# C.V. RAMAN GLOBAL UNIVERSITY
## BHUBANESWAR,ODISHA



## DEPARTMENT OF COMPUTER SCIENCE

## EXPERIENTIAL LEARNING

## ONLINE BANK MANAGEMENT SYSTEM ON JAVA

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# ONLINE BANK MANAGEMENT SYSTEM

# ACKNOWLEDGMENT

I would like to express my deepest gratitude to my mentor(s) for their invaluable guidance, continuous support, and constructive feedback throughout the development of this project. Their expertise and encouragement inspired me to push the project to a higher level of quality and professionalism.

I also extend heartfelt thanks to my peers for their collaboration and insightful suggestions, which helped refine the system's functionality and design.

Additionally, I appreciate my family and friends for their unwavering moral support and belief in my abilities.

Finally, I would like to acknowledge the various authors, researchers, and online resources that provided critical information and technological insights, enabling me to complete this project successfully.

# DECLARATION

The team has successfully completed the Case Study on topic **ONLINE BANK MANAGEMENT SYSTEM** with the guidance and instructions by **MENTOR NAME**. All submitted work is original and some acknowledgements of some external sources .The work has not been previously submitted for any other course as assignment. The case study is completed to the best of our knowledge and in a timely manner. We are confident that it meets the required standards and expectations set by our professors. This case study was conducted with honesty, integrity and transparency. All sources used in the report is clear, understandable without any error and omission.

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# 1. ABSTRACT

The Online Bank Management System is designed to digitize and automate traditional banking processes, enhancing accessibility, security, and user convenience. This system allows customers to perform banking activities online, reducing the need for physical branch visits while ensuring secure, fast, and error-free transactions. The project encompasses account management, fund transfers, loan handling, and administrative controls. By addressing the limitations of manual banking systems, this project contributes to improving operational efficiency, security, and customer satisfaction.

# 2. INTRODUCTION

In the rapidly evolving landscape of modern banking, technological advancements have reshaped how financial institutions operate and how customers interact with their banks. Traditional banking systems, which heavily rely on physical branches, manual record-keeping, and human intervention, are no longer sufficient to meet the growing demands for efficiency, accessibility, and security. As customers seek faster, more convenient, and secure methods to manage their finances, banks must embrace digital transformation to stay competitive.

The **Online Bank Management System** emerges as a revolutionary solution aimed at addressing these challenges by digitizing core banking functions and providing users with 24/7 access to financial services from anywhere in the world. The system enables customers to open and manage accounts, transfer funds, apply for loans, and monitor transactions — all through an intuitive online platform. Meanwhile, bank administrators gain powerful tools to oversee operations, monitor financial activities, and enforce security measures seamlessly.

This project aims to demonstrate how technology can optimize banking operations, reduce the workload of bank employees, and improve the customer experience. By automating repetitive processes such as transaction handling, balance inquiries, and account management, banks can significantly cut operational costs while enhancing service quality. Additionally, the system integrates robust security mechanisms, including encryption and multi-factor authentication, to safeguard sensitive customer data and prevent unauthorized access.

Furthermore, the Online Bank Management System supports the growing demand for financial inclusion by extending banking services to rural and underserved areas, where physical branches may be limited. The platform promotes accessibility, empowering users to manage their finances independently without relying on in-person visits or paperwork.

In summary, this report delves into the comprehensive design, development, and implementation of an Online Bank Management System. It explores the system's architecture, key functionalities, database structure, and security measures while highlighting its advantages, limitations, and potential future enhancements. By the end of this report, readers will gain a clear understanding of how this system contributes to modernizing banking practices, enhancing security, and promoting convenience for both customers and financial institutions.

# 3. PROBLEM STATEMENT

Conventional banking systems suffer from several drawbacks
- Manual workload leads to slower processes and human errors.
- Limited accessibility forces customers to visit branches for most operations.
- Security vulnerabilities in physical records and outdated systems.
- Inconvenience due to long queues and paperwork.

This project addresses these issues by developing an Online Bank Management System that ensures accessibility, security, and operational efficiency.

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# 4. OBJECTIVE OF THE PROJECT

The primary objectives of the Online Bank Management System are:

- **24/7 Accessibility:** Enable customers to perform banking activities anytime, anywhere.

- **Enhanced Efficiency:** Speed up transaction processing and account management.

- **Data Security:** Implement encryption and access control to protect sensitive information.

- **User Convenience:** Simplify banking operations with an intuitive, easy-to-use interface.

- **Cost Reduction:** Minimize manual work, reducing operational expenses.

# 5. SYSTEM REQUIREMENTS

Hardware Requirements
- Processor: Intel Core i5 or higher
- RAM: 8 GB or higher
- Storage: 500 GB HDD or SSD
- Peripherals: Monitor, Keyboard, Mouse

Software Requirements
- Operating System: Windows/Linux/MacOS
- Backend Language: Python/Java
- Frontend Tools: HTML, CSS, JavaScript
- Database: MySQL/MongoDB
- Framework: Django/Spring

# 6. SYSTEM DESIGN

**Architecture Diagram**

A client-server model where users interact with the bank's database via a secure web interface.

**Data Flow Diagrams (DFD)**

Level 0: Shows the interaction between users and the system.

Level 1: Breaks down account management, transactions, and security features.

**ER Diagram**

Includes Customers, Accounts, Transactions, Employees, and Admins with defined relationships.

# 7. MODULE DESCRIPTION

**Admin Module**
- User account management.
- Employee supervision.
- Security monitoring.

**Customer Module**
- Account creation and management.
- Fund transfers and bill payments.

**Employee Module**
- Assists customers in banking operations.
- Manages loan processing.

**Security Module**
- Implements **two-factor authentication**.
- Tracks user activity logs.

# 8. DATABASE DESIGN

**Customers Table: Stores user details.**

**Accounts Table**: Maintains balance and account type.

**Transactions Table**: Tracks deposits, withdrawals, and transfers.

**Relationship Between Tables**

The **Customers**, **Accounts**, and **Transactions** tables are interconnected:
- Each **Customer** can have **multiple accounts** (Savings, Current, etc.).
- Each **Account** is linked to **many transactions**.
- **Transactions** are recorded per account, ensuring a detailed financial history for each customer.

This relational structure supports **data integrity**, **efficient querying**, and **fast retrieval**.

