1. (3 points)

Design a request-reply protocol between two asymmetric processes p and q.   In this protocol, each process can send a request message to the other process, then wait to receive a reply message from the other process before it can send the next request message. Process p has a "higher priority" over process q in the following sense. On one hand, if process p sends a request message to process q and later receives a request message from q, then p does not send a reply message to q until p receives a reply message from q. On the other hand, if process q sends a request message to process p and later receives a request message from p, then q sends a reply message to q right away (before q receives a reply message from p). Use the AP notation to specify the two processes p and q in this protocol.

2. (3 points)

Draw the state transition diagram for the protocol that you designed for Problem 1.

3. (4 points)

Processes p and q in the request-reply protocol of problem 1 are asymmetric. This means that the two processes can have different sets of variables, and different sets of actions. Re-design these processes p and q such that they become symmetric. This can be accomplished by providing each of the two processes with a boolean input named priority and requiring that the values of priority.p and priority.q are unequal. The process, whose priority input has the value true, has higher priority over the other process. Use the AP notation to specify process p (since process q is symmetric to p) in the re-designed protocol.