Roll Number: _____ Section: _____

National University of Computer and Emerging Sciences, Lahore Campus

Course:	Software Engineering	Course Code:	CS-303
Program:	BS(Computer Science)	Semester:	Fall 2017
Duration:	60 Minutes	Total Marks:	30
Paper Date:	04-Nov-17	Weight	12.5%
Section:	D & E (Encircle your section)	Page(s):	2
Exam:	Midterm 2	Reg. No.	

Instruction/Notes:
1. State your assumptions clearly
2. Answer all questions in context of class discussions and the text books.

Question # 1 **30 Marks**

Problem Statement

Royal Bank of Kuwait (RBK) needs a banking application that allows its customers to maintain their bank accounts. The system should allow a customer to view account balance and shop online using the bank account number. Customer can also view the status of the account and change currency of his/her bank account. Some other tasks that a customer should be able to perform include Pay Bills, Transfer Funds (to same or other banks), Request Chequebook Generate Mini Statement, Generate Account Statement for particular period (period not exceeding 1 year), Generate Transaction PIN, Add/Remove beneficiary for fund transfers, and Request Bank draft/Pay Order.

The account statement of last 3 years can be requested through this application, the customer must visit bank in order to get more than 3 years old bank statement. Funds Transfer, Bill Payment, Online Shopping should be processed instantly. The account balance should reflect each of these activities within 5 seconds of request.

RBK expects that once the application is developed, their Customers can login through their unique account number and a strong password. But a customer cannot create his account, only Admin, residing in Head Office of RBK, will create new account of a customer. The Admin creates an account on recommendation of a Branch Manager who uses the same banking system to send the recommendations for opening an account. The Branch Manager enters customers' details in respective recommendations and sends the recommendations to create new accounts before the end of the day. Admin must ask the customers to verify their emails before end of the next working day. Account creation will be successful only if a customer verifies an email address by using the link sent during account creation process. Once the email is verified the Admin creates the account and provides a customer a unique login id through a verified email. The password is generated once account creation is successful, but the password is not shared through the RBK banking system. The customer must change the password at first login and password (of minimum length 8) must contain at least one capital alphabet of English, one small alphabet of English, one special character, and one digit. Admin will also be able to update/delete account of a customer, if recommended by the Branch Manager.

The bank also plans to provide these banking services to mobile users after successful launch of this web based application.

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To do:

1. If you were a developer of the RBK banking application, which architecture would you use? Draw the architecture diagram, using appropriate architecture styles. Give reasons (5 points)
   Layered architecture and MVC architectures could both be suitable for the above scenario.
2. Identify functional requirements and their corresponding verifiable non-functional requirements Assign unique ID's using the identification pattern taught in the class.(10 points)
   Students have to extract the requirements from the above statement using the unique identification pattern taught in the class.
3. Draw a use case diagram and show the use of extends and uses relationship. (5 points)
   All use cases derived from requirements have to be drawn.
4. Define the use case for transferring funds from one bank to another. Use the given template on your answer books (5 points) trace requirements defined in part 2 with usecases identified in part 3.
5. Draw a traceability matrix that traces back your use cases to the requirements. (5 points)

Name of Use Case:			
Created By:	ABC Corporation	**Last Updated By:**	J. Doe
Date Created:	2/15/xx	**Last Revision Date:**	2/22/xx
Description:	This usecase explains the scenario of transferring funds from bank X to Bank Y		
Actors:	Customer,Bank X, Bank Y		
Preconditions:	1. The account numbers and titles are valid 2. There exist funds in the account of the customer in Bank X.		
Postconditions:	1. The amount has been transferred from the Bank X to Bank Y		
Flow:	1. The customer logins to his account by entering account number and password. 2. The customer selects the transfer funds option. 3. The customer specifies the bank and account number where funds have to be transferred. 4. The system verifies the account number. 5. The customer specifies amount to be transferred. 6. System verifies the amount and transfers it to the specified account in bank y.		
Alternative Flows:	1a.System notifies the customer if the account is invalid.		

	3a. System notifies the customer if the account is invalid. 6a System notifies the customer if the amount exceeds the limit.
Exceptions:	1. The system shuts down during the transaction and the transaction is rolled back
Requirements:	1.