Global State

– Due to absence of global clock, states are recorded at different times

– For global consistency, state of the communication channel should be the sequence of messages sent before the sender's state was recorded minus the messages received before the receivers state was recorded.

– Local states are defined in context of an application

  • a send is a part of the local state if it happened before the state was recorded. Ditto for a recv.

- A message causes an inconsistency if it was received, but not sent

- A collection of local states forms a global state

- This global state is consistent iff there are no pairwise inconsistency between local states.

- A message is in transit when it has been sent, but not received.

- The global state is transitless iff there are no local state pairs with messages in transit.

Chandy Lamport Algorithm

– The "initiating" process sets up a marker and records its state. It then sends the marker out on each outgoig channel BEFORE it sends any message.

– When a marker is received

- if your state has not been recorded, record channel state as empty, record your state, forward marker

- otherwise, record the state of the channel as all messages recd after recording of state but before receiving marker.

- Assumes FIFO channels.

- The recorded state may not be identical to any of the actual states of the system !

Chapter 2/6

- Critical Section Problem / Mutual exclusion
  - progress, bounded wait
- Hardware Solution
  - disable interrupts
    - problems ?
- Software Solution
  - busy wait ?
    - Tokens
    - Bakery algorithm
    - Special instructions (atomic test-set)
  - Semaphores
  - Monitors