VIT BHOPAL BANK – PROJECT

Project title: Banking System

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Professor: Dr. SIVABALAN K.R.

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Submitted by: S G SUDHARSHAN

Registration number: 25BAI10706

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INTRODUCTION:

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A **Bank System** is a structured framework that manages financial transactions, customer records, and various banking operations. It allows users to perform essential activities such as depositing money, withdrawing funds, checking account balances, and transferring amounts securely. Modern banking systems are designed to ensure accuracy, speed, and safety in handling customer data and financial activities.

In today's digital world, bank systems rely heavily on technology to provide seamless and efficient services. Automated software solutions help reduce manual errors, improve customer experience, and support online banking features. These systems also ensure data security, maintain transaction history, and enable banks to manage millions of customer accounts effectively.

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PROBLEM STATEMENT:

Managing banking operations manually often leads to errors, delays, and difficulty in maintaining accurate financial records. Traditional methods of handling deposits, withdrawals, account creation, and balance management are time-consuming and inefficient, especially when dealing with many customers. There is also a high risk of data mismanagement, unauthorized access, and lack of transparency in transaction tracking.

To overcome these challenges, there is a need for a computerized **Banking System** that automates essential banking functions. The system should allow users to create accounts, deposit and withdraw money, view transaction history, and check balances securely and efficiently. It must ensure data accuracy, improve service speed, and maintain high security standards while providing a simple and user-friendly interface for both customers and administrators.

PROJECT OBJECTIVES :

- To automate basic banking operations such as account creation, deposits, withdrawals, balance inquiry, and transaction recording in an efficient and error-free manner.
- To provide a secure system that protects customer data, prevents unauthorized access, and ensures safe handling of transactions.
- To improve accuracy and reduce manual errors by maintaining digital records of all accounts and financial activities.

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- To enhance user experience with a simple, intuitive, and user-friendly interface for both customers and administrators.
- To ensure fast processing of transactions so that banking operations can be performed quickly and reliably.
- To maintain detailed transaction history and provide transparency for both users and bank management.
- To support scalability, allowing the system to manage multiple customer accounts and increasing data volume without performance issues.
- To reduce workload on staff by automating repetitive banking tasks and improving overall operational efficiency.

FUNCTIONAL REQUIREMENTS:

1. User-System Interaction:
   - Users enter a request such as creating an account, depositing money, withdrawing money, or checking balance.
   - System verifies and processes the request by checking account details, validating inputs, and performing the required transaction.
   - System displays the result by showing confirmation messages, updated balance, or error notifications.

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2. Data Input:
   - **User Information Input:** The user provides personal details such as name, PIN, and Minimum balance during account creation.
   - **Account Details Input:** The system collects account-related data like account name initial deposit amount
   - **Transaction Input:** Users enter transaction-related data such as deposit amount, withdrawal amount, or account name for balance inquiry.

3. Data processing:
   - Deposit Process
     The system receives the user's account number, Date and deposit amount.
     It verifies if the account exists and checks for valid input.
     The system adds the deposit amount to the existing balance and updates the account records.

   - Withdraw Process
     The user enters the account name, Date and withdrawal amount.
     The system verifies account validity and checks whether sufficient balance is available.

   - Account Balance Process
     The user inputs the account number to view the balance.
     The system validates the account and retrieves the stored balance information.
     It displays the current balance to the user.

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- Account List Process
  The system gathers all stored customer account records. It organizes and retrieves account details such as account number, name, and balance.

4. Output:
   - The System displays the Balance of the account.
   - The System displays the account list,

5. Data storage:
   - The input data entered by user is stored by the system for the future reference and future account balance checking.

NON-FUNCTIONAL REQUIREMENTS :

1. Performance:
   - The system shall provide the details of particular account details within a couple seconds.
   - The system shall provide the list of accounts list details.

2. Security:
   - The system will not hold / store any sensitive data of the user.
   - The system shall be secure against all the common web vulnerabilities.

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3. Usability:
   - The system is made to be simple and easy for the user to use, and the set of instruction will guide the user throughout Banking process.

4. Reliability:
   - The system will provide accurate account details.
   - And the system can be accessed anywhere around the world with a python code executer.

5. Maintainability:
   - The system is written with a maintainable and understandable code with comment lines.
   - The system has proper documentation so that it can be updated in the coming future.

6. Error handling:
   - If the system detects any error in the inputs entered by the user, it displays an error message and requests' the user to try entering the inputs again.

