Homework V (due: 05/02/2017)

CIS 9590 Ad Hoc Networks

Name _____ Student Number _____

1. (Contact graph)
Three mobile nodes move in cycle along a straight line in a uniform speed. The trajectories for nodes A, B, and C are (3,0) to (0,0) for a cycle of 6, (2, 1) to (2, 3 for a cycle of 4, and (1,1) to (1,5) for a cycle of 8, respectively. The initial location for A, B, and C are (3,0), (2,1), and (1,1). Each node has a transmission range of 2. Find all contacts in terms of starting and ending locations and their durations.

2. (Delegation forwarding)
Consider a contact graphs with following contacts at different time slots: t1: (1, 2), (3,5); t2: (1, 4), (2, 6), (2,3); t3: (3,4); t4: (3,7), (1,5); t5: (1,3), (4,6). Initially, only node 1 has the message. The dissemination process for blind flooding, priority-based forwarding, delegation forwarding, assuming that the higher the ID, the higher the node priority (in terms of the probability of meeting the destination). Show dissemination process at the time step.

3. (Evolving graphs)
Given the following evolving graphs: (A, B): 1, 2; (A,C): 3; (A, D): 4, 5; (B,C): 1, 2, 3; (C, F): 1, 6; (D,E): 3,5; (E, F): 6. Find all the earliest-completion, fastest, and minimum-hop paths from node A to node F. Show how your results are obtained.

4. (Cyclic MobiSpace)
Consider the example (Figure 3) in Routing in a Cyclic MobiSpace (reference paper). Suppose the global cycle is 50 time units (that is, the cycle for C is 50, and the cycle for A and B is 25). A and B have contacts are 0 and 25 with probability 0.6, B and C at 2.7 with probability 0.4, and A and C at 10 with probability 0.5. Calculate time-space graph and state-space graph. Find the MDP of state-space graph with C as the destination. (Basically, repeat Fig. 4 and Fig. 5 in the reference paper with new data.)