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1 /Users/lorenzobloise/projects/netmax/venv/bin/
  python /Applications/PyCharm.app/Contents/plugins/
  python-ce/helpers/pycharm/_jb_unittest_runner.py --
  target general_tests.GeneralTests.test_network
2 Testing started at 12:13 ...
3 Launching unittests with arguments python -m
  unittest general_tests.GeneralTests.test_network in
  /Users/lorenzobloise/projects/netmax/tests/
  multi_agent_tests
4
5 2024-09-18 12:13:17,278 - multi_agent.
  competitive_influence_maximization - INFO -
  Starting the competitive influence maximization
  game
6 2024-09-18 12:13:17,278 - multi_agent.
  competitive_influence_maximization - INFO - Round 0
  has started
7 2024-09-18 12:13:17,279 - multi_agent.
  competitive_influence_maximization - INFO - Agent
  Agent_0 (id: 0) is playing
8 2024-09-18 12:13:18,565 - multi_agent.
  competitive_influence_maximization - INFO - The
  Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
9 2024-09-18 12:13:18,565 - multi_agent.
  competitive_influence_maximization - INFO -
  Activating node 41642 by agent Agent_0
10 2024-09-18 12:13:18,565 - multi_agent.
  competitive_influence_maximization - INFO - Spread
  of agent Agent_0 updated with 0 after adding node [41642]
11 2024-09-18 12:13:18,565 - multi_agent.
  competitive_influence_maximization - INFO - Seed
  set of agent Agent_0 updated with 41642 node
12 2024-09-18 12:13:18,565 - multi_agent.
  competitive_influence_maximization - INFO - Agent
  Agent_1 (id: 1) is playing
13 2024-09-18 12:13:18,656 - multi_agent.
  competitive_influence_maximization - INFO - The
  Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
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14 2024-09-18 12:13:18,657 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 29421 by agent Agent_1  
15 2024-09-18 12:13:18,657 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_1 updated with 0 after adding node [  
    29421]  
16 2024-09-18 12:13:18,657 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_1 updated with 29421 node  
17 2024-09-18 12:13:18,657 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_2 (id: 2) is playing  
18 2024-09-18 12:13:18,727 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
19 2024-09-18 12:13:18,727 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 50221 by agent Agent_2  
20 2024-09-18 12:13:18,727 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_2 updated with 0 after adding node [  
    50221]  
21 2024-09-18 12:13:18,727 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_2 updated with 50221 node  
22 2024-09-18 12:13:18,727 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_3 (id: 3) is playing  
23 2024-09-18 12:13:18,799 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
24 2024-09-18 12:13:18,799 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 56339 by agent Agent_3  
25 2024-09-18 12:13:18,799 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_3 updated with 0 after adding node [  
    56339]
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26 2024-09-18 12:13:18,799 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 56339 node
27 2024-09-18 12:13:18,799 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_4 (id: 4) is playing
28 2024-09-18 12:13:18,858 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
29 2024-09-18 12:13:18,858 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 5094 by agent Agent_4
30 2024-09-18 12:13:18,858 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_4 updated with 0 after adding node [5094]
31 2024-09-18 12:13:18,858 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 5094 node
32 2024-09-18 12:13:18,858 - multi_agent.
    competitive_influence_maximization - INFO - Round 1
        has started
33 2024-09-18 12:13:18,858 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_0 (id: 0) is playing
34 2024-09-18 12:13:18,907 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
35 2024-09-18 12:13:18,907 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 5123 by agent Agent_0
36 2024-09-18 12:13:18,907 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_0 updated with 0 after adding node [5123]
37 2024-09-18 12:13:18,907 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_0 updated with 5123 node
38 2024-09-18 12:13:18,907 - multi_agent.
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38 competitive_influence_maximization - INFO - Agent
Agent_1 (id: 1) is playing
39 2024-09-18 12:13:18,948 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
40 2024-09-18 12:13:18,949 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 17599 by agent Agent_1
41 2024-09-18 12:13:18,949 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_1 updated with 0 after adding node [
17599]
42 2024-09-18 12:13:18,949 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_1 updated with 17599 node
43 2024-09-18 12:13:18,949 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_2 (id: 2) is playing
44 2024-09-18 12:13:18,988 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
45 2024-09-18 12:13:18,988 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 30649 by agent Agent_2
46 2024-09-18 12:13:18,988 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_2 updated with 0 after adding node [
30649]
47 2024-09-18 12:13:18,988 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_2 updated with 30649 node
48 2024-09-18 12:13:18,989 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_3 (id: 3) is playing
49 2024-09-18 12:13:19,029 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
50 2024-09-18 12:13:19,029 - multi_agent.
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50 competitive_influence_maximization - INFO -  
    Activating node 48557 by agent Agent_3  
51 2024-09-18 12:13:19,029 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_3 updated with 0 after adding node [  
        48557]  
52 2024-09-18 12:13:19,029 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_3 updated with 48557 node  
53 2024-09-18 12:13:19,029 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_4 (id: 4) is playing  
54 2024-09-18 12:13:19,068 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
55 2024-09-18 12:13:19,068 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 14185 by agent Agent_4  
56 2024-09-18 12:13:19,068 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_4 updated with 0 after adding node [  
        14185]  
57 2024-09-18 12:13:19,068 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_4 updated with 14185 node  
58 2024-09-18 12:13:19,068 - multi_agent.  
    competitive_influence_maximization - INFO - Round 2  
    has started  
59 2024-09-18 12:13:19,068 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_0 (id: 0) is playing  
60 2024-09-18 12:13:19,106 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
61 2024-09-18 12:13:19,106 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 32134 by agent Agent_0  
62 2024-09-18 12:13:19,106 - multi_agent.  
    competitive_influence_maximization - INFO - Spread
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62 of agent Agent_0 updated with 0 after adding node [32134]
63 2024-09-18 12:13:19,106 - multi_agent.
competitive_influence_maximization - INFO - Seed set of agent Agent_0 updated with 32134 node
64 2024-09-18 12:13:19,106 - multi_agent.
competitive_influence_maximization - INFO - Agent Agent_1 (id: 1) is playing
65 2024-09-18 12:13:19,137 - multi_agent.
competitive_influence_maximization - INFO - The Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
66 2024-09-18 12:13:19,137 - multi_agent.
competitive_influence_maximization - INFO - Activating node 55663 by agent Agent_1
67 2024-09-18 12:13:19,137 - multi_agent.
competitive_influence_maximization - INFO - Spread of agent Agent_1 updated with 0 after adding node [55663]
68 2024-09-18 12:13:19,137 - multi_agent.
competitive_influence_maximization - INFO - Seed set of agent Agent_1 updated with 55663 node
69 2024-09-18 12:13:19,137 - multi_agent.
competitive_influence_maximization - INFO - Agent Agent_2 (id: 2) is playing
70 2024-09-18 12:13:19,163 - multi_agent.
competitive_influence_maximization - INFO - The Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
71 2024-09-18 12:13:19,163 - multi_agent.
competitive_influence_maximization - INFO - Activating node 20431 by agent Agent_2
72 2024-09-18 12:13:19,163 - multi_agent.
competitive_influence_maximization - INFO - Spread of agent Agent_2 updated with 0 after adding node [20431]
73 2024-09-18 12:13:19,163 - multi_agent.
competitive_influence_maximization - INFO - Seed set of agent Agent_2 updated with 20431 node
74 2024-09-18 12:13:19,163 - multi_agent.
competitive_influence_maximization - INFO - Agent
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74 Agent_3 (id: 3) is playing
75 2024-09-18 12:13:19,193 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
76 2024-09-18 12:13:19,193 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 69958 by agent Agent_3
77 2024-09-18 12:13:19,193 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_3 updated with 0 after adding node
    [69958]
78 2024-09-18 12:13:19,193 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 69958 node
79 2024-09-18 12:13:19,193 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_4 (id: 4) is playing
80 2024-09-18 12:13:19,220 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
81 2024-09-18 12:13:19,220 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 24045 by agent Agent_4
82 2024-09-18 12:13:19,220 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_4 updated with 0 after adding node
    [24045]
83 2024-09-18 12:13:19,220 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 24045 node
84 2024-09-18 12:13:19,220 - multi_agent.
    competitive_influence_maximization - INFO - Round
    3 has started
85 2024-09-18 12:13:19,220 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_0 (id: 0) is playing
86 2024-09-18 12:13:19,245 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
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86 Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
87 2024-09-18 12:13:19,245 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 44107 by agent Agent_0
88 2024-09-18 12:13:19,245 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_0 updated with 0 after adding node
        [44107]
89 2024-09-18 12:13:19,245 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_0 updated with 44107 node
90 2024-09-18 12:13:19,245 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_1 (id: 1) is playing
91 2024-09-18 12:13:19,268 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
        'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
92 2024-09-18 12:13:19,269 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 4296 by agent Agent_1
93 2024-09-18 12:13:19,269 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_1 updated with 0 after adding node
        [4296]
94 2024-09-18 12:13:19,269 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_1 updated with 4296 node
95 2024-09-18 12:13:19,269 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_2 (id: 2) is playing
96 2024-09-18 12:13:19,292 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
        'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
97 2024-09-18 12:13:19,292 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 17584 by agent Agent_2
98 2024-09-18 12:13:19,292 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_2 updated with 0 after adding node
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98 [17584]
99 2024-09-18 12:13:19,292 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_2 updated with 17584 node
100 2024-09-18 12:13:19,292 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_3 (id: 3) is playing
101 2024-09-18 12:13:19,314 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
102 2024-09-18 12:13:19,315 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 13937 by agent Agent_3
103 2024-09-18 12:13:19,315 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_3 updated with 0 after adding node
    [13937]
104 2024-09-18 12:13:19,315 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 13937 node
105 2024-09-18 12:13:19,315 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_4 (id: 4) is playing
106 2024-09-18 12:13:19,335 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
107 2024-09-18 12:13:19,335 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 35046 by agent Agent_4
108 2024-09-18 12:13:19,335 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_4 updated with 0 after adding node
    [35046]
109 2024-09-18 12:13:19,336 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 35046 node
110 2024-09-18 12:13:19,336 - multi_agent.
    competitive_influence_maximization - INFO - Round
    4 has started
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111 2024-09-18 12:13:19,336 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_0 (id: 0) is playing  
112 2024-09-18 12:13:19,359 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
113 2024-09-18 12:13:19,359 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 10466 by agent Agent_0  
114 2024-09-18 12:13:19,359 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_0 updated with 0 after adding node  
    [10466]  
115 2024-09-18 12:13:19,359 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_0 updated with 10466 node  
116 2024-09-18 12:13:19,359 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_1 (id: 1) is playing  
117 2024-09-18 12:13:19,380 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
118 2024-09-18 12:13:19,380 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 14857 by agent Agent_1  
119 2024-09-18 12:13:19,381 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_1 updated with 0 after adding node  
    [14857]  
120 2024-09-18 12:13:19,381 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_1 updated with 14857 node  
121 2024-09-18 12:13:19,381 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_2 (id: 2) is playing  
122 2024-09-18 12:13:19,402 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
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123 2024-09-18 12:13:19,402 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 19187 by agent Agent_2  
124 2024-09-18 12:13:19,402 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_2 updated with 0 after adding node  
    [19187]  
125 2024-09-18 12:13:19,402 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_2 updated with 19187 node  
126 2024-09-18 12:13:19,402 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_3 (id: 3) is playing  
127 2024-09-18 12:13:19,423 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
128 2024-09-18 12:13:19,423 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 7026 by agent Agent_3  
129 2024-09-18 12:13:19,423 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_3 updated with 0 after adding node  
    [7026]  
130 2024-09-18 12:13:19,423 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_3 updated with 7026 node  
131 2024-09-18 12:13:19,423 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_4 (id: 4) is playing  
132 2024-09-18 12:13:19,445 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
133 2024-09-18 12:13:19,445 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 42832 by agent Agent_4  
134 2024-09-18 12:13:19,445 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_4 updated with 0 after adding node  
    [42832]
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135 2024-09-18 12:13:19,445 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_4 updated with 42832 node  
136 2024-09-18 12:13:19,445 - multi_agent.  
    competitive_influence_maximization - INFO - Round  
    5 has started  
137 2024-09-18 12:13:19,445 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_0 (id: 0) is playing  
138 2024-09-18 12:13:19,466 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
139 2024-09-18 12:13:19,466 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 15011 by agent Agent_0  
140 2024-09-18 12:13:19,466 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_0 updated with 0 after adding node  
    [15011]  
141 2024-09-18 12:13:19,466 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_0 updated with 15011 node  
142 2024-09-18 12:13:19,466 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_1 (id: 1) is playing  
143 2024-09-18 12:13:19,487 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
144 2024-09-18 12:13:19,487 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 13293 by agent Agent_1  
145 2024-09-18 12:13:19,487 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_1 updated with 0 after adding node  
    [13293]  
146 2024-09-18 12:13:19,487 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_1 updated with 13293 node  
147 2024-09-18 12:13:19,487 - multi_agent.
```

```
147 competitive_influence_maximization - INFO - Agent
Agent_2 (id: 2) is playing
148 2024-09-18 12:13:19,505 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
149 2024-09-18 12:13:19,505 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 5015 by agent Agent_2
150 2024-09-18 12:13:19,505 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_2 updated with 0 after adding node
[5015]
151 2024-09-18 12:13:19,505 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_2 updated with 5015 node
152 2024-09-18 12:13:19,505 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_3 (id: 3) is playing
153 2024-09-18 12:13:19,524 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
154 2024-09-18 12:13:19,524 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 50847 by agent Agent_3
155 2024-09-18 12:13:19,524 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_3 updated with 0 after adding node
[50847]
156 2024-09-18 12:13:19,524 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_3 updated with 50847 node
157 2024-09-18 12:13:19,524 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_4 (id: 4) is playing
158 2024-09-18 12:13:19,543 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
159 2024-09-18 12:13:19,543 - multi_agent.
```

```
159 competitive_influence_maximization - INFO -  
    Activating node 33816 by agent Agent_4  
160 2024-09-18 12:13:19,543 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
        of agent Agent_4 updated with 0 after adding node  
        [33816]  
161 2024-09-18 12:13:19,543 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
        set of agent Agent_4 updated with 33816 node  
162 2024-09-18 12:13:19,543 - multi_agent.  
    competitive_influence_maximization - INFO - Round  
        6 has started  
163 2024-09-18 12:13:19,543 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
        Agent_0 (id: 0) is playing  
164 2024-09-18 12:13:19,564 - multi_agent.  
    competitive_influence_maximization - INFO - The  
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
165 2024-09-18 12:13:19,564 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Activating node 27581 by agent Agent_0  
166 2024-09-18 12:13:19,564 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
        of agent Agent_0 updated with 0 after adding node  
        [27581]  
167 2024-09-18 12:13:19,564 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
        set of agent Agent_0 updated with 27581 node  
168 2024-09-18 12:13:19,564 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
        Agent_1 (id: 1) is playing  
169 2024-09-18 12:13:19,582 - multi_agent.  
    competitive_influence_maximization - INFO - The  
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
170 2024-09-18 12:13:19,582 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Activating node 38142 by agent Agent_1  
171 2024-09-18 12:13:19,582 - multi_agent.  
    competitive_influence_maximization - INFO - Spread
```

