



Indian Institute of Information Technology
Vadodara
Mid-Sem Exam: Distributed Computing (CS401)
Time Duration: 120 Minutes & Full Marks: 60

Note: Clearly mention assumptions (if required) taken for answering the questions. Write to the point answers only.

Q.1) What is a Distributed System and what is the need for it? Explain properly? 5 Marks

Q.2) What is idempotency? How does a duplicate request is handled in two message IPC protocol for client-server communication? 2+3 Marks

Q.3) A client makes remote procedure calls to a server. The client takes 6 milliseconds to compute the arguments for each request, and the server takes 12 milliseconds to process each request. The local operating system processing time for each send or receive operation is 1 millisecond, and the network time to transmit each request or reply message is 4 milliseconds. Marshalling or unmarshalling takes 1 millisecond per message.

With proper explanation, Calculate the time taken by the client to generate and return from two requests:

if it has two threads that can make requests concurrently on a single processor. 5 Marks

You can ignore context switching times.

Q.4) Suppose you are implementing a pure distributed (without any central server) real-time collaborative editing system. You want to provide the users with insert, delete and undo operation on their local replica. Elaborate upon the various challenges for implementing such type of systems? What will be the different components you will design for such system? 5+5 Marks

Q.5) Discuss in detail any five types of transparencies that are desired in a distributed system and give examples of each. 10 Marks

Q.6) Suppose you are implementing a peer-to-peer network client which allows each of the client in the system to request and download the files from other peers. Explain what are the different challenges you as a system designer will face. Explain the implementation of such type of client with respect to the challenges that you need to address. 10 Marks

Q.7) How to authenticate and replicate the data using Chord mechanism? Explain the entity lookup mechanism in the Chord with suitable example. 5 + 10 Marks