Notes

An event is called *presnapshot* if it occurs at a process before the local snapshot at that process is taken; otherwise it is called *postsnapshot*. A snapshot is consistent if

- (1) no postsnapshop event is causally before a presnapshot event
- (2) a basic message is included in a channel state if and only if the corresponding send event is presnapshot while the corresponding receive event is postsnapshot.

Exercises

16. Consider the following figure:

(a) Provide the vector timestamps at each send, receive and concurrent event.

(b) Provide an example of a consistent and inconsistent cut.

17. Consider the following: Two processes P and Q are connected in a ring using two channels, and they constantly rotate a message m. At any one time, there is only one copy of m in the system. Each process's state consists of the number of times it has received m, and P sends m first. At a certain point, P has the message and its state is 102. Immediately after sending m, P initiates the snapshot algorithm. Explain the operation of the algorithm in this case, giving the possible global state(s) reported by it.

18. Consider the following figure

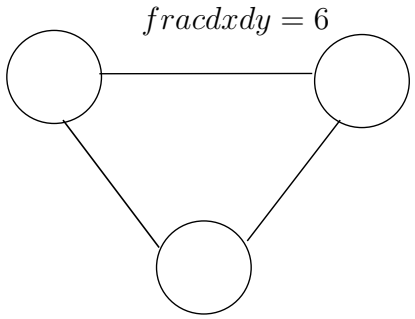

Figure 1: Three process chandy-lamport

19. Argue that a consistent snapshot, meaning one that satisfies properties (1) and (2), rules out orphan messages.