Distributed Algorithms

Assignment 08

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1 Byzantine Generals Theory

In Byzantine Generals, a value is proposed by a distinguished process (commanding general), and it will be sent to other processes ((lieutenant generals) recursively. Processes receive values from others and propose a value by a majority function according to its received values. All correct processes will agree on the same value, and If the proposing process is fault-free, the proposed value is the value agreed on.

The recursive algorithm for oral messages is described as follows:

Algorithm 1 recursive algorithm for oral messages

1: $Initialactionatcommander : OM(m, 0, 1, ..., n-1, v)$
2: $InitialactionatlieutenantL : M_L = \{\}$
3: **function** OM(m, C, G, t)
4: **for** $LinG$ **do**
5: $send(m, G, C + " : " + t)TOL$;
6: **end for**
7: **end function**
8: $whenLieutenantLreceivesMessage$ (m,G,t)
9: **function** RECEIVE(m, G, t)
10: **if** $(m, G, t)ispending$ **then**
11: $M_L := M_L \cup t$;
12: **if** $m! = 0$ **then**
13: $OM(m-1, L, G/\{L\}, t)$
14: **end if**
15: **end if**
16: **end function**
17: $whenLieutenantPhasreceivedallmessage$
18: $v := tree_majority(M_L)$