

HOMEWORK 5 - LEONARDO SERILLI (UBINET)

(1) PROVE THAT SUKUZOKI-KASAMI ALGORITHM VERIFIES 3 PROPERTIES OF MUTUAL EXCLUSION

SAFETY Suppose P_i and P_j both in CS with P_i entered before P_j . This situation is possible only if P_i released the token before exiting from the CS, or the simultaneous presence of two tokens. Both conclusions bring to a contradiction.

LIVENESS If a process P_i is in the queue no other process behind him in the queue can interfere with the assignment of the Token to P_i .

FAIRNESS A process in the QUEUE can't be overtaken by anyone, so it will for sure enter in the critical section.

(2) EXPLAIN WHY THE QUORUM-BASED ALGORITHM PRESENTED IN THIS LECTURE SATISFIES SAFETY, BUT DOES NOT SATISFY LIVENESS

(a) THIS ALGORITHM SATISFIES SAFETY.

• Suppose P_i is in the CS, if any P_j that wants to enter must wait P_i 's RELEASE broadcast.

(b) THIS ALGORITHM DOES NOT SATISFY LIVENESS.

• Suppose that P_i and P_j broadcast a REQUEST messages simultaneously, we have 2 cases for DEADLOCK:

(1) They are in the same ROW or COLUMN. Not P_i nor P_j sends an ACK to the other.

(2) They are on different ROW AND COLUMN, suppose other two processes P_k, P_l : if P_k receive firstly the REQUEST of P_i and P_l the one of P_j , we are in the case where both P_i and P_j are stucked waiting for an ACK.

