LONDON METROPOLITAN UNIVERSITY

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CS4001NI Programming

30% Individual Coursework

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Introduction

Introducing Project Content

The following Project was assigned to us a Programming Courework. In this Project we were given an object-oriented concept of Java. We are required to create three classes named BankCard, DebitCard and Credit Card. In which is BankCard is the Parent class whereas, DebitCard and CreditCard are its two Child classes.

BlueJ

BlueJ is software application for Java Programming language. This application general-purpose, class-based, object-oriented and a secure programming language used for creating programs and coding. The following project was also executed using Blue J . Blue J is a free software application that was recommend to us by our module teacher.

Microsoft Word

Microsoft word is a word processing software that lets the users to create professional-quality documents, reports, letters and resumes. Microsoft word includes features such as grammar check, spelling check, text and font formatting, HTML support, image support, advance page layout, and many more. Charles Simonyi and Richard Brodie who were two former xerox programmers developed Microsoft word in October 1983.

Draw.io

Draw.io is a software for making diagrams and charts. This software lets the users to choose an automatic layout function, or create a custom layout. This software has a large varieties of shapes and hundreds of visual elements to make diagram, charts, projects and many more. It also has a crucial part as this allows the users to present there ideas, views, thought by implementing them in the forms of diagram and charts. In this coursework we have used this software for Class Diagrams. was developed by Gaudenz Alder, founder of J-graph.

Class Diagram

BankGUI

- obj: JFrame
- panel_obj: JPanel
- panel2_obj: JPanel
- Debit_card: JLabel
- Credit_card: JLabel
- Card_id: JLabel
- Client_name: JLabel
- Issuer_bank: JLabel
- Bank_account: JLabel
- Balance_amount: JLabel
- Pin_number: JLabel
- Withdrawal_amount: JLabel
- CVC_number: JLabel
- Credit_limit: JLabel
- Interest_rate: JLabel
- Grace_period: JLabel
- withdrawal_date: JLabel
- expiration_date: JLabel
- card_debit: JTextField
- client_debit: JTextField
- issuer_debit: JTextField
- account_debit: JTextField
- amount_debit: JTextField
- pin_debit: JTextField
- withdrawal_debit: JTextField
- card_credit: JTextField
- client_credit: JTextField
- issuer_credit: JTextField
- account_credit: JTextField
- amount_credit: JTextField
- pin_credit: JTextField
- withdrawal_credit: JTextField
- cvc_credit: JTextField
- interest_credit: JTextField
- grace_credit: JTextField
- credit_credit: JTextField
- debit_card: JButton
- display_button: JButton
- display_obj: JButton
- clear_credit: JButton
- clear_button: JButton
- withdraw_button: JButton
- credit_card: JButton
- withdraw: JButton
- credit_limit: JButton
- cancel: JButton
- day: JComboBox
- month: JComboBox
- year: JComboBox
- date: JComboBox
- months: JComboBox
- Yr: JComboBox

+ actionPerformed(ActionEvent e): void
+ main(String args[]): void
+ gui(): void

Pseudocode

IMPORT JFrame from javax.swing package

IMPORT JPanel from javax.swing package

IMPORT JLabel from javax.swing package

IMPORT JTextField from javax.swing package

IMPORT colours from java.awt package

IMPORT font from java.awt package

IMPORT JRadioBUtton from javax.swing package

IMPORT ButtonGroup from javax.swing package

IMPORT JButton form javax.swing package

IMPORT JTextArea from javax.swing package

IMPORT JComboBox from javax.swing package

IMPORT JCheckBox from javax.swing package

IMPORT ArrayList from java.util package

IMPORT ActionEvent from Java.awt.event package

IMPORT ActionListener from Java.awt.event package

CREATE a class BankCardGUI which implements ActionListener interface

DECLARE an instance variable JFrame as obj using private access modifier

DECLARE an instance variable JPanel as pobj using private access modifier

DECLARE an instance variable JLabel as DebitCard, CardIdDC, ClientNameDC, IssuerBankDC, BankAccountDC, BalanceAmountDC, PinNumber, WithdrawalAmount using private access modifier

DECLARE an instance variable JTextField as CardIdDCTF, ClientNameDCTF, IssuerBankDCTF, BankAccountDCTF, BalanceAmountDCTF, PinNumberDCTF, WithdrawalAmountTF using private access modifier

DECLARE an instance variable JButton as AddDebitCard, DisplayButtonDC, WithdrawalButton, ClearButtonDC using private access modifier

DECLARE an instance variable JComboBox as YearsDC, MonthsDC, DaysDC using private access modifier

DECLARE an instance variable JPanel as pobj2 using private access modifier

DECLARE an instance variable JLabel as CreditCard, CardIdCC, ClientNameCC, IssuerBankCC, BalanceAmountCC, CVCNumber, CreditLimit, GracePeriod, ExpirationDate using private access modifier

DECLARE an instance variable JTextField as CardIdCCTF, ClientNameCCTF, IssuerbankCCTF, BalanceAmountCCTF, CVCNumberTF, CreditLimitTF, GracePeriodTF, BankAccountCCTF, InterestRateTF using private access modifier

DECLARE an instance variable JButton as DisplayButtonCC, ClearCreditCC, AddCreditCard, WithdrawButtonCC, SetCreditLimit, CancelCreditCard using private access modifier

DECLARE an instance variable JComboBox as YearsCC, MonthsCC, Days using private access modifier

DECLARE and INITIALIZE an ArrayList array1ist of BankCard type

Create an instance method actionPerormed(ActionEvent AE) with void as return type

