

National University of Computer and Emerging Sciences, Lahore Campus



Course: Software Engineering
Program: BS (Computer Science)
Duration: 40 Minutes
Quiz Date: 20-March-24
Section: 6E

Course Code: CS-3009
Semester: Spring 2024
Total Marks: 25
Roll No. Name:

Question 1: Describe the Publish-Subscribe Architectural Style?

(10 Marks)

You need to mention (description, when to use, advantages, disadvantages)

Architectural Style	Publish-Subscribe
Description	<p>It is a messaging pattern in which publishers produce messages and broadcast them, without knowing who or how many subscribers there are. Subscribers, on the other hand, receive messages from the message broker, to which they have subscribed, without knowing who the publishers are.</p> <p>This architecture style decouples the producers of messages from the consumers, making it easy to add new producers or consumers without affecting the existing system. It also enables the creation of a scalable, distributed system by allowing multiple subscribers to receive the same message, and it provides a flexible communication model that supports asynchronous communication between components.</p>
When to use	<p>Event-driven systems</p> <p>Distributed systems</p> <p>Real Time messaging</p> <p>Microservices architectures</p> <p>Social networks</p>

Advantages	Decoupling of components Scalability Asynchronous communication Loose coupling Fault tolerance Easy to extend
Disadvantages	Complexity increases Latency in delivering messages Does not maintain message ordering Message loss Difficult to test Security issues: Need to prevent from message tempering and unauthorized access

Question 2)

(15 Marks)

New Bank of Pakistan (NBP) needs a banking application that allows its customers to maintain their bank accounts using the internet. This application shall allow the customers with an existing bank account to perform general banking activities (such as request creation of an internet banking account, view bank account balance, Request Chequebook, Generate Mini Statement, Generate Account Statement for particular period - period not exceeding 1 year, and Request Bank draft/Pay Order) as well as certain transaction (such as pay utility bills, transfer funds, and shop online using the bank account number, change currency of their bank account, Generate Transaction PIN, Add/Remove beneficiary for fund transfers). NBP expects that, once the application is developed, its customers can login using their valid unique account number and a valid password generated by the NBP banking application considering strict security constraints and procedures. When an NBP customer requests to create his/her account through the User Interface (UI) module of this application to the account creation module to record the request in the database and inform Branch Manager through the UI management module. The Branch Manager verifies the customer details available in the database and forwards each verified request to Admin through the same UI management module. The Admin creates an account on recommendation of the Branch Manager and provides the customer with a unique login id through the verified email. The password is generated by the same module once account creation is successful. In addition, the Branch Manager is notified about the success of the account creation process. In case the account creation process is not successful, the Admin rejects the request and the Branch Manager is notified about the rejection. NBP is concerned about secure database management during all interactions of the modules with the database.

To do: Identify components of the NBP system and draw component diagram for the NBP application discussed above. Use ball and socket notation. Appropriately label the 'Requires' and 'Provides' interfaces of the interacting components.

