

Intelligent Systems

20 June 2020

1 Dynamic Protocols for Open Agent SystemsConsider the run for 7 agents, chair c and 6 subjects.

Time	Action
0	<i>request_floor</i> (s_1, c, app_A)
5	<i>request_floor</i> (s_2, c, app_A)
6	<i>request_floor</i> (s_3, c, app_A)
8	<i>request_floor</i> (s_5, c, app_A)
14	<i>propose</i> ($s_3, replace(sr, 3/4m, sm, 1)$)
16	<i>object</i> ($s_1, replace(sr, 3/4m, sm, 1)$)
17	<i>second</i> ($s_5, replace(sr, 3/4m, sm, 1)$) transition protocol argumentation
28	<i>vote</i> ($[s_2, s_3, s_4, s_5, s_6], for, 2$)
30	<i>vote</i> ($s_1, against, 2$)
31	<i>declare</i> ($c, replace(sr, 3/4m, sm, carried, 2)$)
35	<i>propose</i> ($s_5, replace(bc, fcfs, random, 0)$)
36	<i>second</i> ($s_3, replace(bc, fcfs, random, 0)$)
39	<i>object</i> ($s_2, replace(bc, fcfs, random, 0)$) transition protocol argumentation
51	<i>vote</i> ($[s_3, s_4, s_6], for, 1$)
53	<i>vote</i> ($[s_1, s_2], against, 1$)
54	<i>declare</i> ($c, replace(bc, fcfs, random, carried, 1)$)
58	<i>assign_floor</i> (c, s_3)

You are required to prove by justified tracing that the dynamic protocol works as expected.

1. Considering the power, permission and obligation to perform a protocol action, explain fully the meaning of
 $holdsAt(pow(C, revoke_floor(C, S)) = true, T) \leftarrow$
 $holdsAt(role_of(C) = chair, T),$
 $holdsAt(status = granted(S, Tg), T), T \geq Tg$
 $not\ holdsAt(best_candidate = S, T)$
and of
 $initiates(Act, active(DoF, PL) = NewVal, T) \leftarrow$
 $Act = declare(C, Motion, carried, PL + 1),$
 $Motion = replace(DoF, OldVal, NewVal, PL),$
 $holds(pow(C, Act) = true, T)$
2. Show that the actions of *request_floor* are permitted at time points 0, 5, 6, 8.
3. Show why *propose* at time 14 has been accepted by the system.
4. Why is action *object* at time 16 accepted?. If you cannot find a justification provide a definition in the event calculus.
5. Why is the action *second* at time 17 accepted? What happens if these actions at 14, 16 are reversed in time? Explain.
6. Why have all the agents mentioned at 28, 30 accepted to vote. Explain!
7. Show why action *declare* is accepted at 31. On what grounds?
8. What is the difference between the actions at times 28-31 and those at times 51-54?.
9. Why s_5 does not participate in the voting at times 51, 53? Justify fully.