

Slides #14
Architectural Design
Sections 6.1-6.2

CMPT 276
© Dr. B. Fraser

15-02-27

1

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?

15-02-27

2

Software architecture

15-02-27

3

Software architecture

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

15-02-27

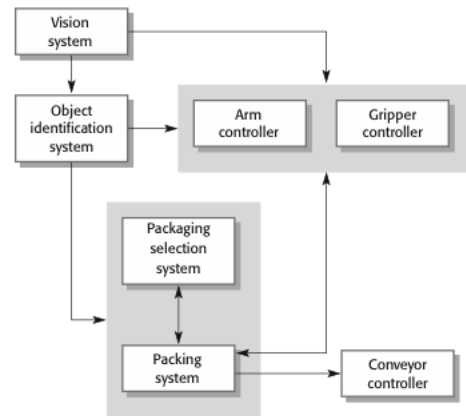
4

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

15-02-27

5

Architectural abstraction

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

15-02-27

6

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.

15-02-27

7

Architecture design decisions

15-02-27

8

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?

15-02-27

9

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.

15-02-27

10

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
 -

15-02-27

11

Architectural views

15-02-27

12

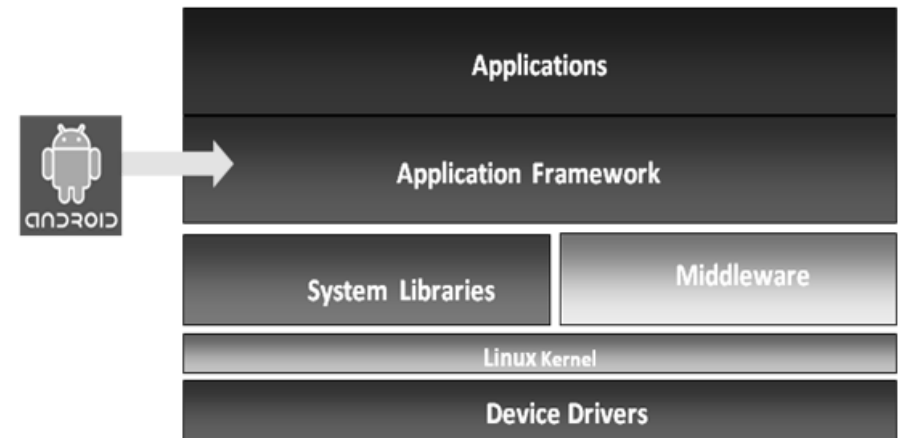
Architectural views

- 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.

15-02-27

13

Android Architecture – Abstract



15-02-27

14

Android Architecture



15-02-27

15

Summary

- 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.

15-02-27

16