7. Resource efficiency:
   - The system is designed to minimise power consumption and optimize battery life.
   - The system shall require less than 10MB of storage space for optimised running.
   - The system doesn't require any network bandwidth so it can be accessed even in places without proper internet connection.

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SYSTEM ARCHITECTURE :

- Presentation layer is built using Jupyter Notebook, where the inputs are accepted from the user.
- Application layer is where the input data is processed and the calculations are performed then the outputs are stored and displayed later.
- Data layer is a storage space where the user inputs and the output values are stored.
- Output renderer is a dynamic area that shows all results including detailed Bank Deposit, Withdraw and balances.

DESIGN DIAGRAM :

1. Workflow:
   User input ➡ Data validation ➡ Account Creation
   Account Deposit ➡ Account Withdraw ➡ Account
   Balance ➡ Account List

2. Data flow Diagram :
   - Create Account:
     Create a Person bank account details.
   - Validation :
     Validate the PIN to the Particular Account.
   - Computation:
     Calculate the Account balance Minimum balance + Deposit amount – Withdrawal amount.
   - Output :
     Displays the processed data, the results and then allows the user to calculate account balance.

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3. Component diagram :
   - Input form : Collects Bank account details from the user
   - Validation module : Checks all input ranges and types
   - Calculation core : Compute Account Balance.
   - Output display : Presents the account details.

DESIGN DECISIONS & RATIONALE :

1. Programming language : Python
- Rationale : Python is a simple, easy to learn language with large number of libraries and frameworks, making it idle for small projects like this.

2. User interface ; Jupyter Notebook
- Rationale : A simple UI is sufficient for this program so Jupyter is chosen which provides an interactive environment for user to input data and view results.

3. Data storage : In-memory data storage
- Rationale : Since the project doesn't require any explicit data storage, in-memory storage is sufficient and efficient.

4. Calculation Algorithm : Simple formula-based calculation

5. Error handling :
- Rationale : Basic error handling is sufficient for the small project like this and the user is expected to enter valid data.

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IMPLEMENTATION DETAILS :

1. Language : Python
2. Development environment : Jupyter Notebook
3. Module : VITBhopalBanking py Module
4. Function : Banking
5. Implementation steps :

- Implement the bank account details account balance.
- Implement the bank accounts
- User can see the account balance
- Test the program with sample inputs and verify the results.

TESTING APPROACH :

1. Unit tests :
   Manually validated the system's logic using known correct Bank account records and mock data.
2. System Integration :
   Tested with full semester data for all possible scenarios such as Highest(S), lowest(F) grade performance and 0 attendance.
3. Validation :
   Entered the values at the boundary, the values such as exactly at grade breakpoints.
4. User flow testing :
   Ensure that an error message display if any of the input it wrong.
5. Peer view :
   Verified among my peer group on calculations and reliability.

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SCREENSHOTS / RESULTS :

```
Select an option:  1

===== Create Account =====
Full name:  SUDHARSHAN
Enter a 4digit pin: 1234
Enter the min balance: 1000
SUCCESSFULLY ADDED
      Name  Pin  Min_deposit
SUDHARSHAN 1234         1000
Welcome to vit bpl bank
1) Create account
2) Deposit
3) Withdraw
4) Check balance
5) List all accounts
0) Exit
```

```
Select an option:  1

===== Create Account =====
Full name:  GOKUL
Enter a 4digit pin: 1233
Enter the min balance: 2000
SUCCESSFULLY ADDED
       Name  Pin  Min_deposit
SUDHARSHAN 1234          1000
     GOKUL 1233          2000
Welcome to vit bpl bank
1) Create account
2) Deposit
3) Withdraw
4) Check balance
5) List all accounts
0) Exit
```

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```
Select an option:  1

===== Create Account =====
Full name:  BHAVESH
Enter a 4digit pin: 1122
Enter the min balance: 3000
SUCCESSFULLY ADDED
       Name  Pin  Min_deposit
SUDHARSHAN 1234          1000
     GOKUL 1233          2000
   BHAVESH 1122          3000
Welcome to vit bpl bank
1) Create account
2) Deposit
3) Withdraw
4) Check balance
5) List all accounts
0) Exit
```