```
171 of agent Agent_1 updated with 0 after adding node [38142]
172 2024-09-18 12:13:19,582 - multi_agent.
    competitive_influence_maximization - INFO - Seed set of agent Agent_1 updated with 38142 node
173 2024-09-18 12:13:19,582 - multi_agent.
    competitive_influence_maximization - INFO - Agent Agent_2 (id: 2) is playing
174 2024-09-18 12:13:19,601 - multi_agent.
    competitive_influence_maximization - INFO - The Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
175 2024-09-18 12:13:19,601 - multi_agent.
    competitive_influence_maximization - INFO - Activating node 69258 by agent Agent_2
176 2024-09-18 12:13:19,601 - multi_agent.
    competitive_influence_maximization - INFO - Spread of agent Agent_2 updated with 0 after adding node [69258]
177 2024-09-18 12:13:19,601 - multi_agent.
    competitive_influence_maximization - INFO - Seed set of agent Agent_2 updated with 69258 node
178 2024-09-18 12:13:19,601 - multi_agent.
    competitive_influence_maximization - INFO - Agent Agent_3 (id: 3) is playing
179 2024-09-18 12:13:19,619 - multi_agent.
    competitive_influence_maximization - INFO - The Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
180 2024-09-18 12:13:19,619 - multi_agent.
    competitive_influence_maximization - INFO - Activating node 8487 by agent Agent_3
181 2024-09-18 12:13:19,619 - multi_agent.
    competitive_influence_maximization - INFO - Spread of agent Agent_3 updated with 0 after adding node [8487]
182 2024-09-18 12:13:19,619 - multi_agent.
    competitive_influence_maximization - INFO - Seed set of agent Agent_3 updated with 8487 node
183 2024-09-18 12:13:19,619 - multi_agent.
    competitive_influence_maximization - INFO - Agent
```

```
183 Agent_4 (id: 4) is playing
184 2024-09-18 12:13:19,636 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
185 2024-09-18 12:13:19,636 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 36870 by agent Agent_4
186 2024-09-18 12:13:19,637 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_4 updated with 0 after adding node
    [36870]
187 2024-09-18 12:13:19,637 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 36870 node
188 2024-09-18 12:13:19,637 - multi_agent.
    competitive_influence_maximization - INFO - Round
    7 has started
189 2024-09-18 12:13:19,637 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_0 (id: 0) is playing
190 2024-09-18 12:13:19,655 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
191 2024-09-18 12:13:19,655 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 62407 by agent Agent_0
192 2024-09-18 12:13:19,655 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_0 updated with 0 after adding node
    [62407]
193 2024-09-18 12:13:19,655 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_0 updated with 62407 node
194 2024-09-18 12:13:19,655 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_1 (id: 1) is playing
195 2024-09-18 12:13:19,674 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
```

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195 Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
196 2024-09-18 12:13:19,674 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 3504 by agent Agent_1
197 2024-09-18 12:13:19,674 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_1 updated with 0 after adding node
        [3504]
198 2024-09-18 12:13:19,674 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_1 updated with 3504 node
199 2024-09-18 12:13:19,675 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_2 (id: 2) is playing
200 2024-09-18 12:13:19,694 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
201 2024-09-18 12:13:19,694 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 24129 by agent Agent_2
202 2024-09-18 12:13:19,694 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_2 updated with 0 after adding node
        [24129]
203 2024-09-18 12:13:19,694 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_2 updated with 24129 node
204 2024-09-18 12:13:19,695 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_3 (id: 3) is playing
205 2024-09-18 12:13:19,714 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
206 2024-09-18 12:13:19,714 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 681 by agent Agent_3
207 2024-09-18 12:13:19,714 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_3 updated with 0 after adding node
```

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207 [681]
208 2024-09-18 12:13:19,714 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 681 node
209 2024-09-18 12:13:19,714 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_4 (id: 4) is playing
210 2024-09-18 12:13:19,732 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
211 2024-09-18 12:13:19,732 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 29156 by agent Agent_4
212 2024-09-18 12:13:19,733 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_4 updated with 0 after adding node
    [29156]
213 2024-09-18 12:13:19,733 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 29156 node
214 2024-09-18 12:13:19,733 - multi_agent.
    competitive_influence_maximization - INFO - Round
    8 has started
215 2024-09-18 12:13:19,733 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_0 (id: 0) is playing
216 2024-09-18 12:13:19,749 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
217 2024-09-18 12:13:19,749 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 10024 by agent Agent_0
218 2024-09-18 12:13:19,749 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_0 updated with 0 after adding node
    [10024]
219 2024-09-18 12:13:19,750 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_0 updated with 10024 node
```

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220 2024-09-18 12:13:19,750 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_1 (id: 1) is playing  
221 2024-09-18 12:13:19,768 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
222 2024-09-18 12:13:19,768 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 14775 by agent Agent_1  
223 2024-09-18 12:13:19,768 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_1 updated with 0 after adding node  
    [14775]  
224 2024-09-18 12:13:19,768 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_1 updated with 14775 node  
225 2024-09-18 12:13:19,768 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_2 (id: 2) is playing  
226 2024-09-18 12:13:19,787 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
227 2024-09-18 12:13:19,787 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 66006 by agent Agent_2  
228 2024-09-18 12:13:19,787 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_2 updated with 0 after adding node  
    [66006]  
229 2024-09-18 12:13:19,787 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_2 updated with 66006 node  
230 2024-09-18 12:13:19,787 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_3 (id: 3) is playing  
231 2024-09-18 12:13:19,804 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
```

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232 2024-09-18 12:13:19,804 - multi_agent.  
competitive_influence_maximization - INFO -  
Activating node 2887 by agent Agent_3  
233 2024-09-18 12:13:19,804 - multi_agent.  
competitive_influence_maximization - INFO - Spread  
of agent Agent_3 updated with 0 after adding node  
[2887]  
234 2024-09-18 12:13:19,805 - multi_agent.  
competitive_influence_maximization - INFO - Seed  
set of agent Agent_3 updated with 2887 node  
235 2024-09-18 12:13:19,805 - multi_agent.  
competitive_influence_maximization - INFO - Agent  
Agent_4 (id: 4) is playing  
236 2024-09-18 12:13:19,822 - multi_agent.  
competitive_influence_maximization - INFO - The  
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
237 2024-09-18 12:13:19,822 - multi_agent.  
competitive_influence_maximization - INFO -  
Activating node 45264 by agent Agent_4  
238 2024-09-18 12:13:19,822 - multi_agent.  
competitive_influence_maximization - INFO - Spread  
of agent Agent_4 updated with 0 after adding node  
[45264]  
239 2024-09-18 12:13:19,822 - multi_agent.  
competitive_influence_maximization - INFO - Seed  
set of agent Agent_4 updated with 45264 node  
240 2024-09-18 12:13:19,822 - multi_agent.  
competitive_influence_maximization - INFO - Round  
9 has started  
241 2024-09-18 12:13:19,822 - multi_agent.  
competitive_influence_maximization - INFO - Agent  
Agent_0 (id: 0) is playing  
242 2024-09-18 12:13:19,839 - multi_agent.  
competitive_influence_maximization - INFO - The  
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
243 2024-09-18 12:13:19,839 - multi_agent.  
competitive_influence_maximization - INFO -  
Activating node 3290 by agent Agent_0  
244 2024-09-18 12:13:19,839 - multi_agent.
```

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244 competitive_influence_maximization - INFO - Spread
      of agent Agent_0 updated with 0 after adding node
      [3290]
245 2024-09-18 12:13:19,839 - multi_agent.
      competitive_influence_maximization - INFO - Seed
      set of agent Agent_0 updated with 3290 node
246 2024-09-18 12:13:19,839 - multi_agent.
      competitive_influence_maximization - INFO - Agent
      Agent_1 (id: 1) is playing
247 2024-09-18 12:13:19,854 - multi_agent.
      competitive_influence_maximization - INFO - The
      Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
248 2024-09-18 12:13:19,854 - multi_agent.
      competitive_influence_maximization - INFO -
      Activating node 21471 by agent Agent_1
249 2024-09-18 12:13:19,854 - multi_agent.
      competitive_influence_maximization - INFO - Spread
      of agent Agent_1 updated with 0 after adding node
      [21471]
250 2024-09-18 12:13:19,855 - multi_agent.
      competitive_influence_maximization - INFO - Seed
      set of agent Agent_1 updated with 21471 node
251 2024-09-18 12:13:19,855 - multi_agent.
      competitive_influence_maximization - INFO - Agent
      Agent_2 (id: 2) is playing
252 2024-09-18 12:13:19,870 - multi_agent.
      competitive_influence_maximization - INFO - The
      Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
253 2024-09-18 12:13:19,870 - multi_agent.
      competitive_influence_maximization - INFO -
      Activating node 4081 by agent Agent_2
254 2024-09-18 12:13:19,870 - multi_agent.
      competitive_influence_maximization - INFO - Spread
      of agent Agent_2 updated with 0 after adding node
      [4081]
255 2024-09-18 12:13:19,870 - multi_agent.
      competitive_influence_maximization - INFO - Seed
      set of agent Agent_2 updated with 4081 node
256 2024-09-18 12:13:19,870 - multi_agent.
```

```
256 competitive_influence_maximization - INFO - Agent
    Agent_3 (id: 3) is playing
257 2024-09-18 12:13:19,885 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
258 2024-09-18 12:13:19,886 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 24019 by agent Agent_3
259 2024-09-18 12:13:19,886 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_3 updated with 0 after adding node
    [24019]
260 2024-09-18 12:13:19,886 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 24019 node
261 2024-09-18 12:13:19,886 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_4 (id: 4) is playing
262 2024-09-18 12:13:19,901 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
263 2024-09-18 12:13:19,901 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 21499 by agent Agent_4
264 2024-09-18 12:13:19,901 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_4 updated with 0 after adding node
    [21499]
265 2024-09-18 12:13:19,901 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 21499 node
266 2024-09-18 12:13:19,901 - multi_agent.
    competitive_influence_maximization - INFO - Round
    10 has started
267 2024-09-18 12:13:19,901 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_0 (id: 0) is playing
268 2024-09-18 12:13:19,918 - multi_agent.
    competitive_influence_maximization - INFO - The
```

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268 Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
269 2024-09-18 12:13:19,918 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 36132 by agent Agent_0
270 2024-09-18 12:13:19,918 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_0 updated with 0 after adding node
[36132]
271 2024-09-18 12:13:19,918 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_0 updated with 36132 node
272 2024-09-18 12:13:19,919 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_1 (id: 1) is playing
273 2024-09-18 12:13:19,934 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
274 2024-09-18 12:13:19,935 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 27170 by agent Agent_1
275 2024-09-18 12:13:19,935 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_1 updated with 0 after adding node
[27170]
276 2024-09-18 12:13:19,935 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_1 updated with 27170 node
277 2024-09-18 12:13:19,935 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_2 (id: 2) is playing
278 2024-09-18 12:13:19,951 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
279 2024-09-18 12:13:19,951 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 10826 by agent Agent_2
280 2024-09-18 12:13:19,951 - multi_agent.
competitive_influence_maximization - INFO - Spread
```

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280  of agent Agent_2 updated with 0 after adding node [10826]
281 2024-09-18 12:13:19,951 - multi_agent.
    competitive_influence_maximization - INFO - Seed set of agent Agent_2 updated with 10826 node
282 2024-09-18 12:13:19,951 - multi_agent.
    competitive_influence_maximization - INFO - Agent Agent_3 (id: 3) is playing
283 2024-09-18 12:13:19,966 - multi_agent.
    competitive_influence_maximization - INFO - The Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
284 2024-09-18 12:13:19,966 - multi_agent.
    competitive_influence_maximization - INFO - Activating node 35543 by agent Agent_3
285 2024-09-18 12:13:19,966 - multi_agent.
    competitive_influence_maximization - INFO - Spread of agent Agent_3 updated with 0 after adding node [35543]
286 2024-09-18 12:13:19,966 - multi_agent.
    competitive_influence_maximization - INFO - Seed set of agent Agent_3 updated with 35543 node
287 2024-09-18 12:13:19,966 - multi_agent.
    competitive_influence_maximization - INFO - Agent Agent_4 (id: 4) is playing
288 2024-09-18 12:13:19,982 - multi_agent.
    competitive_influence_maximization - INFO - The Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
289 2024-09-18 12:13:19,982 - multi_agent.
    competitive_influence_maximization - INFO - Activating node 41050 by agent Agent_4
290 2024-09-18 12:13:19,982 - multi_agent.
    competitive_influence_maximization - INFO - Spread of agent Agent_4 updated with 0 after adding node [41050]
291 2024-09-18 12:13:19,983 - multi_agent.
    competitive_influence_maximization - INFO - Seed set of agent Agent_4 updated with 41050 node
292 2024-09-18 12:13:19,983 - multi_agent.
    competitive_influence_maximization - INFO - Round
```

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292 11 has started
293 2024-09-18 12:13:19,983 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_0 (id: 0) is playing
294 2024-09-18 12:13:19,998 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
295 2024-09-18 12:13:19,998 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 56087 by agent Agent_0
296 2024-09-18 12:13:19,998 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_0 updated with 0 after adding node
[56087]
297 2024-09-18 12:13:19,998 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_0 updated with 56087 node
298 2024-09-18 12:13:19,998 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_1 (id: 1) is playing
299 2024-09-18 12:13:20,012 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
300 2024-09-18 12:13:20,012 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 13765 by agent Agent_1
301 2024-09-18 12:13:20,012 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_1 updated with 0 after adding node
[13765]
302 2024-09-18 12:13:20,012 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_1 updated with 13765 node
303 2024-09-18 12:13:20,012 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_2 (id: 2) is playing
304 2024-09-18 12:13:20,026 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
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304 Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
305 2024-09-18 12:13:20,026 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 17399 by agent Agent_2
306 2024-09-18 12:13:20,026 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_2 updated with 0 after adding node
        [17399]
307 2024-09-18 12:13:20,026 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_2 updated with 17399 node
308 2024-09-18 12:13:20,026 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_3 (id: 3) is playing
309 2024-09-18 12:13:20,039 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
        'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
310 2024-09-18 12:13:20,039 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 4311 by agent Agent_3
311 2024-09-18 12:13:20,039 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_3 updated with 0 after adding node
        [4311]
312 2024-09-18 12:13:20,040 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_3 updated with 4311 node
313 2024-09-18 12:13:20,040 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_4 (id: 4) is playing
314 2024-09-18 12:13:20,053 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
        'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
315 2024-09-18 12:13:20,053 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 56873 by agent Agent_4
316 2024-09-18 12:13:20,053 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_4 updated with 0 after adding node
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316 [56873]
317 2024-09-18 12:13:20,053 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_4 updated with 56873 node
318 2024-09-18 12:13:20,054 - multi_agent.
competitive_influence_maximization - INFO - Round
12 has started
319 2024-09-18 12:13:20,054 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_0 (id: 0) is playing
320 2024-09-18 12:13:20,067 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
321 2024-09-18 12:13:20,067 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 19099 by agent Agent_0
322 2024-09-18 12:13:20,067 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_0 updated with 0 after adding node
[19099]
323 2024-09-18 12:13:20,067 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_0 updated with 19099 node
324 2024-09-18 12:13:20,067 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_1 (id: 1) is playing
325 2024-09-18 12:13:20,080 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
326 2024-09-18 12:13:20,080 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 28662 by agent Agent_1
327 2024-09-18 12:13:20,080 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_1 updated with 0 after adding node
[28662]
328 2024-09-18 12:13:20,080 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_1 updated with 28662 node
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329 2024-09-18 12:13:20,080 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_2 (id: 2) is playing  
330 2024-09-18 12:13:20,093 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
331 2024-09-18 12:13:20,093 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 37648 by agent Agent_2  
332 2024-09-18 12:13:20,093 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_2 updated with 0 after adding node  
    [37648]  
333 2024-09-18 12:13:20,093 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_2 updated with 37648 node  
334 2024-09-18 12:13:20,093 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_3 (id: 3) is playing  
335 2024-09-18 12:13:20,106 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
336 2024-09-18 12:13:20,106 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 32450 by agent Agent_3  
337 2024-09-18 12:13:20,106 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_3 updated with 0 after adding node  
    [32450]  
338 2024-09-18 12:13:20,106 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_3 updated with 32450 node  
339 2024-09-18 12:13:20,106 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_4 (id: 4) is playing  
340 2024-09-18 12:13:20,119 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
```

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341 2024-09-18 12:13:20,120 - multi_agent.  
competitive_influence_maximization - INFO -  
Activating node 3966 by agent Agent_4  
342 2024-09-18 12:13:20,120 - multi_agent.  
competitive_influence_maximization - INFO - Spread  
of agent Agent_4 updated with 0 after adding node  
[3966]  
343 2024-09-18 12:13:20,120 - multi_agent.  
competitive_influence_maximization - INFO - Seed  
set of agent Agent_4 updated with 3966 node  
344 2024-09-18 12:13:20,120 - multi_agent.  
competitive_influence_maximization - INFO - Round  
13 has started  
345 2024-09-18 12:13:20,120 - multi_agent.  
competitive_influence_maximization - INFO - Agent  
Agent_0 (id: 0) is playing  
346 2024-09-18 12:13:20,134 - multi_agent.  
competitive_influence_maximization - INFO - The  
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
347 2024-09-18 12:13:20,134 - multi_agent.  
competitive_influence_maximization - INFO -  
Activating node 39186 by agent Agent_0  
348 2024-09-18 12:13:20,134 - multi_agent.  
competitive_influence_maximization - INFO - Spread  
of agent Agent_0 updated with 0 after adding node  
[39186]  
349 2024-09-18 12:13:20,134 - multi_agent.  
competitive_influence_maximization - INFO - Seed  
set of agent Agent_0 updated with 39186 node  
350 2024-09-18 12:13:20,134 - multi_agent.  
competitive_influence_maximization - INFO - Agent  
Agent_1 (id: 1) is playing  
351 2024-09-18 12:13:20,149 - multi_agent.  
competitive_influence_maximization - INFO - The  
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
352 2024-09-18 12:13:20,149 - multi_agent.  
competitive_influence_maximization - INFO -  
Activating node 63837 by agent Agent_1  
353 2024-09-18 12:13:20,149 - multi_agent.
```