# 9. IMPLEMENTATION

## 1)Login page:-
## Source code

```java
package bank.management.system;

import javax.swing.*;
import java.awt.*;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import java.sql.ResultSet;

public class Login extends JFrame implements ActionListener {
    JLabel label1, label2, label3;
    JTextField textField2;
    JPasswordField passwordField3;

    JButton button1,button2,button3;
    Login(){
        super("Bank Management System");
        ImageIcon i1 = new ImageIcon(ClassLoader.getSystemResource("icon/bank.png"));
        Image i2 = i1.getImage().getScaledInstance(100,100,Image.SCALE_DEFAULT);
        ImageIcon i3 = new ImageIcon(i2);
        JLabel image = new JLabel(i3);
        image.setBounds(350,10,100,100);
        add(image);

        ImageIcon ii1 = new ImageIcon(ClassLoader.getSystemResource("icon/card.png"));
        Image ii2 = ii1.getImage().getScaledInstance(100,100,Image.SCALE_DEFAULT);
        ImageIcon ii3 = new ImageIcon(ii2);
        JLabel iimage = new JLabel(ii3);
        iimage.setBounds(630,350,100,100);
        add(iimage);

        label1 = new JLabel("WELCOME TO ATM");
        label1.setForeground(Color.WHITE);
        label1.setFont(new Font("AvantGarde", Font.BOLD, 38));
        label1.setBounds(230,125,450,40);
        add(label1);

        label2 = new JLabel("Card No:");
        label2.setFont(new Font("Ralway", Font.BOLD, 28));
        label2.setForeground(Color.WHITE);
        label2.setBounds(150,190,375,30);
        add(label2);

        textField2 = new JTextField(15);
        textField2.setBounds(325,190,230,30);
        textField2.setFont(new Font("Arial", Font.BOLD,14));
        add(textField2);

        label3 = new JLabel("PIN: ");
        label3.setFont(new Font("Ralway", Font.BOLD, 28));
        label3.setForeground(Color.WHITE);
        label3.setBounds(150,250,375,30);
        add(label3);

        passwordField3 = new JPasswordField(15);
        passwordField3.setBounds(325,250,230,30);
        passwordField3.setFont(new Font("Arial", Font.BOLD, 14));
        add(passwordField3);

        button1 = new JButton("SIGN IN");
        button1.setFont(new Font("Arial", Font.BOLD, 14));
        button1.setForeground(Color.WHITE);
        button1.setBackground(Color.BLACK);
        button1.setBounds(300,300,100, 30);
        button1.addActionListener(this);
        add(button1);
```

```java
        button2 = new JButton("CLEAR");
        button2.setFont(new Font("Arial", Font.BOLD, 14));
        button2.setForeground(Color.WHITE);
        button2.setBackground(Color.BLACK);
        button2.setBounds(430,300,100, 30);
        button2.addActionListener(this);
        add(button2);

        button3 = new JButton("SIGN UP");
        button3.setFont(new Font("Arial", Font.BOLD, 14));
        button3.setForeground(Color.WHITE);
        button3.setBackground(Color.BLACK);
        button3.setBounds(300,350,230, 30);
        button3.addActionListener(this);
        add(button3);

        ImageIcon iii1 = new ImageIcon(ClassLoader.getSystemResource("icon/backbg.png"));
        Image iii2 = iii1.getImage().getScaledInstance(850,480,Image.SCALE_DEFAULT);
        ImageIcon iii3 = new ImageIcon(iii2);
        JLabel iiimage = new JLabel(iii3);
        iiimage.setBounds(0,0,850,480);
        add(iiimage);


        setLayout(null);
        setSize(850,480);
        setLocation(450,200);
        setUndecorated(true);
        setVisible(true);
    }

    @Override
    public void actionPerformed(ActionEvent e) {
        try{
            if (e.getSource()==button1){
                Connn c = new Connn();
                String cardno = textField2.getText();
                String pin = passwordField3.getText();
                String q = "select * from login where card_number = '"+cardno+"' and  pin = '"+pin+"'";
                ResultSet resultSet = c.statement.executeQuery(q);
                if (resultSet.next()){
                    setVisible(false);
                    new main_Class(pin);
                }else {
                    JOptionPane.showMessageDialog(null,"Incorrect Card Number or PIN");
                }


            }else if (e.getSource() == button2){
                textField2.setText("");
                passwordField3.setText("");
            }else if (e.getSource() == button3){
                new Signup();
                setVisible(false);
            }
        }catch (Exception E){
            E.printStackTrace();
        }

    }

    public static void main(String[] args) {
        new Login();
    }
}
```
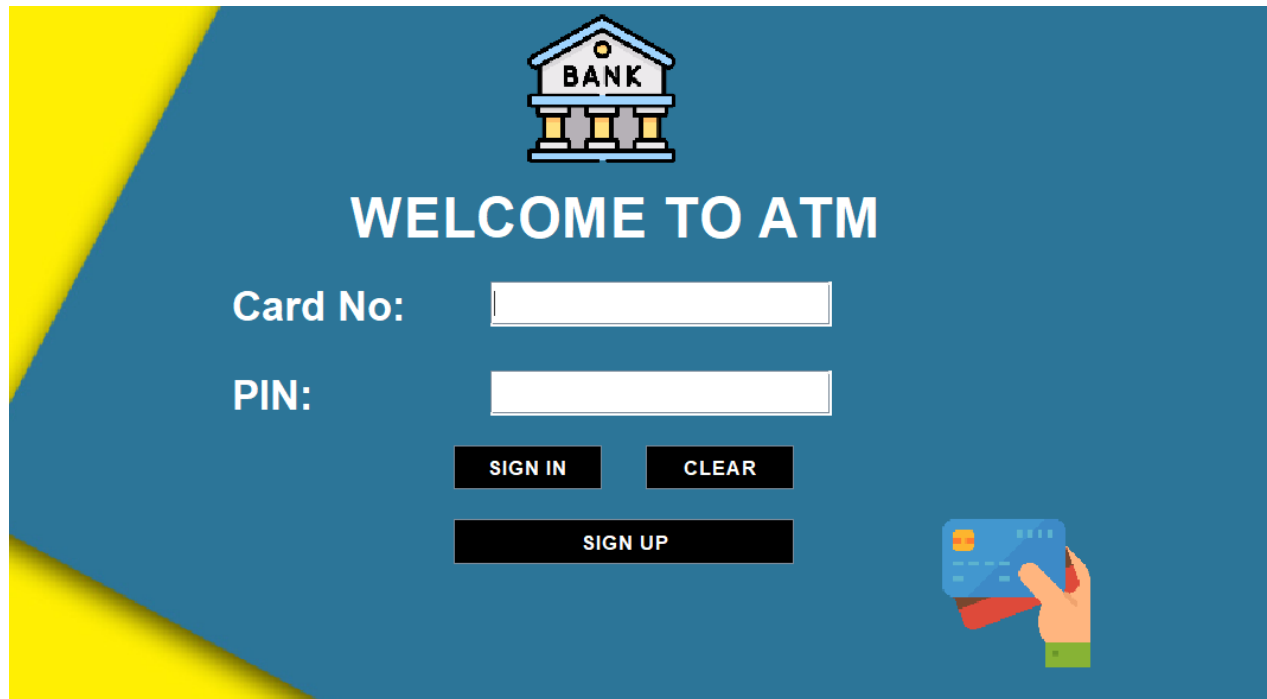
# 2)Sign in page no. 1

```java
package bank.management.system;

import com.toedter.calendar.JDateChooser;

import javax.swing.*;
import java.awt.*;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import java.util.Random;

public class Signup extends JFrame implements ActionListener {
    private static final long serialVersionUID = 1L;
        JRadioButton r1,r2,m1,m2,m3;
    JButton next;

    JTextField textName ,textFname, textEmail,textAdd,textcity,textState,textPin;
    JDateChooser dateChooser;
    Random ran = new Random();
    long first4 =(ran.nextLong() % 9000L) +1000L;
    String first = " " + Math.abs(first4);
    Signup(){
      super ("APPLICATION FORM");

      ImageIcon i1 = new ImageIcon(ClassLoader.getSystemResource("icon/bank.png"));
      Image i2 = i1.getImage().getScaledInstance(100,100,Image.SCALE_DEFAULT);
      ImageIcon i3 = new ImageIcon(i2);
      JLabel image = new JLabel(i3);
      image.setBounds(25,10,100,100);
      add(image);

      JLabel label1 = new JLabel("APPLICATION FORM NO."+ first);
      label1.setBounds(160,20,600,40);
      label1.setFont(new Font("Raleway",Font.BOLD,38));
      add(label1);

      JLabel label2 = new JLabel("Page 1");
      label2.setFont(new Font("Ralway",Font.BOLD, 22));
      label2.setBounds(330,70,600,30);
      add(label2);

