Deterministic consensus PAXOS

A generic method for implementing data structures

Faliures:

* Non-Byzantine
  + A node can stop functioning at any time
  + A node may start working again after some time, either starting again from it’s initial state, or continuing with the state it had when it stopped
  + Non-byzantine failures are not distinguishable from lost messages: for example, if all outgoing messages of a node are lost from now on, then that nodes is effectively stopped from the point of view of the rest of the network
* Byzantine
  + Nodes stop following the established protocol and behaviour in an arbitrary way
  + In particular, nodes may be adversarial: that is, they may try to break the rest of the system by forging messages, duplicating messages etc.
* Byzantine=”excessively complicated”(OED)

Clocks

* Drawings of time
  + Nodes=events
  + Arrow from node a to b = event a happens before event b
* Total order (aka linear order): node are on a line, with all arrows going right
  + Connexity: Either a before b, or b before a: a,b V b,a
  + Plus any total order is a partial order
* Partial order: drawings have no cycles, but are otherwise unconstrained
  + Transitivity: if a before b and b before c, a before c
  + Antisymmetry: Not two (distinct) events are simultaneous