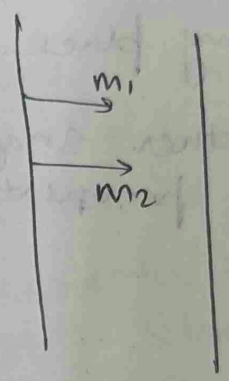
L-8: Chandy-Lamport wrap up: limitations, assumptions, properties.

→ one thing the notion of channels and these channels have FIFO behaviour.

"a connection from one process to another"



m_1 pehle jayega for m_2

This assumption that messages get delivered in FIFO order is a requirement for the Chandy Lamport Diagram to work correctly,

So, if you are in a setting where you can have FIFO anamolies then you are not satisfying the prerequisites to run the algorithm

But if there are FIFO anamolies
So, if there some other algo that can be used to take snapshots?
→ Yes, they will have some other drawbacks

for eg.

One really nice thing about the Chandy Lamport algorithm is that it can run at the same time as the application is running and the application process can keep on doing their thing even as the snapshot is taking place.

but some other snapshot algorithm don't have that nice property.

As per teacher understanding,

If you want to allow non FIFO ~~new~~ channels then you have to pause application processes sometimes.

but with Chandy Lamport you don't have to do that

Enforcing FIFO was one of the assumption of Chandy Lamport

Chandy - Lamport assumptions:

- Channels are FIFO
- reliable delivery of messages (messages aren't lost) (no msg lost / corruption / duplication)
- processes don't crash while the algorithm is running.

Good things about Chandy - Lamport assumption

→ This algorithm is guaranteed to terminate. and it has to record the state of every process and it has to state of every channel and every process is responsible for recording its own state and the state of its incoming channels,

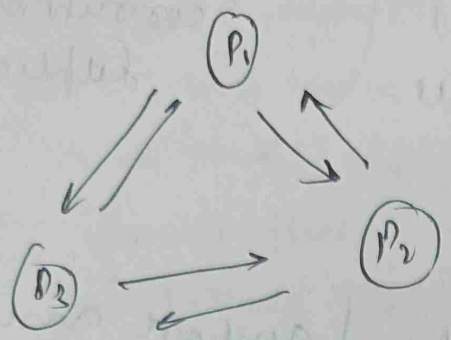
so if every process terminate then whole thing terminate.

→ In the paper "Chandy and Lamport" said "If the communication graph is strongly connected and at least one process begins by recording its state then all processes will record their states in finite time assuming reliable delivery"

means every process is reachable from every other process via channels.

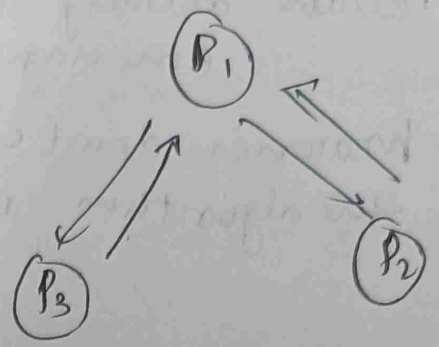
PTO

In our case the communication graph is not only strongly connected but also a complete graph.



we have this!

"Complete and Strongly Connected"



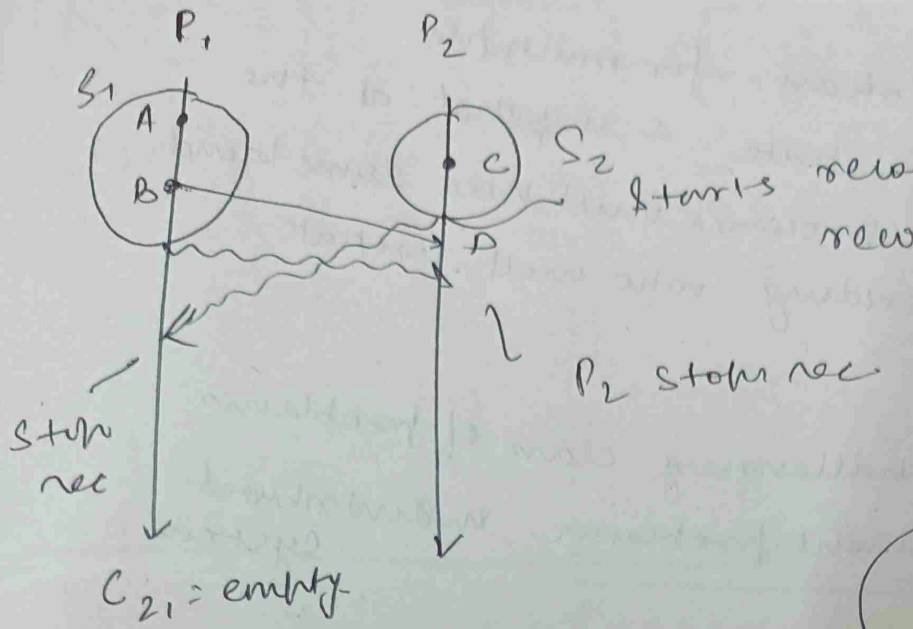
Requirement of Chandy Lamport

"not complete but Strongly connected"