      JLabel label3 = new JLabel("Personal Details");
      label3.setFont(new Font("Raleway", Font.BOLD,22));
      label3.setBounds(290,90,600,30);
      add(label3);
```

```java
JLabel labelName = new JLabel("Name :");
labelName.setFont(new Font("Raleway", Font.BOLD, 20));
labelName.setBounds(100,190,100,30);
add(labelName);

textName = new JTextField();
textName.setFont(new Font("Raleway",Font.BOLD, 14));
textName.setBounds(300,190,400,30);
add(textName);

JLabel labelfName = new JLabel("Father's Name :");
labelfName.setFont(new Font("Raleway", Font.BOLD, 20));
labelfName.setBounds(100,240,200,30);
add(labelfName);

textFname = new JTextField();
textFname.setFont(new Font("Raleway",Font.BOLD, 14));
textFname.setBounds(300,240,400,30);
add(textFname);

JLabel DOB = new JLabel("Date of Birth");
DOB.setFont(new Font("Raleway", Font.BOLD, 20));
DOB.setBounds(100,340,200,30);
add(DOB);


dateChooser = new JDateChooser();
dateChooser.setForeground(new Color(105,105,105));
dateChooser.setBounds(300,340,400,30);
add(dateChooser);

JLabel labelG = new JLabel("Gender");
labelG.setFont(new Font("Raleway", Font.BOLD, 20));
labelG.setBounds(100,290,200,30);
add(labelG);

r1 = new JRadioButton("Male");
r1.setFont(new Font("Raleway", Font.BOLD,14));
r1.setBackground(new Color(222,255,228));
r1.setBounds(300,290,60,30);
add(r1);

r2 = new JRadioButton("Female");
r2.setBackground(new Color(222,255,228));
r2.setFont(new Font("Raleway", Font.BOLD,14));
r2.setBounds(450,290,90,30);
add(r2);

ButtonGroup buttonGroup = new ButtonGroup();
buttonGroup.add(r1);
buttonGroup.add(r2);

JLabel labelEmail = new JLabel("Email address :");
labelEmail.setFont(new Font("Raleway", Font.BOLD, 20));
labelEmail.setBounds(100,390,200,30);
add(labelEmail);

textEmail = new JTextField();
textEmail.setFont(new Font("Raleway",Font.BOLD, 14));
textEmail.setBounds(300,390,400,30);
add(textEmail);


JLabel labelMs = new JLabel("Marital Status :");
labelMs.setFont(new Font("Raleway", Font.BOLD, 20));
labelMs.setBounds(100,440,200,30);
add(labelMs);

m1 = new JRadioButton("Married");
m1.setBounds(300,440,100,30);
m1.setBackground(new Color(222,255,228));
m1.setFont(new Font("Raleway", Font.BOLD,14));
add(m1);

m2 = new JRadioButton("Unmarried");
m2.setBackground(new Color(222,255,228));
```

```java
    m2.setBounds(450,440,100,30);
    m2.setFont(new Font("Raleway", Font.BOLD,14));
    add(m2);

    m3 = new JRadioButton("Other");
    m3.setBackground(new Color(222,255,228));
    m3.setBounds(635,440,100,30);
    m3.setFont(new Font("Raleway", Font.BOLD,14));
    add(m3);

    ButtonGroup buttonGroup1 = new ButtonGroup();
    buttonGroup1.add(m1);
    buttonGroup1.add(m2);
    buttonGroup1.add(m3);

    JLabel labelAdd = new JLabel("Address :");
    labelAdd.setFont(new Font("Raleway", Font.BOLD, 20));
    labelAdd.setBounds(100,490,200,30);
    add(labelAdd);

    textAdd = new JTextField();
    textAdd.setFont(new Font("Raleway",Font.BOLD, 14));
    textAdd.setBounds(300,490,400,30);
    add(textAdd);

    JLabel labelCity = new JLabel("City :");
    labelCity.setFont(new Font("Raleway", Font.BOLD, 20));
    labelCity.setBounds(100,540,200,30);
    add(labelCity);

    textcity = new JTextField();
    textcity.setFont(new Font("Raleway",Font.BOLD, 14));
    textcity.setBounds(300,540,400,30);
    add(textcity);

    JLabel labelPin = new JLabel("Pin Code :");
    labelPin.setFont(new Font("Raleway", Font.BOLD, 20));
    labelPin.setBounds(100,590,200,30);
    add(labelPin);

    textPin = new JTextField();
    textPin.setFont(new Font("Raleway",Font.BOLD, 14));
    textPin.setBounds(300,590,400,30);
    add(textPin);

    JLabel labelstate = new JLabel("State :");
    labelstate.setFont(new Font("Raleway", Font.BOLD, 20));
    labelstate.setBounds(100,640,200,30);
    add( labelstate);

    textState = new JTextField();
    textState.setFont(new Font("Raleway",Font.BOLD, 14));
    textState.setBounds(300,640,400,30);
    add(textState);

    next = new JButton("Next");
    next.setFont(new Font("Raleway",Font.BOLD, 14));
    next.setBackground(Color.BLACK);
    next.setForeground(Color.WHITE);
    next.setBounds(620,710,80,30);
    next.addActionListener(this);
    add(next);

    getContentPane().setBackground(new Color(222,255,228));
    setLayout(null);
    setSize(850,800);
    setLocation(360,40);
    setVisible(true);

}

@Override
public void actionPerformed(ActionEvent e) {

    String formno = first;
    String name = textName.getText();
    String fname = textFname.getText();
```

```java
        String dob = ((JTextField) ((JDateChooser) dateChooser).getDateEditor().getUiComponent()).getText();
        String gender = null;
        if(r1.isSelected()){
            gender = "Male";
        }else if (r2.isSelected()){
            gender = "Female";
        }
        String email = textEmail.getText();
        String marital =null;
        if (m1.isSelected()){
            marital = "Married";
        } else if (m2.isSelected()) {
            marital = "Unmarried";
        } else if (m3.isSelected()) {
            marital = "Other";
        }

        String address = textAdd.getText();
        String city = textcity.getText();
        String pincode = textPin.getText();
        String state = textState.getText();

        try{
            if (textName.getText().equals("")){
                JOptionPane.showMessageDialog(null, "Fill all the fields");
            }else {
                Connn c = new Connn();
                String q = "insert into signup values('"+formno+"',
'"+name+"','"+fname+"','"+dob+"','"+gender+"','"+email+"','"+marital+"', '"+address+"', '"+city+"','"+pincode+"','"+state+"' )";
                c.statement.executeUpdate(q);
                new Signup2(formno);
                setVisible(false);
            }

        }catch (Exception E){
            E.printStackTrace();
        }

    }

    public static void main(String[] args) {
        new Signup();
    }
}
```

