

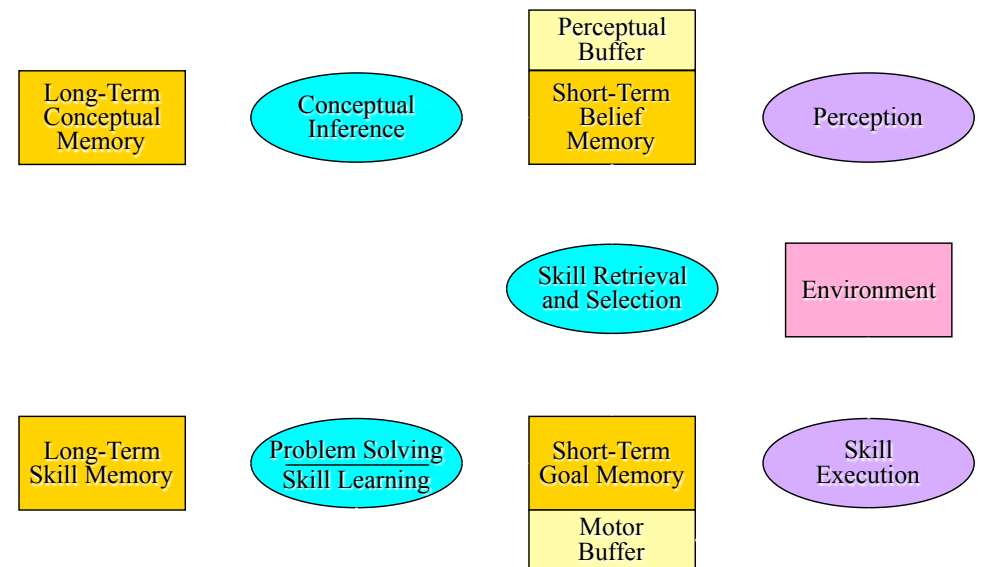
Robot Software Architectures

Robot software architectures

- 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

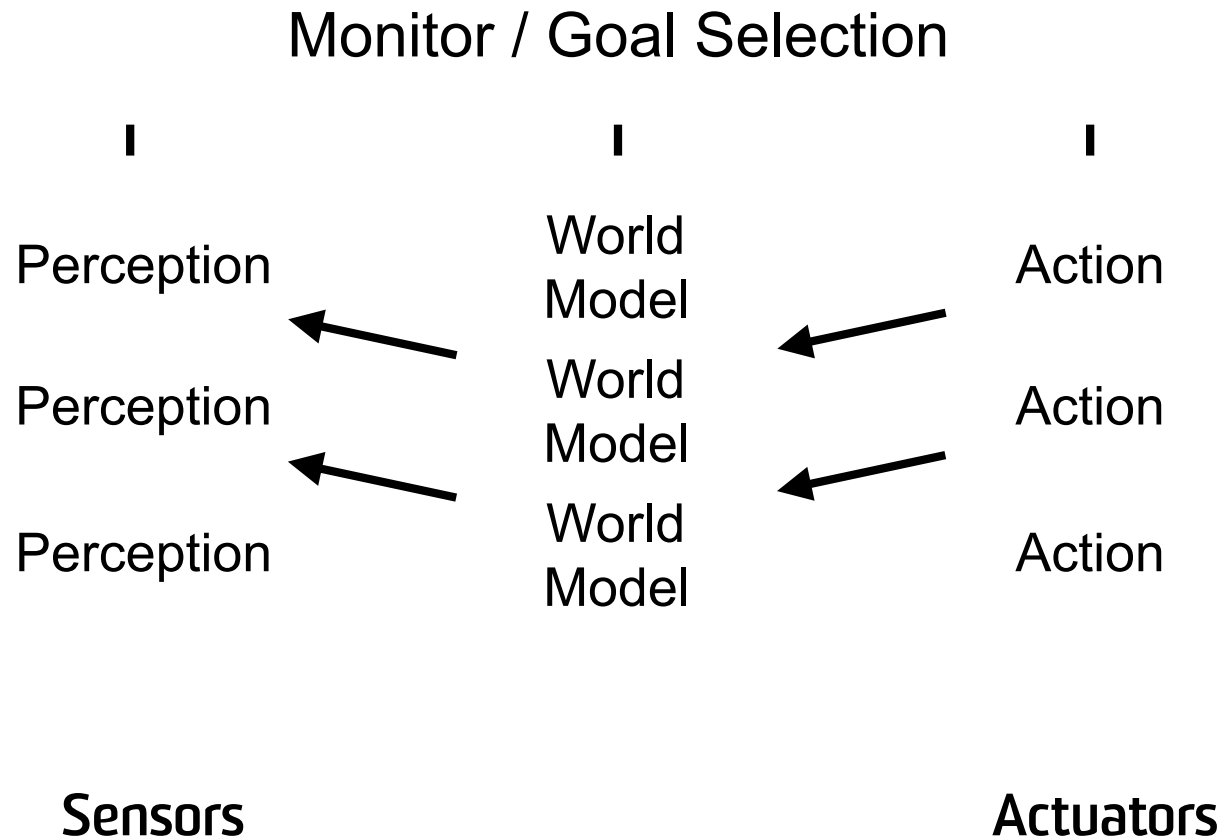
