



# Software Requirements Specifications

Automated Teller Machine System  
(ATMS)

Version: 1.0

Date: 10/04/2013

Release By: XYZ Bank

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Revision 1, 2013

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Russell C. Bjork  
Professor of Computer Science  
Gordon College  
255 Grapevine Road  
Wenham, MA 01984  
(978) 927-2300 x 4377  
bjork@gordon.edu

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## Document Control

<b>Document Name</b>	ATMS Software Requirement Specifications
<b>Reference Number</b>	ATMS_SRS
<b>Version</b>	1.0
<b>Project Code</b>	ABC_ATMS
<b>Status</b>	In-use
<b>Date Released</b>	10 April, 2013

<b>Name</b>	<b>Position</b>	<b>Signature</b>
Prepared By: Ms. Business Analyst	Business Analyst XYZ Bank	
Reviewed By: Mr. Reviewer	Lead Developer XYZ Bank	
Approved By: Mr. Client	Project Manager XYZ Bank	



## Version History

Version	Release Date	Section	Amendments
1.0	10/04/2013	All	Original Document



## Table of Contents

Document Control .....	i
Version History.....	ii
Table of Contents.....	iii
1.0 Introduction .....	1
1.1 Purpose .....	1
1.2 Scope .....	1
1.3 Definition & Acronyms .....	2
1.4 References .....	3
1.5 Overview .....	3
2.0 Overall Description.....	5
2.1 Product Perspective .....	5
2.1.1 User Interfaces.....	5
2.1.2 Hardware Interfaces .....	5
2.1.3 Communication Interfaces.....	5
2.2 Product Feature.....	5
2.3 Users Characteristics.....	7
3.0 <b>Specific Requirements</b> .....	9
3.1 External Interfaces.....	9
3.1.1 Start Up Interface .....	9
3.1.2 Shut Down Interface.....	9
3.1.3 Session Verification Interface .....	10
3.1.4 Transaction Menu Interface.....	10
3.1.5 Withdrawal Interface .....	11
3.1.6 Cash Deposit Interface.....	11
3.1.7 Transfer Interface.....	12
3.1.8 Balance Inquiry Interface.....	13
3.2 Functional Requirement.....	14
3.2.1 F001 Start Up.....	15
3.2.2 F002 Shut Down .....	17
3.2.3 F003 Session Verification.....	18
3.2.4 F004 Transaction Menu .....	22



3.2.5 F005 Withdrawal .....	22
3.2.6 F006 Cash Deposit .....	25
3.2.7 F007 Transfer .....	30
3.2.8 F008 Balance Inquiry .....	33
3.3 Performance Requirement.....	35
3.4 Design Constraints .....	36
3.4.1 Americans with Disabilities Act (ADA) .....	36
3.4.2 Electronic Fund Transfer Act.....	36
3.5 Software System Attributes .....	37
3.5.1 Accuracy .....	37
3.5.2 Security .....	37



## 1.0 Introduction

### 1.1 Purpose

The purpose of this document is to specify the details at the specific requirements elicited by ABC Requirements Engineering Team from ABC Sdn. Bhd. It addresses the functionality, performance, interface, quality attributes and compliance requirements of Automated Teller Machine System (ATMS).

This document is intended for system developer, project manager, configuration manager and client.

### 1.2 Scope

ATMS shall facilitate mainly the following operations:

- i. Start up and shutdown of ATMS.
- ii. Withdrawal, cash deposit, fund transfer and balance inquiry.



## 1.3 Definition & Acronyms

### Definitions

<b>ATM</b>	An Automated Teller Machine (ATM) is the physical machine that offers transaction services to a user, including cash withdrawal, cash deposit, fund transfer and balance inquiry.
<b>Idle</b>	A state of ATMS where the system is “On” but not servicing any user. In this state, ATMS is waiting for the insertion of an ATM card to initiate a user session.
<b>Operator</b>	A bank personnel responsible for physical maintenance activities on the ATM, including but not limited to starting up and shutting down ATM, refilling the cash dispenser in ATM and removing cheque envelopes from ATM.
<b>Transaction</b>	A transaction is a task performed using ATM by a user, including a Cash Withdrawal, Cash Deposit, Fund Transfer and Balance Inquiry.
<b>User</b>	A user is a bank customer who holds an ATM card and is accessing the ATM.

### Acronyms

<b>SRS</b>	System Requirement Specifications
<b>ADA</b>	Americans with Disability Act
<b>ATM</b>	Automated Teller Machine
<b>ATMS</b>	Automated Teller Machine System
<b>IEEE</b>	Institute of Electrical and Electronics Engineers
<b>I/O</b>	Input or output
<b>GUI</b>	Graphical User Interface
<b>PIN</b>	Personal Identification Number
<b>RGB</b>	Red Green Blue (Colour model)





## 1.4 References

This document is prepared in reference to the following documents:

- i. IEEE Std 830-1998, Recommended Practice for Software Requirements Specifications
- ii. ADA Standards 2010 Clause 707

## 1.5 Overview

This document consists of 3 sections:

Section 1 contains the purpose, scope, definitions, acronyms and references made to other documents.

Section 2 contains the overall description of the system, including constraints and assumptions.

Section 3 contains specific requirements of ATMS to be implemented.

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## 2.0 Overall Description

### 2.1 Product Perspective

This section describes the different perspectives of ATMS.

#### 2.1.1 User Interfaces

The following table (Table 1.0) summarizes the list of graphical user interface requirements specified for ATMS:

Requirement ID	Description	Priority	Author
REQ_UI001	ATMS GUI shall make use of only two colour, green (RGB Hex code: #008000) for background and white (RGB Hex code: #FFFFFF) for text.	Medium	John Smith

**Table 1.0 ATMS GUI Requirements**

#### 2.1.2 Hardware Interfaces

ATMS shall be compatible with the following models of ATM hardware manufactured by Wincor Nixdorf:

CINEO C2040

CINEO C2070

CINEO C4040

#### 2.1.3 Communication Interfaces

ATMS shall connect to XYZ Bank transaction server using Local Area Network with minimum speed of 1Mbps.

### 2.2 Product Feature

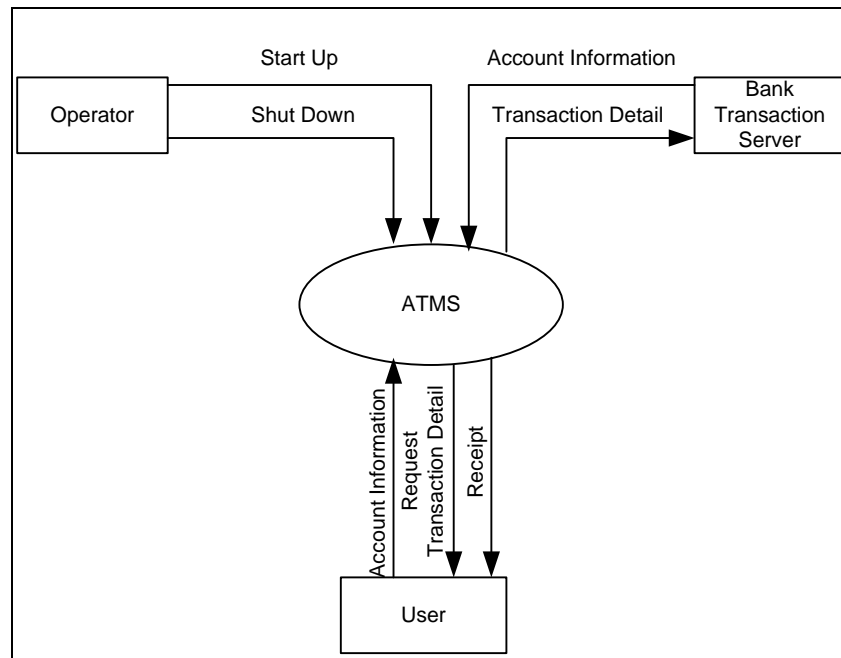
The following table (Table 2.0) contains the list of features to be implemented in ATMS, separated by its accessible role.

Feature ID	Feature	Description	Accessible Role
F001	Start Up	To allow operator to start up ATMS.	Operator
F002	Shut Down	To allow operator to shut down ATMS.	
F003	Session Verification	To allow user to start a session for transaction.	User
F004	Transaction Menu	To allow user to choose the transaction to perform.	
F005	Withdrawal	To allow user to perform a cash withdrawal.	
F006	Cash Deposit	To allow user to perform a cash deposit.	
F007	Transfer	To allow user to perform a fund transfer.	
F008	Balance Inquiry	To allow user to perform a balance inquiry.	