# 3) Sign up page 2

```java
package bank.management.system;

import javax.swing.*;
import java.awt.*;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;

public class Signup2 extends JFrame implements ActionListener {
    JComboBox comboBox,comboBox2,comboBox3,comboBox4,comboBox5;
    JTextField textPan,textAadhar;
    JRadioButton r1,r2, e1,e2;
    JButton next;
    String formno;
    Signup2(String formno){
        super("APPLICATION FORM");

        ImageIcon i1 = new ImageIcon(ClassLoader.getSystemResource("icon/bank.png"));
        Image i2 = i1.getImage().getScaledInstance(100,100,Image.SCALE_DEFAULT);
        ImageIcon i3 = new ImageIcon(i2);
        JLabel image = new JLabel(i3);
        image.setBounds(150,5,100,100);
        add(image);

        this.formno = formno;

        JLabel l1 = new JLabel("Page 2 :-");
        l1.setFont(new Font("Raleway", Font.BOLD,22));
        l1.setBounds(300,30,600,40);
        add(l1);

        JLabel l2 = new JLabel("Additonal Details");
        l2.setFont(new Font("Raleway", Font.BOLD,22));
        l2.setBounds(300,60,600,40);
        add(l2);

        JLabel l3 = new JLabel("Religion :");
        l3.setFont(new Font("Raleway", Font.BOLD,18));
        l3.setBounds(100,120,100,30);
        add(l3);

        String religion[] = {"Hindu","Muslim","Sikh", "Christian", "Other"};
        comboBox = new JComboBox(religion);
        comboBox.setBackground(new Color(252,208,76));
        comboBox.setFont(new Font("Raleway",Font.BOLD,14));
        comboBox.setBounds(350,120,320,30);
        add(comboBox);

        JLabel l4 = new JLabel("Category : ");
        l4.setFont(new Font("Raleway", Font.BOLD,18));
        l4.setBounds(100,170,100,30);
        add(l4);

        String Category [] = {"General","OBC","SC", "ST", "Other"};
        comboBox2 = new JComboBox(Category);
        comboBox2.setBackground(new Color(252,208,76));
        comboBox2.setFont(new Font("Raleway",Font.BOLD,14));
        comboBox2.setBounds(350,170,320,30);
        add(comboBox2);

        JLabel l5 = new JLabel("Income : ");
        l5.setFont(new Font("Raleway", Font.BOLD,18));
        l5.setBounds(100,220,100,30);
        add(l5);

        String income [] = {"Null","<1,50,000","<2,50,000", "5,00,000", "Uptp 10,00,000","Above 10,00,000"};
        comboBox3 = new JComboBox(income);
        comboBox3.setBackground(new Color(252,208,76));
        comboBox3.setFont(new Font("Raleway",Font.BOLD,14));
        comboBox3.setBounds(350,220,320,30);
        add(comboBox3);

        JLabel l6 = new JLabel("Educational : ");
        l6.setFont(new Font("Raleway", Font.BOLD,18));
        l6.setBounds(100,270,150,30);
```

```java
add(l6);

String educational [] = {"Non-Graduate","Graduate","Post-Graduate", "Doctrate", "Others"};
comboBox4 = new JComboBox(educational);
comboBox4.setBackground(new Color(252,208,76));
comboBox4.setFont(new Font("Raleway",Font.BOLD,14));
comboBox4.setBounds(350,270,320,30);
add(comboBox4);


JLabel l7 = new JLabel("Occupation : ");
l7.setFont(new Font("Raleway", Font.BOLD,18));
l7.setBounds(100,340,150,30);
add(l7);

String Occupation [] = {"Salaried","Self-Employed","Business", "Student", "Retired", "Other"};
comboBox5 = new JComboBox(Occupation);
comboBox5.setBackground(new Color(252,208,76));
comboBox5.setFont(new Font("Raleway",Font.BOLD,14));
comboBox5.setBounds(350,340,320,30);
add(comboBox5);

JLabel l8 = new JLabel("PAN Number : ");
l8.setFont(new Font("Raleway", Font.BOLD,18));
l8.setBounds(100,390,150,30);
add(l8);

textPan = new JTextField();
textPan.setFont(new Font("Raleway", Font.BOLD,18));
textPan.setBounds(350,390,320,30);
add(textPan);

JLabel l9 = new JLabel("Aadhar Number : ");
l9.setFont(new Font("Raleway", Font.BOLD,18));
l9.setBounds(100,440,180,30);
add(l9);

textAadhar = new JTextField();
textAadhar.setFont(new Font("Raleway", Font.BOLD,18));
textAadhar.setBounds(350,440,320,30);
add(textAadhar);


JLabel l10 = new JLabel("Senior Citizen : ");
l10.setFont(new Font("Raleway", Font.BOLD,18));
l10.setBounds(100,490,180,30);
add(l10);

r1 = new JRadioButton("Yes");
r1.setFont(new Font("Raleway", Font.BOLD,14));
r1.setBackground(new Color(252,208,76));
r1.setBounds(350,490,100,30);
add(r1);
r2 = new JRadioButton("No");
r2.setFont(new Font("Raleway", Font.BOLD,14));
r2.setBackground(new Color(252,208,76));
r2.setBounds(460,490,100,30);
add(r2);

JLabel l11 = new JLabel("Existing Account : ");
l11.setFont(new Font("Raleway", Font.BOLD,18));
l11.setBounds(100,540,180,30);
add(l11);

e1 = new JRadioButton("Yes");
e1.setFont(new Font("Raleway", Font.BOLD,14));
e1.setBackground(new Color(252,208,76));
e1.setBounds(350,540,100,30);
add(e1);
e2 = new JRadioButton("No");
e2.setFont(new Font("Raleway", Font.BOLD,14));
e2.setBackground(new Color(252,208,76));
e2.setBounds(460,540,100,30);
add(e2);

JLabel l12 = new JLabel("Form No : ");
l12.setFont(new Font("Raleway", Font.BOLD,14));
```

```java
        l12.setBounds(700,10,100,30);
        add(l12);

        JLabel l13 = new JLabel(formno);
        l13.setFont(new Font("Raleway", Font.BOLD,14));
        l13.setBounds(760,10,60,30);
        add(l13);

        next = new JButton("Next");
        next.setFont(new Font("Raleway",Font.BOLD,14));
        next.setBackground(Color.WHITE);
        next.setForeground(Color.BLACK);
        next.setBounds(570,640,100,30);
        next.addActionListener(this);
        add(next);


        setLayout(null);
        setSize(850,750);
        setLocation(450,80);
        getContentPane().setBackground(new Color(252, 208, 76));
        setVisible(true);
    }

    @Override
    public void actionPerformed(ActionEvent e) {
        String rel = (String) comboBox.getSelectedItem();
        String cate = (String) comboBox2.getSelectedItem();
        String inc = (String) comboBox3.getSelectedItem();
        String edu = (String) comboBox4.getSelectedItem();
        String occ = (String) comboBox5.getSelectedItem();

        String pan = textPan.getText();
        String addhar = textAadhar.getText();

        String scitizen = " ";
        if ((r1.isSelected())){
            scitizen = "Yes";
        } else if (r2.isSelected()) {
            scitizen ="No";
        }
        String eAccount = " ";
        if ((r1.isSelected())){
            eAccount = "Yes";
        } else if (r2.isSelected()) {
            eAccount ="No";
        }

        try{
            if (textPan.getText().equals("") || textAadhar.getText().equals("")){
                JOptionPane.showMessageDialog(null,"Fill all the fields");
            }else {
                Connn c = new Connn();
                String q = "insert into signuptwo values('"+formno+"', '"+rel+"',
'"+cate+"','"+inc+"','"+edu+"','"+occ+"','"+pan+"','"+addhar+"','"+scitizen+"','"+eAccount+"')";
                c.statement= c.connection.createStatement();
                new Signup3(formno);
                setVisible(false);
            }


        }catch (Exception E){
            E.printStackTrace();
        }


    }

    public static void main(String[] args) {
        new Signup2("");
    }
}
```

