COS 301 Phase 1

Software Requirements Specification

Students:	*Student Numbers:*
Lesego Mabe	u15055214
Baven Pavaday	u15336728
Ryan Hartley	u15016880
Oluwatosin Botti	u13208642
Keorapetse Shiko	u12231992

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Requirements Draft

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1 Introduction

The first automated teller machine(ATM) made its debut on June 27, 1967, just over 50 years ago. The first ATMs only allowed a user to withdraw money if the were from the same bank. Shared ATMs only became available at a later stage, roughly 10 years after the first ATMs were launched. As time moved on, ATMs started becoming more versatile, allowing for not only the dispensary of cash but other things such as movie tickets, stamps and prepaid cards.

Modern day ATMs from various vendors such as FNB supply a vast amount of operations to their users including to but not limited to :

- □ Depositing Cash
- □ Paying beneficiaries
- □ Pay traffic fines
- □ Purchasing Airtime/Data

The list goes on, all in the effort to provide clients with an easy, user friendly experience.What we have been tasked with as COS 301 students is to work on a concept for the next generation of ATMs.This requires us to develop a new back end system to support three key transactions, that being cash withdrawal/balance inquiry as well as a mini statement. Making use of the NFC on a phone or the NFC situated in the card, users should be able to do the desired transaction easier and quicker than before. As most smart-phones are equipped with NFC nowadays, the ATM will be made to run on the smart-phones. It is essential that clients can always interact with the bank as well as know if the systems are down and what alternative solution there is to their specific problem in the case of such an event.

2 Users

Customers:

The everyday user of the system as well as the user that will interact with the system the most.The customer will use the front-end of the system to make various transactions that will be linked to the back-end.The types and amount of transactions will vary according to the needs/wants of the particular user but each of these transactions can be categorized by withdrawals, printing of bank statements and balance enquiries. A customer withdrawal would involve the user entering a specified amount of cash to withdraw from their bank account and culminate in the user receiving physical cash. A customer will also be able to print a mini statement reflecting all transactions within a specific time frame, this can be done as a solo operation or in conjunction with another operation.The customer can also check their bank balance at any point e.g. before a cash withdrawal or after a cash withdrawal.The customer may use any of the listed transactions in any order or combination. However before any of these transactions are possible the users will first have to authenticate themselves onto the system through certain means.

ATM Technicians:

This user is an employee of the bank or someone that works for an external security company that puts cash into the ATMs.Technicians will have a high overall understanding of how the system works either mechanically, on a software level or both. There are two broad categories of service/work that an ATM technician will perform: maintenance/general upkeep and upgrading of the system. Maintenance work will occur on a fairly regular basis and will involve general upkeep of the system to ensure that it functions optimally. This maintenance could include repairing/replacing faulty parts, adding materials such as paper and ink to the printing subsystem and adding money to the ATM. System upgrades however occur far less frequently than general maintenance and will involve either or both hardware(this could include new keypads, bio-metric scanners) and software(newer operating systems for the ATM, hot-fixes, added functionality) to improve upon the current system in various aspects e.g. performance, ease of use, reliability etc.

3 Functional Requirements

Functional Requirements

1. The system must allow users to apply for accounts.
   (a) Apply to open an FNB account or investment account.

2. The system must allow users to access and update their account details.
   (a) The system must allow users to be manage all of the personal information that bank has of them.
   (b) The system must allow users to change their pin.
   (c) The user should be able to change ATM limits.
   (d) The system must allow users to transfer their money between different accounts using the mobile app i.e. credit, savings, cheque.
   (e) The system must allow users to check balances.

