End Term Project Report On

Introduction to Databases (CSE 3151)

Submitted by

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING FACULTY OF ENGINEERING & TECHNOLOGY (ITER) SIKSHA 'O' ANUSANDHAN DEEMED TO BE UNIVERSITY BHUBANESWAR, ODISHA – 751030

Laboratory Assignments Subject: Introduction to Databases

Subject code: CSE 3151

Assignment 6: Mini project using JDBC connectivity

Objective of this Assignment: To design a miniature Project for a Banking Management System using Java, Oracle, and JDBC.

Requisite:

- Completion of IDB Laboratory Assignment-4
- Basic Java Programming knowledge

Overview of the Project: A Banking Management System is to be designed, putting together the concepts learnt in theory and practiced in laboratory. The Project will integrate a Java frontend menu driven program to the backend Banking Database designed in Oracle through JDBC connectivity.

Project Description: The Java program provides an interface to the user to access, insert, delete, and update the database. The program handles user input, output to and from the database for the said operations. User should be able to do the following operations:

- 1. Show Customer Records:
 - Using this option the details of all the customers should be displayed in a particular format.
- 2. Add Customer Record:
 - Using this option the user needs to provide the information such as cust_no, name, phoneno and city through user input, which will be saved in database. After that using option 1, details of all the customers will be displayed in a particular format.
- 3. Delete Customer Record:Using this option the user needs to provide the cust_no of a customer through user input and all the information related to that customer will be deleted from the database. After that using option 1, details of all the customers will be displayed in a particular format.
- 4. Update Customer Information:

Using this option the user needs to provide the cust_no of a customer through user input and based on the following choice the information related to the customer will be updated.

- 4.1: Update name
- 4.2: Update Phoneno.
- 4.3: Update city

After that using option 1, details of all the customers will be displayed in particular format.

5. Show Account Details of a Customer:

Using this option the user needs to provide the cust_no of a customer through user input and all the information of that customer along with his account_no, type, balance, branch_code, branch_name and branch_city will be displayed in proper format.

6. Show Loan Details of a Customer:

Using this option the user needs to provide the cust_no of a customer through user input and all the information of that customer along with his loan_no, loan amount, branch_code, branch_name and branch_city will be displayed in proper format.

7. Deposit Money to an Account:

Using this option the user needs to provide the account_no of a customer and the amount to be deposited through user input. According to the deposited amount the updated balance will be verified in proper format using option 5.

8. Withdraw Money from an Account:

Using this option the user needs to provide the account_no of a customer and the amount to be withdraw through user input. According to the withdraw amount the updated balance will be verified in proper format using option 5.

9. Exit the Program

The operations are choice based. Appropriate option has to be chosen from a switch-case based menu driven program and the operation on the database is performed accordingly. The output is displayed in the terminal screen with appropriate messages from the database as displayed by Oracle during direct access. Exceptions should be handled properly by the Java program. The output should be displayed in a formatted way for clarity of understanding and visual.