# 4)Sign up page 3

```java
package bank.management.system;

import javax.swing.*;
import java.awt.*;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;

public class Signup2 extends JFrame implements ActionListener {
    JComboBox comboBox,comboBox2,comboBox3,comboBox4,comboBox5;
    JTextField textPan,textAadhar;
    JRadioButton r1,r2, e1,e2;
    JButton next;
    String formno;
    Signup2(String formno){
        super("APPLICATION FORM");

        ImageIcon i1 = new ImageIcon(ClassLoader.getSystemResource("icon/bank.png"));
        Image i2 = i1.getImage().getScaledInstance(100,100,Image.SCALE_DEFAULT);
        ImageIcon i3 = new ImageIcon(i2);
        JLabel image = new JLabel(i3);
        image.setBounds(150,5,100,100);
        add(image);

        this.formno = formno;

        JLabel l1 = new JLabel("Page 2 :-");
        l1.setFont(new Font("Raleway", Font.BOLD,22));
        l1.setBounds(300,30,600,40);
        add(l1);

        JLabel l2 = new JLabel("Additonal Details");
        l2.setFont(new Font("Raleway", Font.BOLD,22));
        l2.setBounds(300,60,600,40);
        add(l2);

        JLabel l3 = new JLabel("Religion :");
        l3.setFont(new Font("Raleway", Font.BOLD,18));
        l3.setBounds(100,120,100,30);
        add(l3);

        String religion[] = {"Hindu","Muslim","Sikh", "Christian", "Other"};
        comboBox = new JComboBox(religion);
        comboBox.setBackground(new Color(252,208,76));
        comboBox.setFont(new Font("Raleway",Font.BOLD,14));
```

```java
comboBox.setBounds(350,120,320,30);
add(comboBox);

JLabel l4 = new JLabel("Category : ");
l4.setFont(new Font("Raleway", Font.BOLD,18));
l4.setBounds(100,170,100,30);
add(l4);

String Category [] = {"General","OBC","SC", "ST", "Other"};
comboBox2 = new JComboBox(Category);
comboBox2.setBackground(new Color(252,208,76));
comboBox2.setFont(new Font("Raleway",Font.BOLD,14));
comboBox2.setBounds(350,170,320,30);
add(comboBox2);

JLabel l5 = new JLabel("Income : ");
l5.setFont(new Font("Raleway", Font.BOLD,18));
l5.setBounds(100,220,100,30);
add(l5);

String income [] = {"Null","<1,50,000","<2,50,000", "5,00,000", "Uptp 10,00,000","Above 10,00,000"};
comboBox3 = new JComboBox(income);
comboBox3.setBackground(new Color(252,208,76));
comboBox3.setFont(new Font("Raleway",Font.BOLD,14));
comboBox3.setBounds(350,220,320,30);
add(comboBox3);

JLabel l6 = new JLabel("Educational : ");
l6.setFont(new Font("Raleway", Font.BOLD,18));
l6.setBounds(100,270,150,30);
add(l6);

String educational [] = {"Non-Graduate","Graduate","Post-Graduate", "Doctrate", "Others"};
comboBox4 = new JComboBox(educational);
comboBox4.setBackground(new Color(252,208,76));
comboBox4.setFont(new Font("Raleway",Font.BOLD,14));
comboBox4.setBounds(350,270,320,30);
add(comboBox4);


JLabel l7 = new JLabel("Occupation : ");
l7.setFont(new Font("Raleway", Font.BOLD,18));
l7.setBounds(100,340,150,30);
add(l7);

String Occupation [] = {"Salaried","Self-Employed","Business", "Student", "Retired", "Other"};
comboBox5 = new JComboBox(Occupation);
comboBox5.setBackground(new Color(252,208,76));
comboBox5.setFont(new Font("Raleway",Font.BOLD,14));
comboBox5.setBounds(350,340,320,30);
add(comboBox5);

JLabel l8 = new JLabel("PAN Number : ");
l8.setFont(new Font("Raleway", Font.BOLD,18));
l8.setBounds(100,390,150,30);
add(l8);

textPan = new JTextField();
textPan.setFont(new Font("Raleway", Font.BOLD,18));
textPan.setBounds(350,390,320,30);
add(textPan);

JLabel l9 = new JLabel("Aadhar Number : ");
l9.setFont(new Font("Raleway", Font.BOLD,18));
l9.setBounds(100,440,180,30);
add(l9);

textAadhar = new JTextField();
textAadhar.setFont(new Font("Raleway", Font.BOLD,18));
textAadhar.setBounds(350,440,320,30);
add(textAadhar);


JLabel l10 = new JLabel("Senior Citizen : ");
l10.setFont(new Font("Raleway", Font.BOLD,18));
l10.setBounds(100,490,180,30);
add(l10);
```

```java
        r1 = new JRadioButton("Yes");
        r1.setFont(new Font("Raleway", Font.BOLD,14));
        r1.setBackground(new Color(252,208,76));
        r1.setBounds(350,490,100,30);
        add(r1);
        r2 = new JRadioButton("No");
        r2.setFont(new Font("Raleway", Font.BOLD,14));
        r2.setBackground(new Color(252,208,76));
        r2.setBounds(460,490,100,30);
        add(r2);

        JLabel l11 = new JLabel("Existing Account : ");
        l11.setFont(new Font("Raleway", Font.BOLD,18));
        l11.setBounds(100,540,180,30);
        add(l11);

        e1 = new JRadioButton("Yes");
        e1.setFont(new Font("Raleway", Font.BOLD,14));
        e1.setBackground(new Color(252,208,76));
        e1.setBounds(350,540,100,30);
        add(e1);
        e2 = new JRadioButton("No");
        e2.setFont(new Font("Raleway", Font.BOLD,14));
        e2.setBackground(new Color(252,208,76));
        e2.setBounds(460,540,100,30);
        add(e2);

        JLabel l12 = new JLabel("Form No : ");
        l12.setFont(new Font("Raleway", Font.BOLD,14));
        l12.setBounds(700,10,100,30);
        add(l12);

        JLabel l13 = new JLabel(formno);
        l13.setFont(new Font("Raleway", Font.BOLD,14));
        l13.setBounds(760,10,60,30);
        add(l13);

        next = new JButton("Next");
        next.setFont(new Font("Raleway",Font.BOLD,14));
        next.setBackground(Color.WHITE);
        next.setForeground(Color.BLACK);
        next.setBounds(570,640,100,30);
        next.addActionListener(this);
        add(next);


        setLayout(null);
        setSize(850,750);
        setLocation(450,80);
        getContentPane().setBackground(new Color(252, 208, 76));
        setVisible(true);
    }

    @Override
    public void actionPerformed(ActionEvent e) {
        String rel = (String) comboBox.getSelectedItem();
        String cate = (String) comboBox2.getSelectedItem();
        String inc = (String) comboBox3.getSelectedItem();
        String edu = (String) comboBox4.getSelectedItem();
        String occ = (String) comboBox5.getSelectedItem();

        String pan = textPan.getText();
        String addhar = textAadhar.getText();

        String scitizen = " ";
        if ((r1.isSelected())){
            scitizen = "Yes";
        } else if (r2.isSelected()) {
            scitizen ="No";
        }
        String eAccount = " ";
        if ((r1.isSelected())){
            eAccount = "Yes";
        } else if (r2.isSelected()) {
            eAccount ="No";
        }
```

```java
        try{
            if (textPan.getText().equals("") || textAadhar.getText().equals("")){
                JOptionPane.showMessageDialog(null,"Fill all the fields");
            }else {
                Connn c = new Connn();
                String q = "insert into signuptwo values('"+formno+"', '"+rel+"',
'"+cate+"','"+inc+"','"+edu+"','"+occ+"','"+pan+"','"+addhar+"','"+scitizen+"','"+eAccount+"')";
                c.statement= c.connection.createStatement();
                new Signup3(formno);
                setVisible(false);
            }


        }catch (Exception E){
            E.printStackTrace();
        }


    }

    public static void main(String[] args) {
        new Signup2("");
    }
}
```



