B.TECH. (CSE)

V SEMESTER

UE20CS303 –SOFTWARE ENGINEERING

PROJECT REPORT ON

ATM SIMULATOR

GROUP NUMBER: 1

SUBMITTED BY

1) Rakshika S (PES2UG20CS264)
2) Shravya U (PES2UG20CS326)

August – Nov 2022

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
BENGALURU – 560100, KARNATAKA, INDIA

TABLE OF CONTENTS

Synopsis/Project Proposal

Project description

The aim of the ATM Simulator project is to build a Python based ATM (Automated Teller Machine) Simulation System. This ATM Simulator requires the constant updating of records of the bank.

Security is the foundation of a good ATM system. This system will provide for secure authenticated connections between users and the bank servers. The whole process will be automated right from password validation to transaction completion. ATM Simulator will enable two important features of an ATM, reduction of human error in the banking system and the possibility of 24 hour personal banking. The card details and PIN database will be a secure module that will not be open to routine maintenance, the only possibility of access to this database will be through queries raised from an ATM simulator in the presence of a valid bank account.

The system provides the access to the customer to create an account, deposit/withdraw the cash from his account, also to view reports of all accounts present. The customers can access their Account details and perform the transactions on account as per their requirements. This project has been developed to carry out the processes easily and quickly, which is not possible with the manuals systems, which are overcome by this software.

This system will have a User Interface which will make the whole process user friendly.

Existing System:

The existing ATM Simulation System was built for the original concept of regional private banks. Small banks in villages and towns will service the needs of the local community and will only require ledgers to record account details. This system is prone to human error and causes undue frustration to users. This system was augmented with the introduction of excel sheets and emails. Banks could now record all information in an excel sheet and then set an update schedule when they will mail all records to a central hub where these records will again be processed and consolidated to form a unified record of all account transactions. These systems did not enable easy access to money and were greatly prone to grievous errors.

Proposed System:

The proposed system aims to solve all this by constant updating of bank records. The Python based construction of the system will enable transactions at any bank or ATM to be registered within a matter of seconds. Security of these details is also a top priority in this system. The bank records are maintained in the database. We are using MySql for the database.

Plan of work and product ownership:

The banking system provides services to a large number of users. The system should identify individual users of the banking system by the account number and account pin.

Input: Account Number, Account PIN

Output: Main Menu

Functional features planned to accomplish in the short term:

- Creating an account
- Login into an existing account
- Account statement
- Cash deposit
- Cash withdrawal
- Change the pin

Creating an account, login and account statement module are to be completed by Team member 1(Rakshika S) within the given deadline.

Cash deposit, cash withdrawal and change the pin module are to be completed by Team member 2 (Shravya U) within the given deadline.

PES UNIVERSITY, BANGALORE

Department of Computer Science and Engineering

SOFTWARE REQUIREMENTS SPECIFICATION

for

ATM SIMULATOR

Version 1.0 approved

Prepared by

1) Rakshika S - PES2UG20CS264

2) Shravya u - PES2UG20CS326

PES UNIVERSITY

01/09/2022

PES UNIVERSITY, BANGALORE

Department of Computer Science and Engineering

Table of Contents

PES UNIVERSITY, BANGALORE

Department of Computer Science and Engineering

Introduction

Purpose

This document describes the software requirements and specification (SRS) of an automated teller machine (ATM). This document is intended for the customer and developer (designer, testers and maintainers).

Intended Audience

The intended audience for this SRS consists of:

- Software engineers
- System engineers
- System customers
- System test engineers
- System customers
- System maintenance engineers
- Managers

Product Scope

The software supports a computerized banking system. The system enables customers to complete simple bank account service via an ATM. An ATM session consists of authenticating a user (i.e., proving the user's identity) based on an account number and personal identification number (PIN), followed by creating and executing financial transactions. To authenticate a user and perform transactions, the ATM must interact with the bank's account information database. For each bank account, the database stores an account number, a PIN and a balance indicating the amount of money in the account. ATM users should be able to view their account balance, withdraw cash (i.e., take money out of an account) and deposit funds (i.e., place money into an account).

