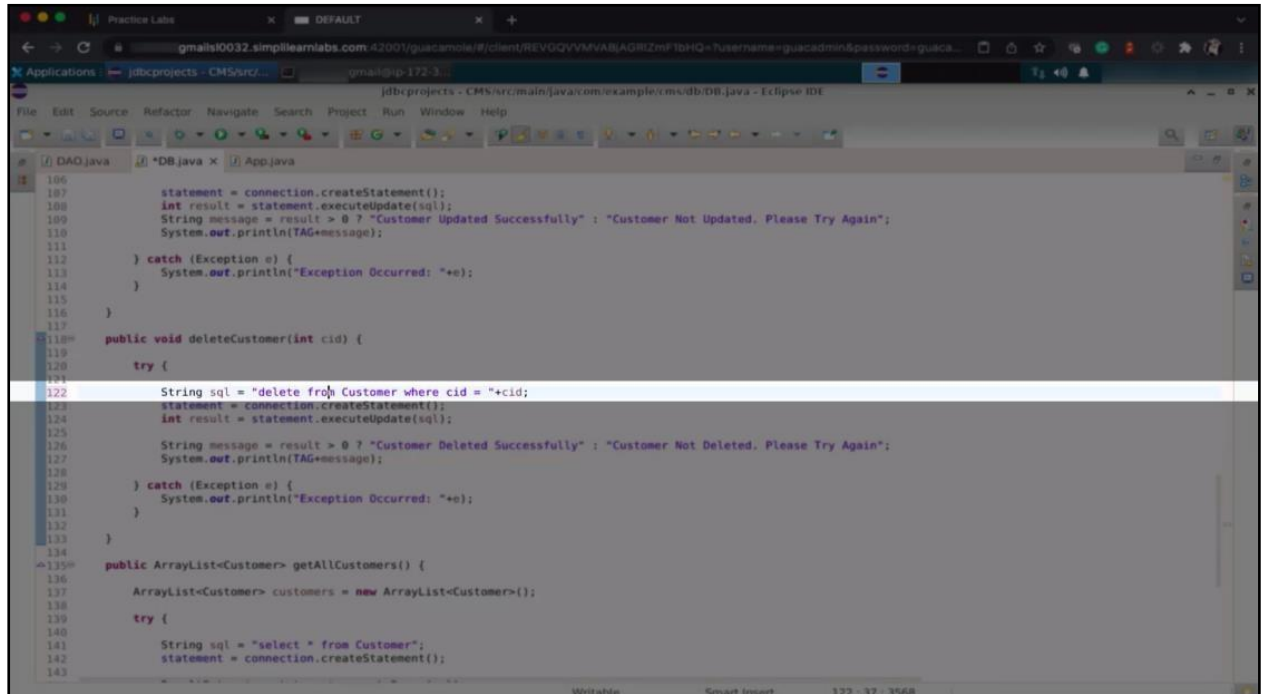
```

<terminated> App [Java Application] /usr/eclipse/plugins/org.eclipse.justi.openjdk.hotspot.jre.full/bin/linux64/java:
Welcome to Customer Management System
Connecting to DB....
[DB] Driver Loaded
[DB] Connection Created
Exception Occurred: java.sql.SQLException: You have an error in your SQL syntax; check the
Customer [name=Fionna, phone=+91 99999 11111, email=fionna@example.com, 11
Customer [name=John Watson, phone=+91 98761 22222, email=john.watson@ex.
Customer [name=Leo, phone=+91 98761 54452, email=leo@example.com, birth st
[DB] Connection Closed. Close Status: true

```

6.4 Update the following line of code to correct the delete query that caused the error:

String sql= "delete from Customer where cid = " +cid;



```

106      statement = connection.createStatement();
107      int result = statement.executeUpdate(sql);
108      String message = result > 0 ? "Customer Updated Successfully" : "Customer Not Updated, Please Try Again";
109      System.out.println(TAG+message);
110  } catch (Exception e) {
111      System.out.println("Exception Occurred: "+e);
112  }
113  }
114  }
115  }
116  }
117  }
118  public void deleteCustomer(int cid) {
119      try {
120      122      String sql = "delete from Customer where cid = "+cid;
123      statement = connection.createStatement();
124      int result = statement.executeUpdate(sql);
125      String message = result > 0 ? "Customer Deleted Successfully" : "Customer Not Deleted, Please Try Again";
126      System.out.println(TAG+message);
127  } catch (Exception e) {
128      System.out.println("Exception Occurred: "+e);
129  }
130  }
131  }
132  }
133  }
134  public ArrayList<Customer> getAllCustomers() {
135      ArrayList<Customer> customers = new ArrayList<Customer>();
136      try {
137      String sql = "select * from Customer";
138      statement = connection.createStatement();
139  
```


6.5 Return to the **App.java** file and run the code

```

1  import com.example.cms.db.DB;
2  import com.example.cms.model.Customer;
3
4  /**
5   * Hello world!
6   */
7
8  public class App
9  {
10     public static void main( String[] args )
11     {
12         System.out.println( "Welcome to Customer Management System" );
13
14         Customer customer = new Customer();
15
16         customer.setCid(2);
17         customer.setName("Leo");
18         customer.setPhone("+91 98761 54452");
19         customer.setEmail("leo@example.com");
20         customer.setBirthDate("1990-08-08");
21         customer.setAge(32);
22         customer.setInDateTime("2022-01-09 10:39:52");
23         customer.setOutDateTime("2022-01-09 11:45:22");
24         customer.setTemperature(99.5f);
25
26         System.out.println("Connecting to DB....");
27         DB db = new DB();
28         db.createConnection();
29
30         //db.createCustomer(customer);
31         //db.updateCustomer(customer);
32
33         db.deleteCustomer(1);
34
35         System.out.println();
36
37         ArrayList<Customer> customers = db.getAllCustomers();
38         customers.forEach( cRef -> System.out.println(cRef));
39     }
40 }