JAVA Program: -

<u>BankApp.java</u>

```
3. Delete Customer Record
    4. Update Customer Information
    5.Account Details Of Customer
    6.Loan Details Of Customer
    7. Deposit Money To Account
    8. Withdraw Money From Account
    9.Exit
System.out.println(menu);
System.out.print("Enter operation to be performed: ");
int choice = sc.nextInt();
switch (choice) {
  case 1: {
    Customer SQL customer = new Customer SQL();
    customer.showCustomerRecord();
    break;
  }
  case 2: {
    Customer SQL customer = new Customer SQL();
    System.out.print("Enter Customer's Name: ");
    String name = sc.next();
    sc.nextLine();
    System.out.print("Enter Customer's Phone Number: ");
    String phone_no = sc.next();
    sc.nextLine();
    System.out.print("Enter Customer's City: ");
    String city = sc.next();
    sc.nextLine();
    Customer cust = new Customer(name, phone no, city);
    customer.addCustomerRecord(cust);
    break;
  }
  case 3: {
    Customer SQL customer = new Customer SQL();
    customer.deleteCustomerRecord();
    break;
  case 4: {
    Customer_SQL customer = new Customer_SQL();
    String menu_ = """
        1.Update Name
        2. Update Phone Number
        3. Update City
```

```
System.out.println(menu_);
  System.out.print("Enter operation to be performed: ");
  int choice_ = sc.nextInt();
  switch (choice_) {
    case 1: {
      customer.updateName();
      break;
    }
    case 2: {
      customer.updatePhoneNumber();
      break;
    }
    case 3: {
      customer.updateCity();
      break;
    }
  break;
case 5: {
  Account SQL account = new Account SQL();
  account.showAccountDetails();
  break;
}
case 6: {
  Loan_SQL loan = new Loan_SQL();
  loan.showLoanDetails();
  break;
}
case 7: {
  Transaction transaction = new Transaction();
  transaction.deposit();
  break;
}
case 8: {
  Transaction transaction = new Transaction();
  transaction.withdraw();
  break;
}
case 9: {
  DBConnection.getConnection().close();
```

```
System.exit(0);
        }
      }
    }
  }
}
Account SQL.java
import java.sql.Connection;
import java.sql.PreparedStatement;
import java.sql.ResultSet;
import java.sql.SQLException;
import java.util.Scanner;
public class Account SQL {
  private final Connection connection;
  public Account_SQL() throws SQLException {
    connection = DBConnection.getConnection();
  }
  public void showAccountDetails() {
    try {
      String query = """
          SELECT
          c.CUST NO, c.NAME, c.PHONENO, c.CITY,
          a.ACCOUNT NO, a.TYPE, a.BALANCE,
          b.BRANCH CODE, b.BRANCH NAME, b.BRANCH CITY
          FROM CUSTOMER_RECORD c
          JOIN ACCOUNT DETAILS a ON c.CUST NO = a.CUST NO
          JOIN BRANCH b ON a.BRANCH CODE = b.BRANCH CODE
          WHERE c.CUST NO = ?;
      PreparedStatement preparedStatement = connection.prepareStatement(query);
      Scanner sc = new Scanner(System.in);
      System.out.print("Enter The Customer Number for Account Details: ");
      preparedStatement.setInt(1, sc.nextInt());
      sc.nextLine();
      ResultSet resultSet = preparedStatement.executeQuery();
      if (resultSet.next()) {
        System.out.println("Customer's Account & Branch information:-\n");
        System.out.println("Customer Number: " + resultSet.getInt(1));
        System.out.println("Name: " + resultSet.getString(2));
        System.out.println("Phone Number: " + resultSet.getString(3));
        System.out.println("City: " + resultSet.getString(4));
```

```
System.out.println("Account Number: " + resultSet.getInt(5));
        System.out.println("Account Type: " + resultSet.getString(6));
        System.out.println("Account Balance: " + resultSet.getDouble(7));
        System.out.println("Branch Code: " + resultSet.getString(8));
        System.out.println("Branch Name: " + resultSet.getString(9));
        System.out.println("Branch City: " + resultSet.getString(10));
      }
      else
        System.out.println("No Such Customer Exist!!");
      sc.close();
    catch (SQLException e) {
      System.out.println(e.getMessage());
    }
  }
}
Customer SQL.java
import java.sql.Connection;
import java.sql.PreparedStatement;
import java.sql.ResultSet;
import java.sql.SQLException;
import java.sql.Statement;
import java.util.Scanner;
public class Customer_SQL {
  private final Connection connection;
  public Customer SQL() throws SQLException {
    connection = DBConnection.getConnection();
  }
  public void showCustomerRecord() {
    try {
      String query = "SELECT * FROM customer record";
      Statement statement = connection.createStatement();
      ResultSet resultSet = statement.executeQuery(query);
      while (resultSet.next()) {
        System.out.println("\n\nCustomer Number:" + resultSet.getInt(1));
        System.out.println("Name :" + resultSet.getString(2));
        System.out.println("Phone Number:" + resultSet.getString(3));
        System.out.println("City:" + resultSet.getString(4));
      }
```

```
connection.close();
  } catch (SQLException e) {
    System.out.println(e.getMessage());
  }
}
public void addCustomerRecord(Customer customer) {
  try {
    String query = "INSERT INTO customer record (cust no, name, phoneno, city) VALUES(?, ?, ?, ?)";
    PreparedStatement preparedStatement = connection.prepareStatement(query);
    String custQuery = "SELECT MAX(cust no) FROM CUSTOMER RECORD";
    Statement statement = connection.createStatement();
    ResultSet resultSet = statement.executeQuery(custQuery);
    int customer no = 1000;
    if (resultSet.next()) {
      customer_no = resultSet.getInt(1) + 1;
    customer.setCustomerNo(customer no);
    preparedStatement.setInt(1, customer no);
    Scanner sc = new Scanner(System.in);
    preparedStatement.setString(2, customer.getName());
    preparedStatement.setString(3, customer.getPhoneNo());
    preparedStatement.setString(4, customer.getCity());
    int rows affected = preparedStatement.executeUpdate();
    if (rows affected > 0) {
      System.out.println("Record Successfully Created!!");
    } else
      System.out.println("Record Creation Unsuccessful, There was an error!!");
  } catch (SQLException e) {
    System.out.println(e.getMessage());
  this.showCustomerRecord();
public void deleteCustomerRecord() {
  try {
    String guery = "DELETE FROM customer record WHERE cust no = ?";
    PreparedStatement preparedStatement = connection.prepareStatement(query);
    Scanner sc = new Scanner(System.in);
    System.out.print("Enter Customer Number of the record to be deleted: ");
    preparedStatement.setInt(1, sc.nextInt());
    sc.nextLine();
    int rows affected = preparedStatement.executeUpdate();
```