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353 competitive_influence_maximization - INFO - Spread
      of agent Agent_1 updated with 0 after adding node
      [63837]
354 2024-09-18 12:13:20,149 - multi_agent.
      competitive_influence_maximization - INFO - Seed
      set of agent Agent_1 updated with 63837 node
355 2024-09-18 12:13:20,149 - multi_agent.
      competitive_influence_maximization - INFO - Agent
      Agent_2 (id: 2) is playing
356 2024-09-18 12:13:20,162 - multi_agent.
      competitive_influence_maximization - INFO - The
      Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
357 2024-09-18 12:13:20,163 - multi_agent.
      competitive_influence_maximization - INFO -
      Activating node 11939 by agent Agent_2
358 2024-09-18 12:13:20,163 - multi_agent.
      competitive_influence_maximization - INFO - Spread
      of agent Agent_2 updated with 0 after adding node
      [11939]
359 2024-09-18 12:13:20,163 - multi_agent.
      competitive_influence_maximization - INFO - Seed
      set of agent Agent_2 updated with 11939 node
360 2024-09-18 12:13:20,163 - multi_agent.
      competitive_influence_maximization - INFO - Agent
      Agent_3 (id: 3) is playing
361 2024-09-18 12:13:20,177 - multi_agent.
      competitive_influence_maximization - INFO - The
      Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
362 2024-09-18 12:13:20,177 - multi_agent.
      competitive_influence_maximization - INFO -
      Activating node 68 by agent Agent_3
363 2024-09-18 12:13:20,177 - multi_agent.
      competitive_influence_maximization - INFO - Spread
      of agent Agent_3 updated with 0 after adding node
      [68]
364 2024-09-18 12:13:20,177 - multi_agent.
      competitive_influence_maximization - INFO - Seed
      set of agent Agent_3 updated with 68 node
365 2024-09-18 12:13:20,177 - multi_agent.
```

```
365 competitive_influence_maximization - INFO - Agent
Agent_4 (id: 4) is playing
366 2024-09-18 12:13:20,191 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
367 2024-09-18 12:13:20,191 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 5437 by agent Agent_4
368 2024-09-18 12:13:20,191 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_4 updated with 0 after adding node
[5437]
369 2024-09-18 12:13:20,191 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_4 updated with 5437 node
370 2024-09-18 12:13:20,191 - multi_agent.
competitive_influence_maximization - INFO - Round
14 has started
371 2024-09-18 12:13:20,191 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_0 (id: 0) is playing
372 2024-09-18 12:13:20,203 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
373 2024-09-18 12:13:20,204 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 105 by agent Agent_0
374 2024-09-18 12:13:20,204 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_0 updated with 0 after adding node
[105]
375 2024-09-18 12:13:20,204 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_0 updated with 105 node
376 2024-09-18 12:13:20,204 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_1 (id: 1) is playing
377 2024-09-18 12:13:20,217 - multi_agent.
competitive_influence_maximization - INFO - The
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377 Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
378 2024-09-18 12:13:20,217 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 39411 by agent Agent_1
379 2024-09-18 12:13:20,217 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_1 updated with 0 after adding node
[39411]
380 2024-09-18 12:13:20,217 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_1 updated with 39411 node
381 2024-09-18 12:13:20,217 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_2 (id: 2) is playing
382 2024-09-18 12:13:20,229 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
383 2024-09-18 12:13:20,229 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 23990 by agent Agent_2
384 2024-09-18 12:13:20,229 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_2 updated with 0 after adding node
[23990]
385 2024-09-18 12:13:20,229 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_2 updated with 23990 node
386 2024-09-18 12:13:20,230 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_3 (id: 3) is playing
387 2024-09-18 12:13:20,242 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
388 2024-09-18 12:13:20,242 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 36785 by agent Agent_3
389 2024-09-18 12:13:20,242 - multi_agent.
competitive_influence_maximization - INFO - Spread
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389 of agent Agent_3 updated with 0 after adding node [36785]
390 2024-09-18 12:13:20,242 - multi_agent.
competitive_influence_maximization - INFO - Seed set of agent Agent_3 updated with 36785 node
391 2024-09-18 12:13:20,242 - multi_agent.
competitive_influence_maximization - INFO - Agent Agent_4 (id: 4) is playing
392 2024-09-18 12:13:20,254 - multi_agent.
competitive_influence_maximization - INFO - The Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
393 2024-09-18 12:13:20,255 - multi_agent.
competitive_influence_maximization - INFO - Activating node 21061 by agent Agent_4
394 2024-09-18 12:13:20,255 - multi_agent.
competitive_influence_maximization - INFO - Spread of agent Agent_4 updated with 0 after adding node [21061]
395 2024-09-18 12:13:20,255 - multi_agent.
competitive_influence_maximization - INFO - Seed set of agent Agent_4 updated with 21061 node
396 2024-09-18 12:13:20,255 - multi_agent.
competitive_influence_maximization - INFO - Round 15 has started
397 2024-09-18 12:13:20,255 - multi_agent.
competitive_influence_maximization - INFO - Agent Agent_0 (id: 0) is playing
398 2024-09-18 12:13:20,267 - multi_agent.
competitive_influence_maximization - INFO - The Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
399 2024-09-18 12:13:20,267 - multi_agent.
competitive_influence_maximization - INFO - Activating node 6467 by agent Agent_0
400 2024-09-18 12:13:20,267 - multi_agent.
competitive_influence_maximization - INFO - Spread of agent Agent_0 updated with 0 after adding node [6467]
401 2024-09-18 12:13:20,267 - multi_agent.
competitive_influence_maximization - INFO - Seed
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401 set of agent Agent_0 updated with 6467 node
402 2024-09-18 12:13:20,267 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_1 (id: 1) is playing
403 2024-09-18 12:13:20,280 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
404 2024-09-18 12:13:20,280 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 51578 by agent Agent_1
405 2024-09-18 12:13:20,280 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_1 updated with 0 after adding node
    [51578]
406 2024-09-18 12:13:20,280 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_1 updated with 51578 node
407 2024-09-18 12:13:20,280 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_2 (id: 2) is playing
408 2024-09-18 12:13:20,292 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
409 2024-09-18 12:13:20,292 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 21191 by agent Agent_2
410 2024-09-18 12:13:20,292 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_2 updated with 0 after adding node
    [21191]
411 2024-09-18 12:13:20,292 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_2 updated with 21191 node
412 2024-09-18 12:13:20,292 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_3 (id: 3) is playing
413 2024-09-18 12:13:20,305 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
```

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413 Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
414 2024-09-18 12:13:20,305 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 39049 by agent Agent_3
415 2024-09-18 12:13:20,305 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_3 updated with 0 after adding node
        [39049]
416 2024-09-18 12:13:20,305 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_3 updated with 39049 node
417 2024-09-18 12:13:20,305 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_4 (id: 4) is playing
418 2024-09-18 12:13:20,318 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
        'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
419 2024-09-18 12:13:20,318 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 48934 by agent Agent_4
420 2024-09-18 12:13:20,318 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_4 updated with 0 after adding node
        [48934]
421 2024-09-18 12:13:20,318 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_4 updated with 48934 node
422 2024-09-18 12:13:20,318 - multi_agent.
    competitive_influence_maximization - INFO - Round
        16 has started
423 2024-09-18 12:13:20,318 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_0 (id: 0) is playing
424 2024-09-18 12:13:20,330 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
        'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
425 2024-09-18 12:13:20,331 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 21472 by agent Agent_0
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```
426 2024-09-18 12:13:20,331 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_0 updated with 0 after adding node  
    [21472]  
427 2024-09-18 12:13:20,331 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_0 updated with 21472 node  
428 2024-09-18 12:13:20,331 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_1 (id: 1) is playing  
429 2024-09-18 12:13:20,343 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
430 2024-09-18 12:13:20,343 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 11675 by agent Agent_1  
431 2024-09-18 12:13:20,343 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_1 updated with 0 after adding node  
    [11675]  
432 2024-09-18 12:13:20,343 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_1 updated with 11675 node  
433 2024-09-18 12:13:20,343 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_2 (id: 2) is playing  
434 2024-09-18 12:13:20,354 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
435 2024-09-18 12:13:20,354 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 6926 by agent Agent_2  
436 2024-09-18 12:13:20,354 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_2 updated with 0 after adding node  
    [6926]  
437 2024-09-18 12:13:20,355 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_2 updated with 6926 node
```

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438 2024-09-18 12:13:20,355 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_3 (id: 3) is playing  
439 2024-09-18 12:13:20,365 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
440 2024-09-18 12:13:20,365 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 24758 by agent Agent_3  
441 2024-09-18 12:13:20,365 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_3 updated with 0 after adding node  
    [24758]  
442 2024-09-18 12:13:20,365 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_3 updated with 24758 node  
443 2024-09-18 12:13:20,365 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_4 (id: 4) is playing  
444 2024-09-18 12:13:20,377 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
445 2024-09-18 12:13:20,377 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 64230 by agent Agent_4  
446 2024-09-18 12:13:20,377 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_4 updated with 0 after adding node  
    [64230]  
447 2024-09-18 12:13:20,377 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_4 updated with 64230 node  
448 2024-09-18 12:13:20,377 - multi_agent.  
    competitive_influence_maximization - INFO - Round  
    17 has started  
449 2024-09-18 12:13:20,377 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_0 (id: 0) is playing  
450 2024-09-18 12:13:20,389 - multi_agent.
```

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450 competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
451 2024-09-18 12:13:20,389 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 4040 by agent Agent_0
452 2024-09-18 12:13:20,389 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_0 updated with 0 after adding node
        [4040]
453 2024-09-18 12:13:20,389 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_0 updated with 4040 node
454 2024-09-18 12:13:20,389 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_1 (id: 1) is playing
455 2024-09-18 12:13:20,400 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
            Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
456 2024-09-18 12:13:20,400 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 36882 by agent Agent_1
457 2024-09-18 12:13:20,400 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_1 updated with 0 after adding node
        [36882]
458 2024-09-18 12:13:20,400 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_1 updated with 36882 node
459 2024-09-18 12:13:20,400 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_2 (id: 2) is playing
460 2024-09-18 12:13:20,411 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
            Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
461 2024-09-18 12:13:20,412 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 23535 by agent Agent_2
462 2024-09-18 12:13:20,412 - multi_agent.
```

```
462 competitive_influence_maximization - INFO - Spread
      of agent Agent_2 updated with 0 after adding node
      [23535]
463 2024-09-18 12:13:20,412 - multi_agent.
      competitive_influence_maximization - INFO - Seed
      set of agent Agent_2 updated with 23535 node
464 2024-09-18 12:13:20,412 - multi_agent.
      competitive_influence_maximization - INFO - Agent
      Agent_3 (id: 3) is playing
465 2024-09-18 12:13:20,422 - multi_agent.
      competitive_influence_maximization - INFO - The
      Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
      Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
466 2024-09-18 12:13:20,422 - multi_agent.
      competitive_influence_maximization - INFO -
      Activating node 12543 by agent Agent_3
467 2024-09-18 12:13:20,422 - multi_agent.
      competitive_influence_maximization - INFO - Spread
      of agent Agent_3 updated with 0 after adding node
      [12543]
468 2024-09-18 12:13:20,423 - multi_agent.
      competitive_influence_maximization - INFO - Seed
      set of agent Agent_3 updated with 12543 node
469 2024-09-18 12:13:20,423 - multi_agent.
      competitive_influence_maximization - INFO - Agent
      Agent_4 (id: 4) is playing
470 2024-09-18 12:13:20,433 - multi_agent.
      competitive_influence_maximization - INFO - The
      Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
      Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
471 2024-09-18 12:13:20,433 - multi_agent.
      competitive_influence_maximization - INFO -
      Activating node 65033 by agent Agent_4
472 2024-09-18 12:13:20,433 - multi_agent.
      competitive_influence_maximization - INFO - Spread
      of agent Agent_4 updated with 0 after adding node
      [65033]
473 2024-09-18 12:13:20,433 - multi_agent.
      competitive_influence_maximization - INFO - Seed
      set of agent Agent_4 updated with 65033 node
474 2024-09-18 12:13:20,433 - multi_agent.
```

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474 competitive_influence_maximization - INFO - Round
18 has started
475 2024-09-18 12:13:20,433 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_0 (id: 0) is playing
476 2024-09-18 12:13:20,445 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
477 2024-09-18 12:13:20,445 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 7395 by agent Agent_0
478 2024-09-18 12:13:20,445 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_0 updated with 0 after adding node
[7395]
479 2024-09-18 12:13:20,445 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_0 updated with 7395 node
480 2024-09-18 12:13:20,445 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_1 (id: 1) is playing
481 2024-09-18 12:13:20,456 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
482 2024-09-18 12:13:20,456 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 28479 by agent Agent_1
483 2024-09-18 12:13:20,456 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_1 updated with 0 after adding node
[28479]
484 2024-09-18 12:13:20,456 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_1 updated with 28479 node
485 2024-09-18 12:13:20,456 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_2 (id: 2) is playing
486 2024-09-18 12:13:20,466 - multi_agent.
competitive_influence_maximization - INFO - The
```

```
486 Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
487 2024-09-18 12:13:20,466 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 54589 by agent Agent_2
488 2024-09-18 12:13:20,466 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_2 updated with 0 after adding node
[54589]
489 2024-09-18 12:13:20,466 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_2 updated with 54589 node
490 2024-09-18 12:13:20,466 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_3 (id: 3) is playing
491 2024-09-18 12:13:20,477 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
492 2024-09-18 12:13:20,477 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 42673 by agent Agent_3
493 2024-09-18 12:13:20,477 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_3 updated with 0 after adding node
[42673]
494 2024-09-18 12:13:20,478 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_3 updated with 42673 node
495 2024-09-18 12:13:20,478 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_4 (id: 4) is playing
496 2024-09-18 12:13:20,488 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
497 2024-09-18 12:13:20,488 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 2811 by agent Agent_4
498 2024-09-18 12:13:20,488 - multi_agent.
competitive_influence_maximization - INFO - Spread
```