# 5)Main machine

```java
package bank.management.system;

import javax.swing.*;
import java.awt.*;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;

public class main_Class extends JFrame implements ActionListener {
    JButton b1,b2,b3,b4,b5,b6,b7;
    String pin;
    main_Class(String pin){
        this.pin = pin;
```

```java
        ImageIcon i1 = new ImageIcon(ClassLoader.getSystemResource("icon/atm2.png"));
        Image i2 = i1.getImage().getScaledInstance(1550,830,Image.SCALE_DEFAULT);
        ImageIcon i3 = new ImageIcon(i2);
        JLabel l3 = new JLabel(i3);
        l3.setBounds(0,0,1550,830);
        add(l3);

        JLabel label = new JLabel("Please Select Your Transaction");
        label.setBounds(430,180,700,35);
        label.setForeground(Color.WHITE);
        label.setFont(new Font("System",Font.BOLD,28));
        l3.add(label);

        b1 = new JButton("DEPOSIT");
        b1.setForeground(Color.WHITE);
        b1.setBackground(new Color(65,125,128));
        b1.setBounds(410,274,150,35);
        b1.addActionListener(this);
        l3.add(b1);

        b2 = new JButton("CASH WITHDRAWL");
        b2.setForeground(Color.WHITE);
        b2.setBackground(new Color(65,125,128));
        b2.setBounds(700,274,150,35);
        b2.addActionListener(this);
        l3.add(b2);

        b3 = new JButton("FAST CASH");
        b3.setForeground(Color.WHITE);
        b3.setBackground(new Color(65,125,128));
        b3.setBounds(410,318,150,35);
        b3.addActionListener(this);
        l3.add(b3);

        b4 = new JButton("MINI STATEMENT");
        b4.setForeground(Color.WHITE);
        b4.setBackground(new Color(65,125,128));
        b4.setBounds(700,318,150,35);
        b4.addActionListener(this);
        l3.add(b4);

        b5 = new JButton("PIN CHANGE");
        b5.setForeground(Color.WHITE);
        b5.setBackground(new Color(65,125,128));
        b5.setBounds(410,362,150,35);
        b5.addActionListener(this);
        l3.add(b5);

        b6 = new JButton("BALANCE ENQUIRY");
        b6.setForeground(Color.WHITE);
        b6.setBackground(new Color(65,125,128));
        b6.setBounds(700,362,150,35);
        b6.addActionListener(this);
        l3.add(b6);

        b7 = new JButton("EXIT");
        b7.setForeground(Color.WHITE);
        b7.setBackground(new Color(65,125,128));
        b7.setBounds(700,406,150,35);
        b7.addActionListener(this);
        l3.add(b7);

        setLayout(null);
        setSize(1550,1080);
        setLocation(0,0);
        setVisible(true);

    }

    @Override
    public void actionPerformed(ActionEvent e) {
      if (e.getSource()==b1){
         new Deposit(pin);
          setVisible(false);
      }else if (e.getSource()==b7){
         System.exit(0);
```

```
        } else if (e.getSource()==b2) {
            new Withdrawl(pin);
            setVisible(false);
        } else if (e.getSource()==b6) {
            new BalanceEnquriy(pin);
            setVisible(false);
        } else if (e.getSource()==b3) {
            new FastCash(pin);
            setVisible(false);
        } else if (e.getSource()==b5) {
            new Pin(pin);
            setVisible(false);
        } else if (e.getSource()==b4) {
            new mini(pin);
        }
    }

    public static void main(String[] args) {
        new main_Class("");
    }
}
```
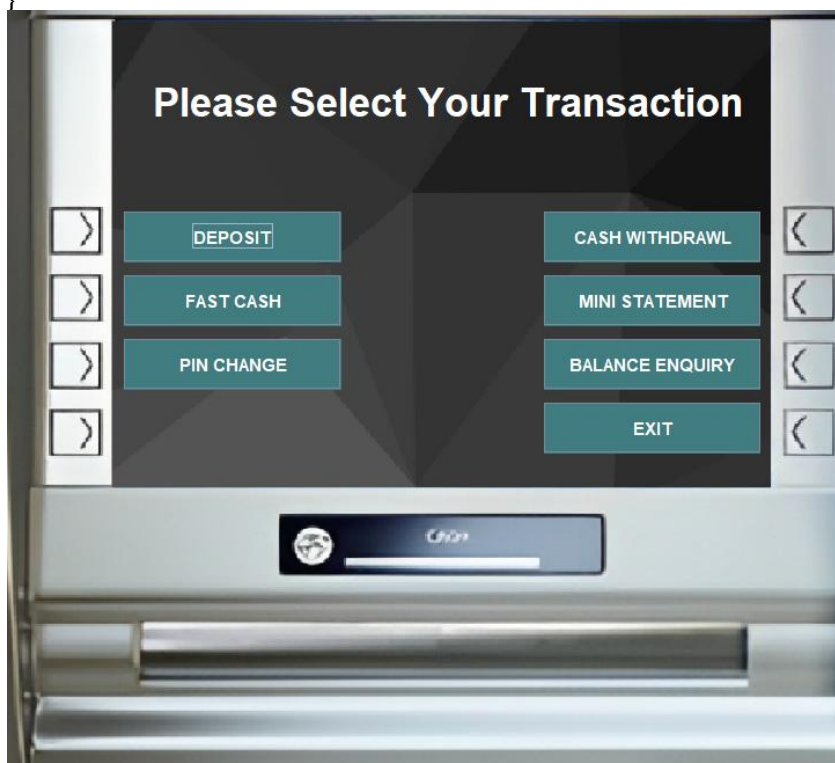


