Exercise Session 7
Terminating Reliable Broadcast

November 15, 2010

Problem 1

Can we implement TRB with the eventually perfect failure detector $\diamond P$, if we assume that at least one process can crash?

See Solution 6.10 in the book.

Problem 2

Show that P is the weakest failure detector for Group Membership.

In order to show that P is the weakest failure detector for Group Membership, we need to show that:

- P can be used to implement Group Membership.

- Group Membership can be used to implement P.

The first direction stems directly from the Group Membership implementation in the class.

For the second direction, we assume that all processes run Group Membership algorithm. Whenever a new view is installed, all processes that are freshly removed from the view are added to the suspected set. This approach satisfies both *Strong Completeness* and *Strong Accuracy* of P, directly from the corresponding properties of Group Membership.

The failure detector D is weakest for solving some problem A (e.g., Consensus or NBAC) if D provides the smallest amount of information about failures that allows to solve A.