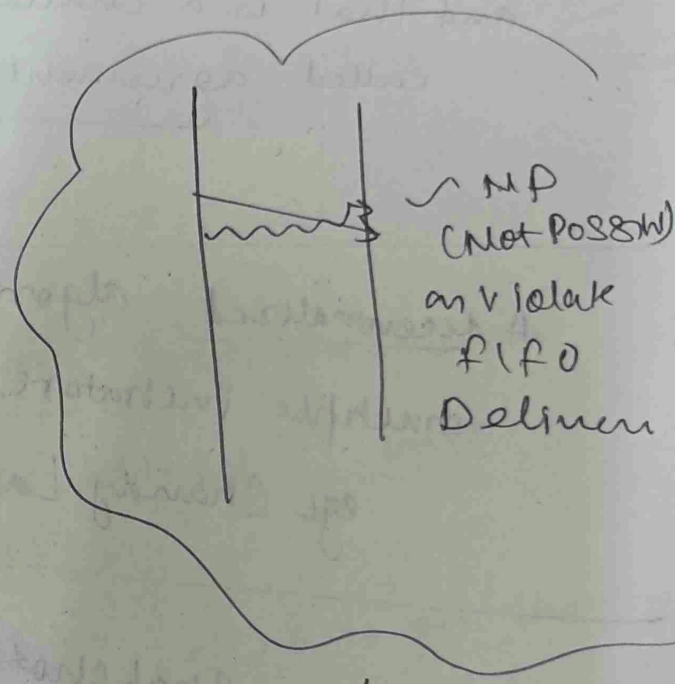
Chandy and Lamport Says that atleast one process has to start by recording its state.

we till have considered only one initiator process, lets include more than one initiator process.

15:00



Sab shi h.



What if it wasn't the case that multiple processes could initiate at the same time.

→ Well then, if somebody wanted to take a snapshot, then they will need to go to everybody and say "hey I am gonna take a snapshot now is that ok".

And what if it's waiting to hear back from everybody to tell them that it's okay what if it gets a message from one of them saying "hey I am gonna take a snapshot", then things get really chaotic.

So, if it's not okay for multiple processes to initiate a snapshot at the same time then processes will need some kind of way of deciding who will initiate.

and that is a challenging class of problems called agreement problem. in distributed system.

A decentralized algorithm is one that can have multiple initiators.

eg:- Chandy Lamport algo

What are snapshots good for?

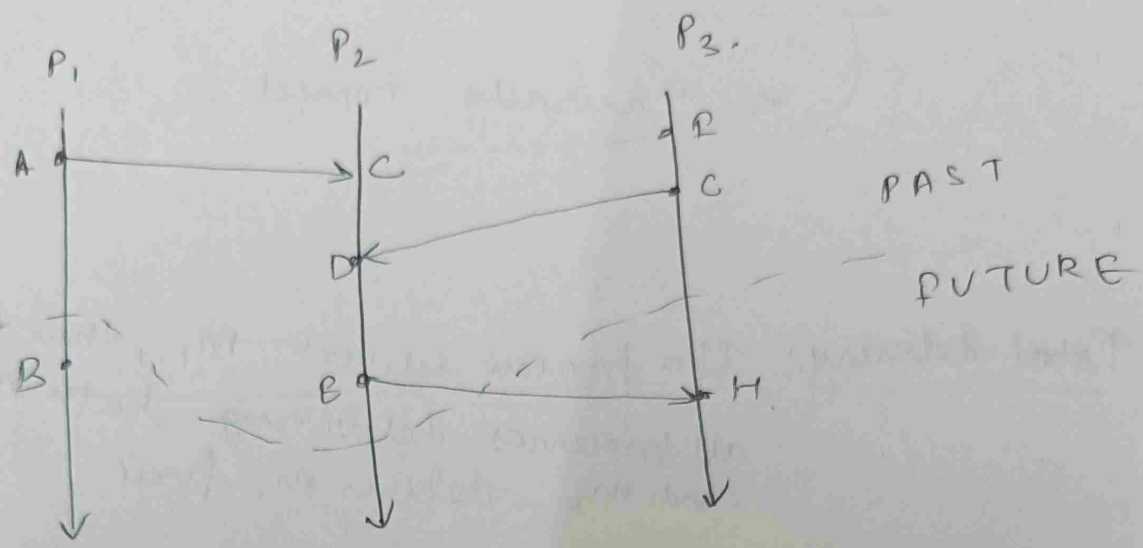
- checkpointing
- deadlock detection

} Snapshot data to sample.