**Table 2.0 ATMS Features**



Figure 1.0 shows the context of ATMS.



**Figure 1.0 ATMS Context Diagram**

An operator's primary role on ATMS is to start up and shut down the ATM. Users are the main target of ATMS where ATMS offers a list of features to them. Bank transaction server will be processing transaction details whenever a transaction is made by a user.

## 2.3 Users Characteristics

There are mainly two roles targeted by ATMS, including operator and user. The following table (Table 3.0) shows the expected level of knowledge for each role.

Role	Description	Required Knowledge
Operator	Bank worker who performs maintenance activities on ATM.	Basic knowledge on ATM maintenance skills, including starting up and shutting down ATM, refilling the ATM cash dispenser and removing cheque envelopes from ATM.
User	General individual who uses the ATM.	Basic knowledge on bank transactions, including how to perform cash withdrawal, cash deposit, fund transfer and balance inquiry.

**Table 3.0 Intended Users & Required Knowledge**



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## 3.0 Specific Requirements

### 3.1 External Interfaces

This section details the external interface requirements of ATMS, separated by features of the system.

#### 3.1.1 Start Up Interface

<b>Requirement ID</b>	REQ_IO101	<b>Version</b>	1.0
<b>Item</b>	On Button (Input)		
<b>Description</b>	"On" button on the ATM.		
<b>Purpose</b>	To allow the operator to start up ATMS.		
<b>Format</b>	Metallic button	<b>Valid Range</b>	Not applicable
<b>Related I/O</b>	None		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_IO102	<b>Version</b>	1.0
<b>Item</b>	Initial Amount of Banknotes (Input)		
<b>Description</b>	Amount of banknotes in ATM during start up.		
<b>Purpose</b>	To allow the operator to specify amount of banknotes in ATM during start up.		
<b>Format</b>	Number	<b>Valid Range</b>	0 – 2147483647
<b>Related I/O</b>	None		
<b>Author</b>	John Smith		

#### 3.1.2 Shut Down Interface

<b>Requirement ID</b>	REQ_IO201	<b>Version</b>	1.0
<b>Item</b>	Off Button (Input)		
<b>Description</b>	"Off" button on the ATM.		
<b>Purpose</b>	To allow the operator to shut down ATMS.		
<b>Format</b>	Metallic button	<b>Valid Range</b>	Not applicable
<b>Related I/O</b>	None		
<b>Author</b>	John Smith		



### 3.1.3 Session Verification Interface

<b>Requirement ID</b>	REQ_IO301	<b>Version</b>	1.0
<b>Item</b>	ATM Card (Input)		
<b>Description</b>	Automated Teller Machine card issued by the bank to a bank customer.		
<b>Purpose</b>	To allow the card holder to perform a transaction using an ATM.		
<b>Format</b>	Magnetic stripe card	<b>Valid Range</b>	Physical measurement of 85.60 × 53.98 mm (3.370 × 2.125 in) and rounded corners with a radius of 2.88–3.48 mm, in accordance with ISO/IEC 7810#ID 1
<b>Related I/O</b>	REQ_IO302 (PIN must match the ATM card to allow transaction using ATM.)		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_IO302	<b>Version</b>	1.0
<b>Item</b>	PIN (Input)		
<b>Description</b>	Personal Identification Number of the associated ATM card consisting of 6 Arabic numerical digits.		
<b>Purpose</b>	To prevent unauthorized access over the ATM card account.		
<b>Format</b>	Number	<b>Valid Range</b>	000000 – 999999
<b>Related I/O</b>	REQ_IO301 (PIN must match the ATM card to allow transaction using ATM.)		
<b>Author</b>	John Smith		

### 3.1.4 Transaction Menu Interface

<b>Requirement ID</b>	REQ_IO401	<b>Version</b>	1.0
<b>Item</b>	Transaction Type (Input)		
<b>Description</b>	Type of transaction that a user can perform on ATM.		
<b>Purpose</b>	To allow the user to choose the type of transaction to perform.		
<b>Format</b>	Number	<b>Valid Range</b>	1 – 4 (1 – Withdrawal, 2 – Deposit, 3 – Transfer, 4 – Balance Inquiry)
<b>Related I/O</b>	None		
<b>Author</b>	John Smith		





### 3.1.5 Withdrawal Interface

<b>Requirement ID</b>	REQ_IO501	<b>Version</b>	1.0
<b>Item</b>	Account Type (Input)		
<b>Description</b>	Type of account that a user wishes to withdraw from.		
<b>Purpose</b>	To allow the user to choose the type of account to withdraw from.		
<b>Format</b>	Number	<b>Valid Range</b>	1 – 3 (1 – Savings, 2 – Checking, 3 – Money Market)
<b>Related I/O</b>	REQ_IO502 (Account type determines where the money will be withdrawn from.)		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_IO502	<b>Version</b>	1.0
<b>Item</b>	Amount of Withdrawal (Input)		
<b>Description</b>	Amount of cash that the user wishes to withdraw.		
<b>Purpose</b>	To allow the user to specify the amount of cash to withdraw.		
<b>Format</b>	Number	<b>Valid Range</b>	1 – 5 (1 – 20, 2 – 40, 3 – 60, 4 – 100, 5 – 200)
<b>Related I/O</b>	REQ_IO501 (Account type determines where the money will be withdrawn from.)		
<b>Author</b>	John Smith		

### 3.1.6 Cash Deposit Interface

<b>Requirement ID</b>	REQ_IO601	<b>Version</b>	1.0
<b>Item</b>	Account Type (Input)		
<b>Description</b>	Type of account that a user wishes to deposit into.		
<b>Purpose</b>	To allow the user to choose the type of account to deposit into.		
<b>Format</b>	Number	<b>Valid Range</b>	1 – 3 (1 – Savings, 2 – Checking, 3 – Money Market)
<b>Related I/O</b>	REQ_IO602 (Account type determines where the money will be deposited into.)		
<b>Author</b>	John Smith		



<b>Requirement ID</b>	REQ_IO602	<b>Version</b>	1.0
<b>Item</b>	Amount of Deposit (Input)		
<b>Description</b>	Amount of cash that the user wishes to deposit.		
<b>Purpose</b>	To allow the user to specify the amount of cash to deposit.		
<b>Format</b>	Number	<b>Valid Range</b>	10 – 2147483647 (After decimal conversion)
<b>Related I/O</b>	REQ_IO601 (Account type determines where the money will be deposited into.)		
<b>Author</b>	John Smith		

### 3.1.7 Transfer Interface

<b>Requirement ID</b>	REQ_IO701	<b>Version</b>	1.0
<b>Item</b>	Account Type (From) (Input)		
<b>Description</b>	Type of account that a user wishes to transfer from.		
<b>Purpose</b>	To allow the user to choose the type of account to transfer from.		
<b>Format</b>	Number	<b>Valid Range</b>	1 – 3 (1 – Savings, 2 – Checking, 3 – Money Market)
<b>Related I/O</b>	REQ_IO703 (Account type determines where the money will be transferred from.)		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_IO702	<b>Version</b>	1.0
<b>Item</b>	Account Type (To) (Input)		
<b>Description</b>	Type of account that a user wishes to transfer to.		
<b>Purpose</b>	To allow the user to choose the type of account to transfer to.		
<b>Format</b>	Number	<b>Valid Range</b>	1 – 3 (1 – Savings, 2 – Checking, 3 – Money Market)
<b>Related I/O</b>	REQ_IO703 (Account type determines where the money will be transferred to.)		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_IO703	<b>Version</b>	1.0
<b>Item</b>	Amount of Transfer (Input)		
<b>Description</b>	Amount of cash that the user wishes to transfer.		
<b>Purpose</b>	To allow the user to specify the amount of fund to transfer.		
<b>Format</b>	Number	<b>Valid Range</b>	1 – 2147483647 (After decimal conversion)
<b>Related I/O</b>	REQ_IO701 (Account type determines where the money will be transferred from.) REQ_IO702 (Account type determines where the money will be transferred to.)		
<b>Author</b>	John Smith		



**3.1.8 Balance Inquiry Interface**

<b>Requirement ID</b>	REQ_IO801	<b>Version</b>	1.0
<b>Item</b>	Account Type (Input)		
<b>Description</b>	Type of account that a user wishes to inquire about its balance.		
<b>Purpose</b>	To allow the user to choose the type of account for balance inquiry.		
<b>Format</b>	Number	<b>Valid Range</b>	1 – 3 (1 – Savings, 2 – Checking, 3 – Money Market)
<b>Related I/O</b>	None		
<b>Author</b>	John Smith		