```
498 of agent Agent_4 updated with 0 after adding node [2811]
499 2024-09-18 12:13:20,488 - multi_agent.
competitive_influence_maximization - INFO - Seed set of agent Agent_4 updated with 2811 node
500 2024-09-18 12:13:20,488 - multi_agent.
competitive_influence_maximization - INFO - Round 19 has started
501 2024-09-18 12:13:20,488 - multi_agent.
competitive_influence_maximization - INFO - Agent Agent_0 (id: 0) is playing
502 2024-09-18 12:13:20,499 - multi_agent.
competitive_influence_maximization - INFO - The Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
503 2024-09-18 12:13:20,499 - multi_agent.
competitive_influence_maximization - INFO - Activating node 48879 by agent Agent_0
504 2024-09-18 12:13:20,499 - multi_agent.
competitive_influence_maximization - INFO - Spread of agent Agent_0 updated with 0 after adding node [48879]
505 2024-09-18 12:13:20,499 - multi_agent.
competitive_influence_maximization - INFO - Seed set of agent Agent_0 updated with 48879 node
506 2024-09-18 12:13:20,499 - multi_agent.
competitive_influence_maximization - INFO - Agent Agent_1 (id: 1) is playing
507 2024-09-18 12:13:20,509 - multi_agent.
competitive_influence_maximization - INFO - The Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
508 2024-09-18 12:13:20,509 - multi_agent.
competitive_influence_maximization - INFO - Activating node 21397 by agent Agent_1
509 2024-09-18 12:13:20,509 - multi_agent.
competitive_influence_maximization - INFO - Spread of agent Agent_1 updated with 0 after adding node [21397]
510 2024-09-18 12:13:20,509 - multi_agent.
competitive_influence_maximization - INFO - Seed
```

```
510 set of agent Agent_1 updated with 21397 node
511 2024-09-18 12:13:20,509 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_2 (id: 2) is playing
512 2024-09-18 12:13:20,518 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
513 2024-09-18 12:13:20,518 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 14885 by agent Agent_2
514 2024-09-18 12:13:20,518 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_2 updated with 0 after adding node
    [14885]
515 2024-09-18 12:13:20,518 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_2 updated with 14885 node
516 2024-09-18 12:13:20,518 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_3 (id: 3) is playing
517 2024-09-18 12:13:20,528 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
518 2024-09-18 12:13:20,528 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 32172 by agent Agent_3
519 2024-09-18 12:13:20,528 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_3 updated with 0 after adding node
    [32172]
520 2024-09-18 12:13:20,529 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 32172 node
521 2024-09-18 12:13:20,529 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_4 (id: 4) is playing
522 2024-09-18 12:13:20,539 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
```

```
522 Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
523 2024-09-18 12:13:20,539 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 9511 by agent Agent_4
524 2024-09-18 12:13:20,539 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_4 updated with 0 after adding node
        [9511]
525 2024-09-18 12:13:20,539 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_4 updated with 9511 node
526 2024-09-18 12:13:20,539 - multi_agent.
    competitive_influence_maximization - INFO - Round
        20 has started
527 2024-09-18 12:13:20,539 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_0 (id: 0) is playing
528 2024-09-18 12:13:20,549 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
529 2024-09-18 12:13:20,550 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 4596 by agent Agent_0
530 2024-09-18 12:13:20,550 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_0 updated with 0 after adding node
        [4596]
531 2024-09-18 12:13:20,550 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_0 updated with 4596 node
532 2024-09-18 12:13:20,550 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_1 (id: 1) is playing
533 2024-09-18 12:13:20,560 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
534 2024-09-18 12:13:20,560 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 8628 by agent Agent_1
```

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535 2024-09-18 12:13:20,560 - multi_agent.  
competitive_influence_maximization - INFO - Spread  
of agent Agent_1 updated with 0 after adding node  
[8628]  
536 2024-09-18 12:13:20,561 - multi_agent.  
competitive_influence_maximization - INFO - Seed  
set of agent Agent_1 updated with 8628 node  
537 2024-09-18 12:13:20,561 - multi_agent.  
competitive_influence_maximization - INFO - Agent  
Agent_2 (id: 2) is playing  
538 2024-09-18 12:13:20,570 - multi_agent.  
competitive_influence_maximization - INFO - The  
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
539 2024-09-18 12:13:20,570 - multi_agent.  
competitive_influence_maximization - INFO -  
Activating node 35956 by agent Agent_2  
540 2024-09-18 12:13:20,570 - multi_agent.  
competitive_influence_maximization - INFO - Spread  
of agent Agent_2 updated with 0 after adding node  
[35956]  
541 2024-09-18 12:13:20,570 - multi_agent.  
competitive_influence_maximization - INFO - Seed  
set of agent Agent_2 updated with 35956 node  
542 2024-09-18 12:13:20,571 - multi_agent.  
competitive_influence_maximization - INFO - Agent  
Agent_3 (id: 3) is playing  
543 2024-09-18 12:13:20,579 - multi_agent.  
competitive_influence_maximization - INFO - The  
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
544 2024-09-18 12:13:20,579 - multi_agent.  
competitive_influence_maximization - INFO -  
Activating node 777 by agent Agent_3  
545 2024-09-18 12:13:20,579 - multi_agent.  
competitive_influence_maximization - INFO - Spread  
of agent Agent_3 updated with 0 after adding node  
[777]  
546 2024-09-18 12:13:20,579 - multi_agent.  
competitive_influence_maximization - INFO - Seed  
set of agent Agent_3 updated with 777 node
```

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547 2024-09-18 12:13:20,579 - multi_agent.  
competitive_influence_maximization - INFO - Agent  
Agent_4 (id: 4) is playing  
548 2024-09-18 12:13:20,589 - multi_agent.  
competitive_influence_maximization - INFO - The  
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
549 2024-09-18 12:13:20,590 - multi_agent.  
competitive_influence_maximization - INFO -  
Activating node 39310 by agent Agent_4  
550 2024-09-18 12:13:20,590 - multi_agent.  
competitive_influence_maximization - INFO - Spread  
of agent Agent_4 updated with 0 after adding node  
[39310]  
551 2024-09-18 12:13:20,590 - multi_agent.  
competitive_influence_maximization - INFO - Seed  
set of agent Agent_4 updated with 39310 node  
552 2024-09-18 12:13:20,590 - multi_agent.  
competitive_influence_maximization - INFO - Round  
21 has started  
553 2024-09-18 12:13:20,590 - multi_agent.  
competitive_influence_maximization - INFO - Agent  
Agent_0 (id: 0) is playing  
554 2024-09-18 12:13:20,600 - multi_agent.  
competitive_influence_maximization - INFO - The  
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
555 2024-09-18 12:13:20,600 - multi_agent.  
competitive_influence_maximization - INFO -  
Activating node 14140 by agent Agent_0  
556 2024-09-18 12:13:20,600 - multi_agent.  
competitive_influence_maximization - INFO - Spread  
of agent Agent_0 updated with 0 after adding node  
[14140]  
557 2024-09-18 12:13:20,600 - multi_agent.  
competitive_influence_maximization - INFO - Seed  
set of agent Agent_0 updated with 14140 node  
558 2024-09-18 12:13:20,600 - multi_agent.  
competitive_influence_maximization - INFO - Agent  
Agent_1 (id: 1) is playing  
559 2024-09-18 12:13:20,610 - multi_agent.
```

```
559 competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
560 2024-09-18 12:13:20,610 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 41176 by agent Agent_1
561 2024-09-18 12:13:20,611 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_1 updated with 0 after adding node
        [41176]
562 2024-09-18 12:13:20,611 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_1 updated with 41176 node
563 2024-09-18 12:13:20,611 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_2 (id: 2) is playing
564 2024-09-18 12:13:20,621 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
            Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
565 2024-09-18 12:13:20,621 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 68748 by agent Agent_2
566 2024-09-18 12:13:20,621 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_2 updated with 0 after adding node
        [68748]
567 2024-09-18 12:13:20,621 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_2 updated with 68748 node
568 2024-09-18 12:13:20,621 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_3 (id: 3) is playing
569 2024-09-18 12:13:20,631 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
            Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
570 2024-09-18 12:13:20,631 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 19089 by agent Agent_3
571 2024-09-18 12:13:20,631 - multi_agent.
```

```
571 competitive_influence_maximization - INFO - Spread
    of agent Agent_3 updated with 0 after adding node
    [19089]
572 2024-09-18 12:13:20,631 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 19089 node
573 2024-09-18 12:13:20,631 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_4 (id: 4) is playing
574 2024-09-18 12:13:20,641 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
575 2024-09-18 12:13:20,641 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 21160 by agent Agent_4
576 2024-09-18 12:13:20,641 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_4 updated with 0 after adding node
    [21160]
577 2024-09-18 12:13:20,641 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 21160 node
578 2024-09-18 12:13:20,642 - multi_agent.
    competitive_influence_maximization - INFO - Round
    22 has started
579 2024-09-18 12:13:20,642 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_0 (id: 0) is playing
580 2024-09-18 12:13:20,651 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
581 2024-09-18 12:13:20,651 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 30585 by agent Agent_0
582 2024-09-18 12:13:20,651 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_0 updated with 0 after adding node
    [30585]
583 2024-09-18 12:13:20,651 - multi_agent.
```

```
583 competitive_influence_maximization - INFO - Seed
    set of agent Agent_0 updated with 30585 node
584 2024-09-18 12:13:20,651 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_1 (id: 1) is playing
585 2024-09-18 12:13:20,661 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
586 2024-09-18 12:13:20,662 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 5052 by agent Agent_1
587 2024-09-18 12:13:20,662 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_1 updated with 0 after adding node
    [5052]
588 2024-09-18 12:13:20,662 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_1 updated with 5052 node
589 2024-09-18 12:13:20,662 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_2 (id: 2) is playing
590 2024-09-18 12:13:20,671 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
591 2024-09-18 12:13:20,671 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 56137 by agent Agent_2
592 2024-09-18 12:13:20,671 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_2 updated with 0 after adding node
    [56137]
593 2024-09-18 12:13:20,671 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_2 updated with 56137 node
594 2024-09-18 12:13:20,671 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_3 (id: 3) is playing
595 2024-09-18 12:13:20,681 - multi_agent.
    competitive_influence_maximization - INFO - The
```

```
595 Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
596 2024-09-18 12:13:20,681 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 43135 by agent Agent_3
597 2024-09-18 12:13:20,681 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_3 updated with 0 after adding node
[43135]
598 2024-09-18 12:13:20,681 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_3 updated with 43135 node
599 2024-09-18 12:13:20,681 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_4 (id: 4) is playing
600 2024-09-18 12:13:20,694 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
601 2024-09-18 12:13:20,694 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 15099 by agent Agent_4
602 2024-09-18 12:13:20,694 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_4 updated with 0 after adding node
[15099]
603 2024-09-18 12:13:20,694 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_4 updated with 15099 node
604 2024-09-18 12:13:20,694 - multi_agent.
competitive_influence_maximization - INFO - Round
23 has started
605 2024-09-18 12:13:20,694 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_0 (id: 0) is playing
606 2024-09-18 12:13:20,703 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
607 2024-09-18 12:13:20,703 - multi_agent.
competitive_influence_maximization - INFO -
```

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607 Activating node 48146 by agent Agent_0
608 2024-09-18 12:13:20,703 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_0 updated with 0 after adding node
        [48146]
609 2024-09-18 12:13:20,703 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_0 updated with 48146 node
610 2024-09-18 12:13:20,703 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_1 (id: 1) is playing
611 2024-09-18 12:13:20,712 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
612 2024-09-18 12:13:20,712 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 6264 by agent Agent_1
613 2024-09-18 12:13:20,712 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_1 updated with 0 after adding node
        [6264]
614 2024-09-18 12:13:20,712 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_1 updated with 6264 node
615 2024-09-18 12:13:20,712 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_2 (id: 2) is playing
616 2024-09-18 12:13:20,721 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
617 2024-09-18 12:13:20,721 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 53141 by agent Agent_2
618 2024-09-18 12:13:20,721 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_2 updated with 0 after adding node
        [53141]
619 2024-09-18 12:13:20,721 - multi_agent.
    competitive_influence_maximization - INFO - Seed
```

```
619 set of agent Agent_2 updated with 53141 node
620 2024-09-18 12:13:20,721 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_3 (id: 3) is playing
621 2024-09-18 12:13:20,731 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
622 2024-09-18 12:13:20,731 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 20566 by agent Agent_3
623 2024-09-18 12:13:20,731 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_3 updated with 0 after adding node
    [20566]
624 2024-09-18 12:13:20,731 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 20566 node
625 2024-09-18 12:13:20,731 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_4 (id: 4) is playing
626 2024-09-18 12:13:20,740 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
627 2024-09-18 12:13:20,740 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 19423 by agent Agent_4
628 2024-09-18 12:13:20,740 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_4 updated with 0 after adding node
    [19423]
629 2024-09-18 12:13:20,740 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 19423 node
630 2024-09-18 12:13:20,740 - multi_agent.
    competitive_influence_maximization - INFO - Round
    24 has started
631 2024-09-18 12:13:20,740 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_0 (id: 0) is playing
```