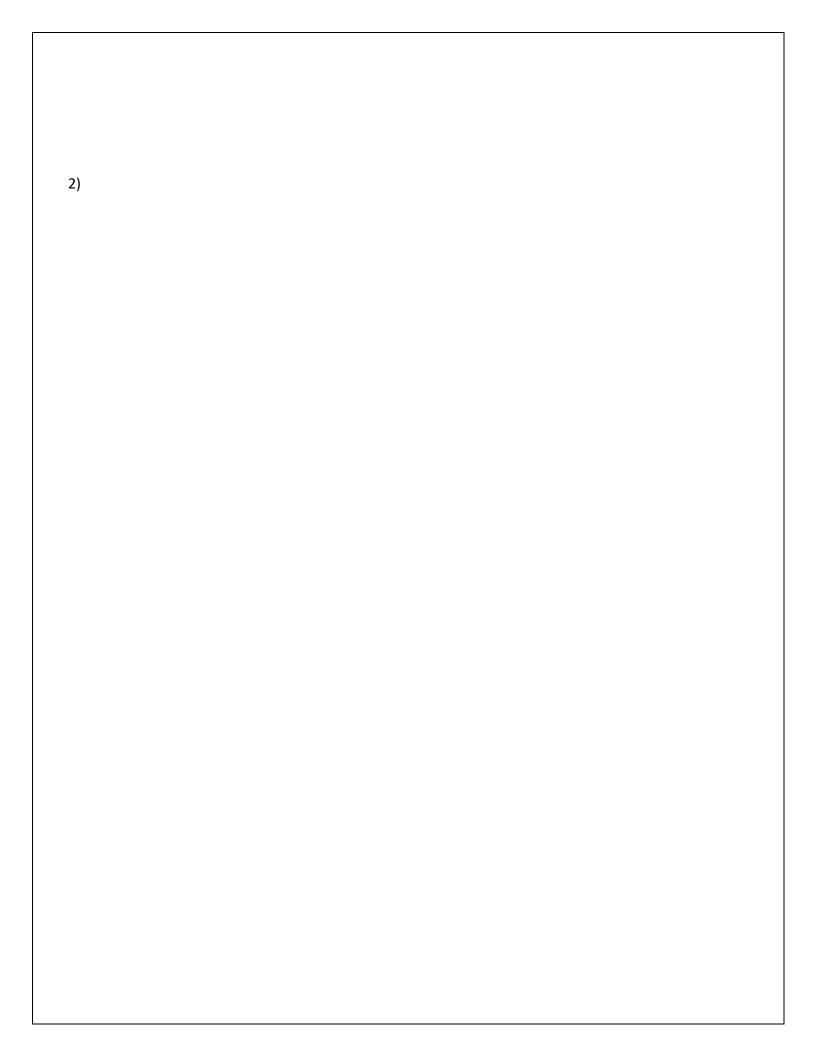
```
if (rows affected > 0) {
      System.out.println("Record Successfully Deleted!!");
    } else
      System.out.println("Record Deletion Unsuccessful, There was an error!!");
  } catch (SQLException e) {
    System.out.println(e.getMessage());
  this.showCustomerRecord();
public void updateName() {
  try {
    String guery = "UPDATE customer record SET name = ? WHERE cust no = ?";
    PreparedStatement preparedStatement = connection.prepareStatement(query);
    Scanner sc = new Scanner(System.in);
    System.out.print("Enter the Customer Number: ");
    preparedStatement.setInt(2, sc.nextInt());
    sc.nextLine();
    System.out.print("Enter the name(update): ");
    preparedStatement.setString(1, sc.nextLine());
    int rows affected = preparedStatement.executeUpdate();
    if (rows affected > 0) {
      System.out.println("Record Updated Deleted!!");
    } else
      System.out.println("Record not updated, There was an error!!");
  } catch (SQLException e) {
    System.out.println(e.getMessage());
  }
  this.showCustomerRecord();
}
public void updatePhoneNumber() {
  try {
    String query = "UPDATE customer record SET phoneno = ? WHERE cust no = ?";
    PreparedStatement preparedStatement = connection.prepareStatement(query);
    Scanner sc = new Scanner(System.in);
    System.out.print("Enter Customer Number: ");
    preparedStatement.setInt(2, sc.nextInt());
    sc.nextLine();
    System.out.print("Enter Phone Number(update): ");
    preparedStatement.setString(1, sc.nextLine());
    int rows affected = preparedStatement.executeUpdate();
    if (rows affected > 0) {
```

```
System.out.println("Record Updated Deleted!!");
      } else
        System.out.println("Record not updated, There was an error!!");
    } catch (SQLException e) {
      System.out.println(e.getMessage());
    }
    this.showCustomerRecord();
  }
  public void updateCity() {
    try {
      String query = "UPDATE customer record SET city = ? WHERE cust no = ?";
      PreparedStatement preparedStatement = connection.prepareStatement(query);
      Scanner sc = new Scanner(System.in);
      System.out.print("Enter Customer Number: ");
      preparedStatement.setInt(2, sc.nextInt());
      sc.nextLine();
      System.out.print("Enter City(update): ");
      preparedStatement.setString(1, sc.nextLine());
      int rows_affected = preparedStatement.executeUpdate();
      if (rows affected > 0) {
        System.out.println("Record Updated Deleted!!");
      } else
        System.out.println("Record not updated, There was an error!!");
    } catch (SQLException e) {
      System.out.println(e.getMessage());
    this.showCustomerRecord();
}
Customer.java
public class Customer {
  private int customerNo;
  private String name;
  private String phoneNo;
  private String city;
  public Customer(String name, String phoneNo, String city) {
    this.name = name;
    this.phoneNo = phoneNo;
    this.city = city;
```

```
public void setCustomerNo(int customerNo) {
    this.customerNo = customerNo;
  }
  public int getCustomerNo() {
    return this.customerNo;
  }
  public void setName(String name) {
    this.name = name;
  }
  public String getName() {
    return this.name;
  }
  public void setPhoneNo(String phoneNo) {
    this.phoneNo = phoneNo;
  }
  public String getPhoneNo() {
    return this.phoneNo;
  }
  public void setCity(String city) {
    this.city = city;
  }
  public String getCity() {
    return this.city;
  }
}
DBConnection.java
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.SQLException;
public class DBConnection {
  private static Connection connection;
  public static Connection getConnection() throws SQLException {
```

```
if (connection == null | | connection.isClosed()) {
      final String url = "jdbc:mysql://localhost:3306/banking database";
      final String userName = "ITER user";
      final String password = "Iter@123";
      try {
        Class.forName("com.mysql.cj.jdbc.Driver");
     } catch (ClassNotFoundException e) {
        System.out.println(e.getMessage());
      }
     try {
        connection = DriverManager.getConnection(url, userName, password);
     } catch (SQLException e) {
        System.out.println(e.getMessage());
      }
    }
    return connection;
 }
}
Test Cases: -
1)
              4. Update Customer Record for any attribute except Customer Number
              Show Account Details of a Customer
              6. Show Loan Details of a Customer
              7. Deposit Money to an Account
              8. Withdraw Money from an Account
              9. Exit the Program
              Enter your choice(1-9):
              C0001
                              RAJ ANAND SINGH 9861258466
                                                            DELHI
                             ANKITA SINGH 9879958651
                                                              BANGALORE
              C0002
              C0003
                              SOUMYA JHA
                                             9885623344
                                                             MUMBAI
              C0004
                              ABHIJIT MISHRA 9455845425
                                                              MUMBAI
              C0005
                              YASH SARAF 9665854585
                                                              KOLKATA
                              SWAROOP RAY
                                             9437855466
              C0006
                                                              CHENNAI
              C0007
                              SURYA NARAYAN 9937955212
                                                              GURGAON
                             PRANAV PRAVEEN 9336652441
              C0008
                                                              PUNE
                                              7870266534
                              STUTI MISRA
              C0009
                                                              DELHI
                              ASLESHA TIWARI null MUMBAI
```

