Simulation Interface Requirements

SI1. The components of the Simulation Interface shall be separated from the ATM controller by defined interfaces which mimic communication with the Physical Console and Enterprise Database.

SI2. The Simulation Interface shall automatically initiate the Simulated Console, Simulated Database, and ATM Controller upon startup.

SI3. The Simulation Interface simulates a single session and terminates when the user completes all activity and requests return of the bank card.

Simulated Console Requirements

UI1. The simulation interface shall mimic the illustration as closely as possible

The simulation interface shall include the following components and functionality

UI2. The simulation interface shall include a Card Slot component.

UI2A. Card slot component shall simulate acceptance of a card from a user.

UI2B. When the Card Slot component is enabled, inserting a simulated card shall notify the ATM Controller.

UI2C. Card slot shall visibly change to indicate that a card is inserted.

UI3. The simulation interface shall include a Keypad component

UI3A. When enabled, the keypad component shall allow the user to enter a number.

UI3A1. Pressing one of the numeric keys on the keypad will cause the number to be displayed on an indicator. The number should be appended to any existing numbers.

UI3B. Pressing the C button on keypad shall clear any digits entered.

UI3C. The ATM Controller may clear the keypad by signaling the User Console.

UI3D. Pressing the E button on keypad shall signal to the ATM Controller that numeric entry is complete.

UI4. The simulation interface shall include a ATM Messages component

UI4A. ATM messages will display text messages when prompted by the ATM Controller.

UI4B. When a new message is received, any previous messages shall be cleared.

UI5. The simulation interface shall include a Left and Right Buttons component.

UI5A. When the buttons are enabled, the user console will notify the ATM Controller each time a button is pressed.

UI6. The simulation interface shall include a Left and Right Menu component.

UI6A. The Left and Right Menu items will display text items when prompted by the ATM Controller.

UI7. The ATM Controller shall have the ability to disable the function of any component on the User Console.

UI7A. A disabled component will perform no action if the user presses or interacts with it. Disabling a display component such as the ATM Messages or Left and Right Menu has no effect.

Simulated Database Requirements

SD1. The database shall store records where each record contains the following elements.

SD1A. Account Number ¨C 5 Digit Integer number

SD1B. First Name ¨C Text, maximum of 256 characters

SD1C. Last Name ¨C Text, maximum of 256 characters

SD1D. Balance ¨C Fractional number with at least 9 integer digits and 2 decimal digits

SD1E. Locked ¨C Boolean flag

SD2. The database shall provide a mechanism to search for a record based upon an account number.

SD2A. Upon locating a record the database shall check the locked element of the record.

SD2A1. If the record is locked, the database shall return an appropriate notification. In this scenario the account information is not returned.

SD2A2. If the record is not locked, the database shall change the element to locked and return the record.

SD2B. If a matching record cannot be located, the database shall return an appropriate notification.

SD2C. If the database interface successfully searches for and locks a record, the interface is said to ¡°own¡± that record.

SD2C1. The database interface should keep a temporary copy of the data in a record it owns.

SD2C2. The database interface should own only one record at a time.

SD2C2A. Attempting to own a second record should return a Session Error.

SD3. The database shall provide a mechanism to modify the account balance of a record.

SD3A. This functionality will only be available on a record that is owned by the interface.

SD3B. Modifying the account balance in this way will only affect the local copy of the owned record.

SD4. The database shall provide a mechanism to access any element of a record.

SD4A. This functionality will only be available on a record that is owned by the interface.

SD5. The database shall provide a mechanism to commit a record.

SD5A. This functionality will only be available on a record that is owned by the interface.

SD5B. When a record is committed, the database interface shall overwrite the balance of the original record with the balance of the local record copy.

SD6. The database shall provide a mechanism to unlock a record.

SD6A. This functionality will only be available on a record that is owned by the interface.

SD6B. When a record is unlocked, the database interface is no longer considered to own the record, and should clear any local copies of the record data.

SD7. It must be somehow possible for a tester to populate the simulated database.However, this may be through an external program or editor.

User Message Requirements

UM1. The ATM Controller shall store a list of messages, as shown in the ATM Messages Table below. The Message Name is an identifier that is used throughout this document to efficiently refer to a given message.

UM1A. The message table shall be stored in such a way that messages can be added, removed, or changed without recompiling the ATM Controller code.

UM2A. Some messages contain parameters in italic that shall be dynamically replaced with data from the Account database or keypad when displayed.

UM2. The ATM Controller will send a message to the User Console as necessary to fulfill other requirements.

ATM Menu Requirements

AM1. The ATM Controller shall store a list of menu states, as shown in the ATM Menus Table below. The Menu State is an identifier that is used throughout this document to efficiently refer to a given menu.

AM1A. The menu table shall be stored in such a way that menu items and states can be added, removed, or changed without recompiling the ATM Controller code.

AM2. The ATM Controller will apply a menu state to the User Console as necessary to fulfill other requirements.

AM2A. Each table item within the menu state corresponds to one of the left or right menu locations on the User Console. Applying a state displays the corresponding text on the corresponding menu location. A menu location with the text ¡°None¡± displays nothing.

ATM Button Requirements

AB1. When a requirement specifies that the ATM Controller should wait for a user button the ATM Controller should wait for the User Console to indicate that a button has been pressed.

AB2. Any buttons pressed before the ATM Controller begins waiting should be ignored.

AB3. When pressed, a button indicates the function associated with it in the current menu state.

AB4. Any buttons with a menu state of none should be ignored.

Initial State Requirements

IS1. On the user console, disable the Keypad, Left Buttons, and Right Buttons. Enable the Card Slot.

IS2. Set the Menu State to Blank.

IS3. Display Welcome Message.

IS4. Wait for the User Console to indicate that a card has been inserted into the Card Slot.

