

Mid-term EXAM (10/14/04)
CDA 6508 Ad Hoc Networks
Open books and notes

Name _____ SSN _____

1. (25 pts) (Cellular Architecture)

- Discuss the difference and similarity between location area and reporting center approaches in cellular architecture.
- In an $n \times n$ grid structured cellular network, can you come up an assignment of n reporting centers such that the average size of the vicinity of a reporting center (i.e., the size of reachable non-reporting cells from the center) is $o(n^2)$? Justify your conclusions.
- Same as above. Assume the number of reporting centers is $4n-4$. Provide an assignment such that the maximum size of vicinity is minimized. Determine the minimized value assuming $n = 3k$.

2. (25 pts) (Link Reversal)

- Apply full and partial link reversals to the graph: $G = (V, E)$, where $V = \{A, B, C, D, E\}$ and $E = \{(A, D), (C, D), (C, B), (E, B), (B, A), (C, A)\}$. Assume that D is the sink and link (A, D) (a directed link from A to D) is broken. You are required to show all the steps and the reversed links at each step.
- Answer each question below; if the answer is yes, one simple example is needed.
 - Full reversal can beat partial reversal in terms of the total of reversed links.
 - Full reversal can beat partial reversal in terms of the number of steps used.

3. (25 pts) (Dominating Set)

Given a network $E = \{[1, 2], [2, 3], [2, 5], [3, 5], [3, 4], [4, 6], [5, 6]\}$, where $[1, 2]$ represents a undirected link between 1 and 2.

- Find a CDS using Wu and Li's marking process. Apply Rules 1 and 2 to further reduce CDS.
- Use ID-based clustering algorithm to derive a DS. Note that the smaller the id, the higher the priority.
- Use ID-based core algorithm to derive a DS.