CREATE an instance method BankCardGUI() with void as return type

DO

INITIALIZE the instance variable obj to new JFrame

SET the title of obj to Bank GUI

SET the bound of objto x-axis to 375px, y-axis to 50px, width to 800px and height to 750px

SET the layout of obj to null

INITIALIZE the instance variable pobjto new JPanel

SET the bound of panel_Debit_Card to x-axis to 0px, y-axis to 0px, width to 800px, height to 375px

SET the layout of pobj to null

SET the background color of pobjto CYAN

INITIALIZE the instance variable DebitCard to new JLabel

SET the text of DebitCard to DEBIT CARD

DECLARE a variable font as DCH

INITIALIZE the variable DCH to new font and SET the font family to Arial , font to BOLD and size to 18

SET the font of DebitCard to font DCH

SET the bounds of DebitCard to x-axis to 325px, y-axis to 0px, width to 150px and height to 80px

ADD instance variable DebitCard to JPanel pobj

INITIALIZE the instance variable PinNumber to new JLabel

SET the text of PinNumber to Pin Number

SET the bounds of PinNumber to x-axis to 400px, y-axis to 160px, width to 155px and height to 20px

ADD the instance variable PinNumber to pobj

INITIALIZE the instance variable BalanceAmountDC to new JLabel

SET the text of BalanceAmountDC to Balance Amount

SET the bounds of BalancAmountDC to x-axis to 530px, y-axis to 160px, width to 100px and height to 30px

ADD the instance variable BalanceAmountDC to pobj

INITIALIZE the instance variable BankAccountDC to new JLabel

SET the text of BankAccountDC to Bank Account

SET the bounds of BankAccountDC to x-axis to 400px, y-axis to 120px, width to 155px and height to 20px

ADD the instance variable BankAccountDC to pobj

INITIALIZE the instance variable IssuerBankDC to new JLabel

SET the text of IssuerBank DCto Issuer Bank

SET the bounds of IssuerBankDC to x-axis to 80px, y-axis to 160px, width to 155px and height to 20px

ADD the instance variable IssuerBankDC to pobj

INITIALIZE the instance variable CardIdDC to new JLabel

SET the text of CardIdDC to Card ID

SET the bounds of CardIdDC to x-axis to 80px, y-axis to 80px, width to 75px and height to 30px

ADD the instance variable CardIdDC to pobj

INITIALIZE the instance variable Client_Name to new JLabel

SET the text of ClientNameDC to Client Name

SET the bounds of ClientNameDC to x-axis to 390px, y-axis to 180px, width to 100px and height to 30px

ADD the instance variable ClientNameDC to pobj

INITIALIZE the instance variable WithdrawalTFAmount to new JLabel

SET the text of WithdrawalAmountTF to Withdrawal Amount

SET the bounds of Withdrawal_Amount to x-axis to 370px, y-axis to 290px, width to 140px and height to 20px

ADD the instance variable WithdrawalAmountTF to pobj

INITIALIZE the instance variable DateOfWithdrawal to new JLabel

SET the text of DateOfWithdrawal to Withdrawal Date

SET the bounds of DateOfWithdrawal to x-axis to 160px, y-axis to 370px, width to 290px and height to 30px

ADD the instance variable DateOfWithdrawal to pobj

INITIALIZE the variable PinNumberTF to new JTextField

SET the bounds of PinNumberTF to x-axis to 530px, y-axis to 165px, width to 155px and height to 20px

ADD the instance variable PinNumberTF to pobj

INITIALIZE the variable BalanceAmountDCTF to new JTextField

SET the bounds of BalanceAmountDCTF to x-axis to 530px, y-axis to 125px, width to 155px and height to 20px

ADD the instance variable BalanceAmountDCTF to pobj

INITIALIZE the variable BankAccountDCTF to new JTextField

SET the bounds of BankAccountDCTF to x-axis to 530px, y-axis to 165px, width to 155px and height to 20px

ADD the instance variable BankAccountDCTF to pobj

Method Description

Methods	Description
+actionPerformed()	Task is performed after clicking JButton
+actionEventListener	Defines operation that has to be done
+getSource()	Selects which button is to be selected
+Integer.valueOf(.getText())	Get Integer value into String
+getSelectedItem	Returns the label of selected Item
+JFrame()	Creates a window which contains border, title and support buttons
+JPanel()	Creates a container and provides space to attach other component
+JLabel()	Places text in a container
+JTextField()	Creates a test field for typing
+JButton()	Creates a button that linked to ActionPerform
+JComboBox()	Creates a popup menu when clicked
+setBounds()	Lets the user to determine the Size and placement
+setText()	Sets the new text value to be placed as the newparameter
+setLayout()	It manages the layout
+setBackground()	It is used to set the back ground to JPanel
+setFont()	It is used to set a new font of the text

+setVisibility()	Set the panel for the view
+setTitle()	Set the name of JFrame
+add()	Insert the element to the collection

Testing

est-1(Compiling & Running using command prompt)

Objective	Compile and run by using the command prompt
Action	To open command prompt and compile and run the object
Expected result	The program is to be compiled using command prompt
Actual result	The outcome is successfully added
Conclusion	The test is successful

Test 2

(a): Add DebitCard

Objective	Add DebitCard
Action	To open BankCardGUI and click the button at DebitCard
Expected result	DebitCard button is successfully clicked
Actual result	The outcome is successfully added
Conclusion	The test is successful

