

Lecture 34: Embedded System Design

- Other design metrics
- Design methodology
- Various design flows

We have studied

- Cost
- Performance
- Power

Other design attributes

- **Design time** must be reasonable. May need to finish by a certain date.
- System must be **reliable**; reliability requirements differ widely.
- **Quality** includes reliability and other aspects: usability, durability, etc.
- **Security**
- ...

Embedded system metrics

- Some metrics:
 - *performance*: MIPS, reads/sec etc. *million instructions per second*
 - *power*: Watts
 - *cost*: Dollars
 - Nonrecurring engineering cost, manufacturing cost
 - *size*: bytes, # components, physical space occupied
- MIPS, Watts and cost are related
 - technology driven
 - to get more MIPS for fewer Watts
 - look at the sources of power consumption
 - use power management and voltage scaling

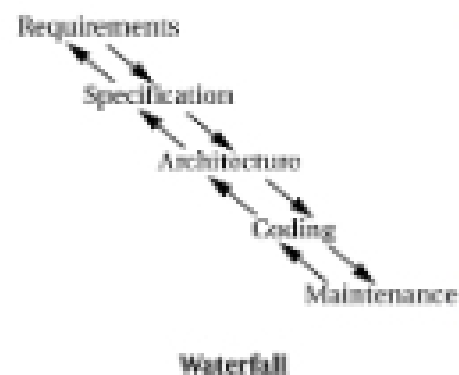
Outline

- Other design metrics
- **Design methodology**
- Various design flows

Basic design methodologies

- Design methodology:
 - A procedure for creating an implementation from a set of requirements.
- Basically, need to figure out flow of decision-making.
 - Determine when bottom-up information is generated.
 - Determine when top-down decisions are made.

Waterfall model



- Basic ideas:
 - complete each stage before advancing
 - the cost of going backwards (up the waterfall) to fix a mistake is very steep
- mostly, the model helps a designer consciously think about organizing the project's activities

Spiral model