The number of rows selected is 10



```
1. Show Customer Records
2. Add Customer Record
3. Delete Customer Record
4. Update Customer Record for any attribute except Customer Number
5. Show Account Details of a Customer
6. Show Loan Details of a Customer
7. Deposit Money to an Account
8. Withdraw Money from an Account
9. Exit the Program
Enter your choice(1-9):
Enter cust no:
C0011
Enter the name:
ANWESHA DAS
Enter the phone:
999999999
Enter the city:
BHUB
1Row Inserted
1. Show Customer Records
2. Add Customer Record
3. Delete Customer Record
4. Update Customer Record for any attribute except Customer Number
5. Show Account Details of a Customer
6. Show Loan Details of a Customer
7. Deposit Money to an Account
8. Withdraw Money from an Account
9. Exit the Program
Enter your choice(1-9):
Enter cust_no:
C0012
Enter the name:
SACHIN SINGH
Enter the phone:
9898989898
Enter the city:
CTC
1Row Inserted
1. Show Customer Records
2. Add Customer Record
3. Delete Customer Record
4. Update Customer Record for any attribute except Customer Number
5. Show Account Details of a Customer
6. Show Loan Details of a Customer
7. Deposit Money to an Account
8. Withdraw Money from an Account
9. Exit the Program
Enter your choice(1-9):
Enter cust no:
C0013
Enter the name:
ARJUN MISHRA
Enter the phone:
777777777
Enter the city:
BBSR
1Row Inserted
```

```
7. Deposit Money to an Account
8. Withdraw Money from an Account
9. Exit the Program
Enter your choice(1-9):
1
C0001
              RAJ ANAND SINGH 9861258466
                                           DELHI
C0002
             ANKITA SINGH
                             9879958651
                                           BANGALORE
C0003
             SOUMYA JHA
                           9885623344
                                          MUMBAI
C0004
             ABHIJIT MISHRA 9455845425
                                          MUMBAI
C0005
              YASH SARAF
                            9665854585
                                           KOLKATA
C0006
             SWAROOP RAY
                            9437855466
                                          CHENNAI
C0007
             SURYA NARAYAN 9937955212
                                          GURGAON
             PRANAV PRAVEEN 9336652441
                                          PUNE
C0008
             STUTI MISRA
C0009
                             7870266534
                                           DELHI
             ASLESHA TIWARI null MUMBAI
C0010
C0011
             ANWESHA DAS 999999999
                                           BHUB
                                           CTC
C0012
              SACHIN SINGH
                             9898989898
C0013
              ARJUN MISHRA
                                           BBSR
                            777777777
The number of rows selected is 13
```