References

1) Software engineering / Ian Sommerville. — 9th ed

Overall Description

Product Perspective

This ATM's software is to run on a new ATM hardware that a local bank wants to install for its customers. This product will be developed from an existing system of the same local bank or from another bank that has similar characteristics of this local bank. The system will be designed in such a way that the user will access and use the ATM and then accesses the banking system, which updates, configures and accesses the details and data of the user from his/her database. The system will also accommodate an operator who will load money in the ATM machine, validate deposits made by a customer, and make sure the system hardware is always on and on power.

PES UNIVERSITY, BANGALORE

Department of Computer Science and Engineering

Product Functions

The functions of the system are:

- Login
- Balance inquiry
- Cash withdraw
- Funds deposit

User Classes and Characteristics

- Open to all users but access level is dependent on knowledge of the system.
- Customers are simply members of the public with no special training.
- Bank security personnel need have no special education or experience.
- Maintainers must be experienced system administrators, able to upgrade and repair the system.

Operating Environment

The hardware, software and technology used should have the following:

- Ability to read values from a keyboard
- Ability to count the currency notes
- Continuous power supply
- Ability to connect to bank's network
- Ability to validate user

Design and Implementation Constraints

- Validate account number
- Validate if the account number is hosted bank, if not prompt an error message
- Validate if the account number is functional, if not prompt an error message
- Validate PIN
- Validate that PIN is not blank, if blank ,prompt error message "please enter PIN"
- Validate that PIN matches with the account number, if not prompt error message" Incorrect PIN, please try again

2.6 Assumptions and Dependencies

- Hardware never fails
- Limited amount of money withdrawn per day
- Limited number of transactions per day
- ATM casing is impenetrable

External Interface Requirements

User Interfaces

Upon first approaching the ATM, the user should experience the following sequence of events:

- The screen displays a welcome message and prompts the user to enter an account number.

- The user enters a five-digit account number, using the keypad.
- The screen prompts the user to enter the PIN (personal identification number) associated with the specified account number.
- The user enters a five-digit PIN, using the keypad.
- If the user enters a valid account number and the correct PIN for that account, the screen displays main menu.
- If the user enters 2 to make a withdrawal the screen displays the menu.

Software Interfaces

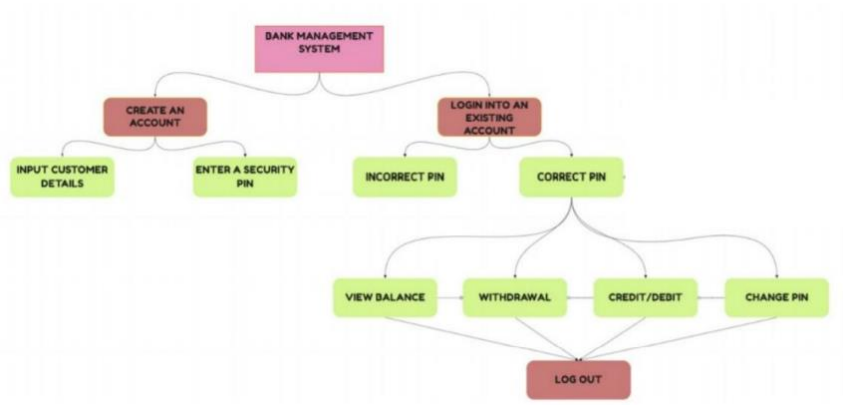
Software requirements at the end user are:

- Operation systems
- Languages supported
- Database

Communications Interfaces

There is no restriction of the ATM network to a specific network protocol as long as the performance requirements are satisfied.

Analysis Models



System Features

The following list offers a brief outline and description of the main features and functionalities of the ATM software system.

1. **Authentication**

Description and Priority

The ATM provides access to the banking system services .In order for a customer to perform a transaction with the bank the system needs to validate the user through their user credentials-

a unique account number and pin. This feature is of high priority since it is the starting point of the user access the system.

Stimulus/Response Sequences

The response/stimulus for different class of users are

- Welcome- welcome message
- Please enter your account number: user login credential
- Enter your pin: user login credentials

Functional Requirements

The banking system provides services to a large number of users. The system should identify individual users of the banking system by the account number and account pin.

Input: Account Number, Account PIN
Output: Main Menu

2. Banking transactions:

Priority

The utility is executable from the main menu displayed numbered options. It enables various users to request balance enquiry, perform withdrawals and carryout deposits.

