

Distributed Systems 17/06/2016

Corso di Laurea Magistrale in Ingegneria Informatica

☐ 5 Credits

☐ 6 out of 12 Credits (not passed CNS yet)

☐ 6 Credits

☐ 6 out of 12 Credits (passed CNS)

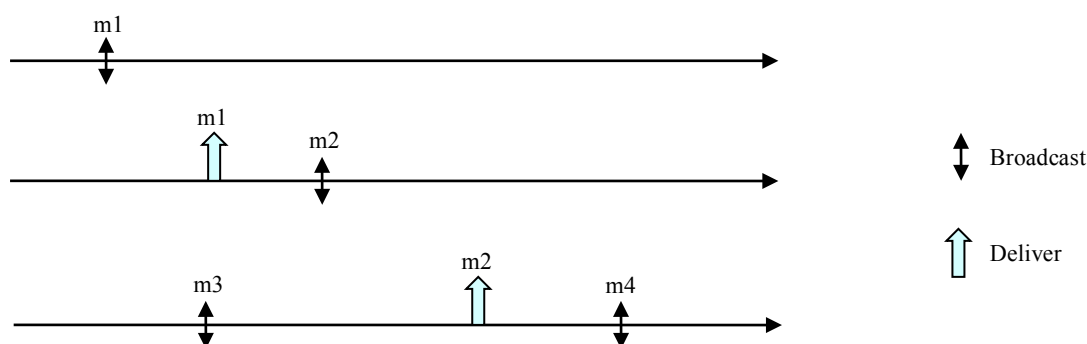
(tick the appropriate box above – write clear below)

Family Name _____ Name _____ Student ID _____

Ex 1: Discuss the assumption on the weaker system model (synchrony assumption and failures) upon which a regular reliable broadcast is able to work correctly. Consider now a uniform reliable broadcast algorithm, how the weaker system model changes in order the algorithm works correctly.

Ex 2:

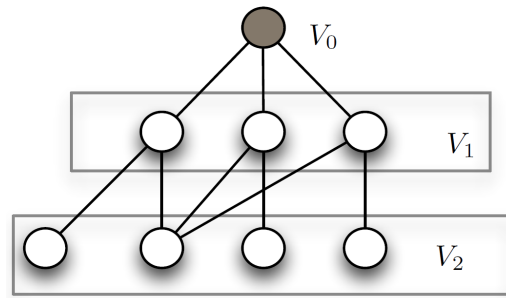
Consider the following partial history



Find the number of all delivery sequences that respect total order of deliveries and do not respect causal order of sendings. (provide an explanation of the answer)

Ex 3: Discuss the CAP theorem, provide an intuition of the proof and present an example of a system which is CA.

Ex 4: Consider a synchronous distributed system formed by a leader v_0 and a set of processes sharing the same ID (i.e., processes are anonymous). Processes and leader are connected through the topology depicted in figure



Processes are partitioned in n sets V_1, V_2, \dots, V_n corresponding to their distance from the leader. Each process knows its distance from the leader stored in the local variable denoted *distance*. Each process at distance i communicates with processes at distance $i+1$ through perfect point to point bidirectional link. Each process stores into a local variable *max_distance* the maximum distance of a process from the leader.

Write a round-based distributed algorithm (pseudo-code of the leader and of a process) that allows the leader to count the number of processes in V_2 . (provide before the pseudo code a short high-level description on how the algorithm works)

Ex 5

Consider a consensus protocol based on rotating coordinator paradigm. Discuss the structure of the algorithm and the under which condition processes converges to a consensus value.

According to the Italian law 675 of the 31/12/96, I authorize the instructor of the course to publish on the web site of the course results of the exams.

Signature: _____