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632 2024-09-18 12:13:20,750 - multi_agent.  
competitive_influence_maximization - INFO - The  
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
633 2024-09-18 12:13:20,750 - multi_agent.  
competitive_influence_maximization - INFO -  
Activating node 33130 by agent Agent_0  
634 2024-09-18 12:13:20,750 - multi_agent.  
competitive_influence_maximization - INFO - Spread  
of agent Agent_0 updated with 0 after adding node  
[33130]  
635 2024-09-18 12:13:20,750 - multi_agent.  
competitive_influence_maximization - INFO - Seed  
set of agent Agent_0 updated with 33130 node  
636 2024-09-18 12:13:20,750 - multi_agent.  
competitive_influence_maximization - INFO - Agent  
Agent_1 (id: 1) is playing  
637 2024-09-18 12:13:20,759 - multi_agent.  
competitive_influence_maximization - INFO - The  
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
638 2024-09-18 12:13:20,759 - multi_agent.  
competitive_influence_maximization - INFO -  
Activating node 3357 by agent Agent_1  
639 2024-09-18 12:13:20,759 - multi_agent.  
competitive_influence_maximization - INFO - Spread  
of agent Agent_1 updated with 0 after adding node  
[3357]  
640 2024-09-18 12:13:20,759 - multi_agent.  
competitive_influence_maximization - INFO - Seed  
set of agent Agent_1 updated with 3357 node  
641 2024-09-18 12:13:20,759 - multi_agent.  
competitive_influence_maximization - INFO - Agent  
Agent_2 (id: 2) is playing  
642 2024-09-18 12:13:20,767 - multi_agent.  
competitive_influence_maximization - INFO - The  
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
643 2024-09-18 12:13:20,767 - multi_agent.  
competitive_influence_maximization - INFO -  
Activating node 5659 by agent Agent_2
```

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644 2024-09-18 12:13:20,767 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_2 updated with 0 after adding node
        [5659]
645 2024-09-18 12:13:20,767 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_2 updated with 5659 node
646 2024-09-18 12:13:20,768 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_3 (id: 3) is playing
647 2024-09-18 12:13:20,777 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
648 2024-09-18 12:13:20,777 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 26538 by agent Agent_3
649 2024-09-18 12:13:20,777 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_3 updated with 0 after adding node
        [26538]
650 2024-09-18 12:13:20,777 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_3 updated with 26538 node
651 2024-09-18 12:13:20,777 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_4 (id: 4) is playing
652 2024-09-18 12:13:20,786 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
653 2024-09-18 12:13:20,786 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 34331 by agent Agent_4
654 2024-09-18 12:13:20,786 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_4 updated with 0 after adding node
        [34331]
655 2024-09-18 12:13:20,786 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_4 updated with 34331 node
```

```
656 2024-09-18 12:13:20,786 - multi_agent.  
competitive_influence_maximization - INFO - Round  
25 has started  
657 2024-09-18 12:13:20,786 - multi_agent.  
competitive_influence_maximization - INFO - Agent  
Agent_0 (id: 0) is playing  
658 2024-09-18 12:13:20,795 - multi_agent.  
competitive_influence_maximization - INFO - The  
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
659 2024-09-18 12:13:20,796 - multi_agent.  
competitive_influence_maximization - INFO -  
Activating node 30842 by agent Agent_0  
660 2024-09-18 12:13:20,796 - multi_agent.  
competitive_influence_maximization - INFO - Spread  
of agent Agent_0 updated with 0 after adding node  
[30842]  
661 2024-09-18 12:13:20,796 - multi_agent.  
competitive_influence_maximization - INFO - Seed  
set of agent Agent_0 updated with 30842 node  
662 2024-09-18 12:13:20,796 - multi_agent.  
competitive_influence_maximization - INFO - Agent  
Agent_1 (id: 1) is playing  
663 2024-09-18 12:13:20,805 - multi_agent.  
competitive_influence_maximization - INFO - The  
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
664 2024-09-18 12:13:20,805 - multi_agent.  
competitive_influence_maximization - INFO -  
Activating node 19691 by agent Agent_1  
665 2024-09-18 12:13:20,805 - multi_agent.  
competitive_influence_maximization - INFO - Spread  
of agent Agent_1 updated with 0 after adding node  
[19691]  
666 2024-09-18 12:13:20,805 - multi_agent.  
competitive_influence_maximization - INFO - Seed  
set of agent Agent_1 updated with 19691 node  
667 2024-09-18 12:13:20,805 - multi_agent.  
competitive_influence_maximization - INFO - Agent  
Agent_2 (id: 2) is playing  
668 2024-09-18 12:13:20,813 - multi_agent.
```

```
668 competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
669 2024-09-18 12:13:20,813 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 59016 by agent Agent_2
670 2024-09-18 12:13:20,813 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_2 updated with 0 after adding node
        [59016]
671 2024-09-18 12:13:20,813 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_2 updated with 59016 node
672 2024-09-18 12:13:20,814 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_3 (id: 3) is playing
673 2024-09-18 12:13:20,823 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
            Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
674 2024-09-18 12:13:20,823 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 41038 by agent Agent_3
675 2024-09-18 12:13:20,823 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_3 updated with 0 after adding node
        [41038]
676 2024-09-18 12:13:20,823 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_3 updated with 41038 node
677 2024-09-18 12:13:20,823 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_4 (id: 4) is playing
678 2024-09-18 12:13:20,831 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
            Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
679 2024-09-18 12:13:20,831 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 18252 by agent Agent_4
680 2024-09-18 12:13:20,831 - multi_agent.
```

```
680 competitive_influence_maximization - INFO - Spread
    of agent Agent_4 updated with 0 after adding node
    [18252]
681 2024-09-18 12:13:20,831 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 18252 node
682 2024-09-18 12:13:20,831 - multi_agent.
    competitive_influence_maximization - INFO - Round
    26 has started
683 2024-09-18 12:13:20,831 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_0 (id: 0) is playing
684 2024-09-18 12:13:20,839 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
685 2024-09-18 12:13:20,839 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 29560 by agent Agent_0
686 2024-09-18 12:13:20,839 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_0 updated with 0 after adding node
    [29560]
687 2024-09-18 12:13:20,839 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_0 updated with 29560 node
688 2024-09-18 12:13:20,839 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_1 (id: 1) is playing
689 2024-09-18 12:13:20,847 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
690 2024-09-18 12:13:20,847 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 2451 by agent Agent_1
691 2024-09-18 12:13:20,847 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_1 updated with 0 after adding node
    [2451]
692 2024-09-18 12:13:20,847 - multi_agent.
```

```
692 competitive_influence_maximization - INFO - Seed
    set of agent Agent_1 updated with 2451 node
693 2024-09-18 12:13:20,847 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_2 (id: 2) is playing
694 2024-09-18 12:13:20,854 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
695 2024-09-18 12:13:20,855 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 5580 by agent Agent_2
696 2024-09-18 12:13:20,855 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_2 updated with 0 after adding node
    [5580]
697 2024-09-18 12:13:20,855 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_2 updated with 5580 node
698 2024-09-18 12:13:20,855 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_3 (id: 3) is playing
699 2024-09-18 12:13:20,863 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
700 2024-09-18 12:13:20,863 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 29230 by agent Agent_3
701 2024-09-18 12:13:20,863 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_3 updated with 0 after adding node
    [29230]
702 2024-09-18 12:13:20,863 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 29230 node
703 2024-09-18 12:13:20,863 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_4 (id: 4) is playing
704 2024-09-18 12:13:20,870 - multi_agent.
    competitive_influence_maximization - INFO - The
```

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704 Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
705 2024-09-18 12:13:20,870 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 26217 by agent Agent_4
706 2024-09-18 12:13:20,870 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_4 updated with 0 after adding node
[26217]
707 2024-09-18 12:13:20,870 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_4 updated with 26217 node
708 2024-09-18 12:13:20,871 - multi_agent.
competitive_influence_maximization - INFO - Round
27 has started
709 2024-09-18 12:13:20,871 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_0 (id: 0) is playing
710 2024-09-18 12:13:20,878 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
711 2024-09-18 12:13:20,878 - multi_agent.
competitive_influence_maximization - INFO -
Activating node 19156 by agent Agent_0
712 2024-09-18 12:13:20,878 - multi_agent.
competitive_influence_maximization - INFO - Spread
of agent Agent_0 updated with 0 after adding node
[19156]
713 2024-09-18 12:13:20,878 - multi_agent.
competitive_influence_maximization - INFO - Seed
set of agent Agent_0 updated with 19156 node
714 2024-09-18 12:13:20,879 - multi_agent.
competitive_influence_maximization - INFO - Agent
Agent_1 (id: 1) is playing
715 2024-09-18 12:13:20,886 - multi_agent.
competitive_influence_maximization - INFO - The
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
716 2024-09-18 12:13:20,886 - multi_agent.
competitive_influence_maximization - INFO -
```

```
716 Activating node 10875 by agent Agent_1
717 2024-09-18 12:13:20,886 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_1 updated with 0 after adding node
        [10875]
718 2024-09-18 12:13:20,886 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_1 updated with 10875 node
719 2024-09-18 12:13:20,886 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_2 (id: 2) is playing
720 2024-09-18 12:13:20,894 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
721 2024-09-18 12:13:20,894 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 53234 by agent Agent_2
722 2024-09-18 12:13:20,894 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_2 updated with 0 after adding node
        [53234]
723 2024-09-18 12:13:20,894 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_2 updated with 53234 node
724 2024-09-18 12:13:20,894 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_3 (id: 3) is playing
725 2024-09-18 12:13:20,902 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
726 2024-09-18 12:13:20,902 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 35545 by agent Agent_3
727 2024-09-18 12:13:20,902 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_3 updated with 0 after adding node
        [35545]
728 2024-09-18 12:13:20,902 - multi_agent.
    competitive_influence_maximization - INFO - Seed
```

```
728 set of agent Agent_3 updated with 35545 node
729 2024-09-18 12:13:20,902 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_4 (id: 4) is playing
730 2024-09-18 12:13:20,910 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
731 2024-09-18 12:13:20,910 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 6271 by agent Agent_4
732 2024-09-18 12:13:20,910 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_4 updated with 0 after adding node
    [6271]
733 2024-09-18 12:13:20,910 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 6271 node
734 2024-09-18 12:13:20,910 - multi_agent.
    competitive_influence_maximization - INFO - Round
    28 has started
735 2024-09-18 12:13:20,910 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_0 (id: 0) is playing
736 2024-09-18 12:13:20,918 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
737 2024-09-18 12:13:20,919 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 65192 by agent Agent_0
738 2024-09-18 12:13:20,919 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_0 updated with 0 after adding node
    [65192]
739 2024-09-18 12:13:20,919 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_0 updated with 65192 node
740 2024-09-18 12:13:20,919 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_1 (id: 1) is playing
```

```
741 2024-09-18 12:13:20,926 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
742 2024-09-18 12:13:20,927 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 623 by agent Agent_1  
743 2024-09-18 12:13:20,927 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_1 updated with 0 after adding node  
    [623]  
744 2024-09-18 12:13:20,927 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_1 updated with 623 node  
745 2024-09-18 12:13:20,927 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_2 (id: 2) is playing  
746 2024-09-18 12:13:20,935 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
747 2024-09-18 12:13:20,935 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 8698 by agent Agent_2  
748 2024-09-18 12:13:20,935 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_2 updated with 0 after adding node  
    [8698]  
749 2024-09-18 12:13:20,935 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_2 updated with 8698 node  
750 2024-09-18 12:13:20,935 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_3 (id: 3) is playing  
751 2024-09-18 12:13:20,944 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
752 2024-09-18 12:13:20,944 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 35409 by agent Agent_3
```

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753 2024-09-18 12:13:20,944 - multi_agent.  
competitive_influence_maximization - INFO - Spread  
of agent Agent_3 updated with 0 after adding node  
[35409]  
754 2024-09-18 12:13:20,944 - multi_agent.  
competitive_influence_maximization - INFO - Seed  
set of agent Agent_3 updated with 35409 node  
755 2024-09-18 12:13:20,944 - multi_agent.  
competitive_influence_maximization - INFO - Agent  
Agent_4 (id: 4) is playing  
756 2024-09-18 12:13:20,952 - multi_agent.  
competitive_influence_maximization - INFO - The  
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
757 2024-09-18 12:13:20,952 - multi_agent.  
competitive_influence_maximization - INFO -  
Activating node 30212 by agent Agent_4  
758 2024-09-18 12:13:20,952 - multi_agent.  
competitive_influence_maximization - INFO - Spread  
of agent Agent_4 updated with 0 after adding node  
[30212]  
759 2024-09-18 12:13:20,952 - multi_agent.  
competitive_influence_maximization - INFO - Seed  
set of agent Agent_4 updated with 30212 node  
760 2024-09-18 12:13:20,952 - multi_agent.  
competitive_influence_maximization - INFO - Round  
29 has started  
761 2024-09-18 12:13:20,952 - multi_agent.  
competitive_influence_maximization - INFO - Agent  
Agent_0 (id: 0) is playing  
762 2024-09-18 12:13:20,961 - multi_agent.  
competitive_influence_maximization - INFO - The  
Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
763 2024-09-18 12:13:20,961 - multi_agent.  
competitive_influence_maximization - INFO -  
Activating node 12006 by agent Agent_0  
764 2024-09-18 12:13:20,961 - multi_agent.  
competitive_influence_maximization - INFO - Spread  
of agent Agent_0 updated with 0 after adding node  
[12006]
```

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765 2024-09-18 12:13:20,961 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_0 updated with 12006 node  
766 2024-09-18 12:13:20,961 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_1 (id: 1) is playing  
767 2024-09-18 12:13:20,969 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
768 2024-09-18 12:13:20,969 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 23205 by agent Agent_1  
769 2024-09-18 12:13:20,969 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_1 updated with 0 after adding node  
    [23205]  
770 2024-09-18 12:13:20,969 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_1 updated with 23205 node  
771 2024-09-18 12:13:20,969 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_2 (id: 2) is playing  
772 2024-09-18 12:13:20,978 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
773 2024-09-18 12:13:20,978 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 34963 by agent Agent_2  
774 2024-09-18 12:13:20,978 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_2 updated with 0 after adding node  
    [34963]  
775 2024-09-18 12:13:20,978 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_2 updated with 34963 node  
776 2024-09-18 12:13:20,978 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_3 (id: 3) is playing  
777 2024-09-18 12:13:20,986 - multi_agent.
```

```
777 competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
    'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
778 2024-09-18 12:13:20,986 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 56175 by agent Agent_3
779 2024-09-18 12:13:20,986 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_3 updated with 0 after adding node
        [56175]
780 2024-09-18 12:13:20,986 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_3 updated with 56175 node
781 2024-09-18 12:13:20,987 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_4 (id: 4) is playing
782 2024-09-18 12:13:20,995 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
        'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
783 2024-09-18 12:13:20,995 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 36786 by agent Agent_4
784 2024-09-18 12:13:20,995 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_4 updated with 0 after adding node
        [36786]
785 2024-09-18 12:13:20,995 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_4 updated with 36786 node
786 2024-09-18 12:13:20,995 - multi_agent.
    competitive_influence_maximization - INFO - Round
        30 has started
787 2024-09-18 12:13:20,995 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_0 (id: 0) is playing
788 2024-09-18 12:13:21,003 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
        'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
789 2024-09-18 12:13:21,003 - multi_agent.
```

```
789 competitive_influence_maximization - INFO -  
    Activating node 15530 by agent Agent_0  
790 2024-09-18 12:13:21,003 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
        of agent Agent_0 updated with 0 after adding node  
        [15530]  
791 2024-09-18 12:13:21,003 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
        set of agent Agent_0 updated with 15530 node  
792 2024-09-18 12:13:21,003 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
        Agent_1 (id: 1) is playing  
793 2024-09-18 12:13:21,011 - multi_agent.  
    competitive_influence_maximization - INFO - The  
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
794 2024-09-18 12:13:21,011 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Activating node 19210 by agent Agent_1  
795 2024-09-18 12:13:21,011 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
        of agent Agent_1 updated with 0 after adding node  
        [19210]  
796 2024-09-18 12:13:21,011 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
        set of agent Agent_1 updated with 19210 node  
797 2024-09-18 12:13:21,012 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
        Agent_2 (id: 2) is playing  
798 2024-09-18 12:13:21,020 - multi_agent.  
    competitive_influence_maximization - INFO - The  
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
799 2024-09-18 12:13:21,020 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Activating node 26209 by agent Agent_2  
800 2024-09-18 12:13:21,020 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
        of agent Agent_2 updated with 0 after adding node  
        [26209]  
801 2024-09-18 12:13:21,020 - multi_agent.
```

```
801 competitive_influence_maximization - INFO - Seed
    set of agent Agent_2 updated with 26209 node
802 2024-09-18 12:13:21,020 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_3 (id: 3) is playing
803 2024-09-18 12:13:21,028 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
804 2024-09-18 12:13:21,028 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 23360 by agent Agent_3
805 2024-09-18 12:13:21,028 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_3 updated with 0 after adding node
    [23360]
806 2024-09-18 12:13:21,029 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 23360 node
807 2024-09-18 12:13:21,029 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_4 (id: 4) is playing
808 2024-09-18 12:13:21,036 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
809 2024-09-18 12:13:21,037 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 33824 by agent Agent_4
810 2024-09-18 12:13:21,037 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_4 updated with 0 after adding node
    [33824]
811 2024-09-18 12:13:21,037 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 33824 node
812 2024-09-18 12:13:21,037 - multi_agent.
    competitive_influence_maximization - INFO - Round
    31 has started
813 2024-09-18 12:13:21,037 - multi_agent.
    competitive_influence_maximization - INFO - Agent
```

```
813 Agent_0 (id: 0) is playing
814 2024-09-18 12:13:21,044 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
815 2024-09-18 12:13:21,044 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 7294 by agent Agent_0
816 2024-09-18 12:13:21,044 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_0 updated with 0 after adding node
    [7294]
817 2024-09-18 12:13:21,044 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_0 updated with 7294 node
818 2024-09-18 12:13:21,045 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_1 (id: 1) is playing
819 2024-09-18 12:13:21,052 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
820 2024-09-18 12:13:21,052 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 19146 by agent Agent_1
821 2024-09-18 12:13:21,052 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_1 updated with 0 after adding node
    [19146]
822 2024-09-18 12:13:21,053 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_1 updated with 19146 node
823 2024-09-18 12:13:21,053 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_2 (id: 2) is playing
824 2024-09-18 12:13:21,060 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
825 2024-09-18 12:13:21,060 - multi_agent.
    competitive_influence_maximization - INFO -
```

```
825 Activating node 11251 by agent Agent_2
826 2024-09-18 12:13:21,060 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_2 updated with 0 after adding node
        [11251]
827 2024-09-18 12:13:21,061 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_2 updated with 11251 node
828 2024-09-18 12:13:21,061 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_3 (id: 3) is playing
829 2024-09-18 12:13:21,067 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
830 2024-09-18 12:13:21,067 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 6834 by agent Agent_3
831 2024-09-18 12:13:21,068 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_3 updated with 0 after adding node
        [6834]
832 2024-09-18 12:13:21,068 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_3 updated with 6834 node
833 2024-09-18 12:13:21,068 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_4 (id: 4) is playing
834 2024-09-18 12:13:21,075 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
835 2024-09-18 12:13:21,075 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 53069 by agent Agent_4
836 2024-09-18 12:13:21,075 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_4 updated with 0 after adding node
        [53069]
837 2024-09-18 12:13:21,075 - multi_agent.
    competitive_influence_maximization - INFO - Seed
```

