# Causal Ordering of Messages

BSS Protocol for Broadcast

# BSS Algorithm

- BSS: Birman-Schiper-Stephenson Protocol
- Broadcast based: a message sent is received by all other processes.
- Deliver a message to a process only if the message preceding it immediately, has been delivered to the process.
- Otherwise, buffer the message.
- Accomplished by using a vector accompanying the message.

# BSS Algorithm ...

1. Process Pi increments the vector time VTpi[i], time stamps, and broadcasts the message m.

2. Pj != Pi receives m. m is delivered when:
   a. VTpj[i] == VTm[I] - 1
   b. VTpj[k] >= VTm[k] for all k in {1,2,..n} - {i}, n is the total number of processes. Delayed message are queued in a sorted manner.
   c. Concurrent messages are ordered by time of receipt.

3. When m is delivered at Pj, VTpj updated according Rule 2 of vector clocks.

# BSS Algorithm …