- any stable property detection.

a property that, once true, remain true.

39:00.

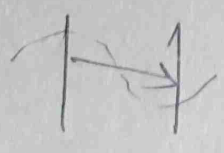


A cut is a "time frontier" going across a Lamport diagram, dividing it into "past" and "future".

An event is "in the cut" if it is on the "past" side.

So, what do you mean for a "cut" to be consistent?

→ A cut is consistent when, for all events E that are in the cut i.f F → E then F is also in the cut.

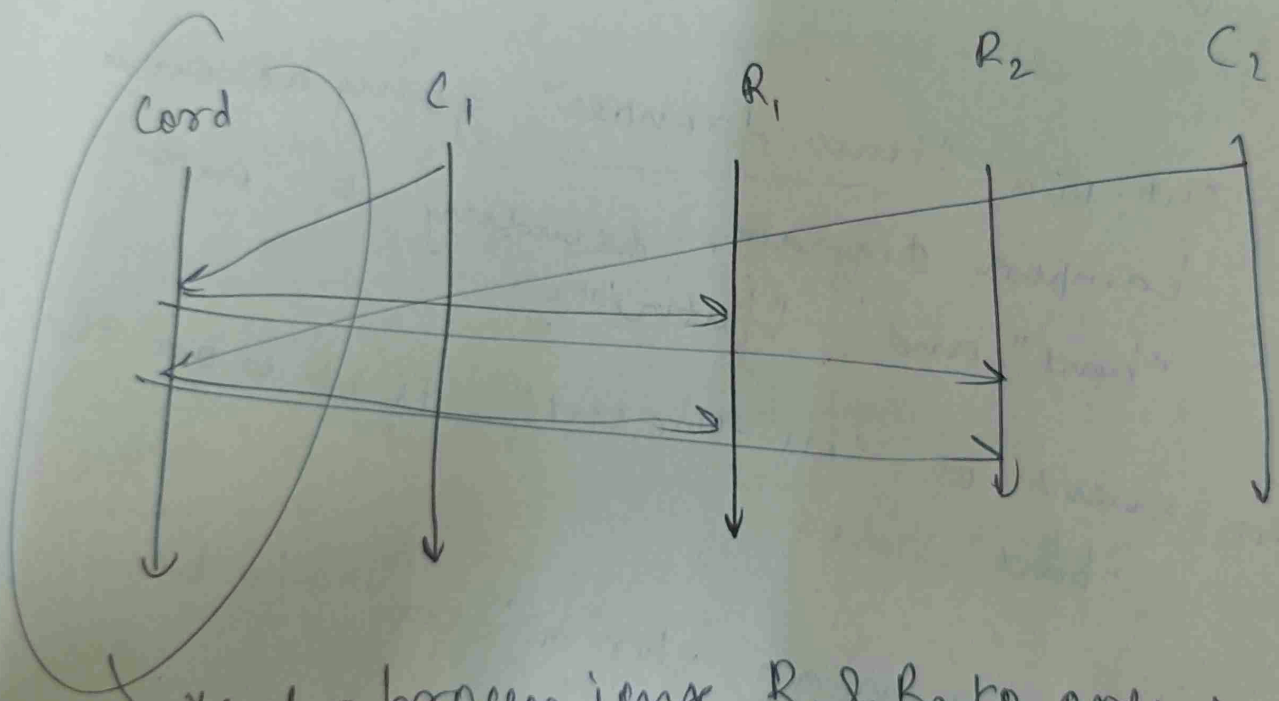


→ This is not consistent cut

The Chandy Lamport algorithm determines a consistent cut.

↳ "causally correct"

Total delivery: If a process delivers m_1, then m_2, all processes delivering both m_1 and m_2 deliver m_1 first



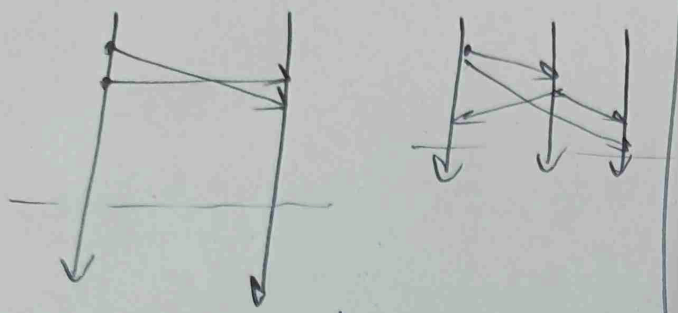
↳ Ye alag process jinse R_1 & R_2 ko order jaye

problems mein thi:

- Slow (coord is a bottleneck)
- coord could crash!

Safety Property

"Something bad won't happen"



Can be violated during finite execution.

Unevenn Property

"Something good eventually happen"