Systems Analysis and Design CA2/
Practical Assignment

ATM Machine

CompuTech

Fernando Tenorio N2016198

1 Introduction

The ATM - Automatic Teller Machine system is an electronic machine that dispenses cash, accepts deposits and operate in with the costumer in diverse way a card is inserted and the correct pin is placed.

Usually banks are “overflowing” with people looking to withdraw money when they need it to pay bills, or to make a lodgment in the cash desks. They also are always in need to do many other operations such as check their balance or even to change their Pin code, which is used to access their bank account.

Those process usually, when done at the bank, sometime can take hours if the customer need to go to the desks, it because before, cash machine were really hard to use, and also it would not be seen in everywhere, and in most of the cases all what they need is only to withdraw money or just to check their balance, an operation easy and quick, that if done in any cash machine would reduce the number of people queueing at the bank. It would save plenty of time of those who normally use their breaks at work, or do not have time to wait hours.

ATM system was created to help and speed up those processes, people can go to any ATM available and withdraw money, make lodgment, check their balance and even change pin code or make some extras transaction such as transfer money from one account to another.

The system works one customer at time, until the operations is done no one is able to insert a new card, since the account opened is still being used. The user is able to see all the information and services provided by the ATM, it means that once the card is inserted and the pin verified he/she will be provided with a menu and all the options that a ATM machine has.

The new way of using bank services is now more effective, since the number of people waiting are now less, and the stress of listening to complain are now reduced. Banks are now able to have a better relationship with their customer, and customer will not have to wait hours to do their need operation.

2 Project **Overview**

With the growth of the banks, and queues getting bigger every day, the need of a new system that allows people to use their bank account without the need of wait hours to be attended to was making banks to work on a new way that will please customer, the user, and bank, the service provider.

Although the number of desks were increasing, banks were still not able to support the demand of customer, so an Automated Teller Machine - ATM - was created to safety provide the clients of a financial institution with access to financial transactions in a public space without the need of a cashier or bank teller.

CompuTech has asked to plan and model a Java program which represents an ATM machine which presents the user a menu of options such as withdraw or to check balance. The system will be easy accessed by the customer once the card is inserted, and after the Pin code is verified and accepted by the system a menu pane will appear and the user will be able to choose the desired transaction. Every time a transaction is being operated, the user will have to use the correct Pin code, it is a safe way of protect their bank account, for example:

- When a transaction such as withdraw is chosen, the user will set the amount desired, but to complete it, the Pin code will be necessary for the full and complete operation, once the Pin is verified, the money will be able to be collected.

The system will be easy to use by the customer, all the information needed will be on the screen, so they will only have to choose and fallow the instructions. With less steps and faster intelligibility between user and machine, we hope to speed up the process and reduce the time taken by transaction a wait on the bank queues.

The ATM will communicate each transaction to the database and obtain verifications that it was allowed as the user has set its Pin and verified by the database, for example:

- In case that the information provided does not match with the database the customer will required to re-enter the Pin before a transaction can proceed.

To develop this ATM system the entire operation has been divided into the following step:

- Verification process (The system will ask the customer some personal information such as “Username”,” Pin Number”).
- Language, service and account selection (In case the person has not an account, he/she will be able to register some personal information).
- Bank Services (The system will operate combined with the bank, so all the information that the customer put on the machine will be checked from the bank).
- Transaction (The system will work on fast transactions such as withdraw and check balance).

3 Problem Definition

With the rapidly growth of business all around the world, the banks become the way of people to safely save money, but with this, the need of people to use banks services. Now a day, people are busy, in means that, they cannot afford to waste time on bank's queue.

So, to solve this problem the ATM machines were created and are getting more and more used by the population. ATM machine basically works with a valid card and PIN number, it means that, if the PIN set is the valid PIN stored in the database that match with the card inserted, the user will have total access to their account. However, some of the ATM machines are not so easy to user, so with the new system, all the transactions will be straight forward, and the user will just put what is being asked by the machine.

3.1 Problem Definition:

Client Bank of Ireland:

3.2 Problem with current system:

- Customer need to go to the counter to solve their problems, causing with it stress and queuing.
- The process of withdraw is pretty slow, takes to many steps.
- Checking customer balance may take long, sometime they sent it by post.
- Registration process is bureaucratic, it can only be made on the counter desk.
- Staffs can keep a good service, once the bank is busy, the customer service may be slow and not efficient.
- May delay on service because of the huge demand, compromising time management.