## 3.2 Functional Requirement

This section details the functional requirements of ATMS, starting with overall requirement, followed by requirements of each features of the system. Figure 2.0 shows the overall use case of ATMS:

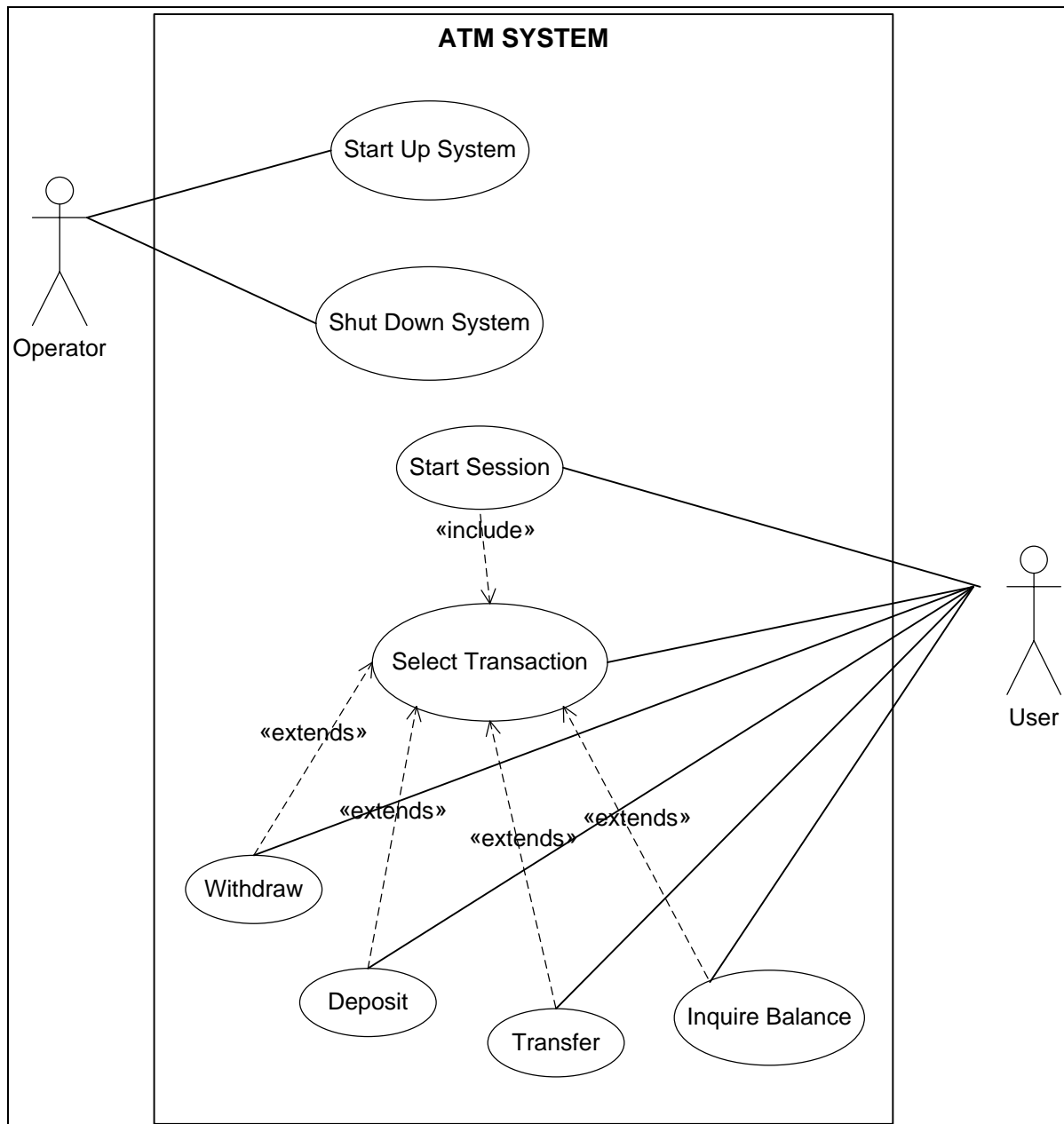


Figure 2.0 ATMS Overall Use Case



<b>Requirement ID</b>	REQ_F001	<b>Version</b>	1.0
<b>Description</b>	System shall record in log after each successful and failed transaction.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F002	<b>Version</b>	1.0
<b>Description</b>	System shall print receipt after each successful transaction.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F003	<b>Version</b>	1.0
<b>Description</b>	System shall allow a user to terminate transaction.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F004	<b>Version</b>	1.0
<b>Description</b>	System shall allow user to choose to perform another transaction after a successful or failed transaction.		
<b>Author</b>	John Smith		

### 3.2.1 F001 Start Up

The functional requirements for Start Up are as followed:

<b>Requirement ID</b>	REQ_F101	<b>Version</b>	1.0
<b>Description</b>	System shall start up when an operator presses "On" button.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F102	<b>Version</b>	1.0
<b>Description</b>	System shall request for input of initial amount of cash.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F103	<b>Version</b>	1.0
<b>Description</b>	System shall be able to verify initial amount of cash.		
<b>Author</b>	John Smith		

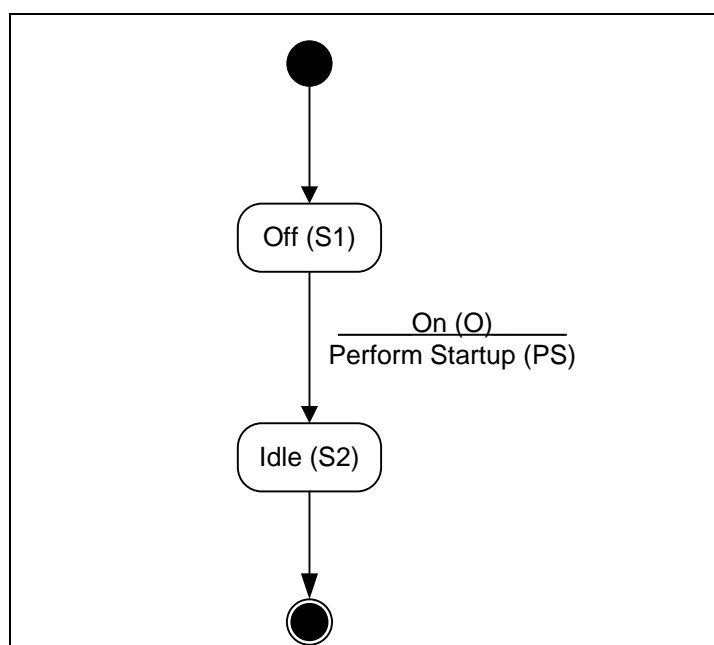
<b>Requirement ID</b>	REQ_F104	<b>Version</b>	1.0
<b>Description</b>	System shall display error message for invalid initial amount of cash.		
<b>Author</b>	John Smith		



The following table (Table 4.0) shows the details of this feature, followed by a state diagram to illustrate the state transition of the feature.

Use Case ID	UC001	Version	1.0
Feature	F001 Start Up		
Purpose	To allow operators to switch on ATMS after maintenance activities.		
Actor	Operator		
Trigger	Operator presses the “On” button on the ATM.		
Precondition	ATMS is in “Off” state.		
Scenario Name	Step	Action	
Main Flow	1	Operator presses “On” button.	
	2	System requests for input of initial amount of cash.	
	3	Operator inputs the number of \$20 banknotes in ATM.	
	4	System verifies the initial amount of cash.	
	5	System enters “On” and “Idle” state and displays message “Please insert your card”.	
Alternate Flow – Invalid Initial Amount of Cash	3.1	Operator inputs invalid initial amount of cash.	
	3.2	System display error message “Must be a valid integer >= 0”	
Rules	Initial amount of cash must be a valid integer >= 0 [REQ_IO102]		
Author	John Smith		

**Table 4.0 Use Case Specification – Start Up**



**Figure 3.0 State Diagram – Start Up**



### 3.2.2 F002 Shut Down

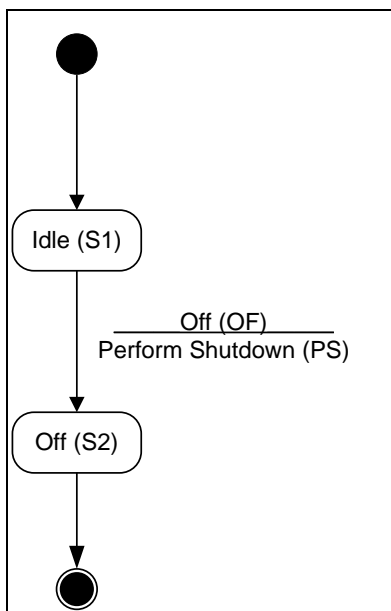
The functional requirements for Shut Down are as followed:

<b>Requirement ID</b>	REQ_F201	<b>Version</b>	1.0
<b>Description</b>	System shall shut down when an operator presses “Off” button during “Idle” state.		
<b>Author</b>	John Smith		

The following table (Table 3.2.2) shows the details of this feature, followed by a state diagram to illustrate the state transition of the feature.