```

By following these steps, you will successfully deleted the customer, as indicated by the message **Customer Deleted Successfully**.

```

-terminated- App [Java Application] /usr/eclipse/plugins/org.eclipse.justi.openjdk.hotspot...
Welcome to Customer Management System
Connecting to DB....
[DB] Driver Loaded
[DB] Connection Created
[DB] Customer Deleted Successfully
Customer [name=John Watson, phone=+91 98761 22222, email=john.watson@exam...
Customer [name=Leo, phone=+91 98761 54452, email=leo@example.com, birthDat...
[DB] Connection Closed. Close Status: true

```


6.6 Return to the terminal and run the select command:
select * from Customers;

The screenshot shows an IDE with a Java file named `App.java` and a terminal window. The Java code defines a `Customer` class and a `main` method that interacts with a database. The terminal window shows the execution of a MySQL query to select all records from the `Customers` table.

```

5 import com.example.cms.db.DB;
6 import com.example.cms.model.Customer;
7
8 /**
9  * Hello world!
10  */
11
12 public class App
13 {
14     public static void main(
15     {
16         System.out.println("
17         Customer customer = ne
18
19         customer.setCid(2);
20         customer.setName("Leo
21         customer.setPhone("+91
22         customer.setEmail("leo
23         customer.setBirthDate(
24         customer.setAge(32);
25         customer.setInDateTim
26         customer.setOutDateTim
27         customer.setTemperat
28
29         System.out.println("C
30         DB db = new DB();
31         db.createConnection();
32
33         //db.createCustomer(cu
34         //db.updateCustomer(cu
35
36         db.deleteCustomer(1);
37
38         System.out.println();
39
40         ArrayList<Customer> customers = db.getAllCustomers();
41         customers.forEach( cRef -> System.out.println(cRef));
42

```

The terminal window shows the execution of a MySQL query to select all records from the `Customers` table:

```

mysql> select * from Customer;
+-----+-----+-----+-----+-----+-----+-----+
| cid | name | phone | email | birthDate | a |
+-----+-----+-----+-----+-----+-----+
| 2 | John Watson | +91 98761 22222 | john.watson@example.com | 1990-08-08 | 90.5 |
+-----+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)

mysql> select * from Customer;
+-----+-----+-----+-----+-----+-----+-----+
| cid | name | phone | email | birthDate | a |
+-----+-----+-----+-----+-----+-----+
| 1 | Fiona | +91 99999 11111 | fiona@example.com | 2022-01-08 | 98.6 |
| 2 | John Watson | +91 98761 22222 | john.watson@example.com | 1990-08-08 | 90.5 |
| 3 | Leo | +91 98761 54452 | leo@example.com | 1990-08-08 | 99.5 |
+-----+-----+-----+-----+-----+-----+
3 rows in set (0.00 sec)

mysql> select * from Customer;

```

You will notice that the customer data has been deleted.

```

5 import com.example.cms.db.DB;
6 import com.example.cms.model.Customer;
7
8 /**
9  * Hello world!
10  */
11
12 public class App {
13
14     public static void main(String[] args) {
15         // Create a new Customer object
16         Customer customer = new Customer();
17
18         // Set customer details
19         customer.setCid(2);
20         customer.setName("Leo");
21         customer.setPhone("+91 98761 22222");
22         customer.setEmail("leo@example.com");
23         customer.setBirthDate("1990-08-08");
24         customer.setAge(32);
25         customer.setInDateTime("2022-01-08 10:39:52");
26         customer.setOutDateTime("2022-01-08 11:45:22");
27         customer.setTemperature(98.5);
28
29         // Print customer details
30         System.out.println("Customer Details:");
31         DB db = new DB();
32         db.createConnection();
33
34         // Create a new Customer object
35         //db.createCustomer(customer);
36         //db.updateCustomer(customer);
37
38         db.deleteCustomer(1);
39
40         System.out.println();
41
42         ArrayList<Customer> customers = db.getAllCustomers();
43         customers.forEach(c -> System.out.println(c));
44     }
45 }

```

```

mysql> select * from Customer;
+----+-----+-----+-----+-----+-----+-----+
| cid | name  | phone | email | birthDate | a |
+----+-----+-----+-----+-----+-----+
| 2   | John | +91 98761 22222 | john.watson@example.com | 1990-08-08 | 98.5 |
| 3   | Leo  | +91 98761 54452 | leo@example.com | 1990-08-08 | 99.5 |
+----+-----+-----+-----+-----+-----+
3 rows in set (0.00 sec)

```

By following these steps, you have successfully demonstrated how CRUD (create, read, update, delete) operations can be performed in a Java project, reflecting changes in the database. We executed an insert query to add a new customer, an update query to modify existing customer details, the **getAllCustomers** operation to retrieve all customer records, and the **deleteCustomer()** function to remove a customer's record.