3.3 Objectives of the new system:

- Speed up withdraw process, taking less steps, but keeping it still safe.
- Reduce the amount of people going to the banks, so they will not have to use the counter to do simple transactions.
- Check customer Pin, if it is correct, the system will continue with the transaction
- Handle check balance, so the customer will not have to go to the bank, or even print it.
- Make new registration.
- It will allow customer to logout the system from any page.

3.4 Scope of the new System:

- The role is to create a project that
    1. Withdraw money from any ATM that has the system installed.
    2. Check Balance on the screen, so there will be no need to have to print it or waste time waiting on queues at the bank.
    3. Pin Number Security.
    4. Quick and easy registration.

4 List of the Functional Requirements

4.1 Bank of Ireland requirements:

R1. Keep a complete list of accountants, which will include name, Pin number;

R2. Validate Card.

R3. Verify Customer username.

R4. Verify Customer Pin Number.

R5. Allow the customer to withdraw cash from any ATM with the system installed.

R6. Display message in case the customer has put an incorrect username.

R7. Display message in case the customer has put an incorrect Pin number.

R8. Allow the user to make a quick and easy registration, just by asking some personal information.

R9. Ask for the Pin number during any transaction made by transaction, making it safe.

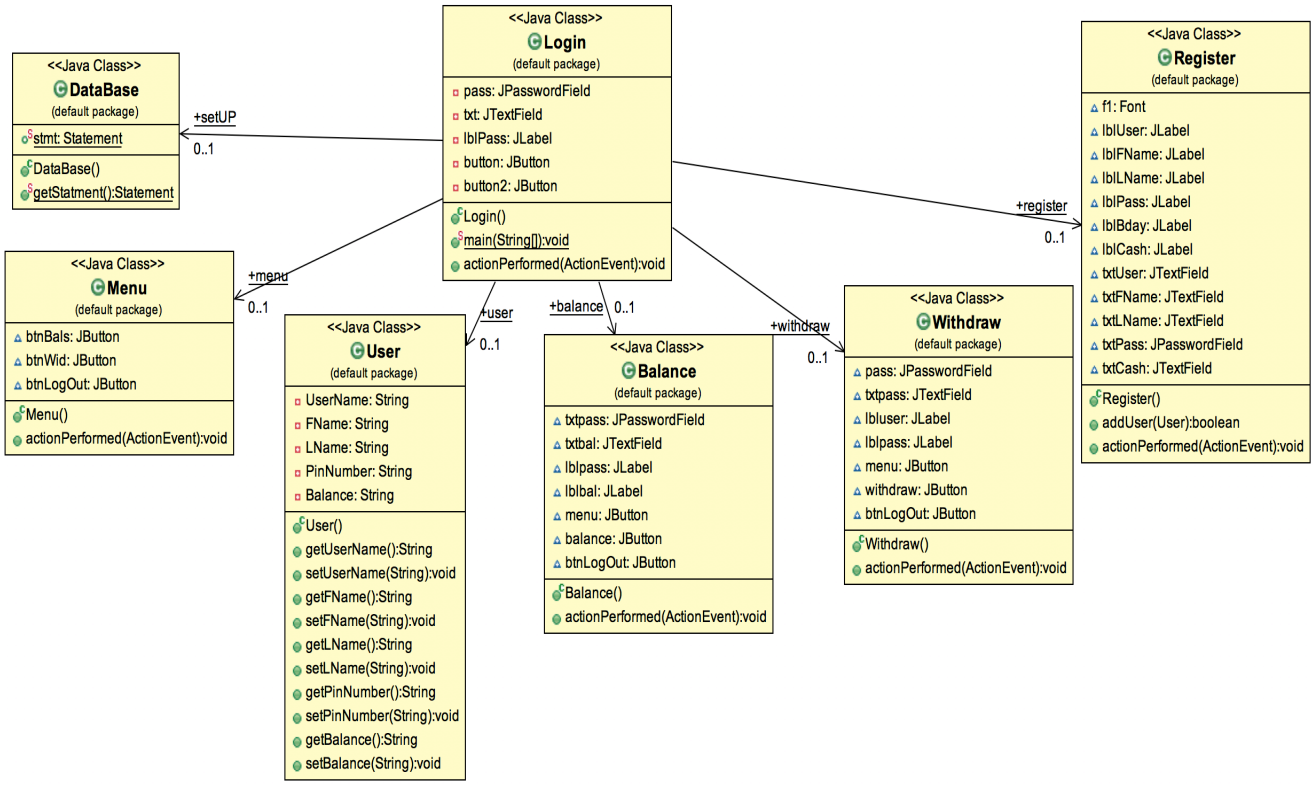
R10. Display the balance on the screen, so the customer will not have to print it.

