Applications and Emerging Challenges (1)

- Mobile systems
  - Wireless communication: unit disk model; broadcast medium (MAC), power management etc.
  - CS perspective: routing, location management, channel allocation, localization and position estimation, mobility management
  - Base station model (cellular model)
  - Ad-hoc network model (rich in distributed graph theory problems)
- Sensor networks: Processor with electro-mechanical interface
- Ubiquitous or pervasive computing
  - Processors embedded in and seamlessly pervading environment
  - Wireless sensor and actuator mechanisms; self-organizing; network-centric, resource-constrained
  - E.g., intelligent home, smart workplace

Applications and Emerging Challenges (2)

- Peer-to-peer computing
  - No hierarchy; symmetric role; self-organizing; efficient object storage and lookup;scalable; dynamic reconfig
- Publish/subscribe, content distribution
  - Filtering information to extract that of interest
- Distributed agents
  - Processes that move and cooperate to perform specific tasks; coordination, controlling mobility, software design and interfaces
- Distributed data mining
  - Extract patterns/trends of interest
  - Data not available in a single repository

Applications and Emerging Challenges (3)

- Grid computing
  - Grid of shared computing resources; use idle CPU cycles
  - Issues: scheduling, QOS guarantees, security of machines and jobs
- Security
  - Confidentiality, authentication, availability in a distributed setting
  - Manage wireless, peer-to-peer, grid environments
    - ★ Issues: e.g., Lack of trust, broadcast media, resource-constrained, lack of structure