1. (10 points)

Design a request-reply protocol between two symmetric processes p and q. In this protocol, each process can send a rqst(j) message to the other process, where j is any value in the range 0..n-1, then wait to receive a rply(j) message from the other process before it can send the next rqst(j) message. Use the AP notation to specify process p in this protocol.

2. (10 points)

Consider a network that consists of the processes p[i : 0..m-1], d, and q[j : 0..n-1]. Any process p[i] can send a rqst message to process d, then wait to receive a rply message from d before it can send the next rqst message to d. Process d receives the rqst messages from the processes in the process array p[i : 0..m-1], and forwards these messages, in a round-robin fashion, to the processes in the process array q[j : 0..n-1]. Each process q[j] sends back a rply message to process d for every rqst message that q[j] receives from d. Process d forwards each received rply message to the corresponding process p[i]. Each rqst message that process d forwards to a process q[j], and each rply message that a process q[j] sends to process d has a field x, whose value is in the range 0..m-1 and whose function is to record index i of process p[i] that originated the rqst message. Specify the processes p[i : 0..m-1], d, and q[j : 0..n-1] in this protocol.