(b): Add CreditCard

Objective	Add CreditCard
Action	To open BankCardGUI and click the button at CreditCard
Expected result	CreditCard button is successfully clicked
Actual result	The outcome is successfully added
Conclusion	The test is successful

(c)Withdraw amount from Debit card

Objective	Withdraw amount from DebitCard
Action	To open BankCard GUI and click the button at Withdraw
Expected result	Withdraw button is successfully clicked
Actual result	The outcome is successfully added
Conclusion	The test is successful

(d)Set the CreditLimit

Objective	Set the CreditLimit
Action	To open BankCardGUI and click the button at credit limit
Expected result	Credit limit button is successfully clicked
Actual result	The outcome is successfully added
Conclusion	The test is successful

(e) Remove the credit card

Objective	Remove the CreditCard
Action	To open BankCardGUI and click cancel credit card button
Expected result	Credit card is to be removed
Actual result	Credit card is removed
Conclusion	The test is successful

Test-3(Testing Appropriate Dialog boxes when unsuitable values entered)

Objective	Withdraw amount from DebitCard
Action	When we input in BankCardGUI outcome is unsuccessful
Expected result	After clicking the debit card unsuccessful debit card is shown
Actual result	Unsuccessful debit card is shown
Conclusion	The test is successful

Error:

Syntax error:

Detection:

Caused by not declaring method properly

```
public class BankCardGUI implements ActionListener
{
    private obj;
    private JPa
    private JLa   <identifier> expected
    private JLabel CardIdDC;
```

Correction:
Object was declared properly

```
import javax.swing.JOptionPane;
public class BankCardGUI implements ActionListener
{
    private JFrame obj;
    private JPanel pobj;
    private JLabel DebitCard;
    private JLabel CardIdDC;
    private JTextField CardIdDCTF;
    private JLabel ClientNameDC;
    private JTextField ClientNameDCTF;
    private JLabel IssuerBankDC;
    private JTextField IssuerBankDCTF;
    private JLabel BankAccountDC;
    private JTextField BankAccountDCTF;
    private JLabel BalanceAmountDC;
    private JTextField BalanceAmountDCTF;
    private JLabel PinNumber;
    private JTextField PinNumberTF;
    private JButton AddDebitCard;
```

Class compiled - no syntax errors

Semantic error:

Detection:

Inappropriate value assigned to a variable

```
else if (AE.getSource()== DisplayButtonDC)
{
    String PNTF = Integer.valueOf(PinNumberTF.getText());
    int WATF = Integer.valueOf(WithdrawalAmountTF.getTe  incompatible types: java.lang.Integer cannot be converted to java.lang.String
    int BADCTF = Integer.valueOf(BalanceAmountDCTF.getT
    int CIDDCTF = Integer.valueOf(CardIdDCTF.getText());
    String BAcDCTF = BankAccountDCTF.getText();
    String IBDCTF = IssuerBankDCTF.getText();
```

Correction:

Appropriate value was assigned to the variable

```
        }

    else if (AE.getSource()== DisplayButtonDC)
    {
        int PNTF = Integer.valueOf(PinNumberTF.getText());
        int WATF = Integer.valueOf(WithdrawalAmountTF.getText());
        int BADCTF = Integer.valueOf(BalanceAmountDCTF.getText());
        int CIDDCTF = Integer.valueOf(CardIdDCTF.getText());
        String BAcDCTF = BankAccountDCTF.getText();
        String IBDCTF = IssuerBankDCTF.getText();
        String CNDCTF = ClientNameDCTF.getText();

        String YDC = YearsDC.getSelectedItem().toString();
        String MDC = MonthsDC.getSelectedItem().toString();
```

Class compiled - no syntax errors

Runtime error:

Conclusion

The following project assignment was assigned to us as a coursework project. This project is based on concept of OOP (Object Oriented Programming) as we used different concepts like encapsulation and inheritance. In this project we implentend various things we were taught to us in our module. We implemented Parent class and Child class where one class is extended to the other. Methods such as accessor, getters, mutator and setters method were also implemented. The use of constructors, parameters, calling methods from a Parents class is done in this project. This project helped me to understand the use of polymorphism and inheritance, constructors, setters, getters method, parent and child classes, access modifiers, create class diagrams and write pseudo codes in Java. The most difficult scenario that I encountered was during the testing of BankCard and CreditCard as I had many errors made in the coding itself and would not display the values. I overcame the difficulties by checking the errors that I made in the code again and again. My friends and Our module teacher has made a huge contribution by helping me completing my project. My friends helped me find the errors that I made in the coding itself whereas, our module teacher helped us get a better grasp of the project. This project was most challenging for me by far yet also challenging during various situations. This project was fun as it was challenging but the results were priceless. We are grateful to our module teacher and college to assign this project to us. As it helped us understand Java more specifically