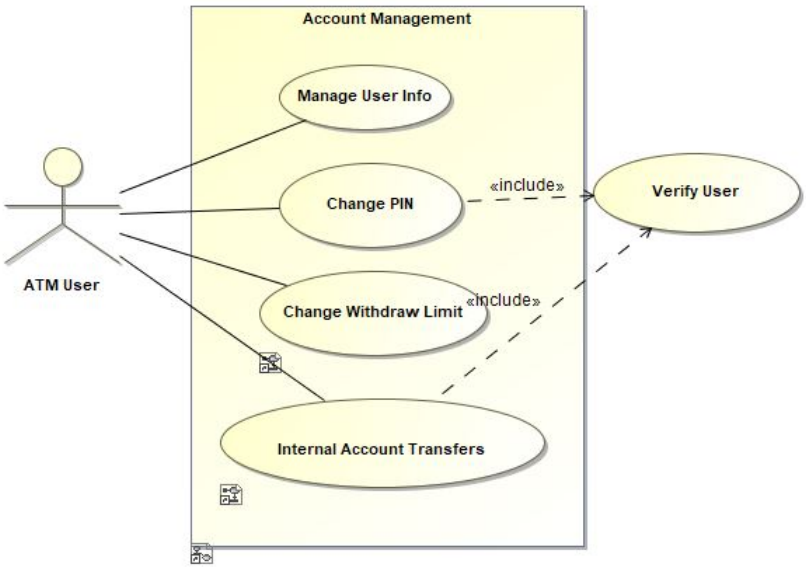


Figure 1: Accounts Management

3. The system must allow users to access their account statements
   (a) The system must allow users to check full bank statements on the application.
   (b) The system must show users a breakdown of transaction costs.
   (c) The system must allow user to view and print mini statements of the accounts.

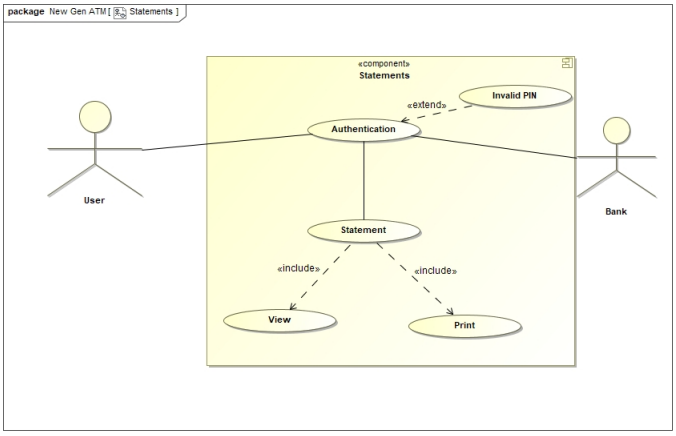
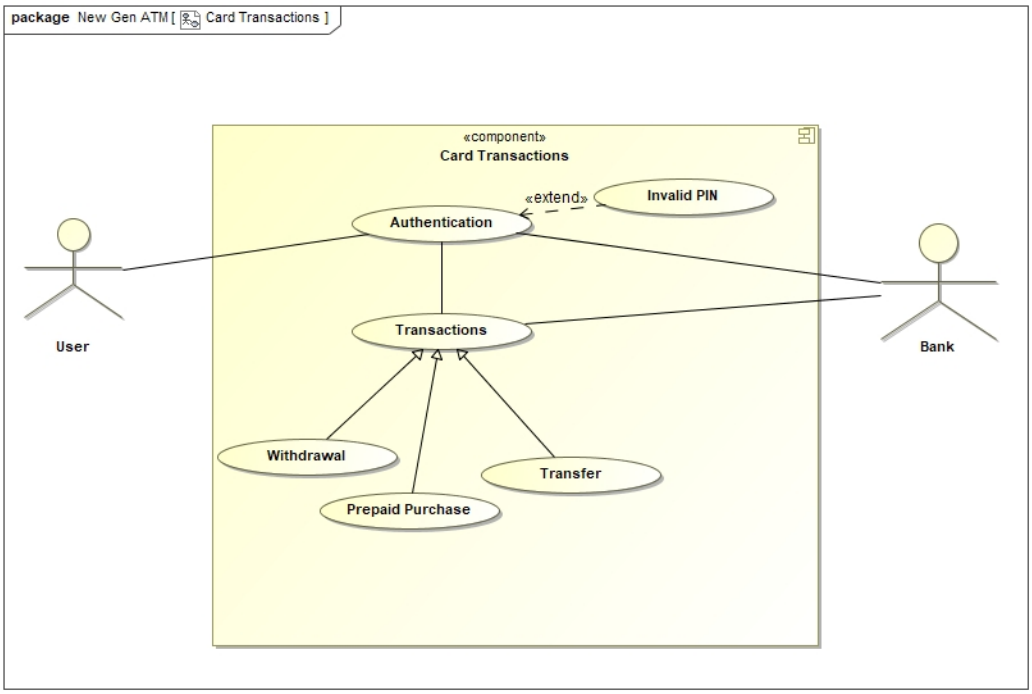


