CS 425/ECE 428 Spring 2016 – Homework 5 Solutions

1. (a): 0

   (b): Three messages

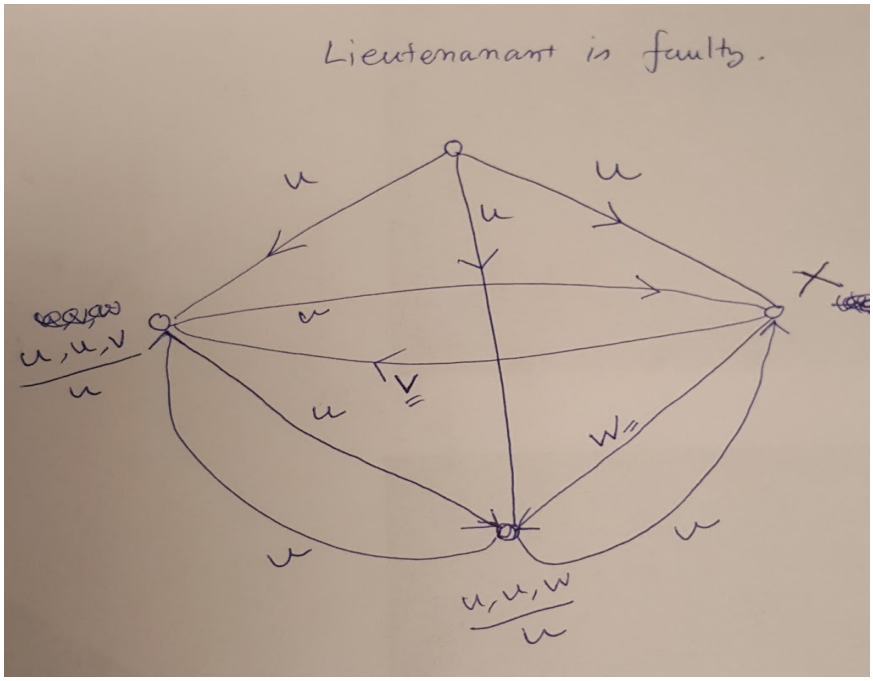
   Let C_{ij} denote the channel from process P_i to process P_j.

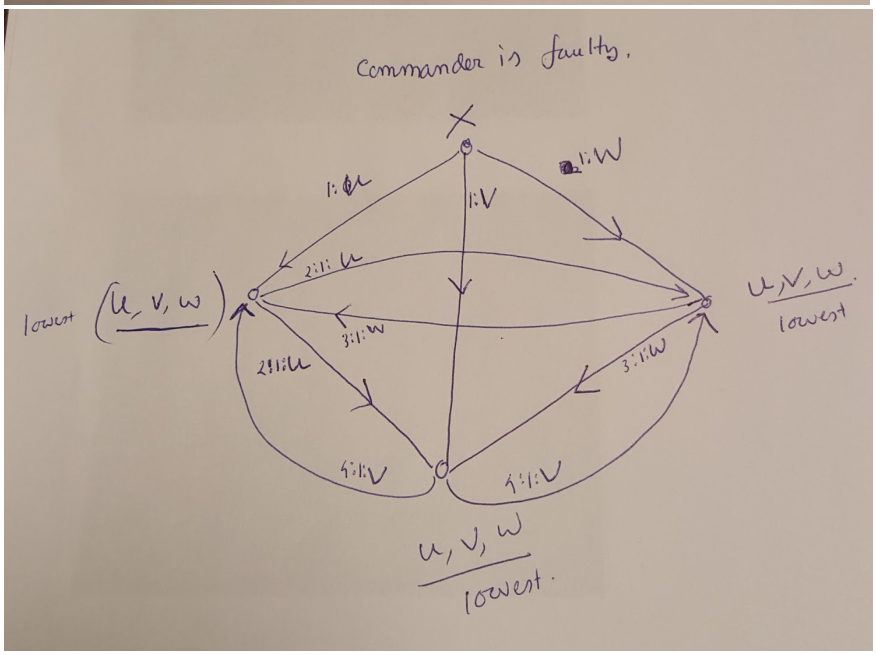
   C_{12}={m2}, C_{32}={m6}, C_{13}={m3}

   OR

   C_{12}={m2}, C_{13}={m1,m3}

2. Yes, it works correctly.





3. **No, Mutual exclusion can be violated.**

Liveness is guaranteed. No deadlock or starvation, since once a process p exit, p will reply to all the queued requests.

Example:
Say there are 3 processes requesting for access to the Critical Section
The following table shows a scenario where mutual exclusion can be violated. Q contains the queued messages.

P0	P1	P2
req	req	req
Q:{P1,P2}	Reply to P0 **Received a reply from P2, waiting for a reply from P0** Q:{P2}	Reply to P0, P1 **Waiting for replies from P0 and P1**
Enter CS		
Exit CS and Reply to P1, P2		
	Received reply from P0 Enter CS	**Received Reply from P0, Waiting for a reply from P1,**
Req	Q:{P2, P0}	
Received reply from P2		Reply to P0
Received reply from P1	Exit CS and Reply to P2 and P0	**Received reply from P1**
Enter CS		Enter CS