

SOLUTION TO HOMEWORK ASSIGNMENT 2**Problem 1 (2pt)**

OM(0) *always* satisfies IC2.

Problem 2 (3pt)

A simple example is OM(1), shown to satisfy IC1 and IC2 in the presence of one failure (you should check that all BGP assumptions are met in this synchronous network). Since OM(1) satisfies IC1 and IC2, all loyal generals must be able to reach consensus.

The first lemma fails because the order with which the schedules are applied matters. An example involving global state was given in class.

Problem 3 (3pt)

The FLP result still holds since a synchronous network with lossy message delivery can emulate how an asynchronous network behaves by dropping an arbitrary number of messages. Therefore, a synchronous lossy network cannot determine whether a process failed since all queries may be lost.

Problem 4 (2pt)

If all processes are single threaded, ME3 is still relevant. One example is when broadcast/multicast is available. Process P_1 broadcasts his request for critical section, P_2 receives the request but decides to rush against P_1 . Request from P_2 reaches the critical section before request from P_1 . Request from P_2 is consequently accepted first, thereby breaking the happen-before ordering.