













*For any events  $a, b$ : if  $a \subset b$ , then  $C(a) < C(b)$*

*a*

*b*

*a*

*b*













```
If(I_AM_SERVER && timestamp == start_time)
{
    pingAllMembers( );
    setMyActivity( ACTIVE );
}
```

*Figure A: Server module to request membership verification from all other nodes.*

```
If(I_AM_SERVER && timestamp == (stop_time - 1))
{
    determineNextServer( );
}
```

*Figure B: Server module to determine which node will be the next server for the system.*



```

    }
}
else if(received_msg == system_state)
{
    if(received_msg.key() == request)
    {
        if(resource_available)
        {
            lockForRequestingNode( resource );
            incrementTimestamp( );
            send( RESPONSE );/* to entire group */
        }
    }
    else if(received_msg.key() == release)
    {
        unlockResource ( resource );
    }
    else if(received_msg.key() == ping)
        memberActivity[sender.id] = ACTIVE;
    else {
        /* system state update - i.e.
        any type of personal information
        about a node that it needs to
        notify other members about
        */
    }
}
}

```

*Figure C: Server module to process incoming messages.*







```
        removeLeavingMember( );
        calculateMyTurnAsServer( );
        if(no_longer_my_turn)
            I_AM_SERVER = false;
    }
}
else if(received_msg == system_state)
{
    if(received_msg.key() == response)
    {
        processRequestResponse( );
    }
    else if(received_msg.key() == release)
    {
        unlockResource ( resource );
    }
    else if(received_msg.key() == ping)
```









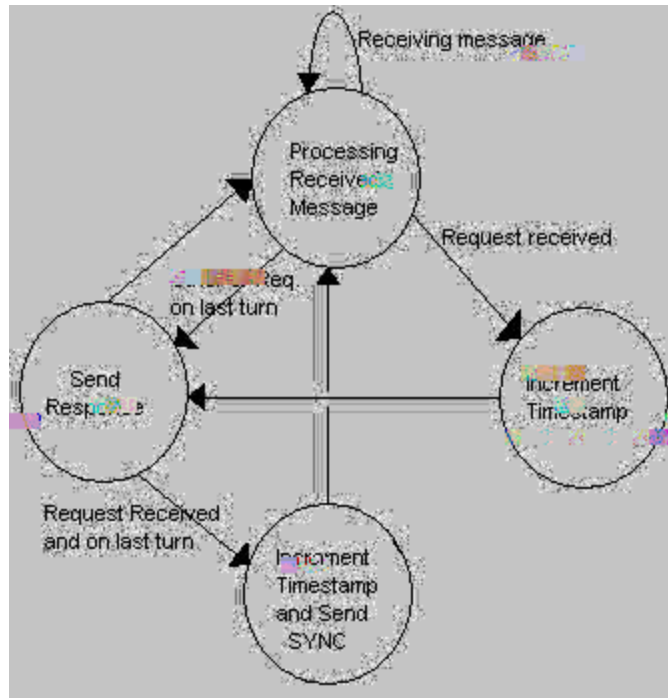


Figure F: State diagram showing the addition of the SYNC message to server module

*The proposed algorithm achieves mutual exclusion.*





