Use Case ID	UC002	Version	1.0
Use Case	F002 System Shut Down		
Purpose	To allow operators to shut down ATMS for maintenance activities.		
Actor	Operator		
Trigger	Operator presses the “Off” button on the ATM.		
Precondition	ATMS is in “On” and “Idle” state.		
Scenario Name	Step	Action	
Main Flow	1	Operator presses “Off” button.	
	2	System displays error message “Not currently available”.	
	3	System stops all services.	
Rules	System must be in “Idle” to be shut down.		
Author	John Smith		

**Table 5.0 Use Case Specification – Shut Down**



**Figure 4.0 State Diagram – Shut Down**



### 3.2.3 F003 Session Verification

The functional requirements for Session Verification are as follows:

<b>Requirement ID</b>	REQ_F301	<b>Version</b>	1.0
<b>Description</b>	System shall start a session when a user inserts an ATM card.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F302	<b>Version</b>	1.0
<b>Description</b>	System shall be able to verify an ATM card.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F303	<b>Version</b>	1.0
<b>Description</b>	System shall request for input of PIN after system successfully verifies an ATM card.		
<b>Author</b>	John Smith		

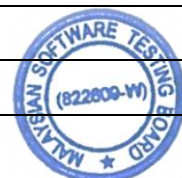
<b>Requirement ID</b>	REQ_F304	<b>Version</b>	1.0
<b>Description</b>	System shall be able to verify a PIN.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F305	<b>Version</b>	1.0
<b>Description</b>	System shall eject ATM card if a user inserts an invalid ATM card.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F306	<b>Version</b>	1.0
<b>Description</b>	System shall request user to re-input PIN in case of invalid PIN for first and second time.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F307	<b>Version</b>	1.0
<b>Description</b>	System shall retain ATM card if a user inputs invalid PIN for 3 times in a day.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F308	<b>Version</b>	1.0
<b>Description</b>	System shall allow a user to terminate session during PIN input.		
<b>Author</b>	John Smith		





<b>Requirement ID</b>	REQ_F309	<b>Version</b>	1.0
<b>Description</b>	System shall allow a user to terminate session while in transaction menu.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F310	<b>Version</b>	1.0
<b>Description</b>	System shall be able to terminate a session.		
<b>Author</b>	John Smith		

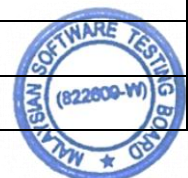
<b>Requirement ID</b>	REQ_F311	<b>Version</b>	1.0
<b>Description</b>	System shall display error message for invalid ATM card.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F312	<b>Version</b>	1.0
<b>Description</b>	System shall display error message for invalid PIN for first and second time.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F313	<b>Version</b>	1.0
<b>Description</b>	System shall display error message for invalid PIN for third time (Card retained).		
<b>Author</b>	John Smith		

The following table (Table 6.0) shows the details of this feature, followed by a state diagram to illustrate the state transition of the feature.

<b>Use Case ID</b>	UC003	<b>Version</b>	1.0
<b>Feature</b>	F003 Session Verification		
<b>Purpose</b>	To allow users to start a session and use the ATM services.		
<b>Actor</b>	User		
<b>Trigger</b>	User inserts an ATM card.		
<b>Precondition</b>	ATMS is in "On" and "Idle" state.		
<b>Scenario Name</b>	<b>Step</b>	<b>Action</b>	
<b>Main Flow</b>	1	User inserts a valid ATM card into the ATM.	
	2	System starts a session and verifies the ATM card.	
	3	System requests for input of PIN.	
	4	User inputs the correct PIN.	



	5	System verifies the PIN
	6	System displays the transaction menu and waits for user's transaction request.
	7	User chooses a transaction.
	8	System performs transaction.
	9	User ends a session.
	10	System terminates session and eject card.
	11	System enters "Idle" state and displays message "Please insert your card".
<b>Alternate Flow – Invalid ATM Card</b>	1.1	User inserts an invalid ATM card into the ATM.
	1.2	System displays error message "Invalid card" and reject the card.
	1.3	Back to Main Flow Step 11.
<b>Alternate Flow – Invalid PIN (1 or 2 times)</b>	4.1.1	User inputs an invalid PIN.
	4.1.2	System verifies that this is not the third time invalid PIN is entered.
	4.1.3	System displays error message "Invalid PIN" and request for user to re-enter password.
<b>Alternate Flow – Invalid PIN (3 times)</b>	4.2.1	User inputs an invalid PIN.
	4.2.2	System verifies that this is the third time invalid PIN is entered.
	4.2.3	System terminates session and retains ATM card.
	4.2.4	System displays error message "Your card has been retained. Please contact the bank."
	4.2.5	Back to Main Flow Step 11.
<b>Alternate Flow – Cancel During PIN Input</b>	4.3.1	User presses "Cancel" button.
	4.3.2	Back to Main Flow Step 10.
<b>Alternate Flow – Cancel During Transaction Menu</b>	7.1	User presses "Cancel" button.
	7.2	Back to Main Flow Step 10.
<b>Rules</b>	i.	3 times invalid PIN causes card retention. [REQ_F307]
<b>Note</b>	i.	Transaction is further split into Withdrawal, Deposit, Transfer and Inquiry will be covered in Section 3.2.5, 3.2.6, 3.2.7, and 3.2.8.
	ii.	For specification of ATM card and PIN, refer to [REQ_IO301] and [REQ_IO302].
<b>Author</b>	John Smith	