```
Select an option:  1

===== Create Account =====
Full name:  RAHUL
Enter a 4digit pin: 1217
Enter the min balance: 4000
SUCCESSFULLY ADDED
      Name  Pin  Min_deposit
SUDHARSHAN 1234          1000
     GOKUL 1233          2000
   BHAVESH 1122          3000
     RAHUL 1217          4000
Welcome to vit bpl bank
1) Create account
2) Deposit
3) Withdraw
4) Check balance
```

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```
Select an option:  1

===== Create Account =====
Full name:  DILIP
Enter a 4digit pin: 1909
Enter the min balance: 7000
SUCCESSFULLY ADDED
       Name  Pin  Min_deposit
SUDHARSHAN 1234          1000
      GOKUL 1233          2000
    BHAVESH 1122          3000
      RAHUL 1217          4000
      DILIP 1909          7000
Welcome to vit bpl bank
1) Create account
```

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```
Welcome to vit bpl bank
1) Create account
2) Deposit
3) Withdraw
4) Check balance
5) List all accounts
0) Exit

Select an option:  2

===== The Deposited Amount =====

Enter Account Name:  SUDHARSHAN
 Enter The Date (YYYY-MM-DD):  2025-10-26
Enter The Deposit Amount:  3000

SUCCESSFULLY DEPOSITED
      Name   Dep_Date  Dep_amt
SUDHARSHAN 2025-10-26   3000.0
```

```
Welcome to vit bpl bank
1) Create account
2) Deposit
3) Withdraw
4) Check balance
5) List all accounts
0) Exit

Select an option:  3

===== The Withdrawn Amount =====

Enter Account Name:  SUDHARSHAN
 Enter The Date (YYYY-MM-DD):  2025-11-11
Enter The Withdraw Amount:  1000

SUCCESSFULLY WITHDRAWN
      Name   Wth_Date  Wth_amt
SUDHARSHAN 2025-11-11   1000.0
```

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```
Welcome to vit bpl bank
1) Create account
2) Deposit
3) Withdraw
4) Check balance
5) List all accounts
0) Exit
Select an option:  4
===== Your Balance =====
Enter Account Name:  SUDHARSHAN
      Name  Pin  Min_deposit
SUDHARSHAN 1234         1000
Total Deposited: 3000.0
Total Withdrawn: 1000.0
Current Balance: 3000.0
```

```
Welcome to vit bpl bank
1) Create account
2) Deposit
3) Withdraw
4) Check balance
5) List all accounts
0) Exit
Select an option:  5
=====All Bank Accounts=====
       Name  Pin  Min_deposit
SUDHARSHAN 1234         1000
     GOKUL 1233         2000
   BHAVESH 1122         3000
     RAHUL 1217         4000
     DILIP 1909         7000
```

```
Welcome to vit bpl bank
1) Create account
2) Deposit
3) Withdraw
4) Check balance
5) List all accounts
0) Exit
Select an option:  0
Goodbye!
```

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CHALLENGES FACED :

1. Finding Account:

   Finding the bank account VIT's Banking system it took long time to understand and implement in Data Frame Python logic behind it and applied it in my program.

2. User error handling:

   Invalid inputs such as PIN length < 4, wrong so checking on them was quite a hard task.

3. Dynamic update:

   Deposit and Withdrawal is updating with current selected account with Dynamic update.

4. Transparency:

   Providing the user with the clear step by step for account creation, Deposit and Withdrawal Calculations and not just their results.

LEARNING AND KEY TAKEAWAYS :

1. Implementation:

   Learnt how to implement the Logic with adequate knowledge to solve the real-world problems,

2. Automation value:

Finding the results This would have took a lot of time and energy if it was done manually but now within seconds with the help of this finding balance we can get the results automatically in a few seconds.

3. Testing :

   Coding part is easy if we know the logic behind it but we can only know our code is correct when it tests run it with multiple values, so I understood that testing a system is as important as designing a system.

4. Communication:

   The system's ability of guidance has been improved, and error messages are directly displayed in the output UI for optimal user support.

FUTURE ENHANCEMENTS :

1. Data persistence :

   Add a support for local storage, so that the user can store his previous session data and prevent it from losing in the next session.

2. User Interface :

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Separately designing a new User Interface (App / Webpage) for better conditions and presentation and instant access of the system rather than running it in Jupyter Notebook.

3. Analytics :

   With the help of the previous data entered by the user predicting their next most probable creating User accounts and balance calculating with graphical dashboards for easier access.

4. Export :

   Enabling exporting reports as in the form of PDF or EXCEL or Direct email share formats for the Bank account use.

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