Appendix

```java
import javax.swing.JFrame;

import javax.swing.JPanel;

import javax.swing.JLabel;

import java.awt.Color;

import java.awt.Font;

import javax.swing.JTextField;

import javax.swing.JTextArea;

import javax.swing.JButton;

import javax.swing.JRadioButton;

import javax.swing.JComboBox;

import javax.swing.JCheckBox;

import javax.swing.ButtonGroup;

import java.awt.event.ActionEvent;

import java.awt.event.ActionListener;

import java.util.ArrayList;

import javax.swing.JOptionPane;

public class BankCardGUI implements ActionListener

{

    private JFrame obj;

    private JPanel pobj;

    private JLabel DebitCard;

    private JLabel CardIdDC;

    private JTextField CardIdDCTF;

    private JLabel ClientNameDC;

    private JTextField ClientNameDCTF;

    private JLabel IssuerBankDC;

    private JTextField IssuerBankDCTF;
```

```java
private JLabel BankAccountDC;

private JTextField BankAccountDCTF;

private JLabel BalanceAmountDC;

private JTextField BalanceAmountDCTF;

private JLabel PinNumber;

private JTextField PinNumberTF;

private JButton AddDebitCard;

private JButton DisplayButtonDC;

private JButton WithdrawButton;

private JButton ClearButtonDC;

private JLabel WithdrawalAmount;

private JTextField WithdrawalAmountTF;

private JLabel DateOfWithdarwal;

private JComboBox YearsDC;

private JComboBox MonthsDC;

private JComboBox DaysDC;

private JPanel pobj2;

private JLabel CreditCard;

private JLabel CardIdCC;

private JTextField CardIdCCTF;

private JLabel ClientNameCC;

private JTextField ClientNameCCTF;

private JLabel IssuerBankCC;

private JTextField IssuerBankCCTF;

private JLabel BalanceAmountCC;

private JTextField BalanceAmountCCTF;

private JLabel CVCNumber;

private JTextField CVCNumberTF;
```

```java
    private JLabel CreditLimit;

    private JTextField CreditLimitTF;

    private JLabel GracePeriod;

    private JTextField GracePeriodTF;

    private JLabel ExpirationDate;

    private JComboBox YearsCC;

    private JComboBox MonthsCC;

    private JComboBox DaysCC;

    private JButton DisplayButtonCC;

    private JButton ClearCreditCC;

    private JButton AddCreditCard;

    private JButton WithdrawButtonCC;

    private JButton SetCreditLimit;

    private JButton CancelCreditCard;

    private JLabel BankAccountCC;

    private JTextField BankAccountCCTF;

    private JLabel InterestRate;

    private JTextField InterestRateTF;


    ArrayList<BankCard> arraylist = new ArrayList<BankCard>();

public void actionPerformed(ActionEvent AE)
{
  //Add Button
  if(AE.getSource()== DebitCard)
   {
        //logic of add for debit card
```

```java
int BADCTF = Integer.valueOf(BalanceAmountDCTF.getText());

int CIDDCTF = Integer.valueOf(CardIdDCTF.getText());

int DC = Integer.valueOf(DebitCard.getText());

String BAcDCTF= BankAccountDCTF.getText();

String IBDCTF = IssuerBankDCTF.getText();

String CNDCTF = ClientNameDCTF.getText();

int PNTF = Integer.valueOf(PinNumberTF.getText());


 boolean B1 = true;
  for (BankCard Bobj : arraylist)
  {


      if (Bobj instanceof DebitCard){


         DebitCard dobj = (DebitCard) Bobj;
         if (Bobj.getID() == DC)
         {


            B1= false;

         }
    }
    }


    if (B1 == true)
    {
      //int Pin_Number,int Balance_Amount,String Bank_Account,String
Issuer_Bank,int Card_ID,String Client_Name

      DebitCard DebitObj1 = new DebitCard(PNTF, BADCTF, BAcDCTF, IBDCTF,
CIDDCTF, CNDCTF);
```

```java
        arraylist.add(DebitObj1);

        //for dialog message

        JOptionPane.showMessageDialog(pobj , "Successfully added");

        }

    else if (B1 ==  false)

        {

        JOptionPane.showMessageDialog(pobj , "The Debit Card with CardId : "+ DC
+" is added ");

        }

    }


    //Credit Card

    else if (AE.getSource()== CreditCard){


        int CC = Integer.valueOf(CreditCard.getText());

        String CNCCTF = ClientNameCCTF.getText();

        String IBCCTF = IssuerBankCCTF.getText();

        String BAcCCTF = BankAccountCCTF.getText();

        int CIDCCTF = Integer.valueOf(CardIdCCTF.getText());

        int BACCTF = Integer.valueOf(BalanceAmountCCTF.getText());

        int CVCNTF = Integer.valueOf(CVCNumberTF.getText());

        double IRTF = Integer.valueOf(InterestRateTF.getText());

        String YCC = YearsCC.getSelectedItem().toString();

        String MCC = MonthsCC.getSelectedItem().toString();

        String DCC = DaysCC.getSelectedItem().toString();

        String ED = YearsCC+""+MonthsCC+""+DaysCC;


        boolean B2  = false;
```

```java
        for (BankCard Cobj : arraylist)
        {
            if (Cobj instanceof CreditCard){
                CreditCard CreditC = (CreditCard) Cobj;
                if (CreditC.getID() == CIDCCTF)