Table 6.0 Use Case Specification – Session Verification



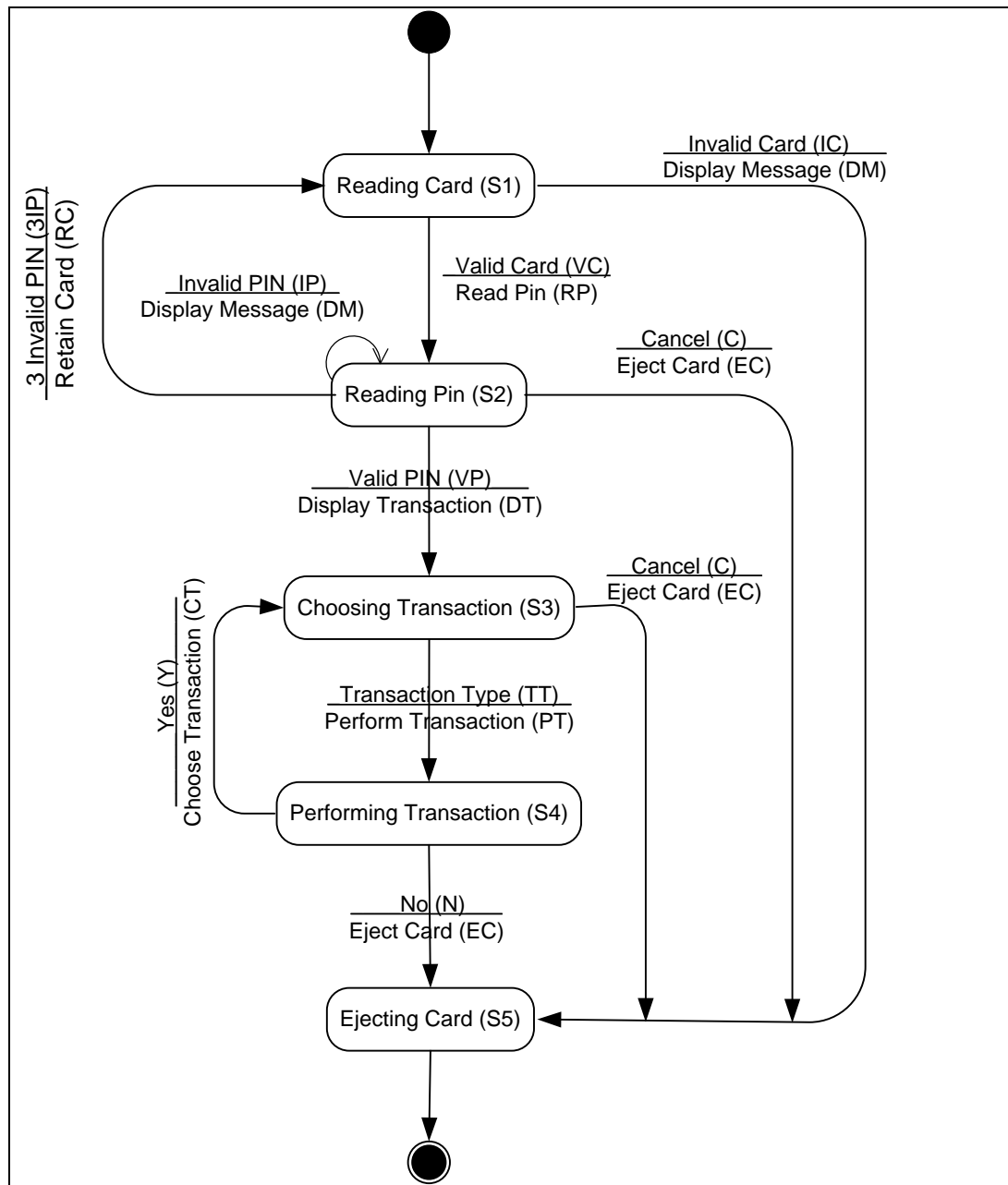


Figure 5.0 State Diagram – Session Verification



### 3.2.4 F004 Transaction Menu

The functional requirements for Transaction Menu are as followed:

<b>Requirement ID</b>	REQ_F401	<b>Version</b>	1.0
<b>Description</b>	System shall display a list of transaction types, including Withdrawal, Deposit, Fund Transfer and Balance Inquiry.		
<b>Author</b>	John Smith		

The flows of Transaction Menu are covered in F003 Session Verification, F005 Withdrawal, F006 Deposit and F008 Balance Inquiry.

### 3.2.5 F005 Withdrawal

The functional requirements for Withdrawal are as follows:

<b>Requirement ID</b>	REQ_F501	<b>Version</b>	1.0
<b>Description</b>	System shall allow user to perform a cash withdrawal.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F502	<b>Version</b>	1.0
<b>Description</b>	System shall request user to choose the type of account for withdrawal.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F503	<b>Version</b>	1.0
<b>Description</b>	System shall be able to verify the type of account for withdrawal.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F504	<b>Version</b>	1.0
<b>Description</b>	System shall request user to input the amount of withdrawal.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F505	<b>Version</b>	1.0
<b>Description</b>	System shall be able to verify the amount of banknotes in ATM.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F506	<b>Version</b>	1.0
<b>Description</b>	System shall be able to verify the daily withdrawal limit of account.		
<b>Author</b>	John Smith		



<b>Requirement ID</b>	REQ_F507	<b>Version</b>	1.0
<b>Description</b>	System shall be able to verify the amount of money in a user's account.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F508	<b>Version</b>	1.0
<b>Description</b>	System shall display error message for invalid account for withdrawal (Non-existing account).		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F509	<b>Version</b>	1.0
<b>Description</b>	System shall display error message for insufficient cash in ATM.		
<b>Author</b>	John Smith		

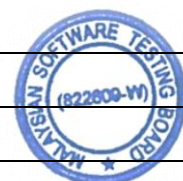
<b>Requirement ID</b>	REQ_F510	<b>Version</b>	1.0
<b>Description</b>	System shall display error message for insufficient balance in a user's account.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F511	<b>Version</b>	1.0
<b>Description</b>	System shall display error message when a user's daily maximum withdrawal limit is reached. (Limit = 300)		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F512	<b>Version</b>	1.0
<b>Description</b>	System shall not respond to invalid account to withdrawal (Out of range).		
<b>Author</b>	John Smith		

The following table (Table 7.0) shows the details of this feature, followed by a state diagram to illustrate the state transition of the feature.

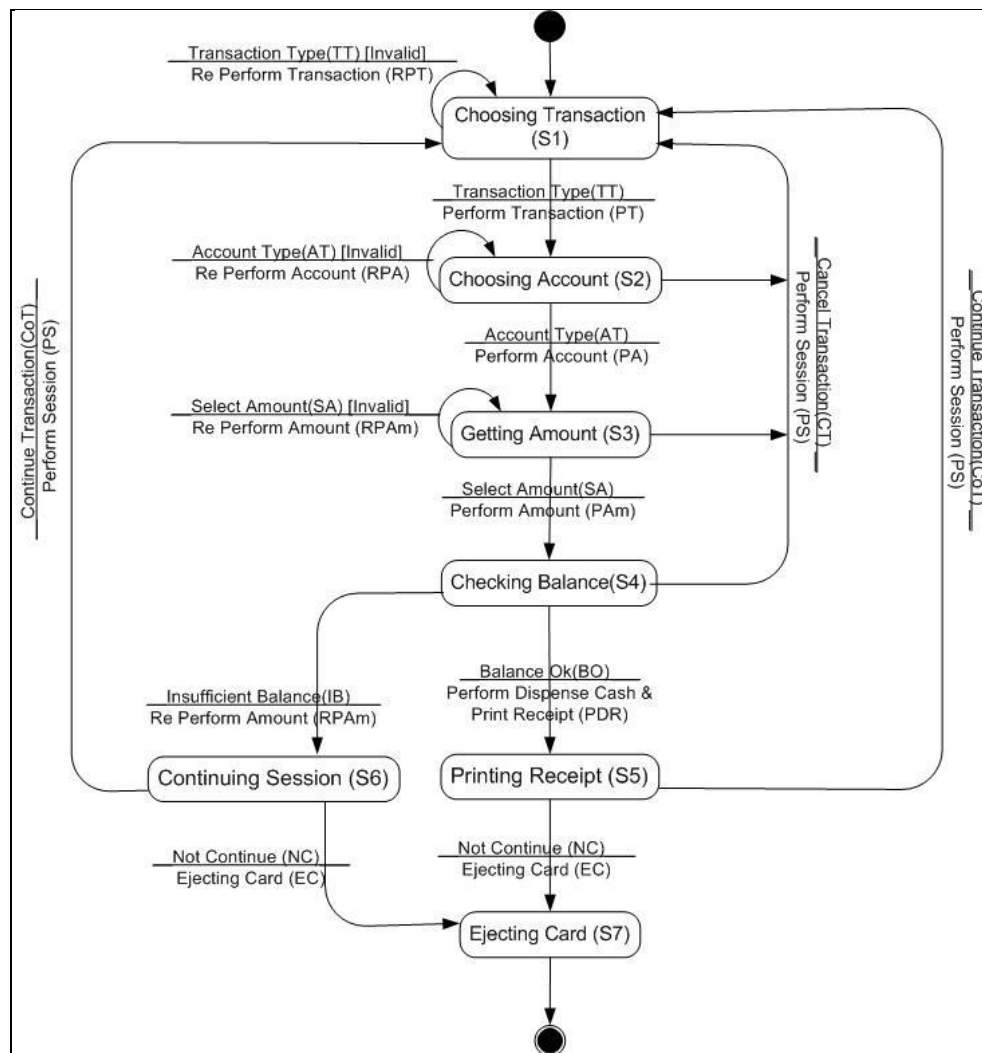
<b>Use Case ID</b>	UC004	<b>Version</b>	1.0
<b>Use Case</b>	Withdrawal		
<b>Purpose</b>	To allow users to perform a cash withdrawal.		
<b>Actor</b>	User		
<b>Trigger</b>	User chooses "Withdrawal" in Transaction Menu.		
<b>Precondition</b>	ATMS is in "On" and at Transaction Menu.		



