ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD
(Department of Computer Science)

Course: Distributed Computing (3485)   **Semester: Spring, 2014**
Level: Bachelor   **Total Marks: 100**

ASSIGNMENT No. 1
(Units: 1-5)

Note: All questions carry equal marks.

Q.1   Discuss the importance of distributed computing? Describe the recent advancement in distributed computing system.

Q.2   Define Remote Procedure Call (RPC) and client server model architecture in detail.

Q.3   Demonstrate the phenomenan of events ordering and resources allocation in distributed computing.

Q.4   Why failures in distributed computing are potential? How to overcome these failures?

Q.5   Explain the term dynamic membership? Also describe the techniques used for allocations of Dynamic Group Membership.

ASSIGNMENT No. 2
(Units: 6-9)

Total Marks: 100

Note: All questions carry equal marks.

Q.1   Define virtual synchorny. Also explain the virtual synchrony algorithm and tools.

Q.2   Why wrapper application is so important? Also describe the techniques used.

Q.3   (a) Explain the consistency technique in distributed computing.
       (b) Define and discuss the architecture of a simple RPC server's wrapper's model.

Q.4   What is a group communication in distributed computing? How flexibility is carried out in group communication?

Q.5   (a) Describe the policy for security in distributed computing model.
       (b) Discuss the masking overhead of protocol layering in detail.

COURSE OUTLINES

3485 Distributed Computing

Credit Hours: 4 (3 + 1)

Recommended Book: *Reliable Distributed Systems: Technologies, Web Services and Applications by Kenneth P. Birman*

Unit# 1 Basic Distributed Computing Technologies
Basic Communication Services
High Assurance Communication
Remote Procedure, Calls and Client Server Model
Styles of Client/Server Computing, CORBA

Unit# 2 Distributed Computing Theory
The Computational Model, Leaders Election
Spares Network Covers and their applications,
Ordering Events & Resource Allocation
Tolerating Processor Failure in Synchronous and Asynchronous Systems

Unit# 3 Reliable Distributed Computing
Hardware/ Software Reliability and Trends
Other Sources of Downtime
Complexity, Detecting Failures
Hostile Environments

Unit# 4 Overcoming Failures in a Distributed System
Consistent Distributed Behavior, Static/ Dynamic Membership
Formalizing Distributed Problem Specifications
Time in Distributed Systems
Failure Models and Reliability Goals
The Distributed Commit Problem

Unit# 5 Dynamic Membership
Dynamic Group Membership
Replicated Data with Malicious Failure
The Impossibility of Asynchronous Consensus (FLP)
Extending Our Protocol into the Full GMS, Scalability

Unit# 6 The Virtual Synchrony Execution Model
Virtual Synchrony
Extended Virtual Synchrony
Virtually Synchronous Algorithms and Tools
Consistency in Distributed Systems

Unit# 7 Applications of Reliability Techniques

Wrappers and Toolkits
Wrapping a Simple RPC Sever
Reliability Distributed Shared Memory

Unit# 8 Software Architecture for Group Communication
Architecture Considerations in Reliable Systems
The Flexibility Group Communication, Protocol Stacks
Use & performance of Horus
Masking the Overhead of Protocol Layering

Unit# 9 Related Technologies
Security Options for Distributed Settings
Clock Synchronization and synchronous Systems
Transactional Systems
Peer-to-Peer Systems and Probabilistic Protocol