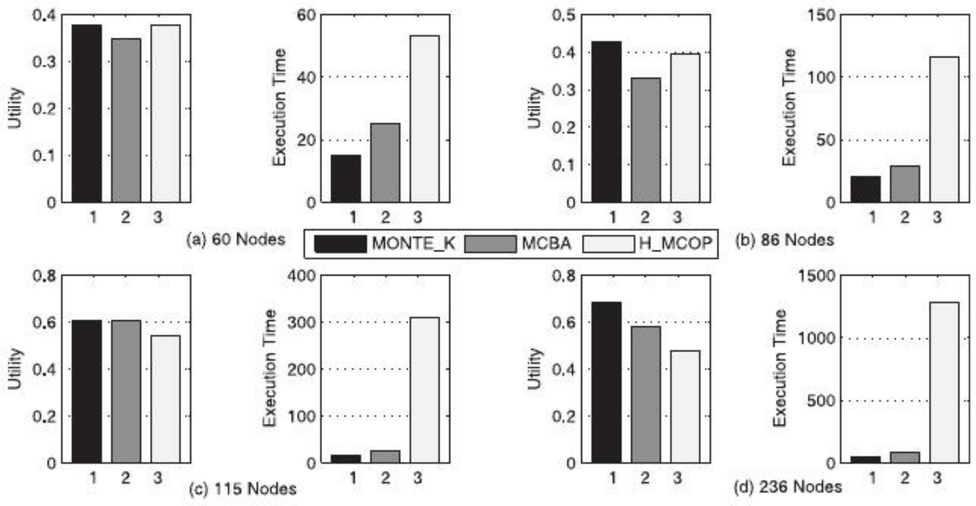


Figure 4: Maximal length of paths is 4 hops

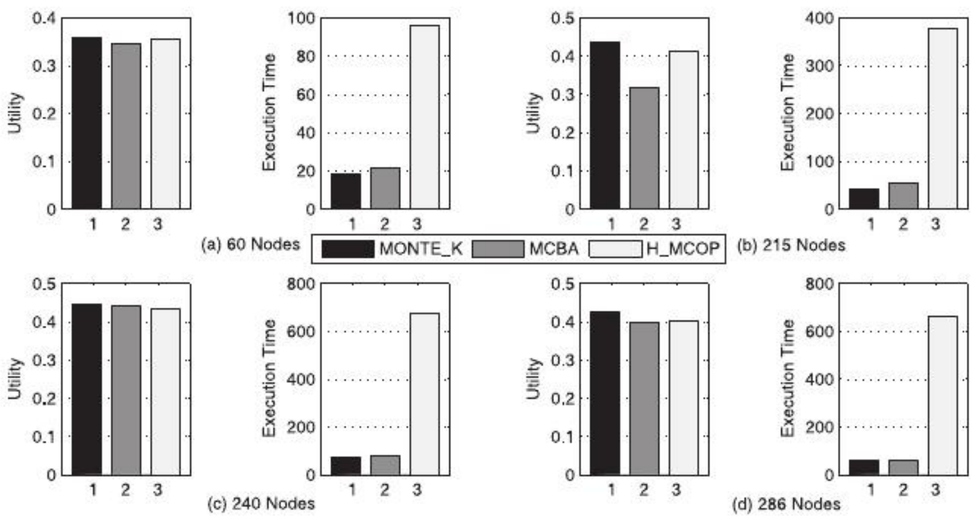
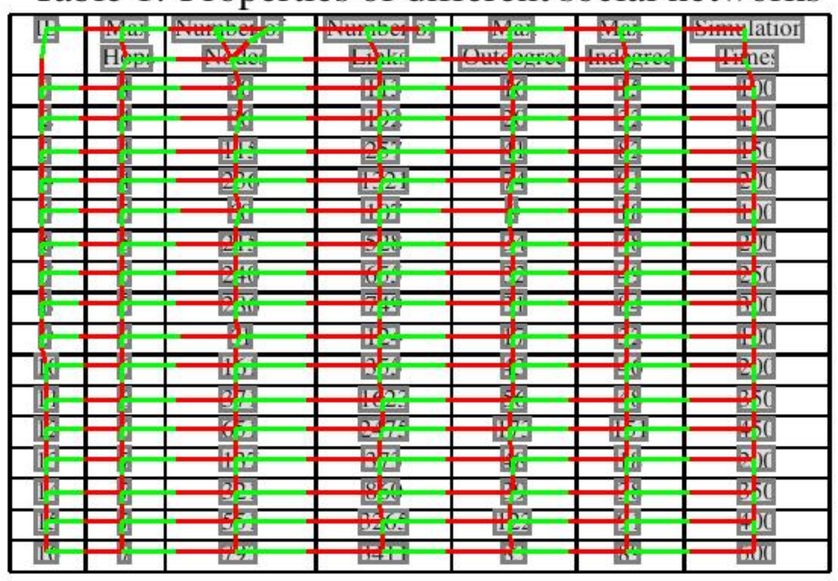


Figure 5: Maximal length of paths is 5 hops

form 500 repeated experiments for MONTE_K and MCBA in each sub-network and record the utilities of the identified social trust paths in each experiment. The maximal utilities of the social trust paths identified in all 500 experiments by MONTE_K and MCBA are selected for the comparison with that yielded by H_MCOP. The average execution time of each of MONTE_K and MCBA in each sub-network is recorded based on 500 repeated experiments. The execution time of H_MCOP is averaged based on 5 independent executions. The results are plotted in Fig. 4 to Fig. 7.