                {
                        B2= true;
                }
            }
        }


        if (B2 == false)
        {
            //int CVC_Number,double Interest_Rate, String Expiration_Date,int Card_ID,
String Client_Name, String Issuer_Bank, String Bank_Account, int Balance_Amount
            CreditCard obj_credit = new CreditCard(CVCNTF, IRTF, ED, CIDCCTF,
CNCCTF, IBCCTF, BAcCCTF, BACCTF);
            arraylist.add(obj_credit);
            //for dialog message
            JOptionPane.showMessageDialog(pobj2,"Successfully added");
        }


        else if (B2 ==  true)
        {
            JOptionPane.showMessageDialog(pobj2, "the creditcard with Crad_id : "+
CIDCCTF +" is added ");
        }
    }
```

```java
        else if(AE.getSource()== WithdrawButton)
        {
            int CIDDCTF = Integer.valueOf(CardIdDCTF.getText());
            String YDC = YearsDC.getSelectedItem().toString();
            String MDC = MonthsDC.getSelectedItem().toString();
            String DDC = DaysDC.getSelectedItem().toString();
            String DOW =DDC+ "" +MDC+","+YDC;
            int PNTF = Integer.valueOf(PinNumberTF.getText());
            int WATF = Integer.valueOf(WithdrawalAmountTF.getText());


        for (BankCard Dobj : arraylist)
          {


             if (Dobj instanceof BankCard){
                 DebitCard debit_obj= (DebitCard) Dobj;
               if (Dobj.getID() == CIDDCTF)
               {
                 //message dialog
                JOptionPane.showMessageDialog(pobj, "The card id is : " + CIDDCTF
+"\n"+"The withdrawl amount is: "+WATF+"\n"+"The pin number is: "+PNTF+"\n"+"The
date of withdrawl: "+DOW);


               }
               if(debit_obj.getPin() == PNTF)
               {
                  if(WATF <= debit_obj.getAmount())
                  {
                     debit_obj.Withdraw(WATF, DOW, PNTF);
                     JOptionPane.showMessageDialog(pobj,"Successfully withdrawed");
```

```java
                }
                else
                {
                    JOptionPane.showMessageDialog(pobj, "The Withdraw was
unsuccessful");
                }


            }

            else
            {
                JOptionPane.showMessageDialog(pobj, "Incorrect Pin Number");
            }
        }




    }
    }


    else if (AE.getSource()== DisplayButtonDC)
    {
      int PNTF = Integer.valueOf(PinNumberTF.getText());
      int WATF = Integer.valueOf(WithdrawalAmountTF.getText());
      int BADCTF = Integer.valueOf(BalanceAmountDCTF.getText());
      int CIDDCTF = Integer.valueOf(CardIdDCTF.getText());
      String BAcDCTF = BankAccountDCTF.getText();
      String IBDCTF = IssuerBankDCTF.getText();
      String CNDCTF = ClientNameDCTF.getText();
```

```java
        String YDC = YearsDC.getSelectedItem().toString();

        String MDC = MonthsDC.getSelectedItem().toString();

        String Day = DaysDC.getSelectedItem().toString();

        String WD = YDC + "" + MDC + " "+YDC;

        System.out.println("The Pin Number is: " + PNTF);

        System.out.println("The Withdrawal Amount is: " + WATF);

        System.out.println("The Date of Withdrawal is: " + WD);

        System.out.println("The Card Id is: "+ CIDDCTF);

        System.out.println("The Bank Account is: "+ BAcDCTF);

        System.out.println("The Issuer Bank is: "+ IBDCTF);

        System.out.println("The Client Name is: "+ CNDCTF);

        System.out.println("The Balance Amount is: "+ BADCTF);



        //JOPtionPane

        JOptionPane.showMessageDialog(pobj,"The Pin Number is: " + PNTF+"\nThe
Withdrawal Amount is: " + WATF+ "\nThe Date of withdrawal is: " + WD+

        "\nThe balance amount is: "+ BADCTF + "\nThe card id is: "+ CIDDCTF + "\nThe
bank account is: "+ BAcDCTF+ "\nThe issuer bank is: "+ IBDCTF + "\nThe client name
is: "+CNDCTF);
        }


        else if (AE.getSource()== DisplayButtonCC)
        {
         int CIDCCTF = Integer.valueOf(CardIdCCTF.getText());

         String CNCCTF = ClientNameCCTF.getText();

         String IBCCTF = IssuerBankCCTF.getText();

         String BAcCCTF = BankAccountCCTF.getText();
```

```java
int BACCTF = Integer.valueOf(BalanceAmountCCTF.getText());

int CVCCCTF = Integer.valueOf(CVCNumberTF.getText());

double IRTF = Integer.valueOf(InterestRateTF.getText());

double CLTF = Integer.valueOf(CreditLimitTF.getText());

int GPTF = Integer.valueOf(GracePeriodTF.getText());


String YCC = YearsCC.getSelectedItem().toString();

String MCC = MonthsCC.getSelectedItem().toString();

String DCC = DaysCC.getSelectedItem().toString();


String ED = YCC +""+ MCC +""+ ""+DCC;


System.out.println("The Card Id is: " +CIDCCTF);

System.out.println("The Client Name is: " +CNCCTF);