Figure 2: Statements

4. The system must allow users to use card transactions
   (a) The user should be able to withdraw money.
   (b) The user should be able to pay account recipients.
   (c) The user should be able to purchase prepaid airtime, data bundles and electricity.
   (d) The user should be able to play Lotto, Powerball and pay traffic fines.
5. The system must allow users to use cardless transactions.
   (a) The user must be able to send and receive to an eWallet.
   (b) The system must allow users to prepare ATM prepared withdrawals (money amounts specified on app beforehand - authentication technique: QR, NFC, used to complete transaction).
   (c) The system must be able to work using USSD in areas where the signal is too weak.
   (d) The user must be able to make cash deposit at selected ATM's

6. The system must allow users to report and cancel lost/stolen cards.

Figure 3: Card transactions



7. The system must be able to log user activities.

8. The system must be able to check which ATM's are online and functional, as well as the amounts available for withdrawal in prepared transactions and assist users in need.
   (a) The system must have better error messages which provide helpful messages or redirect users (send directions to Google Maps on phone) to working ATM's.
   (b) The system must allow video calling or in-app chat for assistance.

9. The system must be able to provide users with helpful tools.
    (a) The system must handle online subscriptions all in one place i.e. Netflix, Google Play, etc. Users can see when bills are due, how much they owe, or submit requests to cancel the services.
    (b) They system must be able to analyze customer transactions to produce insights that can improve customer service (frequent transactions or operations listed to speed up use of app among others - graphical reports).
    (c) The system must have helpful financial tips like how to improve credit scores.
    (d) The system must show how much interest to be gained if money is transferred into a savings account.
    (e) The system must allow users to reserve amounts they want to spend on specific items or events. This money is not withdrawable until a specified date.
    (f) The system must allow users to reserve an emergency amount that can be hidden from the balance.

10. The system must provide gamification functionality.
    (a) The system must use gamification principles to rewards millennial's for good financial decisions (like staying off cash, depositing money into savings, using NFCs for payments, paying bills on time using app).
    (b) The system must allow the gamification points to be used for benefits (being able to win tickets to FNB sponsored events from random draw competitions).
    (c) The system must allow gamification points to be shared with other users.

4 Quality Requirements

Performance:

This quality requirement refers to the how well the system works and the speed at which operations can be done. This is depended on the hardware(type of phone) being used in the ATMs as well as the connection speed between the ATM and the back end system. The performance can be measured in terms of time, elements of the system to be measured would include the speed at which the app/ transactions take place.

Reliability:

This quality requirement refers to the ability of the system to work as expected and maintain how it works over the course of its expected life time. It is essential that when a transaction is being processed, that if there is a failure the system needs to alert the user and cancel the transaction on both mediums. We will check that the software can perform failure-free operation for a specified amount of time across a range of devices.

Scalability:

This quality requirement refers to the how expandable the system will be, if it is able to be implemented in ares which are densely populated such as cities as well as less populated areas such as rural towns. This also extends to how the system will work in areas with perfect signal opposed to limited signal areas. It is important to note that not all users will be using devices that have NFC or have data always ready to be used, consideration and research into the use of QR codes and making use of USSD codes must be done. To test this quality requirement we will test the performance(failure/success rate) of the systems in the various specified areas which have been named above as well as the amount of people able to make use of the system.