3)

```
***** Banking Management System****
1. Show Customer Records
2. Add Customer Record
3. Delete Customer Record
4. Update Customer Record for any attribute except Customer Number
5. Show Account Details of a Customer
6. Show Loan Details of a Customer
7. Deposit Money to an Account
8. Withdraw Money from an Account
9. Exit the Program
Enter your choice(1-9):
Enter a cust no for deletion:
C0013
1Row deleted
***** Banking Management System*****
1. Show Customer Records
2. Add Customer Record
3. Delete Customer Record
4. Update Customer Record for any attribute except Customer Number
5. Show Account Details of a Customer
6. Show Loan Details of a Customer
7. Deposit Money to an Account
8. Withdraw Money from an Account
9. Exit the Program
Enter your choice(1-9):
Enter a cust_no for deletion:
C0016
ORow deleted
```

```
2. Add Customer Record
3. Delete Customer Record
4. Update Customer Record for any attribute except Customer Num
5. Show Account Details of a Customer
6. Show Loan Details of a Customer
7. Deposit Money to an Account
Withdraw Money from an Account
9. Exit the Program
Enter your choice(1-9):
Enter 1: For Name 2: For Phone no 3: For City to update:
Enter Cust No
C0011
Enter updated Phone
6370105068
1Updated Successfully
1. Show Customer Records
2. Add Customer Record
3. Delete Customer Record
4. Update Customer Record for any attribute except Customer Number
5. Show Account Details of a Customer
6. Show Loan Details of a Customer
7. Deposit Money to an Account
8. Withdraw Money from an Account
9. Exit the Program
Enter your choice(1-9):
Enter 1: For Name 2: For Phone no 3: For City to update:
Enter Cust No
C0011
Enter updated name
BIKASH
1Updated Successfully
3. Delete Customer Record
4. Update Customer Record for any attribute except Customer No
5. Show Account Details of a Customer
Show Loan Details of a Customer
7. Deposit Money to an Account
8. Withdraw Money from an Account
9. Exit the Program
Enter your choice(1-9):
Enter 1: For Name 2: For Phone no 3: For City to update:
Enter Cust No
C0011
Enter updated City
ROURKELA
1Updated Successfully
```

```
5)
```