# 6)Deposit page

```
package bank.management.system;

import javax.swing.*;
import java.awt.*;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import java.util.Date;

public class Deposit extends JFrame implements ActionListener {
    String pin;
    TextField textField;

    JButton b1, b2;
    Deposit(String pin){
        this.pin = pin;

        ImageIcon i1 = new ImageIcon(ClassLoader.getSystemResource("icon/atm2.png"));
        Image i2 = i1.getImage().getScaledInstance(1550,830,Image.SCALE_DEFAULT);
        ImageIcon i3 = new ImageIcon(i2);
        JLabel l3 = new JLabel(i3);
```

```java
        l3.setBounds(0,0,1550,830);
        add(l3);

        JLabel label1 = new JLabel("ENETR AMOUNT YOU WANT TO DEPOSIT");
        label1.setForeground(Color.WHITE);
        label1.setFont(new Font("System", Font.BOLD, 16));
        label1.setBounds(460,180,400,35);
        l3.add(label1);

        textField = new TextField();
        textField.setBackground(new Color(65,125,128));
        textField.setForeground(Color.WHITE);
        textField.setBounds(460,230,320,25);
        textField.setFont(new Font("Raleway", Font.BOLD,22));
        l3.add(textField);

        b1 = new JButton("DEPOSIT");
        b1.setBounds(700,362,150,35);
        b1.setBackground(new Color(65,125,128));
        b1.setForeground(Color.WHITE);
        b1.addActionListener(this);
        l3.add(b1);

        b2 = new JButton("BACK");
        b2.setBounds(700,406,150,35);
        b2.setBackground(new Color(65,125,128));
        b2.setForeground(Color.WHITE);
        b2.addActionListener(this);
        l3.add(b2);




        setLayout(null);
        setSize(1550,1080);
        setLocation(0,0);
        setVisible(true);

    }

    @Override
    public void actionPerformed(ActionEvent e) {
        try {
            String amount = textField.getText();
            Date date = new Date();
            if (e.getSource()==b1){
                if (textField.getText().equals("")){
                    JOptionPane.showMessageDialog(null,"Please enter the Amount you want to Deposit");
                }else {
                    Connn c = new Connn();
                    c.statement.executeUpdate("insert into bank values('"+pin+"', '"+date+"','Deposit', '"+amount+"')");
                    JOptionPane.showMessageDialog(null,"Rs. "+amount+" Deposited Successfully");
                    setVisible(false);
                    new main_Class(pin);
                }
            }else if (e.getSource()==b2){
                setVisible(false);
                new main_Class(pin);
            }
        }catch (Exception E){
            E.printStackTrace();
        }

    }

    public static void main(String[] args) {
        new Deposit("");
    }
}
```
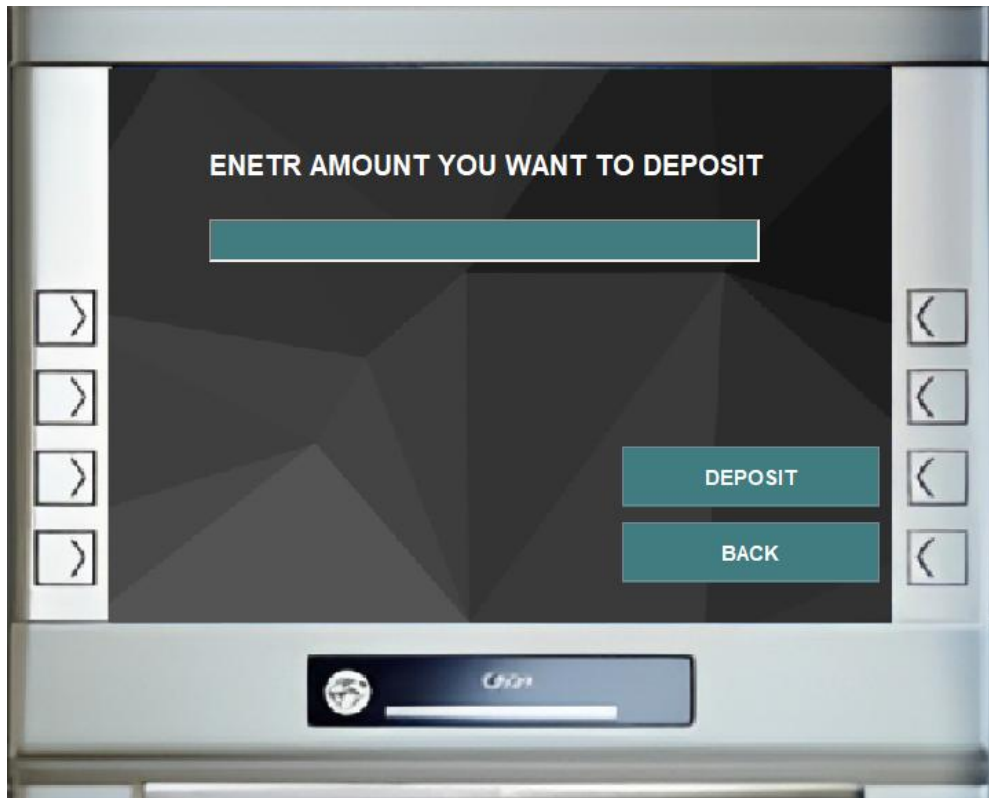
# 7)Withdrawal page

```java
package bank.management.system;

import javax.swing.*;
import java.awt.*;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import java.sql.ResultSet;
import java.util.Date;

public class Withdrawl extends JFrame implements ActionListener {

    String pin;
    TextField textField;

    JButton b1, b2;
    Withdrawl(String pin){
        this.pin=pin;
        ImageIcon i1 = new ImageIcon(ClassLoader.getSystemResource("icon/atm2.png"));
        Image i2 = i1.getImage().getScaledInstance(1550,830,Image.SCALE_DEFAULT);
        ImageIcon i3 = new ImageIcon(i2);
        JLabel l3 = new JLabel(i3);
        l3.setBounds(0,0,1550,830);
        add(l3);

        JLabel label1 = new JLabel("MAXIMUM WITHDRAWAL IS RS.10,000");
        label1.setForeground(Color.WHITE);
        label1.setFont(new Font("System", Font.BOLD, 16));
        label1.setBounds(460,180,700,35);
        l3.add(label1);

        JLabel label2 = new JLabel("PLEASE ENTER YOUR AMOUNT");
        label2.setForeground(Color.WHITE);
        label2.setFont(new Font("System", Font.BOLD, 16));
        label2.setBounds(460,220,400,35);
        l3.add(label2);


        textField = new TextField();
        textField.setBackground(new Color(65,125,128));
        textField.setForeground(Color.WHITE);
```

```java
        textField.setBounds(460,260,320,25);
        textField.setFont(new Font("Raleway", Font.BOLD,22));
        l3.add(textField);

        b1 = new JButton("WITHDRAW");
        b1.setBounds(700,362,150,35);
        b1.setBackground(new Color(65,125,128));
        b1.setForeground(Color.WHITE);
        b1.addActionListener(this);
        l3.add(b1);

        b2 = new JButton("BACK");
        b2.setBounds(700,406,150,35);
        b2.setBackground(new Color(65,125,128));
        b2.setForeground(Color.WHITE);
        b2.addActionListener(this);
        l3.add(b2);

        setLayout(null);
        setSize(1550,1080);
        setLocation(0,0);
        setVisible(true);
    }

    @Override
    public void actionPerformed(ActionEvent e) {
        if(e.getSource()==b1) {
            try {
                String amount = textField.getText();
                Date date = new Date();
                if (textField.getText().equals("")) {
                    JOptionPane.showMessageDialog(null, "Please enter the Amount you want to withdraw");
                } else {
                    Connn c = new Connn();
                    ResultSet resultSet = c.statement.executeQuery("select * from bank where pin = '" + pin + "'");
                    int balance = 0;
                    while (resultSet.next()) {
                        if (resultSet.getString("type").equals("Deposit")) {
                            balance += Integer.parseInt(resultSet.getString("amount"));
                        } else {
                            balance -= Integer.parseInt(resultSet.getString("amount"));
                        }
                    }
                    if (balance < Integer.parseInt(amount)) {
                        JOptionPane.showMessageDialog(null, "Insuffient Balance");
                        return;
                    }

                    c.statement.executeUpdate("insert into bank values('" + pin + "', '" + date + "', 'Withdrawl', '" + amount + "' )");
                    JOptionPane.showMessageDialog(null, "Rs. " + amount + " Debited Successfully");
                    setVisible(false);
                    new main_Class(pin);

                }
            } catch (Exception E) {

            }
        } else if (e.getSource()==b2) {
            setVisible(false);
            new main_Class(pin);
        }
    }

    public static void main(String[] args) {
        new Withdrawl("");
    }
}
```