R11. Allow the user to logout from any screen after a desired transaction is completed.

R12. Make use of a database, so that all the information will be stored and checked when it is needed.

R13. Login into the system using the username and Pin number provided. [refers to R1]

5 Class Diagram



6 CRC Card

Login	
-Holds pin number and username. -Access the account	-DataBase -Menu -Balance -Withdraw -Register -User

Menu	
-Holds the options from the user to choose which action will be taken. -Access the account	-Login -DataBase -Balance -Withdraw -Register

DataBase	
-Holds the connection to the database. -allow access from register to create new user	-Login -Register

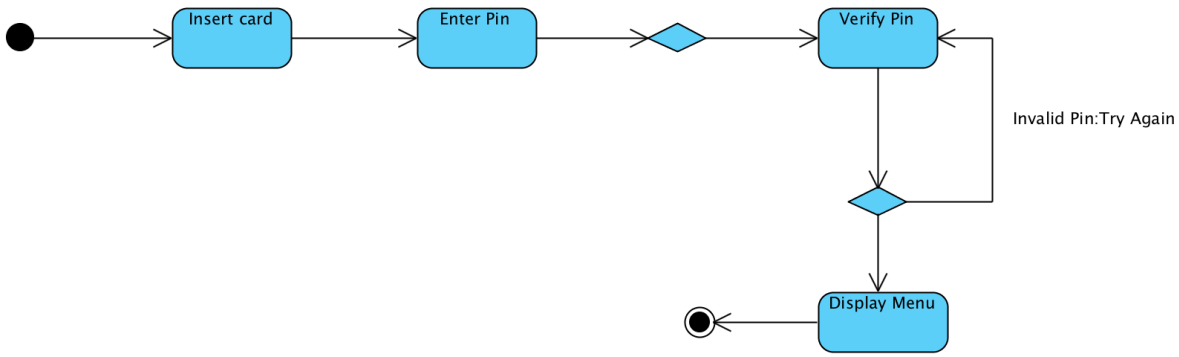
Balance	
-Holds pin number -Access the account -Check Balance -Display balance on scressn	-Login -DataBase -Menu -Withdraw

Register	
-Gets user information -set the amount on the account. -create a new account	-Login -DataBase -User

