Software vs Cognitive Architectures
Robot Operating System (ROS)
Blackboards

- Agents communicate by posting objects to blackboard
- Objects are timestamped and logged to a database
  - enables introspection and learning
- An agent subscribes to objects of specified types
- Agent is activated when object of the right type is posted
speech recognition

“pick up the green ball”

natural language processing

pickup(B)

move(..)

camera

motor actions

tactile sensors

colour recognition

depth analysis
• Most robot systems are ad hoc combinations of components
• Supported by software architectures (e.g. ROS)
• No principled way of combining components
• No principled way of extending system or components through learning
Cognitive Architectures for Robots

- How to integrate these specialised components?
- What is an appropriate architecture?

Icarus – Langley
Agent Architecture

Monitor / Goal Selection

Sensors

Perception

World Model

Action

Actuators

Perception

World Model

Nilsson - Triple Tower

Albus - RCS
Scales in the Hierarchy

- General, deterministic, persistent, slow, human readable
- Specialised, stochastic, transient, fast, unreadable
Nilsson’s Triple Tower
RCS (Albus)