Military College of Signals

Mid Term Exams
BESE-14 (A&B)
CPS-622: Design of Distributed Systems

Instructor
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Time: 90 Mins
Max Points: 30

Note:

- Attempt all parts and all questions.
- Be precise and avoid un-necessary details.

Part 1 (15)

1. Use the World Wide Web as an example to illustrate the concept of resource sharing, client and server. **[2]**

2. Given the following URL: http://www.mcs.nust.edu.pk/research/distributed/index.html
List the components of URL. Also state how URL provides *Location Transparency*. **[2]**

3. With examples, describe the concepts of *Access Transparency, Location Transparency, Mobility Transparency*, **[3]**

4. Describe briefly peer-to-peer system, particularly highlighting the advantages it provides for design of distributed systems that a Client-Server model fails to deal with. **[2]**

5. Multiple servers can interact with each other to provide a service to clients. While providing the service, they can use *data replication* and *data partitioning*. Describe briefly the real world example of distributed systems where each of these techniques is employed (one example for each). **[2]**

6. What is mobile code? What problems related to heterogeneity can occur in Mobile Code and what techniques are used to resolve them? Briefly explain with the help of an example of Mobile Code. **[3]**

7. Write an XML for statement: "Lectures Schedule: BESE-14 has one lecture of Distributed Computing on Tuesday and two on Friday" **[1]**

Part 2 (15)

8. What assumptions are made about time while designing the Synchronous Distributed Systems? **[2]**

9. Describe briefly the concept of *Arbitrary Failures*. How can these failures occur in processes and communication? What technique is used generally to deal with arbitrary failures in communication? **[3]**

10. Regarding failure models in the distributed systems, what are send omissions and receive omission? **[2]**

11. Consider two communication services for use in asynchronous distributed systems. In service A, messages may be lost, delayed or delivered too fast for the recipient to handle them, but those that are delivered arrive in order and with correct contents.
In service B, messages may be duplicated or delayed and checksums apply only to headers.

    a) Describe the classes of failure exhibited by each service. **[3]**
    b) Can services A & B be described as reliable communication services? Why? **[1]**

12. What type of failures can be observed if a distributed application for management of bank accounts does not handle duplicate requests? Give an example scenario **[1]**

13. Suppose that a basic disk read can sometimes read values that are different from those written. State the type of failure exhibited by a basic disk read. **[1]**

14. In the context of Interaction Model for distributed systems, describe the concept of *Latency* and which factors are involved in it? **[1+1]**

Bonus
How many bits are in IPv6? Ever wondered why did we not switch from IPv4 to IPv5? **[1]**