
Theory Assignment 4

Communication

Exercise 1 -

Describe the function of the three lowest layers of the OSI protocol suite. What is the benefit in having separate layers over a single one?

Exercise 2 -

C has a construction called a union, in which a field of a record (called a struct in C) can hold any one of several alternatives. At run time, there is no way to tell which one is in there. Does this feature of C have any implications for remote procedure call (RPC)? Explain your answer.

Exercise 3 -

You are asked to build an embedded monitoring system that uses a camera to track events in real time. The embedded device needs to communicate with a sophisticated AI model on a remote cluster via RPC, and make quick decisions based on the reply. Explain pros and cons of choosing asynchronous vs synchronous RPC communication for this scenario.

Exercise 4 -

Message Passing Interface (MPI) is a transient communication model often used in scientific simulations, in which a large number of parallel processes run intensive computation and communication a limited period of time. Would MPI be suitable to implement a email-ing system? Why? [4 points]

Exercise 5 -

If a communication paradigm is asynchronous, is it also time-decoupled? Explain your answer with one example.