Security:

This quality requirement refers to the safety of the users confidential information, ensuring that it cannot be intercepted and misused to the determent of the user. The main idea of the system will be to make use an NFC for the first part of the verification. Two other methods to ensure validation will take place, one being the use of bio-metrics- either finger print scanner or facial recognition- and once that is passed, a final one time pin will be sent to the user. This will be quantified by the amount of reports issued by users of user profiles getting logged into as well as any issues with regards to the validation system(how many people have the ability to make use of bio-metrics).

Flexibility:

This quality requirement refers to the ability of the system to work as it is intended but have the ability to work as a standard ATM does in the event that a problem occurs with the implemented system. The back end system that will be implemented needs to be made backwards compatible to ensure this flexibility. The system should only allow for the use of an ATM in a standard fashion if the new system is having issues. Testing needs to be done to ensure that the system will work on both the new system and old system. The time it takes to switch from the new system to the old system in the event that an error occurs.

Maintainability:

This quality requirement refers to the ability of the system to be repaired/maintained both easily and timely. The ease at which a system can be maintained relies on the implementation of the system which needs to allow for quick access, comprehension of the problem through alerts which results in timely repairs/maintenance. The system software must be able to alert/notify technicians of problems, the alert should contain a detailed and relevant error message The system software must keep a detailed list containing what is needed for the next maintenance i.e. printing paper,ink etc. Thus the measure of quality would be the time taken to repair/maintain the system. The system software must be able to alert/notify technicians of problems, the alert should contain a detailed and relevant error message The system software must keep a detailed list containing what is needed for the next maintenance i.e. printing paper,ink etc.

Auditability/Monitorability:

This quality requirement refers to the ability of the system to be examined or scrutinized using information stored by the system regarding changes, problems and every day usage. Auditability/Monitorability is completely reliant on well structured and detailed logs/records that contain relevant information regarding specific issue. The system must keep detailed records of daily events/transactions Thus the measure of quality would be how consistent the logging of events would be.

Intergratebility:

This quality requirement refers to the ability of the system to be merged or combined into/with another system or subsystem. It is imperative in modern times that systems can be used in conjunction with one another. The system must be implemented in a modular manner so that changes can be pinpointed within certain subsystems to prevent changes in other unrelated subsystems Thus the measure of quality would be time consuming and expensive it would be to adapt a certain system so that it would function when being integrated with/in another system.

Cost:

This quality requirement refers to the overall costs associated with the system. These costs manifest in a multitude of aspects the largest being: initial capital in terms of implementation (labour costs, hardware costs, software costs), the cost of needed to ensure that the system is in working order(maintenance and repairs) and future plans for upgrading the system. However the overall cost would be lower if the number of errors would be less due to the obvious reduction in repair cost. Lower amount of errors in system through good implementation using practices such as test driven development Thus the measure of quality increasing the mean time to failure it which in less overall monetary value needed in the system. Lower amount of errors in system through good implementation using practices such as test driven development

Usability/Interaction:

This quality requirement refers to how easily the system can be learned and effectively used. The system components which is in direct contact with human interaction should be designed such that it is easy to understand and operate. This includes both internal(in terms of the ATM software) and external (in terms of the built-in keypad/keyboard) The system must provide clear tips/instructions to assist in specific problems(this could take place in the form of helpful notifications/pop-ups) The measure of quality could be quantified according to user scores given to the system after it's use by a user in the form of usability tests which measure performance based on the success rate at performing various tasks.

5 Traceability Matrix

	Accounts	Users	Gamification	Finances	Transactions	Databases
1a)	X	X				X
2a)	X	X				X
2b)	X	X				X
2c)	X	X				X
2d)	X			X		
2e)	X					
3a)	X				X	
3b)	X				X	
3c)	X				X	
4a)	X			X	X	
4b)	X	X		X		
4c)	X			X		
4d)	X			X	X	
5a)	X			X	X	
5b)	X	X		X	X	
5c)					X	
5d)	X			X	X	
6)		X				X
7)		X				X
8a)						X
8b)						X
9a)		X				
9b)		X			X	
9c)				X		
9d)				X		
9e)	X	X		X		
9f)	X	X				
10a)			X			
10b)			X			
10c)			X			