System.out.println("The Issuer Bank is: " +IBCCTF);

System.out.println("The Bank Account is: " +BAcCCTF);

System.out.println("The Balance Amount is: " +BACCTF);

System.out.println("The CVC Number is: " + CVCCCTF);

System.out.println("The Interest Rate is: " +IRTF);

System.out.println("The Credit Limit is: " +CLTF);

System.out.println("The Grace Period is: " +GPTF);

System.out.println("The Expiration Date is: " +ED);


JOptionPane.showMessageDialog(pobj2, "The card id is: "+CIDCCTF+

"\nThe client name is: " +CNCCTF+"\nThe issuer bank is: "+ IBCCTF +"\nThe
namk account is: "+BAcCCTF+ "\nThe balance amount is: "+BACCTF+

"\nThe CVC number is: "+CVCCCTF+ "\nThe interest rate is: "+IRTF+ "\nThe
credit limit is: "+CLTF+ "\nThe grace periiod is: "+GPTF+ "\nThe expiration date is:
"+ED);
```

```java
    }
    else if (AE.getSource()== ClearCreditCC){

        CardIdCCTF.setText("");

        ClientNameCCTF.setText("");

        IssuerBankCCTF.setText("");

        BankAccountCCTF.setText("");

        BalanceAmountCCTF.setText("");

        InterestRateTF.setText("");

        CVCNumberTF.setText("");

        CreditLimitTF.setText("");

        GracePeriodTF.setText("");

    }
    else if (AE.getSource()== ClearButtonDC){

        CardIdDCTF.setText("");

        ClientNameDCTF.setText("");

        IssuerBankDCTF.setText("");

        BankAccountDCTF.setText("");

        BalanceAmountDCTF.setText("");

        WithdrawalAmountTF.setText("");

        PinNumberTF.setText("");

    }
    else if (AE.getSource() == CancelCreditCard)

    {

        int CIDCCTF = Integer.valueOf(CardIdCCTF.getText());

        int BACCTF = Integer.valueOf(BalanceAmountCCTF.getText());

        String BAcCCTF = BankAccountCCTF.getText();

        String IBCCTF = IssuerBankCCTF.getText();

        String CNCCTF = ClientNameCCTF.getText();
```

```java
int CVCNCCTF = Integer.valueOf(CVCNumberTF.getText());

double IRTF = Double.valueOf(InterestRateTF.getText());

String YCC = YearsCC.getSelectedItem().toString();

String MCC = MonthsCC.getSelectedItem().toString();

String DCC = DaysCC.getSelectedItem().toString();

String ED = YCC + " " + MCC + " " + DCC;

double CLTF =  Double.valueOf(CreditLimitTF.getText());

int GPTF = Integer.valueOf(GracePeriodTF.getText());


for (BankCard j: arraylist)
{
   CreditCard obj_credit = (CreditCard) j;
   if (j instanceof CreditCard)
   {
    if (obj_credit.getID() == CIDCCTF)
    {
      obj_credit.Cancel_Credit_Card();
         JOptionPane.showMessageDialog(pobj2, "Credit Card is Cancelled");
         CVCNumberTF.setText("");
         CreditLimitTF.setText("");
         GracePeriodTF.setText("");
         arraylist.remove(obj_credit);


    }
    else
    {
       JOptionPane.showMessageDialog(pobj2, "Wrong card ID entered! Please
enter valid card ID");
    }
```

```
        }
     }
 }


     else if(AE.getSource()== CreditLimit)
     {
     //card_credit,client_credit,issuer_credit,account_credit,amount_credit,
cvc,credit,interest,grace


     int CIDCCTF = Integer.valueOf(CardIdCCTF.getText());
     int BACCTF = Integer.valueOf(BalanceAmountCCTF.getText());
     String BAcCCTF = BankAccountCCTF.getText();
     String IBCCTF = IssuerBankCCTF.getText();
     String CNCCTF = ClientNameCCTF.getText();
     int CNTF = Integer.valueOf(CVCNumberTF.getText());
     double IRTF = Double.valueOf(InterestRateTF.getText());
     String YCC = YearsCC.getSelectedItem().toString();
     String MCC = MonthsCC.getSelectedItem().toString();
     String DCC = DaysCC.getSelectedItem().toString();
     String ED = YCC + " " + MCC + " " + DCC;
     double CLTFt =  Double.valueOf(CreditLimitTF.getText());
     int GPTF = Integer.valueOf(GracePeriodTF.getText());
     // instance of operator for getting value

     for (BankCard j: arraylist)
     {

        if (j instanceof CreditCard)
        {
```

```java
            //downcasting(converting)
            CreditCard obj_credit = (CreditCard) j;
            // comparing the value of card_id (if the values are same or not)
             if (obj_credit.getID() == CIDCCTF)
             {
                 obj_credit.Cancel_Credit_Card();
                 JOptionPane.showMessageDialog(pobj2, "Credit card is cancelled");
                 CVCNumberTF.setText("");
                 CreditLimitTF.setText("");
                 GracePeriodTF.setText("");
                 arraylist.remove(obj_credit);


             }
             else
             {
              JOptionPane.showMessageDialog(pobj2, "Wrong card ID entered! Please
enter valid card ID");
             }
          }
    }
}
}
public static void main(String [] args)
{
   BankCardGUI Direct = new BankCardGUI();
}
   public void GUi()
{
      //JFrame of BankCard