Stimulus and response

The response/stimulus for the different classes of users are :

- Balance enquiry option: the screen displays the user's account balance
- Withdrawal Option: The screen displays a menu containing standard withdrawal amounts.
- Deposit feature: The user enters a deposit amount or 0

Functional requirements

The system should be able to perform banking transactions from the main menu that the user selects at the ATM.

Input : Main Menu Option
Output: Executed Banking transaction

3. Verify withdrawals and deposits

Description and priority:

This feature enables users not to overdraw their accounts and update their accounts when deposits have been carried out. If the user makes a balance inquiry, the screen displays the user's account balance.

Stimulus and response:

If withdrawn amount chosen is greater than users account balance: the screen should display this to the user If the withdrawn amount is acceptable: The ATM proceeds to the next withdrawal step If the user deposits an envelope. The amount is add to the users bank balance but not available for withdrawal until physical verified

Functional requirement:

The system should be able to verify the withdrawals and deposits.

Input : withdrawal or deposit
Output : ATM proceeds to the next step of transaction or displays message of failure to proceed to the next step.

User exit interface:

Description and priority:
The feature enables the user to exit the system and to display the welcome message for the next user.

Stimulus and response:
Exit the system : thank you message, then display the welcome message for the next user.

Functional requirement:
The system should log out the user to control access the users bank account.

Input :exit the system.
Output :thank you message, then display the welcome message for the next user.

Other Non-functional Requirements

Performance Requirements

- It must be able to perform in adverse conditions
- Must have high data transfer rate

Safety Requirements

- Must be safe in physical aspect, say in a booth
- Must be sealed to the floor to prevent any kind of theft
- There must be a guard just outside the booth for man power security

Security Requirements

- Users are advised to chSange their PIN on first use
- Users are advised not to tell their PIN to anyone
- The maximum number of attempts to enter PIN are limited to three

Software Quality Attributes

- Easy to learn usage for an ordinary person .i.e. within 10 minutes
- Easy to understand operation from an engineering perspective .i.e. one week
- The system will be down for 30 minutes in each 24 hour cycle
- System can be easily integrate with bank system
- Software can be installed on a number of ATMs without affecting current operation status
- Easy to troubleshoot and maintain in case system fails abruptly

Business Rules

N/A

Other Requirements

None

Appendix A: Glossary

- Account: A single account in a bank against which transactions can be applied. Accounts maybe of various types with at least checking and savings. A customer can hold more than one account.
- ATM: An electronic telecommunications device that enables the customers of a financial institution to perform financial transactions without the need for a human cashier, clerk or bank teller.
- Bank: A financial institution that holds accounts for customers and that issues account numbers and passwords authorizing access to accounts over the ATM network
- Bank computer: The computer owned by a bank that interfaces with the ATM network and the banks own cashier stations. A bank may actually have its own internal network of computers to process accounts but we are only concerned with the one that interacts with the network.
- Customer: The holder of one or more accounts in a bank. A customer can consist of one or more. Persons or corporations the correspondence is not relevant to this problem. The same person holding an account at a different bank is considered a different customer.
- Transaction: A single integral request for operations on the accounts of a single customer. We only specified that ATMs must dispense cash, accept cash deposits and view balance. The ATM does not give a print of these but rather displays them on the screen.
- Database: A database is an organized collection of data stored on a computer.

Appendix B: Field Layouts

An Excel sheet containing field layouts and properties/attributes and report requirements.

Sample sheet with information required to register the customer

Field	Length	Data Type	Description	Is Mandatory
Account Number	16	Numeric		Y
ISFC code	11	Alphanumeric		Y
Card Amount	20	Numeric		Y
Mandate Start Date	8	Date	Date of Mandate Registration	N
Mandate End Date	8	Date	Date of Mandate Expiry	N
Status	25	Alphanumeric	Status of Registration	Y
Customer Name	60	String		Y

Reject Reason Code	4	String	Reject Reason code in case mandate is rejected	N

Sample Report Requirements: Include the fields to be included in the report

Registration Report	**Transaction Report**
Bank Account Number	Transaction Reference Number
ISFC Code	Bank Account Number
Bank Name	IFSC Code
Account Status	Bank Name
Account Type	Customer Name
Customer Name	Card Number
Card Number	Debit Transaction Amount
SI Start Date	Transaction Date
Status	Status
Remarks	Debit Attempt Number
	Remarks

