

# Review session

5/1/06

# Project

- This Friday, 5/5/06
- Each group is given about 15 mins.
- Make slides, or use the board.
- Present your problem, your algorithm, and performance evaluation.
- The final report is due on final exam day.

# Final exam

- Date: Friday, 5/12/06.
- 2-4:30pm.
- Location: here.
- There will be 5 problems, each with 5 pts.
- The range of final will cover the materials since midterm.
- Work on the slides and required readings.

# Overview

- Location management
- Mobile IP/TCP
- Localization
- Routing w/ virtual coordinates
- Topology control

# Location management

- In cellular networks
  - Basic operations: update & paging.
  - Partitioning into location areas.
  - A balance between the two operations.
- Key notions
  - How to balance the costs of update/paging, dependent on traffic pattern?
  - Any weakness and improvement?

# Location management

- In ad hoc networks
  - Challenge: who stores the location information? How to query?
  - Identify location servers
  - Location query and location update.
  - GLS scheme: a hierarchical mechanism for location distribution/query.
- Key notion:
  - Understand how GLS works.

# Mobile IP

- Do a minimal change to the current protocol to enable user mobility at network layer.
  - Mobile agent, foreign agent
  - Tunneling
  - Registration, change of foreign agent.
  - Problems: triangular routing, security.
- Key notion:
  - Understand how mobile IP works and the motivations behind the design.

# Mobile TCP

- Do a minimal change to the current protocol to enable user mobility at transport layer.
  - Basic TCP congestion control
  - Why is wireless communication causing problems for traditional TCP?
  - Indirect TCP, snoop TCP, mobile TCP, etc...
- Key notion:
  - Understand how mobile TCP works and the motivations behind the design.



# Localization

- Find locations of wireless nodes.
  - Basic operation: triangulation
  - Localization for a set of nodes: iterative multilateration.
  - Challenges in localization: error propagation, incomplete localization, global rigidity problem.
  - Laman condition on rigid graphs.
- Key notion:
  - Understand atomic triangulation and iterative triangulation.
  - Understand Laman condition.

# Routing with virtual coordinates

- Geographical routing without geographical info
  - Use virtual coordinates for greedy forwarding
  - Algorithm 1: create a rubber-band drawing.
  - Algorithm 2: use a spanning tree to create polar coordinates.
- Key notion:
  - Understand how they work.
  - Pros and cons.

# Topology control

- Decide the transmission range of the wireless nodes to have a connected graph
  - Percolation behavior: there is a critical threshold beyond which the graph is connected.
  - A practical algorithm based on cones.
- Key notion:
  - Understand the cone-based algorithm.
  - Properties of the graph related with the angle  $\alpha$  , e.g., connectivity, power efficiency.

Questions?