Military College of Signals

Final Exams: BESE-14 (A&B)

Distributed Computing

Instructor: **Dr. Hammad Afzal**

Max Points: **50**

Time: 150 Mins

Part 1 (14 Marks)

1. For the following application, which of the protocols is more suited: UDP or TCP, briefly explain why:
   Voice over IP [1]

2. What factors affect the responsiveness of an application that accesses shared data managed by a server? Describe remedies that are available and discuss their usefulness. [3]

3. What are idempotent operations? *Discuss* whether the following operations are idempotent (Write your assumptions clearly if you are making any) [1+3]
   a. Pressing a lift (elevator) request button.
   b. Writing data to a file
   c. Appending data to a file

4. What is meant by *state* of an object? Describe the concept of encapsulation in the context of Object Oriented Model and Distributed Object Model. Also comment on how encapsulation facilitates concurrency in the case of latter. [3]

5. Compare and Contrast Mobile Code and Remote Method Invocation. [2]

6. How flow control mechanism works in TCP? [1]

Part 2 (14 Marks)

1. The request reply protocol (RRP) uses messages to be passed from the client to the server (request) and from the server to the client (response). Considering RRP protocol specify the following: [2+3]
   a. Message format
   b. Considering the failure model of the RR protocol, how can this model deal with communication failures in case of UDP?

2. Explain the term with suitable examples. "Remote Object Reference". In particular, comment on its format and how is it made unique in a Distributed System. [4]

3. While implementing *At-Most Once Semantics* using History where each request from client (Send is blocking) is followed by a reply from server. How many recent reply record are to be kept in History by server side and why? [2]

4. Write briefly the function of any of the three following HTTP methods:
   Get, Head, Post, Put, Delete [3]

Part 3 (11 Marks)

1. What is the role of Remote Reference Module (RRM) in executing the Remote method invocation? Describe what entries are maintained by RRM in client and server machines. [4]

2. In RMI, which modules are responsible for marshalling and un-marshalling on Client and Server side? [1]

3. Which components comprise the *RMI Software*? [1]

4. Describe the role of Proxy in execution of Remote Method Invocation highlighting the difference between implementation of Remote Interface provided by a Proxy on Client Side and Servants on the Server side. [2]

5. Client needs to have ROR in order to invoke a method of a Remote Object. In typical RMI implementations, what are the different ways in which an ROR can be transferred to other machine. [2]

6. Remote Object Reference (ROR) is created on Client Side or Server Side? [1]

Part 4 (11 Marks)

1. What is the role of Web Crawler in working of Search Engines? [2]

2. Would you handle faults at client side or server side in the *Web Mail Service?* Explain; you can also list down your assumptions about the types of faults that may occur. [2]

3. Describe briefly "Content Delivery Network". [2]

4. Describe briefly the concept of "Software as a Service". Also give at least one example. [2]

5. While accessing any page in Internet browser, you receive message "Connection Timed Out". What type of failure may have occurred in this scenario? [1]

6. Draw an RDF Model of scenario: *MCS is a constituent institute of NUST. NUST is headed by a Rector and MCS is headed by a Commandant. Rector's email ID is rector@nust.edu.pk* . [2]