Appendix C: Requirement Traceability Matrix

Sl. No	Requirement ID	Brief Description of Requirement	Test Case ID	Test data	Expected result
1)	1234	Verify login	1	Id= abcd Password=3456	successful
2)	3456	Transaction	2	Debit 1000	successful

PES UNIVERSITY, BANGALORE

Department of Computer Science and Engineering

Project plan Document:

1: Identify the lifecycle to be followed for the execution of your project and justify why you have chosen the model.

We are using agile methodology in the software development lifecycle.

Agile SDLC methodology is based on collaborative decision making between requirements and solutions teams, and a cyclical, iterative progression of producing working software. Work is done in regularly iterated cycles, known as sprints, that usually last two to four weeks.

We are using this methodology because software is developed in incremental, rapid cycles. This results in small incremental releases with each release building on previous functionality. Each release is thoroughly tested to ensure software quality is maintained. It is used for time critical applications.

2: Identify the tools which u want to use it throughout the lifecycle like planning tool, design tool, version control, development tool, bug tracking, testing tool.

Tools used are:

JIRA for planning and bug tracking.
Github for version control.
Autodesk Product Design Suite for design,
VS code for development. (Language used Python)
Selenium IDE for testing.

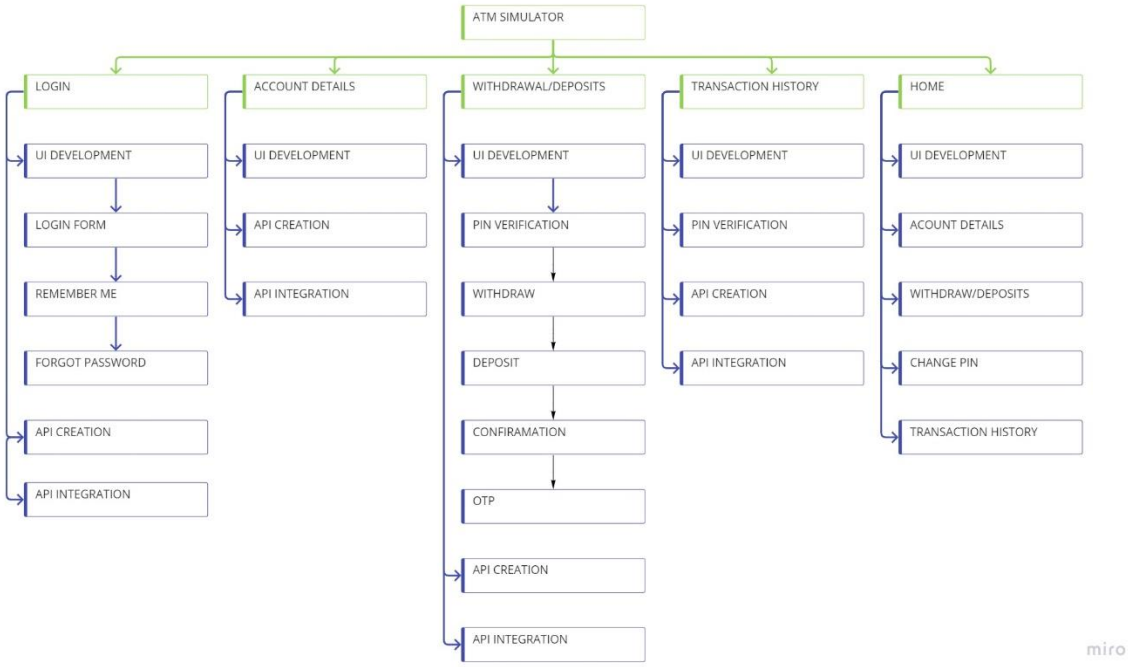
3: Determine all the deliverables and categorise them as reuse/build components and justify the same.

Login module: Reusable. Can be used for different projects
Withdraw/deposit module: Build
Change PIN module: Reusable. Can be used for different projects as change password.
Home page module: Build
Transaction history: Build

4: Create a WBS for the entire functionalities in detail.