6)

```
***** Banking Management System****
1. Show Customer Records
2. Add Customer Record
3. Delete Customer Record
4. Update Customer Record for any attribute except Customer Number
5. Show Account Details of a Customer
6. Show Loan Details of a Customer
7. Deposit Money to an Account
8. Withdraw Money from an Account
9. Exit the Program
Enter your choice(1-9):
Enter Cust No
c0003
                                               Branch Name:
Acc. No.:
             Type: Balance:
                                   Branch Code:
                                                                      Branch City:
                                                              MUMBAI
A0001
             SB
                      200000
                                    B003
                                                  JUHU BRANCH
Enter your choice(1-9):
Enter Cust No
c0016
Acc. No.:
           Type: Balance:
                                  Branch Code: Branch Name:
                                                                     Branch City:
         ***** Banking Management System*****
         1. Show Customer Records
         Add Customer Record
         3. Delete Customer Record
         4. Update Customer Record for any attribute except C
         5. Show Account Details of a Customer
         6. Show Loan Details of a Customer
         7. Deposit Money to an Account
         8. Withdraw Money from an Account
         9. Exit the Program
         Enter your choice(1-9):
         Enter Cust No
         c0003
         SQLServerResultSet:1 no of rows affected
  ***** Banking Management System*****
  1. Show Customer Records
  2. Add Customer Record
  3. Delete Customer Record
  4. Update Customer Record for any attribute except Customer Number
  5. Show Account Details of a Customer
  6. Show Loan Details of a Customer
  7. Deposit Money to an Account
  8. Withdraw Money from an Account
  9. Exit the Program
  Enter your choice(1-9):
  Enter Cust No
  SQLServerResultSet:2 no of rows affected
  C0005 YASH SARAF 9665854585 KOLKATA L0001 3000000 B006 SRIRAMPURAM BRANCH CHENNAI
```

```
***** Banking Management System****
1. Show Customer Records
2. Add Customer Record
3. Delete Customer Record
4. Update Customer Record for any attribute except Customer Number
5. Show Account Details of a Customer
6. Show Loan Details of a Customer
7. Deposit Money to an Account
8. Withdraw Money from an Account
9. Exit the Program
Enter your choice(1-9):
Enter Cust No
c0008
SQLServerResultSet:3 no of rows affected
C0008 PRANAV PRAVEEN 9336652441 PUNE L0006 25000 B006 SRIRAMPURAM BRANCH CHENNAI
  ***** Banking Management System*****
  1. Show Customer Records
  2. Add Customer Record
  3. Delete Customer Record
  4. Update Customer Record for any attribute except Customer N
  5. Show Account Details of a Customer
  6. Show Loan Details of a Customer
  7. Deposit Money to an Account
  8. Withdraw Money from an Account
  9. Exit the Program
  Enter your choice(1-9):
  Enter Cust No
  c0016
  SQLServerResultSet:4 no of rows affected
               ***** Banking Management System*****
               1. Show Customer Records
               2. Add Customer Record
               3. Delete Customer Record
               4. Update Customer Record for any attribute
               5. Show Account Details of a Customer
               6. Show Loan Details of a Customer
               7. Deposit Money to an Account
               8. Withdraw Money from an Account
               9. Exit the Program
               Enter your choice(1-9):
               Enter Account No
               a0008
               Enter the amount to deposite
               1Balance Updated
                  Enter your choice(1-9):
                  Enter Account No
                  Enter the amount to deposite
                  10000
                  1Balance Updated
```