Table 1: Properties of different social networks



Utility: We can see that in any of 16 cases, MONTE_K does not yield any utility worse than that of H_MCOP while in most sub-networks, the utilities of social trust paths identified by MONTE_K are better than those of H_MCOP (*see Fig. 4(a, c, d), Fig. 5(a) to (d), Fig. 6 (a) to (d) and Fig. 7 (b) to (d)*). The sum of utilities computed by MONTE_K is 12.23% more than that of H_MCOP in 4 hops sub-networks, 4.27% more in 5 hops, 60.62% more in 6 hops and 41.51% more in 7 hops. This is because when a trust path with the maximal utility is a feasible solution, H_MCOP can identify it as the optimal solution. However, when the identified trust path is not a feasible solution, H_MCOP can hardly find a near-optimal solution and some times yields an infeasible one even when a feasible solution exists (*see Fig. 6(b) where the utility computed by H_MCOP is 0*).

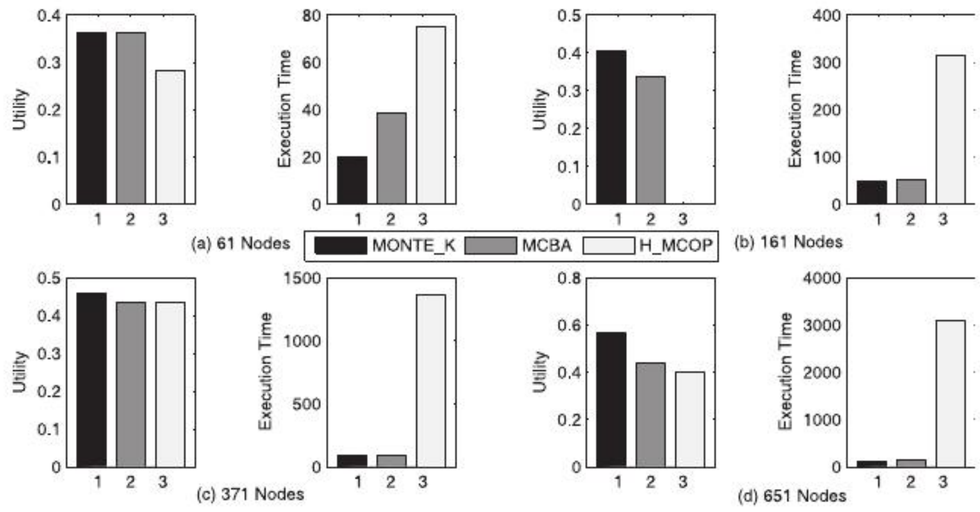


Figure 6: Maximal length of paths is 6 hops

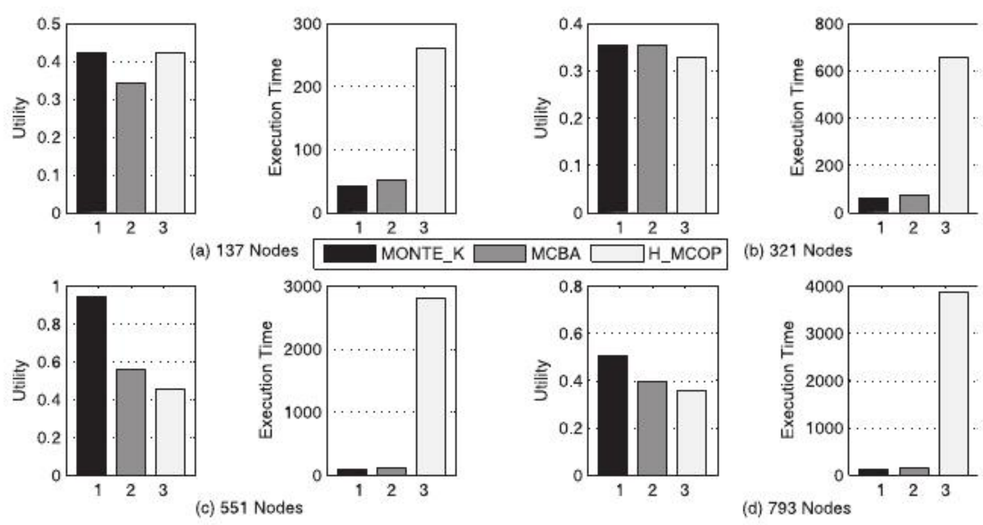


Figure 7: Maximal length of paths is 7 hops

Regarding the utility of identified paths, MONTE_K also outperforms MCBA in most cases and is no worse than MCBA in all cases. The sum of utilities computed by MONTE_K is 17.25% more than that of MCBA in 4 hops sub-networks, 10.89% more in 5 hops, 14.30% more in 6 hops and 34.60% more in 7 hops. This is because *Strategy 2* in MONTE_K guarantees that the solutions identified by later simulations will be no worse than the current one.

Execution Time: From Fig. 4 to Fig. 7, we can observe that the execution time of MONTE_K is significantly less than that of H_MCOP in all sub-networks. The total execution time of MONTE_K is only 5.92% of that of H_MCOP in 4 hops sub-networks, 10.58% in 5 hops, 5.63% in 6 hops and 4.05% in 7 hops. In particular, in the most complex sub-network with 793 nodes, 3411 links and 7 hops (*see the last row of Table 1*), the execution time of MONTE_K is only 2.88% of that of H_MCOP (*see Fig. 7 (d)*). From the above results, we can see that MONTE_K is much more efficient than H_MCOP for identifying the optimal social trust path,