PES UNIVERSITY, BANGALORE

Department of Computer Science and Engineering



5: Do a rough estimate of effort required to accomplish each task in terms of person months.

Approximately,

KLOC=1

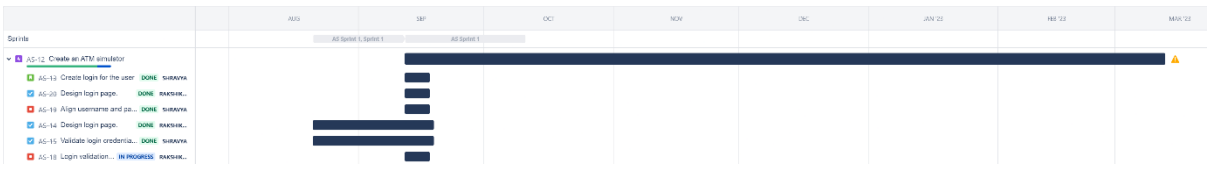
People doing the project: 3

Hence we project type is organic

Estimation of effort re required to accomplish each task in terms of person months=

2.4 x (1) ^ 1.05 = 2.4 person months

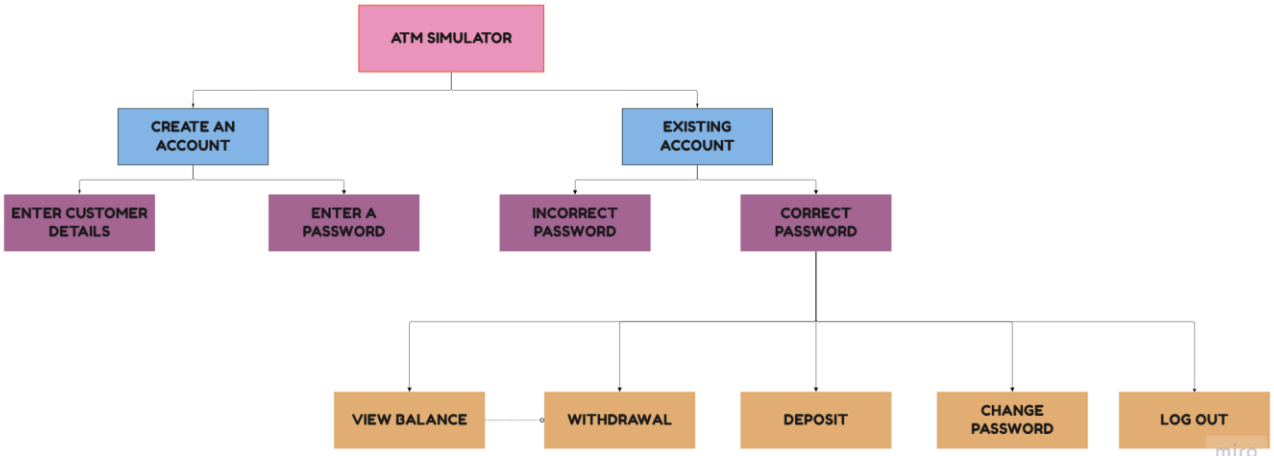
6: Create the Gantt Chart for scheduling using any tool.



PES UNIVERSITY, BANGALORE

Department of Computer Science and Engineering

Design diagram



PES UNIVERSITY, BANGALORE

Department of Computer Science and Engineering

Test Plan Document

Test cases:

Test Case ID	Name of Module	Test case description	Pre-conditions	Test Steps	Test data	Expected Results	Actual Result	Test Result
1100	Check credentials module	To test the login functionality. When the password is invalid	Account number should be entered	1) Navigate to existing account 2) Enter account number 3) Enter invalid password 4) Click enter	Account number: 123 Password: 67809145	Login should not be Successful. Display wrong password.	Login is not successful. Displays wrong password.	Pass
1234	Check Account number module	To test the login functionality. When the account number is invalid	Atm simulator should be running	1) Navigate to existing account 2) Enter account number 3) Enter password 4) Click enter	Account number: 123345 Password: 67809145	Login should not be Successful. Display account number is wrong.	Login is not Successful. Displays account number is wrong.	Pass
4537	Check credentials module	To test the login functionality. When the password is valid.	Account number should be entered.	1) Navigate to existing account 2) Enter account number 3) Enter valid password 4) Click enter	Account number: 123 Password: 12345678	Login should be successful with “welcome user_name”	Login is successful with “welcome user_name”	Pass
2839	Modify password module	When the password length exceeds 8 while changing the password , password	Change password option must be selected.	1) Navigate to existing account 2) Enter account number and password	New Password: 123456789	Password should not be changed successfully. Display password length exceeds 8 characters.	Password is not changed successfully. Displays password length exceeds 8 characters.	Pass

