Topics

1) What is a software architecture?
2) What decisions are made when designing an architecture?
3) How can we show views of the architectural design?

Software architecture

- Architectural design
  - deciding how sub-systems are...
- Done in early system design.
  - Often done in parallel with some specification activities.
Box and line diagrams

- Simple block diagrams:

- Very abstract: don't show the nor properties of the sub-systems.

The architecture of a packing robot control system

Architectural abstraction

- Design architecture
  - Programs:
    - How a single program is..
  - Enterprise systems:
    - How many..
    - Each run by different companies.

Advantages of explicit architecture

- Stakeholder communication
  - Architecture diagram can..
    - It's high-level, so easier to understand.

- System analysis
  - Helps analyze how the system will meet its..

- Large-scale reuse
  - Architecture may be reusable across a...
    - Product-line architectures may be developed.
Architectural design decisions

- Architectural design is a creative process
  - Design process depending on type of system.
  - Decisions affect..

- Architectural design decisions
  - Can a generic application architecture be used?
    - Known as..
  - Will the system be distributed?
  - How is it..
  - What control strategy should be used?

Architecture patterns

- Patterns: Common architectures
  - Don't re-invent the wheel

- Architectural patterns or ‘styles’.
  - and can be instantiated in different ways.
  - Physical Example in Phones:
    - Flip phone
    - Touch screen
    - Slide-out keyboard.
  - Discussed next lecture.

Architecture Characteristics

- Performance
  - Use large-grain rather than fine-grain components.

- Security
  - Use a layered architecture with..

- Safety
  - Localize safety-critical features in just a few subsystems.

- Availability
  - Include redundancy and mechanisms for fault tolerance.

- Maintainability
  -

Architectural views
Architectural views

- Architecture Diagram
  - What goes into an architectural model?
  - Each architectural model only shows one view or perspective of the system.

- Examples:
  - Static:
  - Dynamic:
  - Deployment: components distribution across a network.

- Multiple views of the architecture are useful.
  - An informal diagram can be enough to show design; need not be UML.

Android Architecture – Abstract

- Software architecture: description of how a software system is organized.
- Architectural design decisions:
  - type of application,
  - distribution of the system,
  - architectural pattern to be used.
  (examples next lecture)
- Architectures documented from several views.