Scenario Name	Step	Action
<b>Main Flow</b>	1	User chooses "Withdrawal" in Transaction Menu.
	2	System requests for type of account to withdraw from.
	3	User chooses valid type of account to withdraw from.
	4	System verifies type of account to withdraw from.
	5	System requests for amount to withdraw.
	6	User enters valid amount to withdraw.
	7	System verifies amount of banknotes in ATM.
	8	System verifies daily withdrawal limit of account.
	9	System verifies amount of money in account.
	10	System dispenses cash equal to withdrawal amount.
	11	System records in log and prints receipt.
	12	System asks whether user wants to perform another transaction.
	13	User chooses "No".
	14	System terminates session and ejects card.
	15	System enters "Idle" state and displays message "Please insert your card".
<b>Alternate Flow – Invalid Account Type</b>	3.1.1	User chooses invalid type of account to withdraw from.
	3.1.2	System displays error message "Invalid account type."
	3.1.3	Back to Main Flow Step 12.
<b>Alternate Flow – Cancel Withdrawal At Account Type Selection</b>	3.2.1	User presses "Cancel" button.
	3.2.2	Back to Main Flow Step 12.
<b>Alternate Flow – Invalid Withdrawal Amount (Insufficient Balance in ATM)</b>	6.1.1	User inputs invalid amount to withdraw. (Amount more than balance in ATM)
	6.1.2	System displays error message "Insufficient cash".
	6.1.3	Back to Basic Flow Step 5.
<b>Alternate Flow – Invalid Withdrawal Amount (Insufficient Balance in Account)</b>	6.2.1	User inputs invalid amount to withdraw. (Amount more than balance in customer's account)
	6.2.2	System displays error message "Insufficient balance".
	6.2.3	Back to Basic Flow Step 5.
<b>Alternate Flow – Invalid Withdrawal Amount (Daily Withdrawal Limit Reached)</b>	6.3.1	User inputs invalid amount to withdraw. (Amount more than daily withdrawal limit)
	6.3.2	System displays error message "Daily withdrawal limit reached."
	6.3.3	Back to Basic Flow Step 5.



<b>Alternate Flow – Cancel When Entering Withdrawal Amount</b>	6.4.1	User presses “Cancel” button.
	6.4.2	Back to Main Flow Step 12.
<b>Alternate Flow – Perform Another Transaction</b>	13.1	User chooses “Yes”.
	13.2	System displays the transaction menu and waits for user’s transaction request.
<b>Rules</b>	i. Withdrawal amount is set at 20, 40, 60, 100 and 200. [REQ_IO502] ii. Daily withdrawal limit is set at 300 by default. [REQ_F510]	

**Table 7.0 Use Case Specification – Withdrawal****Figure 6.0 State Diagram – Withdrawal****3.2.6 F006 Cash Deposit**

The functional requirements for Deposit are as follows:

<b>Requirement ID</b>	REQ_F601	<b>Version</b>	1.0
<b>Description</b>	System shall allow user to perform a cash deposit.		



<b>Author</b>	John Smith		
<b>Requirement ID</b>	REQ_F602	<b>Version</b>	1.0
<b>Description</b>	System shall request user to choose the type of account for deposit.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F603	<b>Version</b>	1.0
<b>Description</b>	System shall be able to verify the type of account for deposit.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F604	<b>Version</b>	1.0
<b>Description</b>	System shall request user to input the amount of deposit.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F605	<b>Version</b>	1.0
<b>Description</b>	System shall be able to verify the amount of deposit.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F606	<b>Version</b>	1.0
<b>Description</b>	System shall display error message for invalid account for deposit (Non-existing account).		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F607	<b>Version</b>	1.0
<b>Description</b>	System shall deduct \$0.10 from account as processing fee.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F608	<b>Version</b>	1.0
<b>Description</b>	System shall not respond to invalid account to deposit (Out of range).		
<b>Author</b>	John Smith		

The following table (Table 8.0) shows the details of this feature, followed by a state diagram to illustrate the state transition of the feature.

<b>Use Case ID</b>	UC005	<b>Version</b>	1.0
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<b>Use Case</b>	Cash Deposit	
<b>Purpose</b>	To allow users to perform a cash deposit.	
<b>Actor</b>	User	
<b>Trigger</b>	User chooses “Deposit” in Transaction Menu.	
<b>Precondition</b>	ATMS is in “On” and at Transaction Menu.	
<b>Scenario Name</b>	<b>Step</b>	<b>Action</b>
<b>Main Flow</b>	1	User chooses “Deposit” in Transaction Menu.
	2	System requests for type of account to deposit into.
	3	User chooses valid type of account to deposit into.
	4	System verifies type of account to deposit into.
	5	System requests for amount to deposit.
	6	User enters specifies amount to deposit and cash envelope.
	7	System verifies amount of money.
	8	System updates account after deposit.
	9	System records in log and prints receipt.
	10	System asks whether user wants to perform another transaction.
	11	User chooses “No”.
	12	System terminates session and ejects card.
	13	System enters “Idle” state and displays message “Please insert your card”.
<b>Alternate Flow – Invalid Account Type</b>	3.1.1	User chooses invalid type of account to deposit into.
	3.1.2	System displays error message “Invalid account type.”
	3.1.3	Back to Main Flow Step 10.
<b>Alternate Flow – Cancel Deposit At Account Type Selection</b>	3.2.1	User presses “Cancel” button.
	3.2.2	Back to Main Flow Step 10.
<b>Alternate Flow – Invalid Deposit Amount (Lower Than Minimum or Higher Than Maximum Amount Accepted)</b>	6.1.1	User inputs invalid amount to deposit. (Amount lower than minimum or higher than maximum amount accepted)
	6.1.2	System displays error message “Invalid amount of deposit”.
	6.1.3	Back to Basic Flow Step 5.
<b>Alternate Flow – Cancel When Entering Deposit Amount</b>	6.2.1	User presses “Cancel” button.
	6.2.2	Back to Main Flow Step 10.



<b>Alternate Flow – Perform Another Transaction</b>	11.1	User chooses “Yes”.
	11.2	System displays the transaction menu and waits for user’s transaction request.
<b>Rules</b>	i. Minimum deposit amount is set at 10. [REQ_IO601] ii. A process fee of 10 cents is applied and deducted from deposited amount. [REQ_F607]	
<b>Author</b>	John Smith	

**Table 8.0 Use Case Specification – Cash Deposit**

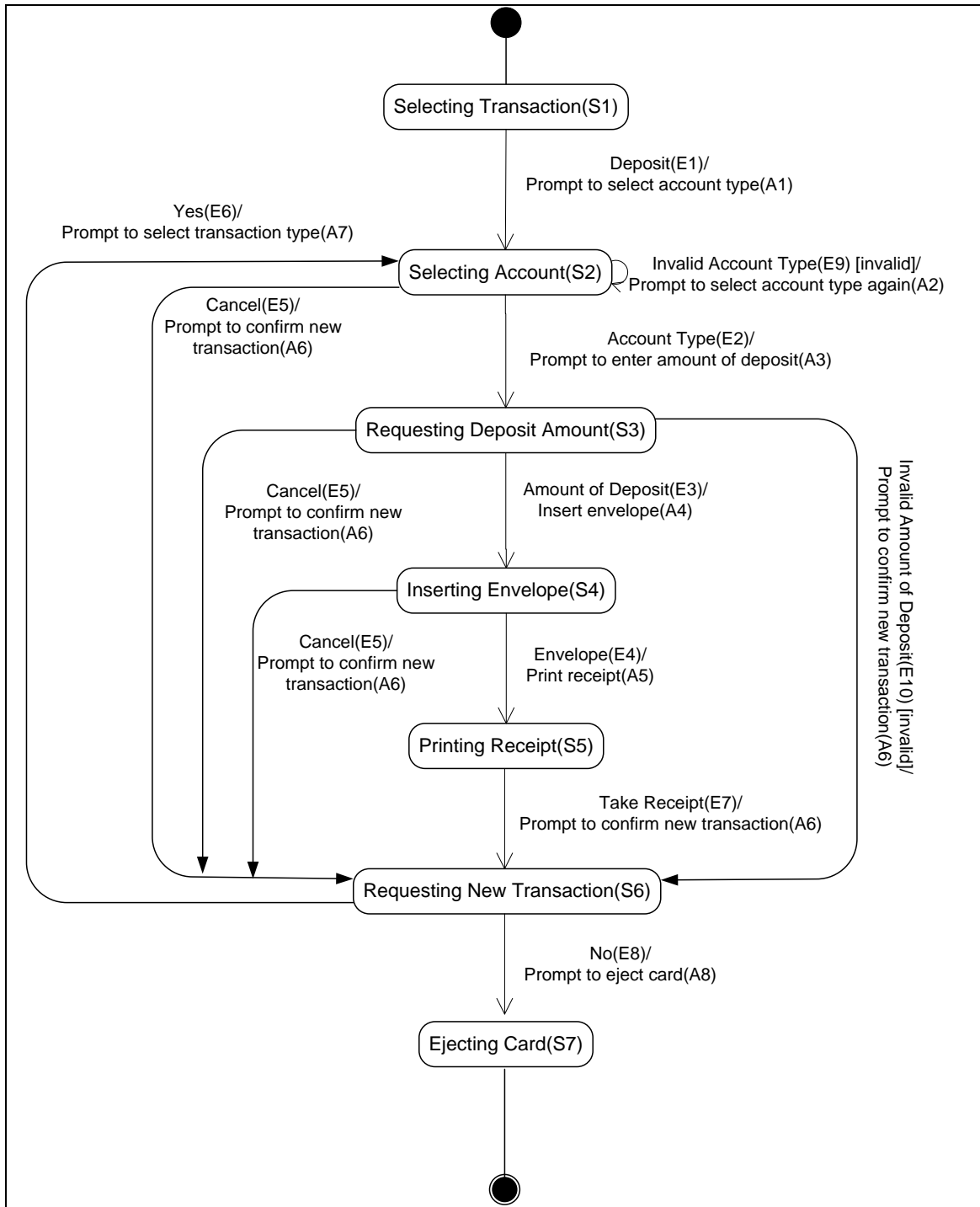


Figure 7.0 State Diagram – Cash Deposit



### 3.2.7 F007 Transfer

The functional requirements for Transfer are as follows:

<b>Requirement ID</b>	REQ_F701	<b>Version</b>	1.0
<b>Description</b>	System shall allow user to perform a fund transfer.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F702	<b>Version</b>	1.0
<b>Description</b>	System shall request user to choose the type of account to transfer from.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F703	<b>Version</b>	1.0
<b>Description</b>	System shall be able to verify the type of account to transfer from.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F704	<b>Version</b>	1.0
<b>Description</b>	System shall request user to choose the type of account to transfer to.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F705	<b>Version</b>	1.0
<b>Description</b>	System shall be able to verify the type of account to transfer to.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F706	<b>Version</b>	1.0
<b>Description</b>	System shall request user to input the amount of fund transfer.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F707	<b>Version</b>	1.0
<b>Description</b>	System shall be able to verify the amount of fund transfer.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F708	<b>Version</b>	1.0
<b>Description</b>	System shall display error message for invalid account to transfer (Non-existing account).		
<b>Author</b>	John Smith		

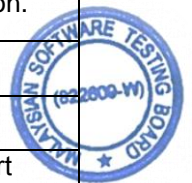


<b>Requirement ID</b>	REQ_F709	<b>Version</b>	1.0
<b>Description</b>	System shall display error message for insufficient balance in a user's account.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F710	<b>Version</b>	1.0
<b>Description</b>	System shall not respond to invalid account to transfer (Out of range).		
<b>Author</b>	John Smith		

The following table (Table 9.0) shows the details of this feature, followed by a state diagram to illustrate the state transition of the feature.

<b>Use Case ID</b>	UC006	<b>Version</b>	1.0
<b>Use Case</b>	Transfer		
<b>Purpose</b>	To allow users to perform a transfer between accounts.		
<b>Actor</b>	User		
<b>Trigger</b>	User chooses "Transfer" in Transaction Menu.		
<b>Precondition</b>	ATMS is in "On" and at Transaction Menu.		
<b>Scenario Name</b>	<b>Step</b>	<b>Action</b>	
<b>Main Flow</b>	1	User chooses "Transfer" in Transaction Menu.	
	2	System requests for type of account to transfer from.	
	3	User chooses valid type of account to transfer from.	
	4	System verifies type of account to transfer from.	
	5	System requests for type of account to transfer into.	
	6	User chooses valid type of account to transfer into.	
	7	System verifies type of account to transfer into.	
	8	System requests for amount to transfer.	
	9	User enters valid amount to transfer.	
	10	System verifies amount of money in account.	
	11	System records in log and prints receipt.	
	12	System asks whether user wants to perform another transaction.	
	13	User chooses "No".	
	14	System terminates session and ejects card.	
	15	System enters "Idle" state and displays message "Please insert your card".	



<b>Alternate Flow – Invalid Account Type (From)</b>	3.1.1	User chooses invalid type of account to transfer from.
	3.1.2	Back to Main Flow Step 2.
<b>Alternate Flow – Cancel Transfer At Account Type Selection (From)</b>	3.2.1	User presses “Cancel” button.
	3.2.2	Back to Main Flow Step 12.
<b>Alternate Flow – Invalid Account Type (To)</b>	6.1.1	User chooses invalid type of account to transfer to.
	6.1.2	Back to Main Flow Step 5.
<b>Alternate Flow – Cancel Transfer At Account Type Selection (To)</b>	6.2.1	User presses “Cancel” button.
	6.2.2	Back to Main Flow Step 12.
<b>Alternate Flow – Invalid Transfer Amount (Amount more than account balance)</b>	9.1.1	User inputs invalid amount to transfer. (Amount more than daily account balance)
	9.1.2	System displays error message “Insufficient balance in account.”
	9.1.3	Back to Basic Flow Step 12.
<b>Alternate Flow – Cancel When Entering Transfer Amount</b>	9.2.1	User presses “Cancel” button.
	9.2.2	Back to Main Flow Step 12.
<b>Alternate Flow – Perform Another Transaction</b>	13.1	User chooses “Yes”.
	13.2	System displays the transaction menu and waits for user’s transaction request.
<b>Rules</b>	i. Minimum transfer amount is \$1.00. ii. Maximum transfer amount is \$2,147,483,647	
<b>Author</b>	John Smith	

Table 9.0 Use Case Specification – Transfer



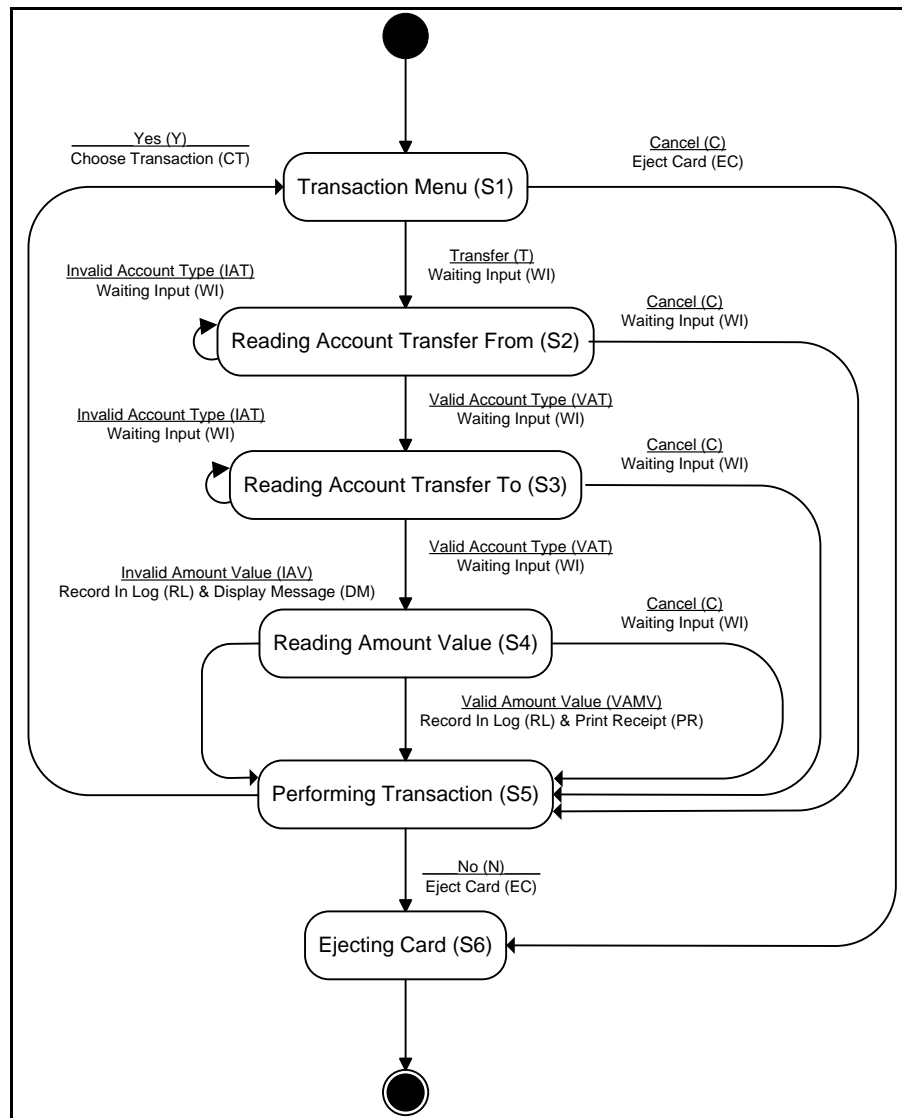


Figure 8.0 State Diagram – Transfer

### 3.2.8 F008 Balance Inquiry

The functional requirements for Balance Inquiry are as follows:

Requirement ID	REQ_F801	Version	1.0
Description	System shall allow user to perform a balance inquiry.		
Author	John Smith		

Requirement ID	REQ_F802	Version	1.0
Description	System shall request user to choose the type of account to inquire.		
Author	John Smith		



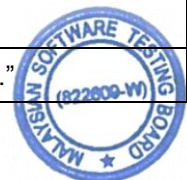
<b>Requirement ID</b>	REQ_F803	<b>Version</b>	1.0
<b>Description</b>	System shall be able to verify the type of account to inquire.		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F804	<b>Version</b>	1.0
<b>Description</b>	System shall display error message for invalid account to inquire (Non-existing account).		
<b>Author</b>	John Smith		

<b>Requirement ID</b>	REQ_F805	<b>Version</b>	1.0
<b>Description</b>	System shall not respond to invalid account to inquire (Out of range).		
<b>Author</b>	John Smith		

The following table (Table 10.0) shows the details of this feature, followed by a state diagram to illustrate the state transition of the feature.