IS5. Transition to the Login State.

Login State Requirements

LO1. On the user console, disable the Card Slot, Left Buttons, and Right Buttons. Enable the Keypad.

LO2. Clear the Keypad.

LO3. Set the Menu State to Blank.

LO4. Display Welcome Message.

LO5. Wait for the User Console to indicate that a number has been entered into the keypad.

LO6. Query the Account Database for the number

LO6A. If the Account is not found in the database or is locked, this is considered an invalid login attempt.

LO6A1. In the event of an invalid login, display the Account Verification Failed Message.

LO6A2. In the event of an invalid login, restart the Login state.

LO6B. If the Account is found and not locked clear the Keypad and transition to the Main Menu State.

Main Menu State Requirements

MM1. On the user console, disable the Card Slot and Keypad. Enable the Left Buttons, and Right Buttons.

MM2. Display Main Menu Message.

MM3. Set the Menu State to Main Menu.

MM4. Wait for a user button press.

MM4A. Pressing the Balance Inquiry button transitions the system to the Balance Inquiry state.

MM4B. Pressing the Deposit button transitions the system to the Deposit state.

MM4C. Pressing the Withdraw button transitions the system to the Withdraw state.

MM4D. Pressing the Fast Cash $50 button shall cause the system to check if the balance of the Account Database record is greater or equal to $50.00.

MM4D1. If there are sufficient funds, modify the balance of the Account Database record and commit the change.

MM4D2. If there are insufficient funds, make no change to the database and display the Withdrawal Failed Message in the subsequent Withdrawal Complete state.

MM4D3. Transition to the Withdrawal Complete state after Fast Cash $50 is pressed, whether the transaction was successful or not.

MM4E. Pressing the Return Card and Terminate button transitions the system to the Terminate state.

Balance Inquiry State Requirements

BI1. On the user console, disable the Card Slot and Keypad. Enable the Left Buttons and Right Buttons.

BI2. Clear the Keypad.

BI3. Display Balance Inquiry Message.

BI4. Set the Menu State to Return.

BI5. Wait for a user button press.

BI5A. Pressing the Done button transitions the system to the Main Menu state.

Deposit State Requirements

DP1. On the user console, disable the Card Slot. Enable the Keypad, Left Buttons and Right Buttons.

DP2. Display Deposit Message.

DP3. Set the Menu State to Cancel.

DP4. Wait for the User Console to indicate a user button press or a keypad entry.

DP4A. Pressing the Cancel button transitions the system to the Main Menu state.

DP4B. A keypad entry triggers a deposit

DP4B1. In the event of a deposit, modify the balance of the Account Database record and commit the change.

DP4B2. In the event of a deposit, transition to the Deposit Complete State

Deposit Complete State Requirements

DC1. On the user console, disable the Card Slot and Keypad. Enable the Left Buttons and Right Buttons.

DC2. Clear the Keypad.

DC3. Display Deposit Complete Message.

DC4. Set the Menu State to Return.

DC5. Wait for a user button press.

DC5A. Pressing the Done button transitions the system to the Main Menu state.

Withdrawal State Requirements

WD1. On the user console, disable the Card Slot. Enable the Keypad, Left Buttons and Right Buttons.

WD2. Display Withdrawal Message.

WD3. Set the Menu State to Cancel.

WD4. Wait for the User Console to indicate a user button press or a keypad entry.

WD4A. Pressing the Cancel button transitions the system to the Main Menu state.

WD4B. A keypad entry triggers a withdrawal

WD4B1. In the event of a withdrawal, compare the balance of the Account Database record to the withdrawal amount.

WD4B1A. If there are sufficient funds, modify the balance of the Account Database record and commit the change.

WD4B1B. If there are insufficient funds make no change to the database and display the Withdrawal Failed Message in the subsequent Withdrawal Complete state.

WD4B2. In the event of a withdrawal or failed withdrawal, transition to the Withdrawal Complete state.

Withdrawal Complete State Requirements

WC1. On the user console, disable the Card Slot and Keypad. Enable the Left Buttons and Right Buttons.

WC2. Display Withdrawal Complete Message or Withdrawal Failed Message depending upon whether the withdrawal was successful.

WC3. Set the Menu State to Return.

WC4. Wait for a user button press.

WC4A. Pressing the Done button transitions the system to the Main Menu state.

Terminate State Requirements

TS1. Disable all of the components of the User Console.

TS2. Signal the User Console to return any inserted card to the user.

TS3. Set the Menu State to Blank.

TS4. Display Session Terminate Message.

Security Requirements

SC1. The machine transitions to the Terminate State after three consecutive invalid login attempts.

SC2. The machine transitions to the Terminate State after an inactivity period of ten seconds during which no input from the console is detected.

Error Handling Requirements

EH1. The system shall define three levels of error with associated actions.

EH1A. A Minor Error shall be invisible to the user. The system should continue any operations without interruption.

EH1B. A Session Error will cause the system to enter the Terminate State. No additional feedback to the user is necessary.

EH1B1. A session error shall cause any records locked by the ATM Controller to be unlocked. No changes should be committed.

EH1C. A System error will lock out the system.

EH1C1. A system error shall cause any records locked by the ATM Controller to be unlocked. No changes should be committed.

EH1C2. A system error shall disable all User Console controls.

EH1C3. A system error shall set the menu state to Blank.

EH1C4. A system error shall display System Error Message.

EH2. The error handling system shall maintain a log file which can be checked by ATM maintenance personnel.

EH2A. The error log shall include a description of each error that occurs.

EH2B. The error log shall include the level of the error, as specified by EH1.

EH2C. The error log shall include the time and date at which the error occurred.

EH2D. The error log shall include the account number of any user logged in at the time the error occurred.