```

```java
obj = new JFrame();

obj.setTitle("BankCard GUI");

obj.setBounds(375, 50, 800,750);

obj.setLayout(null);


//JPanel of Debit Card

pobj = new JPanel();

pobj.setBounds(0, 0,800,375);

pobj.setLayout(null);

pobj.setBackground(Color.CYAN);


//JLabel of Debit Card

DebitCard = new JLabel();

DebitCard.setText("DEBIT CARD");

Font DCH = new Font("Arial", Font.BOLD , 18);

DebitCard.setFont(DCH);

DebitCard.setBounds(325,0,150,80);

pobj.add(DebitCard);


//JLabel of Card Id

CardIdDC = new JLabel();

CardIdDC.setText("Card ID :");

CardIdDC.setBounds(80,80,75,30);

pobj.add(CardIdDC);


//JTextField of Card Id

CardIdDCTF = new JTextField();

CardIdDCTF.setBounds(160,85,155,20);
```

```java
pobj.add(CardIdDCTF);

//JLabel of Client Name
ClientNameDC= new JLabel();
ClientNameDC.setText("Client Name:");
ClientNameDC.setBounds(80,120,75,30);
pobj.add(ClientNameDC);

//JTextField of Client Name
ClientNameDCTF = new JTextField();
ClientNameDCTF.setBounds(160,125,155,20);
pobj.add(ClientNameDCTF);

//JLabel of Issuer Bank
IssuerBankDC = new JLabel();
IssuerBankDC.setText("Issuer Bank:");
IssuerBankDC.setBounds(80,160,75,30);
pobj.add(IssuerBankDC);

//JTextField of Issuer Bank
IssuerBankDCTF = new JTextField();
IssuerBankDCTF.setBounds(160,165,155,20);
pobj.add(IssuerBankDCTF);

//JLabel of Bank Account
BankAccountDC = new JLabel();
BankAccountDC.setText("Bank Account:");
BankAccountDC.setBounds(400,80,100,30);
```

```java
pobj.add(BankAccountDC);

//JTextField of Bank Account
BankAccountDCTF = new JTextField();
BankAccountDCTF.setBounds(530,85,155,20);
pobj.add(BankAccountDCTF);

//JLabel of Balance Amount
BalanceAmountDC = new JLabel();
BalanceAmountDC.setText("Balance Amount:");
BalanceAmountDC.setBounds(400,120,140,30);
pobj.add(BalanceAmountDC);

//JTextField of Balance Amount
BalanceAmountDCTF = new JTextField();
BalanceAmountDCTF.setBounds(530,125,155,20);
pobj.add(BalanceAmountDCTF);

//JLabel of Pin Number
PinNumber = new JLabel();
PinNumber.setText("Pin Number:");
PinNumber.setBounds(400,160,100,30);
pobj.add(PinNumber);

//JTextField of Pin Number
PinNumberTF = new JTextField();
PinNumberTF.setBounds(530,165,155,20);
pobj.add(PinNumberTF);
```

```java
//JButton of Add Debit Card

AddDebitCard = new JButton();

AddDebitCard.setText(" Add Debit Card");

AddDebitCard.setBounds(225, 200, 150, 20);

AddDebitCard.addActionListener(this);

pobj.add(AddDebitCard);


//JButton of Display

DisplayButtonDC = new JButton();

DisplayButtonDC.setText("Display");

DisplayButtonDC.setBounds(400, 200,90, 20);

DisplayButtonDC.addActionListener(this);

pobj.add(DisplayButtonDC);


//JButton of Withdraw

WithdrawButton = new JButton();

WithdrawButton.setText("Withdraw");

WithdrawButton.setBounds(260, 250,90, 20);

WithdrawButton.addActionListener(this);

pobj.add(WithdrawButton);


//JButton of Clear

ClearButtonDC = new JButton();

ClearButtonDC.setText("Clear");

ClearButtonDC.setBounds(405, 250, 80, 20);

ClearButtonDC.addActionListener(this);

pobj.add(ClearButtonDC);
```

```java
//JLabel of Withdrawal Amount
WithdrawalAmount = new JLabel();
WithdrawalAmount.setText("Withdrawal Amount:");
WithdrawalAmount.setBounds(250,285,170,30);
pobj.add(WithdrawalAmount);

//JTextField of Withdrawal Amount
WithdrawalAmountTF = new JTextField();
WithdrawalAmountTF.setBounds(370,290,140,20);
pobj.add(WithdrawalAmountTF);

//JLabel of Date of Withdarawal
DateOfWithdarwal = new JLabel();
DateOfWithdarwal.setText("Date of Withdrawal:");
DateOfWithdarwal.setBounds(170,325,290,30);
pobj.add(DateOfWithdarwal);

//JComboBox of Years
String YearsVDC[] = {"2023","2024","2025","2026","2027","2028","2029",
    "2030","2031","2032","2033"};
YearsDC = new JComboBox(YearsVDC);
YearsDC.setBounds (295,325,70,25);
pobj.add(YearsDC);

//JComboBox of Months
String MonthsVDC[] = {"January","February","March","April","May",
    "June","July","August","September","October","November",
```

```java
    "December"};
MonthsDC = new JComboBox(MonthsVDC);
MonthsDC.setBounds (365,325,70,25);
pobj.add(MonthsDC);

//JComboBox of Days
 String DaysVDC[] = {"1","2","3","4","5","6","7","8","9","10","11",
    "12","13","14","15","16","17","18","19","20","21","22", "23"
    , "24", "25", "26", "27", "28", "29","30"};
DaysDC = new JComboBox(DaysVDC);
DaysDC.setBounds (435,325,50,25);
pobj.add(DaysDC);

//JPanel of Credit Card
pobj2 = new JPanel();
pobj2.setBounds(0, 375,800,375);
pobj2.setLayout(null);
pobj2.setBackground(Color.ORANGE);

//JLabel of Credit Card
CreditCard = new JLabel();
CreditCard.setText("CREDIT CARD");
Font fc = new Font("Arial", Font.BOLD , 18);
CreditCard.setFont(fc);
CreditCard.setBounds(325,0,150,80);
pobj2.add(CreditCard);

//JLabel of Card ID
```

```java
CardIdCC = new JLabel();