# 8)Data Base Connectivity:-

**package bank.management.system;**

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

```java
public class Connn {
    Connection connection;
    Statement statement;
    public Connn(){
        try{
            connection = DriverManager.getConnection("jdbc:mysql:///banksystem","root","Aparupa@2002");
            statement = connection.createStatement();
        }catch (Exception e){
            e.printStackTrace();
        }

    }
}
```

# 10. TESTING

**Unit Testing**: Ensures each module functions correctly.

**System Testing**: Evaluates overall system performance.

**User Acceptance Testing (UAT)**: Verifies usability from a customer's perspective.

# 4. RESULT

The system successfully provides real-time transactions, account monitoring, and secure fund transfers.

# 5. SECURITY MEASURES

Security is a crucial component of any online banking system. Given the sensitivity of financial data, this system incorporates multiple layers of security to ensure data integrity, prevent unauthorized access, and protect user privacy.

**Two-Factor Authentication (2FA)**
Two-factor authentication is implemented to add an extra layer of security. When a user logs in, they must provide their regular credentials (username and password) along with a unique, time-sensitive code sent to their registered mobile device or email. This prevents unauthorized logins even if the password is compromised.

**Data Encryption**
All data transmitted between users and the server is encrypted using robust protocols such as SSL/TLS. This ensures that sensitive information, like account details and passwords, cannot be intercepted during transmission. Additionally, sensitive data in the database is encrypted using industry-standard encryption algorithms like AES-256.

**Role-Based Access Control**
To limit access to critical functionalities, role-based access control (RBAC) is implemented. Different users (customers, employees, admins) have distinct permissions. For example:

- Customers can access only their accounts and perform basic operations.
- Employees have access to customer accounts for assistance but cannot perform financial transactions.
- Admins have full control over the system for maintenance and monitoring.

**Activity Logs**
The system maintains detailed logs of all user activities, including logins, transactions, and configuration changes. These logs are crucial for auditing and can help detect suspicious behavior, enhancing overall security.

# 4. ADVANTAGES AND LIMITATIONS
## Advantages

The Online Bank Management System provides numerous benefits to both the bank and its customers:

- **Improved Efficiency:** The system automates repetitive and manual tasks, reducing processing time for tasks like account management, transaction handling, and loan processing.
- **24/7 Accessibility:** Customers can access their accounts anytime, anywhere, without the need to visit a physical branch. This ensures convenience and saves time.
- **Enhanced Security:** With multi-layered security features like two-factor authentication and data encryption, the system ensures that financial data remains safe from unauthorized access and cyberattacks.
- **Error Reduction:** By automating transactions and data management, the system minimizes human errors that commonly occur in manual banking processes.

- **Cost Reduction:** Banks can reduce staffing and physical infrastructure costs by transitioning more operations to the online platform.

## Limitations

Despite its benefits, the system has a few limitations:

- **Requires Internet Access:** The system relies on an active internet connection. Customers without stable internet access may face difficulties in accessing services.
- **Potential Cybersecurity Risks:** While the system has strong security measures, no online platform is completely immune to cyberattacks. Continuous monitoring and updates are necessary to mitigate emerging threats.
- **Technical Learning Curve:** Some users, particularly those unfamiliar with digital systems, may require assistance or training to navigate the platform effectively.
- **Maintenance and Downtime:** Regular updates and system maintenance may occasionally cause downtime, temporarily affecting accessibility.

# 5. FUTURE ENHANCEMENTS

The Online Bank Management System is designed to be scalable and adaptable to future advancements. Some potential future improvements include:

## AI-Based Fraud Detection

Implementing machine learning algorithms can help detect unusual transaction patterns, flagging potential fraud in real-time. For example, the system can analyze transaction behavior and alert administrators or freeze accounts if suspicious activity is detected.

## Mobile App Support

Developing a dedicated mobile application will improve accessibility, allowing customers to perform transactions, manage accounts, and receive instant notifications directly from their smartphones.

## Voice-Based Transactions

Integrating voice recognition technology can offer hands-free banking services. Users could perform basic operations, like checking balances or transferring funds, using voice commands — enhancing accessibility for visually impaired or non-tech-savvy customers.

## Chatbot Integration

An AI-powered chatbot can provide 24/7 customer support, guiding users through tasks like fund transfers, password resets, or loan inquiries without needing human intervention.

# CONCLUSION

The Online Bank Management System is a powerful tool for modernizing banking operations. It automates key processes, enhances security, and provides convenient, round-the-clock accessibility to users. By reducing manual errors, operational costs, and reliance on physical branches, it represents a significant step toward the future of digital banking.

The system's modular design ensures scalability, allowing for future enhancements such as AI-driven fraud detection, mobile app integration, and voice-based transactions. As technology

evolves, this system can continue to adapt, ensuring banks remain competitive while offering customers a seamless, secure, and user-friendly banking experience.

# REFERENCE

- To ensure the accuracy and credibility of this report, various sources were consulted. Below is a list of key references used throughout the project:

**Research Papers:**
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# APPENDIX

- Source code snippets
- Additional diagrams
- System setup instructions

# THANK YOU