```
837 set of agent Agent_4 updated with 53069 node
838 2024-09-18 12:13:21,075 - multi_agent.
    competitive_influence_maximization - INFO - Round
    32 has started
839 2024-09-18 12:13:21,075 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_0 (id: 0) is playing
840 2024-09-18 12:13:21,082 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
841 2024-09-18 12:13:21,082 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 18078 by agent Agent_0
842 2024-09-18 12:13:21,082 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_0 updated with 0 after adding node
    [18078]
843 2024-09-18 12:13:21,082 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_0 updated with 18078 node
844 2024-09-18 12:13:21,082 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_1 (id: 1) is playing
845 2024-09-18 12:13:21,088 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
846 2024-09-18 12:13:21,088 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 10977 by agent Agent_1
847 2024-09-18 12:13:21,088 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_1 updated with 0 after adding node
    [10977]
848 2024-09-18 12:13:21,089 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_1 updated with 10977 node
849 2024-09-18 12:13:21,089 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_2 (id: 2) is playing
```

```
850 2024-09-18 12:13:21,096 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
851 2024-09-18 12:13:21,096 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 18540 by agent Agent_2
852 2024-09-18 12:13:21,096 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_2 updated with 0 after adding node
    [18540]
853 2024-09-18 12:13:21,096 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_2 updated with 18540 node
854 2024-09-18 12:13:21,096 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_3 (id: 3) is playing
855 2024-09-18 12:13:21,102 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
856 2024-09-18 12:13:21,103 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 11245 by agent Agent_3
857 2024-09-18 12:13:21,103 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_3 updated with 0 after adding node
    [11245]
858 2024-09-18 12:13:21,103 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 11245 node
859 2024-09-18 12:13:21,103 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_4 (id: 4) is playing
860 2024-09-18 12:13:21,109 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
861 2024-09-18 12:13:21,109 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 16684 by agent Agent_4
```

```
862 2024-09-18 12:13:21,109 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
        of agent Agent_4 updated with 0 after adding node  
        [16684]  
863 2024-09-18 12:13:21,110 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
        set of agent Agent_4 updated with 16684 node  
864 2024-09-18 12:13:21,110 - multi_agent.  
    competitive_influence_maximization - INFO - Round  
        33 has started  
865 2024-09-18 12:13:21,110 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
        Agent_0 (id: 0) is playing  
866 2024-09-18 12:13:21,117 - multi_agent.  
    competitive_influence_maximization - INFO - The  
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
867 2024-09-18 12:13:21,117 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Activating node 58721 by agent Agent_0  
868 2024-09-18 12:13:21,117 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
        of agent Agent_0 updated with 0 after adding node  
        [58721]  
869 2024-09-18 12:13:21,117 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
        set of agent Agent_0 updated with 58721 node  
870 2024-09-18 12:13:21,117 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
        Agent_1 (id: 1) is playing  
871 2024-09-18 12:13:21,124 - multi_agent.  
    competitive_influence_maximization - INFO - The  
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
872 2024-09-18 12:13:21,124 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Activating node 9967 by agent Agent_1  
873 2024-09-18 12:13:21,124 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
        of agent Agent_1 updated with 0 after adding node  
        [9967]
```

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874 2024-09-18 12:13:21,124 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_1 updated with 9967 node  
875 2024-09-18 12:13:21,124 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_2 (id: 2) is playing  
876 2024-09-18 12:13:21,131 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
877 2024-09-18 12:13:21,132 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 7070 by agent Agent_2  
878 2024-09-18 12:13:21,132 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_2 updated with 0 after adding node  
    [7070]  
879 2024-09-18 12:13:21,132 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_2 updated with 7070 node  
880 2024-09-18 12:13:21,132 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_3 (id: 3) is playing  
881 2024-09-18 12:13:21,139 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
882 2024-09-18 12:13:21,139 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 13977 by agent Agent_3  
883 2024-09-18 12:13:21,139 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_3 updated with 0 after adding node  
    [13977]  
884 2024-09-18 12:13:21,139 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_3 updated with 13977 node  
885 2024-09-18 12:13:21,139 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_4 (id: 4) is playing  
886 2024-09-18 12:13:21,146 - multi_agent.
```

```
886 competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
    'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
887 2024-09-18 12:13:21,146 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 6324 by agent Agent_4
888 2024-09-18 12:13:21,146 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_4 updated with 0 after adding node
        [6324]
889 2024-09-18 12:13:21,147 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_4 updated with 6324 node
890 2024-09-18 12:13:21,147 - multi_agent.
    competitive_influence_maximization - INFO - Round
        34 has started
891 2024-09-18 12:13:21,147 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_0 (id: 0) is playing
892 2024-09-18 12:13:21,155 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
        'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
893 2024-09-18 12:13:21,155 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 3033 by agent Agent_0
894 2024-09-18 12:13:21,155 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_0 updated with 0 after adding node
        [3033]
895 2024-09-18 12:13:21,155 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_0 updated with 3033 node
896 2024-09-18 12:13:21,155 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_1 (id: 1) is playing
897 2024-09-18 12:13:21,162 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
        'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
898 2024-09-18 12:13:21,163 - multi_agent.
```

```
898 competitive_influence_maximization - INFO -  
    Activating node 40890 by agent Agent_1  
899 2024-09-18 12:13:21,163 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
        of agent Agent_1 updated with 0 after adding node  
        [40890]  
900 2024-09-18 12:13:21,163 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
        set of agent Agent_1 updated with 40890 node  
901 2024-09-18 12:13:21,163 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
        Agent_2 (id: 2) is playing  
902 2024-09-18 12:13:21,170 - multi_agent.  
    competitive_influence_maximization - INFO - The  
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
903 2024-09-18 12:13:21,170 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Activating node 23540 by agent Agent_2  
904 2024-09-18 12:13:21,170 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
        of agent Agent_2 updated with 0 after adding node  
        [23540]  
905 2024-09-18 12:13:21,170 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
        set of agent Agent_2 updated with 23540 node  
906 2024-09-18 12:13:21,170 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
        Agent_3 (id: 3) is playing  
907 2024-09-18 12:13:21,178 - multi_agent.  
    competitive_influence_maximization - INFO - The  
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
908 2024-09-18 12:13:21,178 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Activating node 17072 by agent Agent_3  
909 2024-09-18 12:13:21,178 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
        of agent Agent_3 updated with 0 after adding node  
        [17072]  
910 2024-09-18 12:13:21,178 - multi_agent.
```

```
910 competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 17072 node
911 2024-09-18 12:13:21,178 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_4 (id: 4) is playing
912 2024-09-18 12:13:21,185 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
913 2024-09-18 12:13:21,185 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 53270 by agent Agent_4
914 2024-09-18 12:13:21,186 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_4 updated with 0 after adding node
    [53270]
915 2024-09-18 12:13:21,186 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 53270 node
916 2024-09-18 12:13:21,186 - multi_agent.
    competitive_influence_maximization - INFO - Round
    35 has started
917 2024-09-18 12:13:21,186 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_0 (id: 0) is playing
918 2024-09-18 12:13:21,193 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
919 2024-09-18 12:13:21,193 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 14194 by agent Agent_0
920 2024-09-18 12:13:21,193 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_0 updated with 0 after adding node
    [14194]
921 2024-09-18 12:13:21,193 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_0 updated with 14194 node
922 2024-09-18 12:13:21,193 - multi_agent.
    competitive_influence_maximization - INFO - Agent
```

```
922 Agent_1 (id: 1) is playing
923 2024-09-18 12:13:21,200 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
924 2024-09-18 12:13:21,200 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 52016 by agent Agent_1
925 2024-09-18 12:13:21,201 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_1 updated with 0 after adding node
    [52016]
926 2024-09-18 12:13:21,201 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_1 updated with 52016 node
927 2024-09-18 12:13:21,201 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_2 (id: 2) is playing
928 2024-09-18 12:13:21,208 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
929 2024-09-18 12:13:21,208 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 20400 by agent Agent_2
930 2024-09-18 12:13:21,208 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_2 updated with 0 after adding node
    [20400]
931 2024-09-18 12:13:21,208 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_2 updated with 20400 node
932 2024-09-18 12:13:21,208 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_3 (id: 3) is playing
933 2024-09-18 12:13:21,215 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
934 2024-09-18 12:13:21,215 - multi_agent.
    competitive_influence_maximization - INFO -
```

```
934 Activating node 16808 by agent Agent_3
935 2024-09-18 12:13:21,215 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_3 updated with 0 after adding node
        [16808]
936 2024-09-18 12:13:21,215 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_3 updated with 16808 node
937 2024-09-18 12:13:21,215 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_4 (id: 4) is playing
938 2024-09-18 12:13:21,222 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
939 2024-09-18 12:13:21,223 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 29201 by agent Agent_4
940 2024-09-18 12:13:21,223 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_4 updated with 0 after adding node
        [29201]
941 2024-09-18 12:13:21,223 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_4 updated with 29201 node
942 2024-09-18 12:13:21,223 - multi_agent.
    competitive_influence_maximization - INFO - Round
        36 has started
943 2024-09-18 12:13:21,223 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_0 (id: 0) is playing
944 2024-09-18 12:13:21,231 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
945 2024-09-18 12:13:21,231 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 27469 by agent Agent_0
946 2024-09-18 12:13:21,231 - multi_agent.
    competitive_influence_maximization - INFO - Spread
        of agent Agent_0 updated with 0 after adding node
```

```
946 [27469]
947 2024-09-18 12:13:21,231 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_0 updated with 27469 node
948 2024-09-18 12:13:21,231 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_1 (id: 1) is playing
949 2024-09-18 12:13:21,238 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
950 2024-09-18 12:13:21,238 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 65935 by agent Agent_1
951 2024-09-18 12:13:21,238 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_1 updated with 0 after adding node
    [65935]
952 2024-09-18 12:13:21,238 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_1 updated with 65935 node
953 2024-09-18 12:13:21,238 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_2 (id: 2) is playing
954 2024-09-18 12:13:21,245 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
955 2024-09-18 12:13:21,245 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 21913 by agent Agent_2
956 2024-09-18 12:13:21,246 - multi_agent.
    competitive_influence_maximization - INFO - Spread
    of agent Agent_2 updated with 0 after adding node
    [21913]
957 2024-09-18 12:13:21,246 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_2 updated with 21913 node
958 2024-09-18 12:13:21,246 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_3 (id: 3) is playing
```

```
959 2024-09-18 12:13:21,252 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
960 2024-09-18 12:13:21,252 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 426 by agent Agent_3  
961 2024-09-18 12:13:21,252 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_3 updated with 0 after adding node  
    [426]  
962 2024-09-18 12:13:21,253 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_3 updated with 426 node  
963 2024-09-18 12:13:21,253 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_4 (id: 4) is playing  
964 2024-09-18 12:13:21,259 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
965 2024-09-18 12:13:21,259 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 17466 by agent Agent_4  
966 2024-09-18 12:13:21,259 - multi_agent.  
    competitive_influence_maximization - INFO - Spread  
    of agent Agent_4 updated with 0 after adding node  
    [17466]  
967 2024-09-18 12:13:21,259 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_4 updated with 17466 node  
968 2024-09-18 12:13:21,259 - multi_agent.  
    competitive_influence_maximization - INFO - Round  
    37 has started  
969 2024-09-18 12:13:21,260 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
    Agent_0 (id: 0) is playing  
970 2024-09-18 12:13:21,266 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
    Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
```

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971 2024-09-18 12:13:21,266 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Activating node 33289 by agent Agent_0  
972 2024-09-18 12:13:21,266 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Spread of agent Agent_0 updated with 0 after  
        adding node [33289]  
973 2024-09-18 12:13:21,266 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
        set of agent Agent_0 updated with 33289 node  
974 2024-09-18 12:13:21,266 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
        Agent_1 (id: 1) is playing  
975 2024-09-18 12:13:21,273 - multi_agent.  
    competitive_influence_maximization - INFO - The  
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
976 2024-09-18 12:13:21,273 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Activating node 19093 by agent Agent_1  
977 2024-09-18 12:13:21,273 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Spread of agent Agent_1 updated with 0 after  
        adding node [19093]  
978 2024-09-18 12:13:21,273 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
        set of agent Agent_1 updated with 19093 node  
979 2024-09-18 12:13:21,273 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
        Agent_2 (id: 2) is playing  
980 2024-09-18 12:13:21,280 - multi_agent.  
    competitive_influence_maximization - INFO - The  
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
981 2024-09-18 12:13:21,280 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Activating node 21893 by agent Agent_2  
982 2024-09-18 12:13:21,280 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Spread of agent Agent_2 updated with 0 after  
        adding node [21893]
```

```
983 2024-09-18 12:13:21,280 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_2 updated with 21893 node  
984 2024-09-18 12:13:21,280 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
        Agent_3 (id: 3) is playing  
985 2024-09-18 12:13:21,286 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
986 2024-09-18 12:13:21,286 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 9997 by agent Agent_3  
987 2024-09-18 12:13:21,286 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Spread of agent Agent_3 updated with 0 after  
    adding node [9997]  
988 2024-09-18 12:13:21,286 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_3 updated with 9997 node  
989 2024-09-18 12:13:21,286 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
        Agent_4 (id: 4) is playing  
990 2024-09-18 12:13:21,293 - multi_agent.  
    competitive_influence_maximization - INFO - The  
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
991 2024-09-18 12:13:21,293 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Activating node 52778 by agent Agent_4  
992 2024-09-18 12:13:21,293 - multi_agent.  
    competitive_influence_maximization - INFO -  
    Spread of agent Agent_4 updated with 0 after  
    adding node [52778]  
993 2024-09-18 12:13:21,293 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
    set of agent Agent_4 updated with 52778 node  
994 2024-09-18 12:13:21,293 - multi_agent.  
    competitive_influence_maximization - INFO - Round  
        38 has started  
995 2024-09-18 12:13:21,293 - multi_agent.
```

```
995 competitive_influence_maximization - INFO - Agent
    Agent_0 (id: 0) is playing
996 2024-09-18 12:13:21,300 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
997 2024-09-18 12:13:21,300 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 57595 by agent Agent_0
998 2024-09-18 12:13:21,300 - multi_agent.
    competitive_influence_maximization - INFO -
        Spread of agent Agent_0 updated with 0 after
        adding node [57595]
999 2024-09-18 12:13:21,300 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_0 updated with 57595 node
1000 2024-09-18 12:13:21,300 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_1 (id: 1) is playing
1001 2024-09-18 12:13:21,306 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1002 2024-09-18 12:13:21,306 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 5919 by agent Agent_1
1003 2024-09-18 12:13:21,306 - multi_agent.
    competitive_influence_maximization - INFO -
        Spread of agent Agent_1 updated with 0 after
        adding node [5919]
1004 2024-09-18 12:13:21,306 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_1 updated with 5919 node
1005 2024-09-18 12:13:21,306 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_2 (id: 2) is playing
1006 2024-09-18 12:13:21,312 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1007 2024-09-18 12:13:21,312 - multi_agent.
```

```
1007 competitive_influence_maximization - INFO -
    Activating node 6750 by agent Agent_2
1008 2024-09-18 12:13:21,312 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_2 updated with 0 after
    adding node [6750]
1009 2024-09-18 12:13:21,312 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_2 updated with 6750 node
1010 2024-09-18 12:13:21,312 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_3 (id: 3) is playing
1011 2024-09-18 12:13:21,319 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1012 2024-09-18 12:13:21,319 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 6689 by agent Agent_3
1013 2024-09-18 12:13:21,319 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_3 updated with 0 after
    adding node [6689]
1014 2024-09-18 12:13:21,319 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 6689 node
1015 2024-09-18 12:13:21,319 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_4 (id: 4) is playing
1016 2024-09-18 12:13:21,325 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1017 2024-09-18 12:13:21,325 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 41436 by agent Agent_4
1018 2024-09-18 12:13:21,325 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_4 updated with 0 after
    adding node [41436]
1019 2024-09-18 12:13:21,325 - multi_agent.
```