CardIdCC.setText("Card ID:");

CardIdCC.setBounds(80,60,75,30);

pobj2.add(CardIdCC);


//JTextField of Card ID

CardIdCCTF = new JTextField();

CardIdCCTF.setBounds(160,65,155,20);

pobj2.add(CardIdCCTF);


//JLabel of Client Name

ClientNameCC= new JLabel();

ClientNameCC.setText("Client Name:");

ClientNameCC.setBounds(80,100,75,30);

pobj2.add(ClientNameCC);


//JTextField of Client Name

ClientNameCCTF = new JTextField();

ClientNameCCTF.setBounds(160,105,155,20);

pobj2.add(ClientNameCCTF);


//JLabel of Issuer Bank

IssuerBankCC = new JLabel();

IssuerBankCC.setText("Issuer Bank:");

IssuerBankCC.setBounds(80,140,75,30);

pobj2.add(IssuerBankCC);


//JTextField of Issuer Bank
```

```java
IssuerBankCCTF = new JTextField();

IssuerBankCCTF.setBounds(160,145,155,20);

pobj2.add(IssuerBankCCTF);


//JLabel of CVC Number

CVCNumber = new JLabel();

CVCNumber.setText("CVC Number:");

CVCNumber.setBounds(400,60,100,30);

pobj2.add(CVCNumber);


//JTextField of CVC Number

CVCNumberTF = new JTextField();

CVCNumberTF.setBounds(530,65,155,20);

pobj2.add(CVCNumberTF);


//JLabel of Balance Amount

BalanceAmountCC = new JLabel();

BalanceAmountCC.setText("Balance Amount:");

BalanceAmountCC.setBounds(400,100,140,30);

pobj2.add(BalanceAmountCC);


//JTextField of Balance Account

BalanceAmountCCTF = new JTextField();

BalanceAmountCCTF.setBounds(530,105,155,20);

pobj2.add(BalanceAmountCCTF);


//JLabel of Credit Limit

CreditLimit = new JLabel();
```

```java
CreditLimit.setText("Credit Limit:");

CreditLimit.setBounds(400,140,100,30);

pobj2.add(CreditLimit);


//JTextField of Credit Limit

CreditLimitTF = new JTextField();

CreditLimitTF.setBounds(530,145,155,20);

pobj2.add(CreditLimitTF);


//JButton of Adding Credit Card

AddCreditCard = new JButton();

AddCreditCard.setText("Add Credit Card");

AddCreditCard.setBounds(170, 180, 150, 20);

AddCreditCard.addActionListener(this);

pobj2.add(AddCreditCard);


//JButton of Display Button

DisplayButtonCC = new JButton();

DisplayButtonCC.setText("Display");

DisplayButtonCC.setBounds(330, 180,90, 20);

pobj2.add(DisplayButtonCC);


//JButton of Canceling Credit Card

CancelCreditCard = new JButton();

CancelCreditCard.setText("Cancel Credit Card");

CancelCreditCard.setBounds(460, 180, 150, 20);

CancelCreditCard.addActionListener(this);

pobj2.add(CancelCreditCard);
```

```java
//JLabel of Expiration Date

ExpirationDate = new JLabel();

ExpirationDate .setText("Expiration Date:");

ExpirationDate.setBounds(120,220,150,30);

pobj2.add(ExpirationDate );


String YearsVCC[] =
{"2000","2001","2002","2003","2004","2005","2006","2007","2008","2009","2010","2011",
"2012","2013","2014","2015",

"2016","2017","2018","2019","2020","2021","2022","2023"};


YearsCC = new JComboBox(YearsVCC);

YearsCC.setBounds (230,220,70,25);

pobj2.add(YearsCC);


String MonthsVCC[] = {"January", "February", "March", "April", "May", "June",
"July", "August", "September", "October", "November", "December"};


MonthsCC = new JComboBox(MonthsVCC);

MonthsCC.setBounds (300,220,70,25);

pobj2.add(MonthsCC);


 String DaysVCC[] = {"1","2", "3", "4", "5", "6", "7", "8", "9",

"10","11","12", "13", "14", "15", "16", "17", "18", "19","20",

"21","22", "23", "24", "25", "26", "27", "28", "29","30"};


DaysCC = new JComboBox(DaysVCC);

DaysCC.setBounds (370,220,50,25);
```

```java
pobj2.add(DaysCC);


//JButton of Clearing Credit
ClearCreditCC = new JButton();
ClearCreditCC.setText("Clear");
ClearCreditCC.setBounds(470, 220,90, 20);
ClearCreditCC.addActionListener(this);
pobj2.add(ClearCreditCC);


//JLabel of Bank Account
BankAccountCC = new JLabel();
BankAccountCC.setText("Bank Account:");
BankAccountCC.setBounds(80,260,100,30);
pobj2.add(BankAccountCC);


//JTextField of Bank Account
BankAccountCCTF = new JTextField();
BankAccountCCTF.setBounds(180,265,135,20);
pobj2.add(BankAccountCCTF);


//Jlabel of Interest Rate
InterestRate = new JLabel();
InterestRate .setText("Interest Rate :");
InterestRate .setBounds(400,260,170,30);
pobj2.add(InterestRate );


//JTextField of Interest Rate
InterestRateTF = new JTextField();
```

```java
InterestRateTF.setBounds(530,265,155,20);
pobj2.add(InterestRateTF);

//JButton of Setting Credit Limit
SetCreditLimit = new JButton();
SetCreditLimit.setText("Set The Credit Limit");
SetCreditLimit.setBounds(180,300,180 , 20);
SetCreditLimit.addActionListener(this);
pobj2.add(SetCreditLimit);

//JLabel of Grace Period
GracePeriod = new JLabel();
GracePeriod.setText("Grace Period:");
GracePeriod.setBounds(400,300,170,30);
pobj2.add(GracePeriod);

//JTextField of Grace Period
GracePeriodTF= new JTextField();
GracePeriodTF.setBounds(530,305,155,20);
pobj2.add(GracePeriodTF);obj.add(pobj);
obj.add(pobj2);
obj.setVisible(true);
}
}
```