<b>Use Case ID</b>	UC007	
<b>Use Case</b>	Balance Inquiry	
<b>Purpose</b>	To allow users to perform a balance inquiry.	
<b>Actor</b>	User	
<b>Trigger</b>	User chooses "Balance Inquiry" in Transaction Menu.	
<b>Precondition</b>	ATMS is in "On" and at Transaction Menu.	
<b>Scenario Name</b>	<b>Step</b>	<b>Action</b>
<b>Main Flow</b>	1	User chooses "Balance Inquiry" in Transaction Menu.
	2	System requests for type of account to inquire.
	3	User chooses valid type of account to inquire.
	4	System verifies type of account to inquire.
	5	System records in log and prints receipt.
	6	System asks whether user wants to perform another transaction.
	7	User chooses "No".
	8	System terminates session and ejects card.
	9	System enters "Idle" state and displays message "Please insert your card".
<b>Alternate Flow – Invalid Account Type</b>	3.1.1	User chooses invalid type of account to inquire.
	3.1.2	System displays error message "Invalid account type."





	3.1.3	Back to Main Flow Step 6.
<b>Alternate Flow – Cancel Balance Inquiry At Account Type Selection</b>	3.2.1	User presses “Cancel” button.
	3.2.2	Back to Main Flow Step 6.

Table 10.0 Use Case Specification – Balance Inquiry

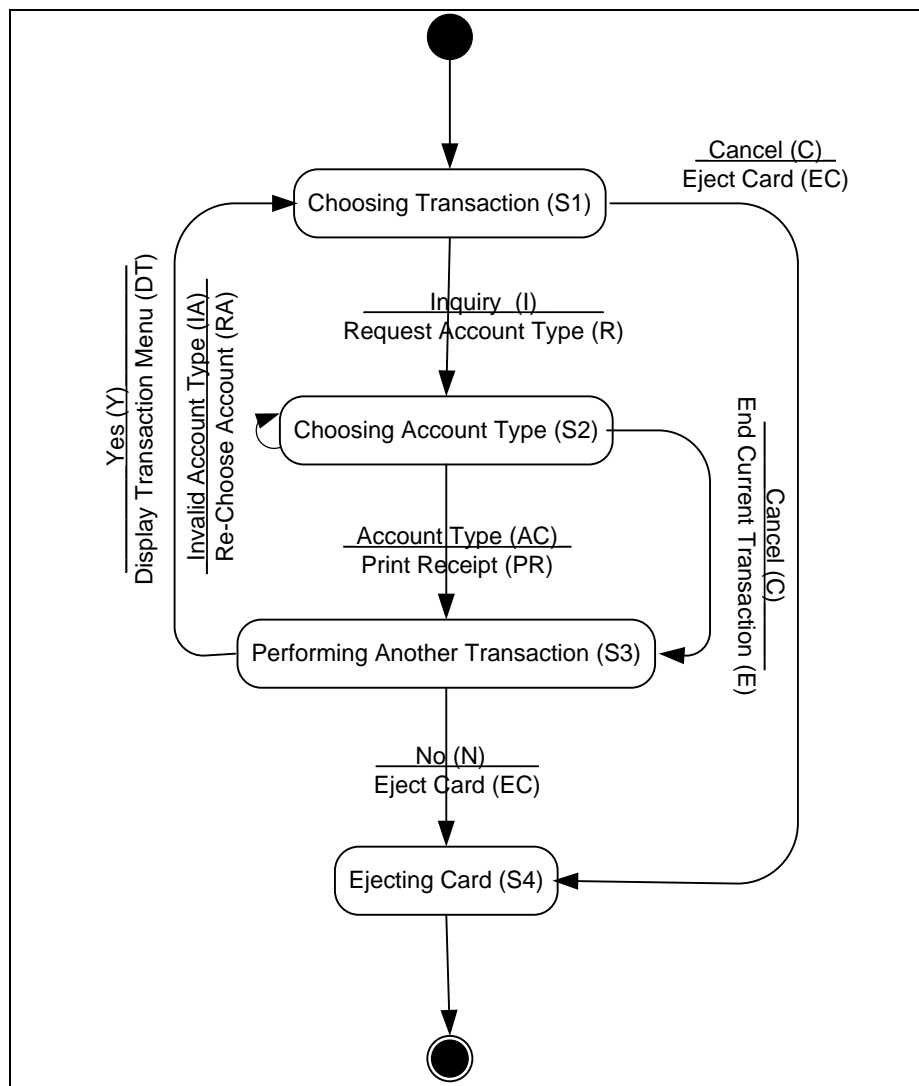


Figure 9.0 State Diagram – Balance Inquiry

### 3.3 Performance Requirement

The performance requirements for ATMS are as follows:

Requirement ID	Description	Priority	Author
REQ_P001	The average response time of ATMS shall be less than 2 seconds.	High	John Smith



Requirement ID	Description	Priority	Author
REQ_P002	The bank transaction server shall be able to support up to 1000 connections (inclusive of 1000) at the same time.	High	John Smith

### 3.4 Design Constraints

This section outlines the standard compliances that are related to ATMS

#### 3.4.1 Americans with Disabilities Act (ADA)

Applicable design constraint under this act is:

##### 707.6.2 Numeric Keys

Numeric keys shall be arranged in a 12-key ascending or descending telephone keypad layout. The number five key shall be tactilely distinct from the other keys.

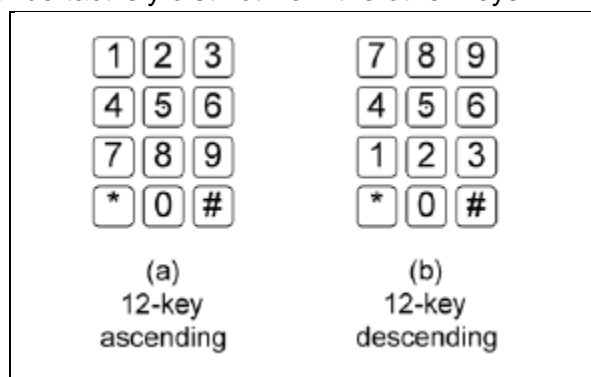


Figure 10.0 Example of ATM Numeric Key Layout

#### 3.4.2 Electronic Fund Transfer Act

Applicable design constraint under this act is:

##### Disclosures at Automated Teller Machines - Section 205.16

An ATM operator that charges a fee is required to post notice that a fee will be imposed and disclose the amount of the fee. Notices must be posted both (1) in a prominent and conspicuous location on or at the machine; and (2) on the screen or on a paper notice before the consumer is committed to paying a fee. (Section 205.16(c) (1) and (2)). The fee may be imposed by the ATM operator only if: (1) the consumer is provided the required notices; and (2) the consumer elects to continue the transaction. (Section 205.16(e)).

The “clear and conspicuous notice” standard applies to notice posted on or at the ATM. The “clear and readily understandable standard” applies to the content of the notice. The requirement that the notice be in a retainable format only applies to printed notices (not those on the ATM screen). (Section 205.16(c)).



### 3.5 Software System Attributes

This section specifies the attributes that are expected from ATMS and their implementations.

#### 3.5.1 Accuracy

The accuracy requirements for ATMS are as follows:

Requirement ID	Description	Priority	Author
REQ_Q001	ATMS shall have less than 0.00001% computational error in calculation.	High	John Smith

#### 3.5.2 Security

The security requirements for ATMS are as follows:

Requirement ID	Description	Priority	Author
REQ_Q002	ATMS shall keep log for every transaction both on ATM and in the bank transaction server.	High	John Smith

Requirement ID	Description	Priority	Author
REQ_Q003	ATMS shall use secured line for connection with bank transaction server.	High	John Smith

