Assignment 5

Problem 1

Consider a system that uses the two-phase commit protocol with the cooperative termination protocol and no other optimization. Assuming there are two participants (P1 and P2) and a coordinator (C), for each of the following either describe an execution scenario or explain why it cannot happen:

  a.   P1 and P2 participants are blocked.
  b.   Only P2 participant is blocked.
  c.   C is blocked.

Problem 2

Suppose there are n processes involved in 2PC, where process 1 is the transaction's home. Suppose the processes are arranged in a chain (NOT a ring), so that each process can only communicate with adjacent processes in the chain. That is, process 1 can communicate only with process 2, process n-1 can communicate only with process n, and for each i where $1<i<n$, process i can communicate only with processes i-1 and i+1.

  a.   Devise a version of the 2PC protocol for this arrangement of processes that uses $2n - 2$ messages to commit a transaction.
  b.   In the protocol you devised in (a), is there any process that is never in an uncertainty period? If so, which one, and why?
  c.   In the protocol you devised in (a), what action commits the transaction?
  d.   Explain how to modify the protocol to speed up the protocol in the event that a process votes No.