PES UNIVERSITY, BANGALORE

Department of Computer Science and Engineering

		should not be updated.		3) Navigate to change password 4) Enter a new password length greater than 8. 4) Click enter				
9043	Create account module	When the balance amount entered is less than 500 , an account can not be created.	Create account option must be selected.	1) Navigate to create account 2) Enter all the details. 3) Enter amount less than 500.	Name: student1 Email: xyz@gmail.com Phone no.: 9037914021 Amount: 100	Account should not be created. Display minimum balance is less than 500.	Account is not created. Displays minimum balance is less than 500.	Pass
1267	Withdrawal module	When withdrawal amount exceeds account balance , money should not be debited.	Withdrawal option must be selected.	1) Navigate to existing account 2) Enter account number and password 3) Navigate to withdrawal 4) Enter amount exceeding account balance.	Amount: 10000	Money should not be debited. Display Insufficient Amount	Money is not debited. Displays Insufficient Amount	Pass
9753	Withdrawal module	When withdrawal amount is less than or equal to account balance , money should be debited.	Withdrawal option must be selected.	1) Navigate to existing account 2) Enter account number and password 3) Navigate to withdrawal	Amount: 500	Money should be debited. Display Please collect your cash and account balance.	Money is debited. Displays Please collect your cash and account balance.	Pass

				4) Enter amount less or equal to account balance.				
2585	Create account module	Not to allow the user to have null name, email, phone number.	Should be navigated to create account	1) Navigate to Create Account 2) enter without typing name, email and phone number	Name: Email: Phone number:	Should give a warning that name, email and phone number cannot be null.	Displays a warning that name, email and phone number cannot be null	Pass

- **Test Case ID :** Each test case should be represented by a unique ID. To indicate test types, follow some convention like "UT_01" indicating "Unit Testing - Test Case#1."
- **Name of the module :** Specify the name of the **main module or sub module** being tested
- **Test Case Description :** Specify the summary or test purpose in brief
- **Pre- Conditions :** Any requirement that needs to be done before execution of this test case.
- **Test Steps** : Mention all the steps in detail and specify the order in which it is to be executed.
- **Test Data :** Input for the test case to be executed. Specify different data sets with precise values to be used as input. (create test case for both valid and invalid inputs)
- **Expected Results :** Mention the expected results including error or precise messages that should be displayed on screen
- **Actual Results :** After execution of test case fill this column with the result obtained
- **Test Result (Pass/Fail) :** Mark this field as “fail” if the actual result is not same as expected result else mark as “pass”.

PES UNIVERSITY, BANGALORE

Department of Computer Science and Engineering

Screenshots of the output:

```
C:\Windows\System32\cmd.exe

C:\Users\Shravya U\Documents\sem 5\SE\code\ATM-Simulator-master>python atm.py
11/07/22                                                    20:24:46
                        WELCOME TO ATM SIMULATOR
                            1.Create Account
                            2.Existing Customer
1
11/07/22                                                    20:24:46
                            1.Current Account
                            2.Savings Account
1
11/07/22                                                    20:24:46
Enter Your Name:Shravya
Enter Your Email:shravya0408@gmail.com
Enter Your Mobile number:9845470830
Enter amount:10000


Thanks for creating your account.
Your account number is 394283715
Your password is 96270840
```

```
C:\Users\Shravya U\Documents\sem 5\SE\code\ATM-Simulator-master>python atm.py
11/07/22                                                    20:26:11
                        WELCOME TO ATM SIMULATOR
                            1.Create Account
                            2.Existing Customer
1
11/07/22                                                    20:26:11
                            1.Current Account
                            2.Savings Account
1
11/07/22                                                    20:26:11
Enter Your Name:Rakshika
Enter Your Email:rakshikaprasad@gmail.com
Enter Your Mobile number:9845467091
Enter amount:100
Minimum amount is 500 to create your account.
```