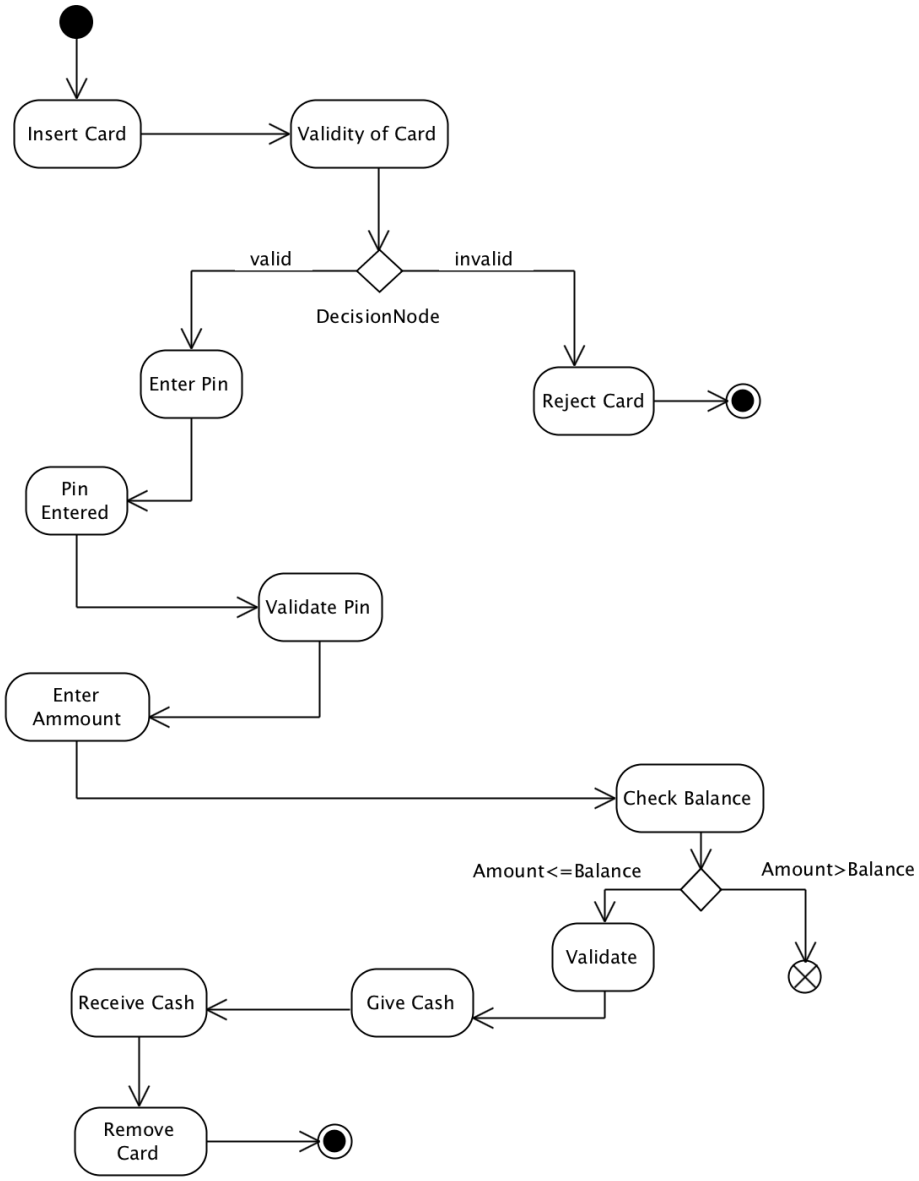
Withdraw	
-Holds pin number and username. -Access the account -Withdraw money	-Login -DataBase -Menu -Balance

User	
- Hold user information -use set and get methods	-Login -Register

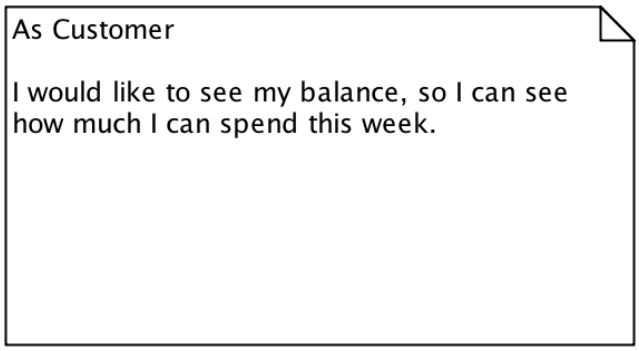
7 State Diagram

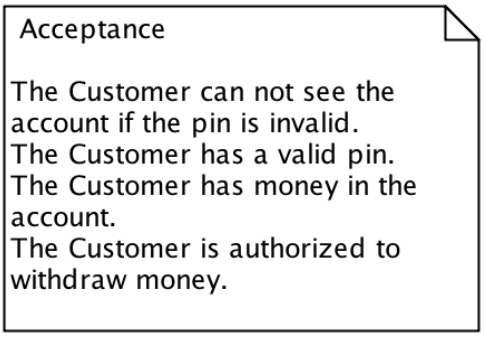


8 Activity Diagram



9 User Story


As Customer
I would like to see my balance, so I can see how much I can spend this week.


Acceptance
The Customer can not see the account if the pin is invalid.
The Customer has a valid pin.
The Customer has money in the account.
The Customer is authorized to withdraw money.