```
1019 competitive_influence_maximization - INFO - Seed
      set of agent Agent_4 updated with 41436 node
1020 2024-09-18 12:13:21,326 - multi_agent.
      competitive_influence_maximization - INFO - Round
      39 has started
1021 2024-09-18 12:13:21,326 - multi_agent.
      competitive_influence_maximization - INFO - Agent
      Agent_0 (id: 0) is playing
1022 2024-09-18 12:13:21,332 - multi_agent.
      competitive_influence_maximization - INFO - The
      Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1023 2024-09-18 12:13:21,332 - multi_agent.
      competitive_influence_maximization - INFO -
      Activating node 42907 by agent Agent_0
1024 2024-09-18 12:13:21,332 - multi_agent.
      competitive_influence_maximization - INFO -
      Spread of agent Agent_0 updated with 0 after
      adding node [42907]
1025 2024-09-18 12:13:21,332 - multi_agent.
      competitive_influence_maximization - INFO - Seed
      set of agent Agent_0 updated with 42907 node
1026 2024-09-18 12:13:21,332 - multi_agent.
      competitive_influence_maximization - INFO - Agent
      Agent_1 (id: 1) is playing
1027 2024-09-18 12:13:21,339 - multi_agent.
      competitive_influence_maximization - INFO - The
      Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1028 2024-09-18 12:13:21,339 - multi_agent.
      competitive_influence_maximization - INFO -
      Activating node 48679 by agent Agent_1
1029 2024-09-18 12:13:21,339 - multi_agent.
      competitive_influence_maximization - INFO -
      Spread of agent Agent_1 updated with 0 after
      adding node [48679]
1030 2024-09-18 12:13:21,339 - multi_agent.
      competitive_influence_maximization - INFO - Seed
      set of agent Agent_1 updated with 48679 node
1031 2024-09-18 12:13:21,339 - multi_agent.
      competitive_influence_maximization - INFO - Agent
```

```
1031 Agent_2 (id: 2) is playing
1032 2024-09-18 12:13:21,346 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1033 2024-09-18 12:13:21,346 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 18702 by agent Agent_2
1034 2024-09-18 12:13:21,346 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_2 updated with 0 after
    adding node [18702]
1035 2024-09-18 12:13:21,346 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_2 updated with 18702 node
1036 2024-09-18 12:13:21,346 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_3 (id: 3) is playing
1037 2024-09-18 12:13:21,353 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1038 2024-09-18 12:13:21,353 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 12479 by agent Agent_3
1039 2024-09-18 12:13:21,353 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_3 updated with 0 after
    adding node [12479]
1040 2024-09-18 12:13:21,353 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 12479 node
1041 2024-09-18 12:13:21,353 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_4 (id: 4) is playing
1042 2024-09-18 12:13:21,360 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1043 2024-09-18 12:13:21,361 - multi_agent.
    competitive_influence_maximization - INFO -
```

```
1043 Activating node 4059 by agent Agent_4
1044 2024-09-18 12:13:21,361 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_4 updated with 0 after
    adding node [4059]
1045 2024-09-18 12:13:21,361 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 4059 node
1046 2024-09-18 12:13:21,361 - multi_agent.
    competitive_influence_maximization - INFO - Round
    40 has started
1047 2024-09-18 12:13:21,361 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_0 (id: 0) is playing
1048 2024-09-18 12:13:21,367 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1049 2024-09-18 12:13:21,368 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 41150 by agent Agent_0
1050 2024-09-18 12:13:21,368 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_0 updated with 0 after
    adding node [41150]
1051 2024-09-18 12:13:21,368 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_0 updated with 41150 node
1052 2024-09-18 12:13:21,368 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_1 (id: 1) is playing
1053 2024-09-18 12:13:21,374 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1054 2024-09-18 12:13:21,375 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 43258 by agent Agent_1
1055 2024-09-18 12:13:21,375 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_1 updated with 0 after
```

```
1055 adding node [43258]
1056 2024-09-18 12:13:21,375 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_1 updated with 43258 node
1057 2024-09-18 12:13:21,375 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_2 (id: 2) is playing
1058 2024-09-18 12:13:21,381 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1059 2024-09-18 12:13:21,381 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 3507 by agent Agent_2
1060 2024-09-18 12:13:21,381 - multi_agent.
    competitive_influence_maximization - INFO -
        Spread of agent Agent_2 updated with 0 after
        adding node [3507]
1061 2024-09-18 12:13:21,382 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_2 updated with 3507 node
1062 2024-09-18 12:13:21,382 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_3 (id: 3) is playing
1063 2024-09-18 12:13:21,388 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1064 2024-09-18 12:13:21,388 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 3324 by agent Agent_3
1065 2024-09-18 12:13:21,388 - multi_agent.
    competitive_influence_maximization - INFO -
        Spread of agent Agent_3 updated with 0 after
        adding node [3324]
1066 2024-09-18 12:13:21,389 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 3324 node
1067 2024-09-18 12:13:21,389 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_4 (id: 4) is playing
```

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1068 2024-09-18 12:13:21,395 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1069 2024-09-18 12:13:21,395 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 32223 by agent Agent_4
1070 2024-09-18 12:13:21,395 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_4 updated with 0 after
    adding node [32223]
1071 2024-09-18 12:13:21,395 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 32223 node
1072 2024-09-18 12:13:21,395 - multi_agent.
    competitive_influence_maximization - INFO - Round
    41 has started
1073 2024-09-18 12:13:21,396 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_0 (id: 0) is playing
1074 2024-09-18 12:13:21,402 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1075 2024-09-18 12:13:21,402 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 16153 by agent Agent_0
1076 2024-09-18 12:13:21,402 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_0 updated with 0 after
    adding node [16153]
1077 2024-09-18 12:13:21,402 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_0 updated with 16153 node
1078 2024-09-18 12:13:21,402 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_1 (id: 1) is playing
1079 2024-09-18 12:13:21,409 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
```

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1080 2024-09-18 12:13:21,409 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 40215 by agent Agent_1
1081 2024-09-18 12:13:21,409 - multi_agent.
    competitive_influence_maximization - INFO -
        Spread of agent Agent_1 updated with 0 after
        adding node [40215]
1082 2024-09-18 12:13:21,409 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_1 updated with 40215 node
1083 2024-09-18 12:13:21,409 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_2 (id: 2) is playing
1084 2024-09-18 12:13:21,416 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1085 2024-09-18 12:13:21,416 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 7608 by agent Agent_2
1086 2024-09-18 12:13:21,416 - multi_agent.
    competitive_influence_maximization - INFO -
        Spread of agent Agent_2 updated with 0 after
        adding node [7608]
1087 2024-09-18 12:13:21,416 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_2 updated with 7608 node
1088 2024-09-18 12:13:21,416 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_3 (id: 3) is playing
1089 2024-09-18 12:13:21,422 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1090 2024-09-18 12:13:21,422 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 10583 by agent Agent_3
1091 2024-09-18 12:13:21,422 - multi_agent.
    competitive_influence_maximization - INFO -
        Spread of agent Agent_3 updated with 0 after
        adding node [10583]
```

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1092 2024-09-18 12:13:21,422 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 10583 node
1093 2024-09-18 12:13:21,422 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_4 (id: 4) is playing
1094 2024-09-18 12:13:21,428 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1095 2024-09-18 12:13:21,428 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 69616 by agent Agent_4
1096 2024-09-18 12:13:21,429 - multi_agent.
    competitive_influence_maximization - INFO -
        Spread of agent Agent_4 updated with 0 after
        adding node [69616]
1097 2024-09-18 12:13:21,429 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 69616 node
1098 2024-09-18 12:13:21,429 - multi_agent.
    competitive_influence_maximization - INFO - Round
        42 has started
1099 2024-09-18 12:13:21,429 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_0 (id: 0) is playing
1100 2024-09-18 12:13:21,435 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1101 2024-09-18 12:13:21,435 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 56887 by agent Agent_0
1102 2024-09-18 12:13:21,435 - multi_agent.
    competitive_influence_maximization - INFO -
        Spread of agent Agent_0 updated with 0 after
        adding node [56887]
1103 2024-09-18 12:13:21,435 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_0 updated with 56887 node
1104 2024-09-18 12:13:21,435 - multi_agent.
```

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1104 competitive_influence_maximization - INFO - Agent
    Agent_1 (id: 1) is playing
1105 2024-09-18 12:13:21,441 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1106 2024-09-18 12:13:21,441 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 23986 by agent Agent_1
1107 2024-09-18 12:13:21,441 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_1 updated with 0 after
    adding node [23986]
1108 2024-09-18 12:13:21,441 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_1 updated with 23986 node
1109 2024-09-18 12:13:21,441 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_2 (id: 2) is playing
1110 2024-09-18 12:13:21,447 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1111 2024-09-18 12:13:21,447 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 18370 by agent Agent_2
1112 2024-09-18 12:13:21,447 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_2 updated with 0 after
    adding node [18370]
1113 2024-09-18 12:13:21,447 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_2 updated with 18370 node
1114 2024-09-18 12:13:21,447 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_3 (id: 3) is playing
1115 2024-09-18 12:13:21,454 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1116 2024-09-18 12:13:21,454 - multi_agent.
```

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1116 competitive_influence_maximization - INFO -
    Activating node 70286 by agent Agent_3
1117 2024-09-18 12:13:21,454 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_3 updated with 0 after
    adding node [70286]
1118 2024-09-18 12:13:21,454 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 70286 node
1119 2024-09-18 12:13:21,454 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_4 (id: 4) is playing
1120 2024-09-18 12:13:21,459 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1121 2024-09-18 12:13:21,459 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 6172 by agent Agent_4
1122 2024-09-18 12:13:21,459 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_4 updated with 0 after
    adding node [6172]
1123 2024-09-18 12:13:21,459 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 6172 node
1124 2024-09-18 12:13:21,459 - multi_agent.
    competitive_influence_maximization - INFO - Round
    43 has started
1125 2024-09-18 12:13:21,459 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_0 (id: 0) is playing
1126 2024-09-18 12:13:21,465 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1127 2024-09-18 12:13:21,465 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 21500 by agent Agent_0
1128 2024-09-18 12:13:21,465 - multi_agent.
    competitive_influence_maximization - INFO -
```

```
1128 Spread of agent Agent_0 updated with 0 after
      adding node [21500]
1129 2024-09-18 12:13:21,465 - multi_agent.
      competitive_influence_maximization - INFO - Seed
      set of agent Agent_0 updated with 21500 node
1130 2024-09-18 12:13:21,465 - multi_agent.
      competitive_influence_maximization - INFO - Agent
      Agent_1 (id: 1) is playing
1131 2024-09-18 12:13:21,471 - multi_agent.
      competitive_influence_maximization - INFO - The
      Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1132 2024-09-18 12:13:21,471 - multi_agent.
      competitive_influence_maximization - INFO -
      Activating node 8547 by agent Agent_1
1133 2024-09-18 12:13:21,471 - multi_agent.
      competitive_influence_maximization - INFO -
      Spread of agent Agent_1 updated with 0 after
      adding node [8547]
1134 2024-09-18 12:13:21,471 - multi_agent.
      competitive_influence_maximization - INFO - Seed
      set of agent Agent_1 updated with 8547 node
1135 2024-09-18 12:13:21,471 - multi_agent.
      competitive_influence_maximization - INFO - Agent
      Agent_2 (id: 2) is playing
1136 2024-09-18 12:13:21,477 - multi_agent.
      competitive_influence_maximization - INFO - The
      Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1137 2024-09-18 12:13:21,477 - multi_agent.
      competitive_influence_maximization - INFO -
      Activating node 36560 by agent Agent_2
1138 2024-09-18 12:13:21,477 - multi_agent.
      competitive_influence_maximization - INFO -
      Spread of agent Agent_2 updated with 0 after
      adding node [36560]
1139 2024-09-18 12:13:21,477 - multi_agent.
      competitive_influence_maximization - INFO - Seed
      set of agent Agent_2 updated with 36560 node
1140 2024-09-18 12:13:21,477 - multi_agent.
      competitive_influence_maximization - INFO - Agent
```

```
1140 Agent_3 (id: 3) is playing
1141 2024-09-18 12:13:21,483 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1142 2024-09-18 12:13:21,483 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 26344 by agent Agent_3
1143 2024-09-18 12:13:21,483 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_3 updated with 0 after
    adding node [26344]
1144 2024-09-18 12:13:21,483 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 26344 node
1145 2024-09-18 12:13:21,483 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_4 (id: 4) is playing
1146 2024-09-18 12:13:21,489 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1147 2024-09-18 12:13:21,489 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 37704 by agent Agent_4
1148 2024-09-18 12:13:21,489 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_4 updated with 0 after
    adding node [37704]
1149 2024-09-18 12:13:21,489 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 37704 node
1150 2024-09-18 12:13:21,489 - multi_agent.
    competitive_influence_maximization - INFO - Round
    44 has started
1151 2024-09-18 12:13:21,489 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_0 (id: 0) is playing
1152 2024-09-18 12:13:21,495 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
```

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1152 Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1153 2024-09-18 12:13:21,495 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 8834 by agent Agent_0
1154 2024-09-18 12:13:21,495 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_0 updated with 0 after
    adding node [8834]
1155 2024-09-18 12:13:21,495 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_0 updated with 8834 node
1156 2024-09-18 12:13:21,495 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_1 (id: 1) is playing
1157 2024-09-18 12:13:21,501 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
    'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1158 2024-09-18 12:13:21,501 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 55730 by agent Agent_1
1159 2024-09-18 12:13:21,501 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_1 updated with 0 after
    adding node [55730]
1160 2024-09-18 12:13:21,501 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_1 updated with 55730 node
1161 2024-09-18 12:13:21,501 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_2 (id: 2) is playing
1162 2024-09-18 12:13:21,506 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
    'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1163 2024-09-18 12:13:21,507 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 25536 by agent Agent_2
1164 2024-09-18 12:13:21,507 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_2 updated with 0 after
```

```
1164 adding node [25536]
1165 2024-09-18 12:13:21,507 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_2 updated with 25536 node
1166 2024-09-18 12:13:21,507 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_3 (id: 3) is playing
1167 2024-09-18 12:13:21,512 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1168 2024-09-18 12:13:21,512 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 48565 by agent Agent_3
1169 2024-09-18 12:13:21,512 - multi_agent.
    competitive_influence_maximization - INFO -
        Spread of agent Agent_3 updated with 0 after
        adding node [48565]
1170 2024-09-18 12:13:21,513 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 48565 node
1171 2024-09-18 12:13:21,513 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_4 (id: 4) is playing
1172 2024-09-18 12:13:21,519 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1173 2024-09-18 12:13:21,519 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 6897 by agent Agent_4
1174 2024-09-18 12:13:21,519 - multi_agent.
    competitive_influence_maximization - INFO -
        Spread of agent Agent_4 updated with 0 after
        adding node [6897]
1175 2024-09-18 12:13:21,519 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 6897 node
1176 2024-09-18 12:13:21,519 - multi_agent.
    competitive_influence_maximization - INFO - Round
        45 has started
```

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1177 2024-09-18 12:13:21,519 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_0 (id: 0) is playing
1178 2024-09-18 12:13:21,526 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1179 2024-09-18 12:13:21,526 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 29082 by agent Agent_0
1180 2024-09-18 12:13:21,526 - multi_agent.
    competitive_influence_maximization - INFO -
        Spread of agent Agent_0 updated with 0 after
        adding node [29082]
1181 2024-09-18 12:13:21,526 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_0 updated with 29082 node
1182 2024-09-18 12:13:21,526 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_1 (id: 1) is playing
1183 2024-09-18 12:13:21,532 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1184 2024-09-18 12:13:21,532 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 15443 by agent Agent_1
1185 2024-09-18 12:13:21,533 - multi_agent.
    competitive_influence_maximization - INFO -
        Spread of agent Agent_1 updated with 0 after
        adding node [15443]
1186 2024-09-18 12:13:21,533 - multi_agent.
    competitive_influence_maximization - INFO - Seed
        set of agent Agent_1 updated with 15443 node
1187 2024-09-18 12:13:21,533 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_2 (id: 2) is playing
1188 2024-09-18 12:13:21,539 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
```

