UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 4 Examination in Engineering: December 2015

Module Number: EE4106 **Module Name: Software Engineering Principles**

[1 Hour and 30 minutes]

[Answer **all questions**, each question carries **10 marks**]

Section B

Q1 An automated teller machine (ATM) is a banking subsystem that provides bank customers with access to financial transactions in a public space without the need for a cashier, clerk, or bank teller.

The ATM will service one customer at a time. The ATM must be able to provide the following services to the customer:

1. A customer must be able to make a cash withdrawal from any suitable account linked to the card, in multiples of 100.00 LKR. Approval must be obtained from the bank before cash is dispensed.
2. A customer must be able to make a deposit to any account linked to the card, consisting of cash and/or checks in an envelope. The customer will enter the amount of the deposit into the ATM, subject to manual verification when the envelope is removed from the machine by an operator. Approval must be obtained from the bank before physically accepting the envelope.
3. A customer must be able to make a transfer of money between any two accounts linked to the card.
4. A customer must be able to make a balance inquiry of any account linked to the card.

The ATM will communicate each transaction to the bank and obtain verification that it was allowed by the bank.

The ATM will have a key-operated switch that will allow an operator to start and stop the servicing of customers. After turning the switch to the "on" position, the operator will be required to verify and enter the total cash on hand. The machine can only be turned off when it is not servicing a customer. When the switch is moved to the "off" position, the machine will shut down and close the connection with bank, so that the operator may remove deposit envelopes and reload the machine with cash, blank receipts, etc.
ATM Technician provides Maintenance and Repairs.

a) Identify the actor(s) of the system.

[1 Mark]

b) Draw a high level use case diagram to analyze above requirements.

[5 Marks]

c) On most bank ATMs, the customer is authenticated by inserting a plastic ATM card and entering a personal identification number (PIN). Customer authentication is required for every ATM transaction which is the generalization of ATM services provided to the customer. Customer may need some help from the ATM, whenever ATM Transaction is at the location specified by the menu and the bank customer requests help, e.g. by selecting Help menu item.

Please provide use case representation to above scenario by considering customer activated use cases.

[2 Marks]

d) Draw a sequence diagram to show shutdown operation of ATM machine.

[2 Marks]

Q2 a) What are the issues in waterfall development methods?

[2 Marks]

b) What are the things we do in Scrum project management process?

[1.5 Marks]

c) Draw a UML Class Diagram representing the following elements from the problem domain for a hockey league. A hockey league is made up of at least four hockey teams. Each hockey team is composed of six to twelve players, and one player captains the team. A team has a name and a record. Players have a number and a position. Hockey teams play games against each other. Each game has a score and a location. Teams are sometimes lead by a coach. A coach has a level of accreditation and a number of years of experience, and can coach multiple teams. Coaches and players are people, and people have names and addresses. Draw a class diagram for this information, and be sure to label all associations with appropriate multiplicities.

[6.5 Marks]