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AI607 HW4 : Cascading Behavior & Influence Maximization

1.1 Cascading behavior of initial number of node (N)

Policy	Degree						Random					
N	**0.1**	**0.25**	**0.5**	**1.0**	**2.5**	**5.0**	**0.1**	**0.25**	**0.5**	**1.0**	**2.5**	**5.0**
q	1.0											
Trial1	9695	13222	17610	21702	27128	32531	271	941	972	5687	7671	12187
Trial2	9208	12614	16856	21449	27189	32342	153	1319	2892	3464	6280	12591
Trial3	9606	13002	16715	21157	27349	32373	577	843	1126	2247	7132	11674
Trial4	9921	12860	17194	21790	27195	32246	227	949	1614	2882	8270	13320
Trial5	9497	14015	16745	21385	27278	32374	919	695	1087	3332	6911	11922
Trial6	10461	13528	16943	21257	27357	32637	119	601	1547	4550	10995	12226
Trial7	9559	13124	16683	21410	27351	32525	344	1329	1132	2753	7241	12453
Trial8	9534	13276	17533	21252	27309	32582	796	1475	2791	4573	7122	14011
Trial9	9249	13052	16416	21119	27152	32419	362	684	1519	2465	5760	12469
Trial10	9001	14103	16575	21704	27287	32401	144	1323	1371	2679	8335	11784
Average	**9573.1**	**13279.6**	**16927**	**21422.5**	**27259.5**	**32443**	**391.2**	**1015.9**	**1605.1**	**3463.2**	**7571.7**	**12463.7**

1.2 Cascading behavior of propagation threshold (q)

Policy	Degree					Random				
N	1.0									
q	**0.2**	**0.4**	**0.6**	**0.8**	**1.0**	**0.2**	**0.4**	**0.6**	**0.8**	**1.0**
Trial1	3182	5896	9568	15099	21636	879	1017	1531	2203	2568
Trial2	3099	6272	9776	15439	21319	872	1009	1429	1583	3668
Trial3	3107	5925	9829	14806	21414	866	1029	1285	1771	4029
Trial4	3081	6085	9973	14928	21072	898	1082	1454	1687	5358
Trial5	3078	6027	9866	14726	20657	883	1214	1752	1724	4020
Trial6	2992	6107	9967	14926	20876	859	1002	1413	2041	4607
Trial7	3165	6074	10081	14938	21074	850	1004	1405	1910	2969
Trial8	3014	6128	9987	14893	21525	878	1018	1429	1604	2417
Trial9	3093	6068	9899	15471	21667	853	1102	1710	2244	4543
Trial10	3116	5977	10083	14835	21476	843	1086	1315	1588	4173
Average	**3092.7**	**6055.9**	**9902.9**	**15006.1**	**21271.6**	**868.1**	**1056.3**	**1472.3**	**1835.5**	**3835.2**

2.1 Custom selection policy for influence maximization

Among N initial active nodes, I chose N-40 nodes just as the 'degree' policy where the nodes with the highest degrees are selected. Then, I greedily select the rest 40 nodes using the criteria computed by the sum of propagation probability ($= \mathrm{q}/\deg_{\mathrm{in}}(v)$) of its neighbors. This is motivated from the 'greedy hill climbing' method in lecture note 12 page 21. The average number of active nodes increased comparing to the 'degree' / 'random' policy. (In average, it took about 10 minutes.)

Policy	**Custom**									
N	1.0									
q	1.0									
Trial1	Trial2	Trial3	Trial4	Trial5	Trial6	Trial7	Trial8	Trial9	Trial10	**Average**
22740	22828	22303	22502	22483	22327	22131	22346	22383	22965	**22500.8**