10 Analysis of the Java Code (Account.Java)

```
class Account { // This class is responsible for the storing and manipulation of the account.

    private int balance = 5000;
        //variable integer, which stores the customer current balance.

    public boolean debit(int a) {
        //method responsible to withdraw money.

         if((balance-a) > 0) {
        //(if) condition to check if the customer has the balance, so it will not go below 0.

              balance = balance -a;
        //checking the balance, so if it is equal or bigger than the amount required.
              return true;
        //debit successful

         }
         else {
              return false;
        //insufficient funds,
         }
    }

    public int getBalance() {
        //method to return the balance after any transaction.

         return  balance;
    }
}
```

11 Analysis of the Java Code (ATMCar.java)

```
class ATMCard{
//Class responsible to manipulate and store information about the card.

    private boolean locked = false;
        //variable to state whether the card is locked or not.

    private int pin = 1234;
        //variable int to set the card's pin.

    public boolean pinOK(int p){
        //method that will check if the method is valid or not.

         if(p == pin){
        //condition that will check if the Pin typed is the same as the Pin stored.

              return true;
        // if the Pin is correct, so the method will return it as true
         }
         return false;
        // if the Pin is wrong.
    }

    public void lockCard(){
        //method to lock the card, so if the result of the method pinOK() is false, so the
method will be true.
         locked = true;
    }

    public boolean isLocked(){
//method used to check the actual state of the variable int pin , to know whether the card is
locked.
         return locked;
    }
 }
```

12 Software Testing

The purpose of the testing the project is to evaluate and analyses the requirements of the customer, designing and implementing the system, testing the functionality and maintaining the software of the ATM component of a larger ATM network and getting a consistent analysis of its requirements and specifications need by the customer. It will help the user to have a better understanding of the code and the program, once the menu will show step by step how the program runs and how the system works.

It is important to know the purpose of a ATM machine system, when analyzing one. It because all the activities are directly related to the final product, which is the user. Considering that all ATM machine that uses different system will not work on the same way.

The project aims to describe assumptions such as:

- The model of a ATM machine and network.
- The project delivers the software components.
- All hardware documentations must be available at the time of the installation and so must the software.
- To show the statics about the project, so the customer will have an acknowledgment of when it must be completed within the due date.

The initial test cases can be identified early in the process design, so it may serve as a vehicle for checking that the implementation is basically correct, they are used to represent an initial check that the functionality specified by the use case is present.

To have a better understanding of the software testing, it is worth remembering of the automated testing and manual testing, and know which you should use and when, so that, when doing a software testing, you will have a great knowledge about the system that is being tested, since both offer advantages and disadvantages.

In manual testing, test cases are executed manually, it means by human, not having the uses of tools or scripts. Manual testing allows more observation, which may be more useful in case of the goal is to improve customer experience or even “user-friendliness”. However, manual testing also has its disadvantages such as time-consuming, since it is made by human, it only uses human resources, also is less reliable, because it is no accurate at all time due to human error.

Manual testing is very suitable to areas and scenarios such as:

- Exploratory Testing
- Usability Testing
- Ad-hoc Testing

Automated testing, otherwise, is more reliable, as it is performed by tools and scripts, and as the name says, the uses automated software that will work on a faster and big scale. Automated testing is executed by automated equipment, which are significantly faster than a manual approach, they are practical when test cases are running repeatedly over a long period of time.

Automated test is very suitable to areas and scenarios such as:

- Regression Testing
- Load Testing
- Repeated Execution
- Performance Testing

Testing still remains the practice of software development as the most important part of quality assurance. It is to help to have a clearance of a code, and how to address the needs of the customer, especially because of two tasks that not only consume much time effort, but also will set the system with a better design and quality of usage and preparing to the tests cases.

Object-oriented frameworks provide the user a better quality of testing, once they are working with java, it will help on understanding code and its competitively. For example, it provides tools that help on:

- The Design
- The implementation
- The testing for a family of Software systems.

They will know then, how to work with classes, and see that they can directly use or inherit the framework, for this purpose, tools such as Framework Interface State Transition Tester (FIST2) is traduced to develop its prototype.

Therefore, with by having made god use of manual and automated test, the system will probably be free of bugs and errors caused during the development process.

13 Reference

En.wikipedia. Automated Teller Machine. Available at [https://en.wikipedia.org/wiki/Automated_teller_machine]. Accessed (Abril 22, 2018)

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