

## Mobile and Ubiquitous Computing

### Revision Part I

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## Elements of Mobile Computing

- Wireless communication
  - Disconnection
  - Low bandwidth
  - High bandwidth variability
  - Heterogeneous networks
  - Security
- Mobility
  - Addressing and routing
  - Location based information
  - Migration
- Portability
  - Low power
  - Small interface
  - Restricted storage
  - Security



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## Example: Wireless Characteristics

- Implication: signal interacts with the environment
  - noise, echoes (multi-path, timing), blocking
  - objects, walls, other sources, weather
- Implication: network topology very dynamic
  - hosts come and go, loss of connectivity, variable density
- Result: degradation/variability of capability to communicate, errors
- Networks and applications must deal with this



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### Research Papers

- Mobile IP
  - Main points about its operation
- Service discovery
  - Principles and techniques
    - E.g. registration
- Placelab
  - Main principle

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### Location sensing

- Location sensing techniques
  - Triangulation
  - Proximity
  - Scene analysis
- Location sensing systems
  - Properties
  - Examples
  - Challenges

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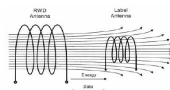
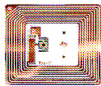
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### RFID Operating Principle

- Tag components
  - Microcontroller
  - Antenna (wire/conductive carbon ink)
  - Polymer enclosure
  - Battery (optional)
- Reader detected by voltage difference at the antenna endpoints caused by inductive or capacitive coupling
  - Magnetic (near) field (LF or HF)
  - Electric (UHF)



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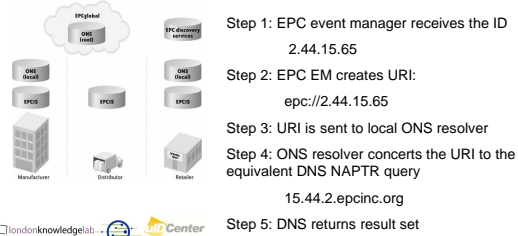
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## Object Naming Service

### Bit Format:

[10 00000000000000000101100 00000000000001111 000000000000000001000001]

Decimal Format: [2.44.15.65]



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## Tiny OS basics

- Main characteristics
  - Memory, power consumption, modularity
  - Programming with
- System model
  - Concurrency
  - Modules and configs

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