

For any events a, b : if $a \subseteq b$, 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)
```

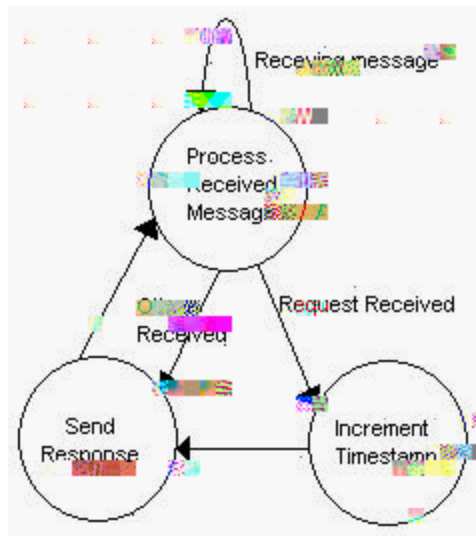



Figure E: State diagram showing when the server node increments the timestamp value.

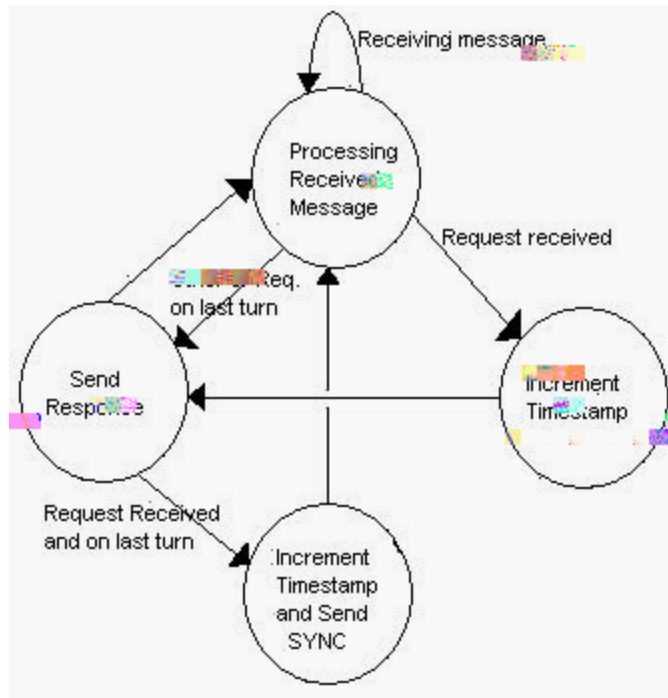


Figure F: State diagram showing the addition of the SYNC message to server module

The proposed algorithm achieves mutual exclusion.