7)

```
8)
                   ***** Banking Management System****
                   1. Show Customer Records
                   2. Add Customer Record
                   3. Delete Customer Record
                   4. Update Customer Record for any attribute
                   5. Show Account Details of a Customer
                   6. Show Loan Details of a Customer
                   7. Deposit Money to an Account
                   8. Withdraw Money from an Account
                   9. Exit the Program
                   Enter your choice (1-9):
                   Enter Account No
                   a0008
                   Enter the amount to deposite
                   800
                   1Balance Updated
                                          Enter your choice (1-9):
         Enter your choice (1-9):
         Enter Account No
                                           Enter Account No
                                          a0005
         Enter the amount to deposit
                                          Enter the amount to deposit
                                          10000
         Insuffient balance
                                          1 Balance Updated
9)
          ***** Banking Management System****
         1. Show Customer Records
          2. Add Customer Record
          3. Delete Customer Record
         4. Update Customer Record for any attribute except Customer Number
          5. Show Account Details of a Customer
          6. Show Loan Details of a Customer
         7. Deposit Money to an Account
          8. Withdraw Money from an Account
         9. Exit the Program
         Enter your choice (1-9):
         Visit us next time
```

```
***** Banking Management System****
1. Show Customer Records
2. Add Customer Record
3. Delete Customer Record
4. Update Customer Record for any attribute except Customer Number
5. Show Account Details of a Customer
6. Show Loan Details of a Customer
7. Deposit Money to an Account
8. Withdraw Money from an Account
9. Exit the Program
Enter your choice (1-9):
Enter from 1 to 9 nothing else please again
***** Banking Management System****
1. Show Customer Records
2. Add Customer Record
3. Delete Customer Record
4. Update Customer Record for any attribute except Customer Number
5. Show Account Details of a Customer
6. Show Loan Details of a Customer
7. Deposit Money to an Account
8. Withdraw Money from an Account
9. Exit the Program
Enter your choice (1-9):
```