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1189 2024-09-18 12:13:21,539 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Activating node 2798 by agent Agent_2  
1190 2024-09-18 12:13:21,539 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Spread of agent Agent_2 updated with 0 after  
        adding node [2798]  
1191 2024-09-18 12:13:21,539 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
        set of agent Agent_2 updated with 2798 node  
1192 2024-09-18 12:13:21,539 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
        Agent_3 (id: 3) is playing  
1193 2024-09-18 12:13:21,544 - multi_agent.  
    competitive_influence_maximization - INFO - The  
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
1194 2024-09-18 12:13:21,545 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Activating node 58068 by agent Agent_3  
1195 2024-09-18 12:13:21,545 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Spread of agent Agent_3 updated with 0 after  
        adding node [58068]  
1196 2024-09-18 12:13:21,545 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
        set of agent Agent_3 updated with 58068 node  
1197 2024-09-18 12:13:21,545 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
        Agent_4 (id: 4) is playing  
1198 2024-09-18 12:13:21,551 - multi_agent.  
    competitive_influence_maximization - INFO - The  
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
1199 2024-09-18 12:13:21,551 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Activating node 21074 by agent Agent_4  
1200 2024-09-18 12:13:21,551 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Spread of agent Agent_4 updated with 0 after  
        adding node [21074]
```

```
1201 2024-09-18 12:13:21,551 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 21074 node
1202 2024-09-18 12:13:21,551 - multi_agent.
    competitive_influence_maximization - INFO - Round
        46 has started
1203 2024-09-18 12:13:21,551 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_0 (id: 0) is playing
1204 2024-09-18 12:13:21,558 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1205 2024-09-18 12:13:21,558 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 25833 by agent Agent_0
1206 2024-09-18 12:13:21,558 - multi_agent.
    competitive_influence_maximization - INFO -
        Spread of agent Agent_0 updated with 0 after
        adding node [25833]
1207 2024-09-18 12:13:21,558 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_0 updated with 25833 node
1208 2024-09-18 12:13:21,558 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_1 (id: 1) is playing
1209 2024-09-18 12:13:21,563 - multi_agent.
    competitive_influence_maximization - INFO - The
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1210 2024-09-18 12:13:21,563 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 10763 by agent Agent_1
1211 2024-09-18 12:13:21,563 - multi_agent.
    competitive_influence_maximization - INFO -
        Spread of agent Agent_1 updated with 0 after
        adding node [10763]
1212 2024-09-18 12:13:21,563 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_1 updated with 10763 node
1213 2024-09-18 12:13:21,563 - multi_agent.
```

```
1213 competitive_influence_maximization - INFO - Agent
    Agent_2 (id: 2) is playing
1214 2024-09-18 12:13:21,569 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1215 2024-09-18 12:13:21,569 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 25487 by agent Agent_2
1216 2024-09-18 12:13:21,569 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_2 updated with 0 after
    adding node [25487]
1217 2024-09-18 12:13:21,569 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_2 updated with 25487 node
1218 2024-09-18 12:13:21,569 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_3 (id: 3) is playing
1219 2024-09-18 12:13:21,575 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1220 2024-09-18 12:13:21,575 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 20460 by agent Agent_3
1221 2024-09-18 12:13:21,575 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_3 updated with 0 after
    adding node [20460]
1222 2024-09-18 12:13:21,575 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 20460 node
1223 2024-09-18 12:13:21,575 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_4 (id: 4) is playing
1224 2024-09-18 12:13:21,581 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1225 2024-09-18 12:13:21,581 - multi_agent.
```

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1225 competitive_influence_maximization - INFO -
    Activating node 42172 by agent Agent_4
1226 2024-09-18 12:13:21,581 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_4 updated with 0 after
    adding node [42172]
1227 2024-09-18 12:13:21,581 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 42172 node
1228 2024-09-18 12:13:21,581 - multi_agent.
    competitive_influence_maximization - INFO - Round
    47 has started
1229 2024-09-18 12:13:21,582 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_0 (id: 0) is playing
1230 2024-09-18 12:13:21,587 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1231 2024-09-18 12:13:21,588 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 27203 by agent Agent_0
1232 2024-09-18 12:13:21,588 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_0 updated with 0 after
    adding node [27203]
1233 2024-09-18 12:13:21,588 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_0 updated with 27203 node
1234 2024-09-18 12:13:21,588 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_1 (id: 1) is playing
1235 2024-09-18 12:13:21,594 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1236 2024-09-18 12:13:21,594 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 24714 by agent Agent_1
1237 2024-09-18 12:13:21,594 - multi_agent.
    competitive_influence_maximization - INFO -
```

```
1237 Spread of agent Agent_1 updated with 0 after
      adding node [24714]
1238 2024-09-18 12:13:21,594 - multi_agent.
      competitive_influence_maximization - INFO - Seed
      set of agent Agent_1 updated with 24714 node
1239 2024-09-18 12:13:21,594 - multi_agent.
      competitive_influence_maximization - INFO - Agent
      Agent_2 (id: 2) is playing
1240 2024-09-18 12:13:21,599 - multi_agent.
      competitive_influence_maximization - INFO - The
      Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1241 2024-09-18 12:13:21,600 - multi_agent.
      competitive_influence_maximization - INFO -
      Activating node 46646 by agent Agent_2
1242 2024-09-18 12:13:21,600 - multi_agent.
      competitive_influence_maximization - INFO -
      Spread of agent Agent_2 updated with 0 after
      adding node [46646]
1243 2024-09-18 12:13:21,600 - multi_agent.
      competitive_influence_maximization - INFO - Seed
      set of agent Agent_2 updated with 46646 node
1244 2024-09-18 12:13:21,600 - multi_agent.
      competitive_influence_maximization - INFO - Agent
      Agent_3 (id: 3) is playing
1245 2024-09-18 12:13:21,606 - multi_agent.
      competitive_influence_maximization - INFO - The
      Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1246 2024-09-18 12:13:21,606 - multi_agent.
      competitive_influence_maximization - INFO -
      Activating node 40836 by agent Agent_3
1247 2024-09-18 12:13:21,606 - multi_agent.
      competitive_influence_maximization - INFO -
      Spread of agent Agent_3 updated with 0 after
      adding node [40836]
1248 2024-09-18 12:13:21,606 - multi_agent.
      competitive_influence_maximization - INFO - Seed
      set of agent Agent_3 updated with 40836 node
1249 2024-09-18 12:13:21,606 - multi_agent.
      competitive_influence_maximization - INFO - Agent
```

```
1249 Agent_4 (id: 4) is playing
1250 2024-09-18 12:13:21,611 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1251 2024-09-18 12:13:21,611 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 52388 by agent Agent_4
1252 2024-09-18 12:13:21,611 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_4 updated with 0 after
    adding node [52388]
1253 2024-09-18 12:13:21,611 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 52388 node
1254 2024-09-18 12:13:21,611 - multi_agent.
    competitive_influence_maximization - INFO - Round
    48 has started
1255 2024-09-18 12:13:21,611 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_0 (id: 0) is playing
1256 2024-09-18 12:13:21,616 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1257 2024-09-18 12:13:21,616 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 5825 by agent Agent_0
1258 2024-09-18 12:13:21,617 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_0 updated with 0 after
    adding node [5825]
1259 2024-09-18 12:13:21,617 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_0 updated with 5825 node
1260 2024-09-18 12:13:21,617 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_1 (id: 1) is playing
1261 2024-09-18 12:13:21,622 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
```

```
1261 Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1262 2024-09-18 12:13:21,622 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 18805 by agent Agent_1
1263 2024-09-18 12:13:21,622 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_1 updated with 0 after
    adding node [18805]
1264 2024-09-18 12:13:21,622 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_1 updated with 18805 node
1265 2024-09-18 12:13:21,622 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_2 (id: 2) is playing
1266 2024-09-18 12:13:21,628 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
    'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1267 2024-09-18 12:13:21,628 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 10604 by agent Agent_2
1268 2024-09-18 12:13:21,628 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_2 updated with 0 after
    adding node [10604]
1269 2024-09-18 12:13:21,628 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_2 updated with 10604 node
1270 2024-09-18 12:13:21,628 - multi_agent.
    competitive_influence_maximization - INFO - Agent
    Agent_3 (id: 3) is playing
1271 2024-09-18 12:13:21,634 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0,
    'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1272 2024-09-18 12:13:21,634 - multi_agent.
    competitive_influence_maximization - INFO -
    Activating node 8747 by agent Agent_3
1273 2024-09-18 12:13:21,634 - multi_agent.
    competitive_influence_maximization - INFO -
    Spread of agent Agent_3 updated with 0 after
```

```
1273 adding node [8747]
1274 2024-09-18 12:13:21,634 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_3 updated with 8747 node
1275 2024-09-18 12:13:21,634 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_4 (id: 4) is playing
1276 2024-09-18 12:13:21,640 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1277 2024-09-18 12:13:21,640 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 3562 by agent Agent_4
1278 2024-09-18 12:13:21,640 - multi_agent.
    competitive_influence_maximization - INFO -
        Spread of agent Agent_4 updated with 0 after
        adding node [3562]
1279 2024-09-18 12:13:21,640 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_4 updated with 3562 node
1280 2024-09-18 12:13:21,640 - multi_agent.
    competitive_influence_maximization - INFO - Round
        49 has started
1281 2024-09-18 12:13:21,641 - multi_agent.
    competitive_influence_maximization - INFO - Agent
        Agent_0 (id: 0) is playing
1282 2024-09-18 12:13:21,647 - multi_agent.
    competitive_influence_maximization - INFO - The
    Spreads of agents {'Agent_0': 0, 'Agent_1': 0, 'Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
1283 2024-09-18 12:13:21,647 - multi_agent.
    competitive_influence_maximization - INFO -
        Activating node 27882 by agent Agent_0
1284 2024-09-18 12:13:21,647 - multi_agent.
    competitive_influence_maximization - INFO -
        Spread of agent Agent_0 updated with 0 after
        adding node [27882]
1285 2024-09-18 12:13:21,647 - multi_agent.
    competitive_influence_maximization - INFO - Seed
    set of agent Agent_0 updated with 27882 node
```

```
1286 2024-09-18 12:13:21,647 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
        Agent_1 (id: 1) is playing  
1287 2024-09-18 12:13:21,652 - multi_agent.  
    competitive_influence_maximization - INFO - The  
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
            Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
1288 2024-09-18 12:13:21,652 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Activating node 12467 by agent Agent_1  
1289 2024-09-18 12:13:21,653 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Spread of agent Agent_1 updated with 0 after  
        adding node [12467]  
1290 2024-09-18 12:13:21,653 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
        set of agent Agent_1 updated with 12467 node  
1291 2024-09-18 12:13:21,653 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
        Agent_2 (id: 2) is playing  
1292 2024-09-18 12:13:21,659 - multi_agent.  
    competitive_influence_maximization - INFO - The  
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
            Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
1293 2024-09-18 12:13:21,659 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Activating node 65768 by agent Agent_2  
1294 2024-09-18 12:13:21,659 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Spread of agent Agent_2 updated with 0 after  
        adding node [65768]  
1295 2024-09-18 12:13:21,659 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
        set of agent Agent_2 updated with 65768 node  
1296 2024-09-18 12:13:21,659 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
        Agent_3 (id: 3) is playing  
1297 2024-09-18 12:13:21,666 - multi_agent.  
    competitive_influence_maximization - INFO - The  
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
            Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}
```

```
1298 2024-09-18 12:13:21,666 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Activating node 46664 by agent Agent_3  
1299 2024-09-18 12:13:21,666 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Spread of agent Agent_3 updated with 0 after  
        adding node [46664]  
1300 2024-09-18 12:13:21,666 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
        set of agent Agent_3 updated with 46664 node  
1301 2024-09-18 12:13:21,666 - multi_agent.  
    competitive_influence_maximization - INFO - Agent  
        Agent_4 (id: 4) is playing  
1302 2024-09-18 12:13:21,676 - multi_agent.  
    competitive_influence_maximization - INFO - The  
        Spreads of agents {'Agent_0': 0, 'Agent_1': 0, '  
        Agent_2': 0, 'Agent_3': 0, 'Agent_4': 0}  
1303 2024-09-18 12:13:21,677 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Activating node 15301 by agent Agent_4  
1304 2024-09-18 12:13:21,677 - multi_agent.  
    competitive_influence_maximization - INFO -  
        Spread of agent Agent_4 updated with 0 after  
        adding node [15301]  
1305 2024-09-18 12:13:21,677 - multi_agent.  
    competitive_influence_maximization - INFO - Seed  
        set of agent Agent_4 updated with 15301 node  
1306 2024-09-18 12:13:21,677 - multi_agent.  
    competitive_influence_maximization - INFO - Game  
        over  
1307 100%|██████████| 1000/1000 [12:54<00:00,  1.29it/  
        s]  
1308     algorithm      time  \  
1309 0      degdis  4.398773  
1310  
1311
```

```
1311                                         Agent_0
  \
1312 0  [41643, 5124, 32135, 44108, 10467, 15012,
        27582, 62408, 10025, 3291, 36133, 56088, 19100,
        39187, 106, 6468, 21473, 4041, 7396, 48880, 4597
        , 14141, 30586, 48147, 33131, 30843, 29561, 19157
        , 65193, 12007, 15531, 7295, 18079, 58722, 3034,
        14195, 27470, 33290, 57596, 42908, 41151, 16154,
        56888, 21501, 8835, 29083, 25834, 27204, 5826,
        27883]
```

```
1313
1314     Agent_0_spread  \
1315 0      2138.502
1316
1317
```

Agent_1

```
  \
1318 0  [29422, 17600, 55664, 4297, 14858, 13294,
        38143, 3505, 14776, 21472, 27171, 13766, 28663,
        63838, 39412, 51579, 11676, 36883, 28480, 21398,
        8629, 41177, 5053, 6265, 3358, 19692, 2452, 10876
        , 624, 23206, 19211, 19147, 10978, 9968, 40891,
        52017, 65936, 19094, 5920, 48680, 43259, 40216,
        23987, 8548, 55731, 15444, 10764, 24715, 18806,
        12468]
```

```
1319
1320     Agent_1_spread  \
1321 0      3669.059
1322
1323
```

Agent_2

```
1323 \
1324 0 [50222, 30650, 20432, 17585, 19188, 5016,
       69259, 24130, 66007, 4082, 10827, 17400, 37649,
       11940, 23991, 21192, 6927, 23536, 54590, 14886,
       35957, 68749, 56138, 53142, 5660, 59017, 5581,
       53235, 8699, 34964, 26210, 11252, 18541, 7071,
       23541, 20401, 21914, 21894, 6751, 18703, 3508,
       7609, 18371, 36561, 25537, 2799, 25488, 46647,
       10605, 65769]
1325
1326     Agent_2_spread \
1327 0         2314.692
1328
1329

                                         Agent_3 \
1330 0 [56340, 48558, 69959, 13938, 7027, 50848, 8488
       , 682, 2888, 24020, 35544, 4312, 32451, 69, 36786
       , 39050, 24759, 12544, 42674, 32173, 778, 19090,
       43136, 20567, 26539, 41039, 29231, 35546, 35410,
       56176, 23361, 6835, 11246, 13978, 17073, 16809,
       427, 9998, 6690, 12480, 3325, 10584, 70287, 26345
       , 48566, 58069, 20461, 40837, 8748, 46665]
1331
1332     Agent_3_spread \
1333 0         2693.617
1334
1335

                                         Agent_4 \
1336 0 [5095, 14186, 24046, 35047, 42833, 33817,
       36871, 29157, 45265, 21500, 41051, 56874, 3967,
```

```
1336 5438, 21062, 48935, 64231, 65034, 2812, 9512,  
    39311, 21161, 15100, 19424, 34332, 18253, 26218,  
    6272, 30213, 36787, 33825, 53070, 16685, 6325,  
    53271, 29202, 17467, 52779, 41437, 4060, 32224,  
    69617, 6173, 37705, 6898, 21075, 42173, 52389,  
    3563, 15302]  
1337  
1338     Agent_4_spread  
1339 0         3297.591  
1340  
1341  
1342 Ran 1 test in 786.920s  
1343  
1344 OK  
1345  
1346 Process finished with exit code 0  
1347
```