PES UNIVERSITY, BANGALORE

Department of Computer Science and Engineering

```
C:\Users\Shravya U\Documents\sem 5\SE\code\ATM-Simulator-master>python atm.py
11/07/22                                                    20:32:08
                        WELCOME TO ATM SIMULATOR
                             1.Create Account
                             2.Existing Customer
2
11/07/22                                                    20:32:08
Enter your account number:394283715
Enter your password:98454
                       WELCOME Shravya TO ATM SIMULATOR
                             1.Account Statement
                             2.Withdraw
                             3.Deposit
                             4.Change Password
                             5.Logout
4
Enter new password:1234
Password is changed successfully

Your new password is 1234
```

```
C:\Users\Shravya U\Documents\sem 5\SE\code\ATM-Simulator-master>python atm.py
11/07/22                                                    20:33:21
                        WELCOME TO ATM SIMULATOR
                             1.Create Account
                             2.Existing Customer
2
11/07/22                                                    20:33:21
Enter your account number:394283715
Enter your password:1234
                       WELCOME Shravya TO ATM SIMULATOR
                             1.Account Statement
                             2.Withdraw
                             3.Deposit
                             4.Change Password
                             5.Logout
1
11/07/22                                                    20:33:21
Customer Name -Shravya
Available Balance -10000
Account -Current
Account Number -394283715
```

PES UNIVERSITY, BANGALORE

Department of Computer Science and Engineering

```
C:\Users\Shravya U\Documents\sem 5\SE\code\ATM-Simulator-master>python atm.py
11/07/22                                                    20:34:14
                        WELCOME TO ATM SIMULATOR
                            1.Create Account
                            2.Existing Customer
2
11/07/22                                                    20:34:14
Enter your account number:394283715
Enter your password:1234
                       WELCOME Shravya TO ATM SIMULATOR
                            1.Account Statement
                            2.Withdraw
                            3.Deposit
                            4.Change Password
                            5.Logout
2
11/07/22                                                    20:34:14
Enter amount:50000
Insufficient amount
```

```
C:\Users\Shravya U\Documents\sem 5\SE\code\ATM-Simulator-master>python atm.py
11/07/22                                                    20:34:49
                        WELCOME TO ATM SIMULATOR
                            1.Create Account
                            2.Existing Customer
2
11/07/22                                                    20:34:49
Enter your account number:394283715
Enter your password:1234
                       WELCOME Shravya TO ATM SIMULATOR
                            1.Account Statement
                            2.Withdraw
                            3.Deposit
                            4.Change Password
                            5.Logout
2
11/07/22                                                    20:34:49
Enter amount:500
Please collect your cash
Available balance 9500
```

PES UNIVERSITY, BANGALORE

Department of Computer Science and Engineering

```
C:\Users\Shravya U\Documents\sem 5\SE\code\ATM-Simulator-master>python atm.py
11/07/22                                                        20:35:16
                        WELCOME TO ATM SIMULATOR
                            1.Create Account
                            2.Existing Customer
2
11/07/22                                                        20:35:16
Enter your account number:394283715
Enter your password:1234
                        WELCOME Shravya TO ATM SIMULATOR
                            1.Account Statement
                            2.Withdraw
                            3.Deposit
                            4.Change Password
                            5.Logout
3
11/07/22                                                        20:35:16
Enter amount:9000
Deposited successfully
Available balance 18500

C:\Users\Shravya U\Documents\sem 5\SE\code\ATM-Simulator-master>python atm.py
11/07/22                                                        20:35:44
                        WELCOME TO ATM SIMULATOR
                            1.Create Account
                            2.Existing Customer
2
11/07/22                                                        20:35:44
Enter your account number:394283715
Enter your password:1234
                        WELCOME Shravya TO ATM SIMULATOR
                            1.Account Statement
                            2.Withdraw
                            3.Deposit
                            4.Change Password
                            5.Logout
5

C:\Users\Shravya U\Documents\sem 5\SE\code\ATM-Simulator-master>
```