Cognitive Architectures for Robots

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



Icarus – Langley

Agent Architecture



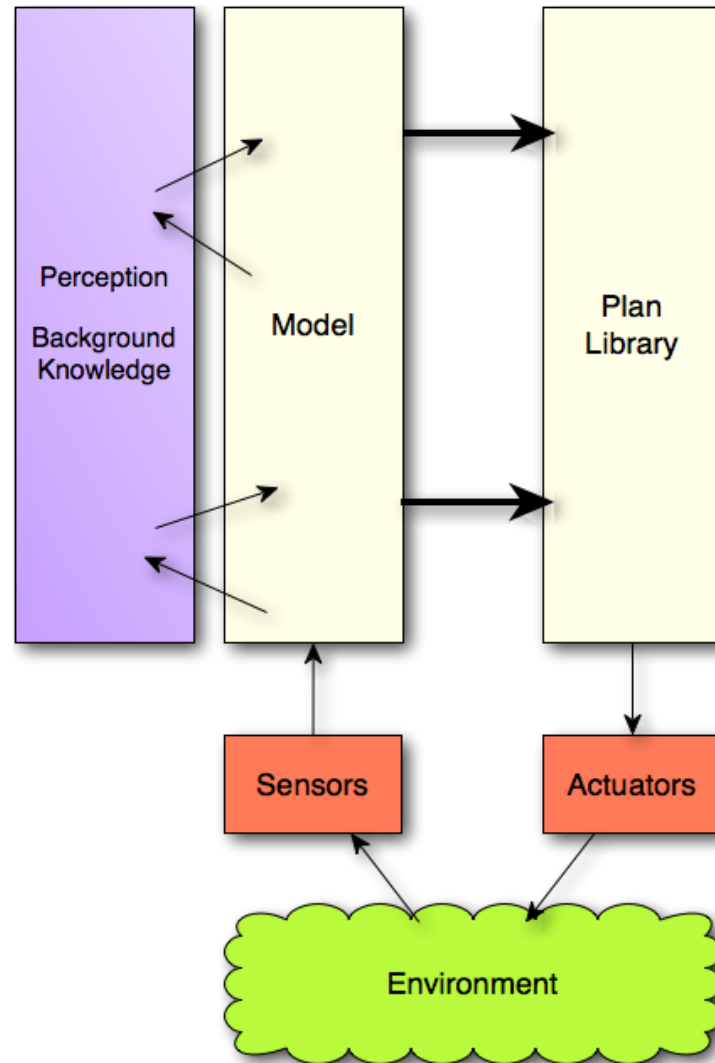
Albus - RCS

Nilsson - Triple Tower

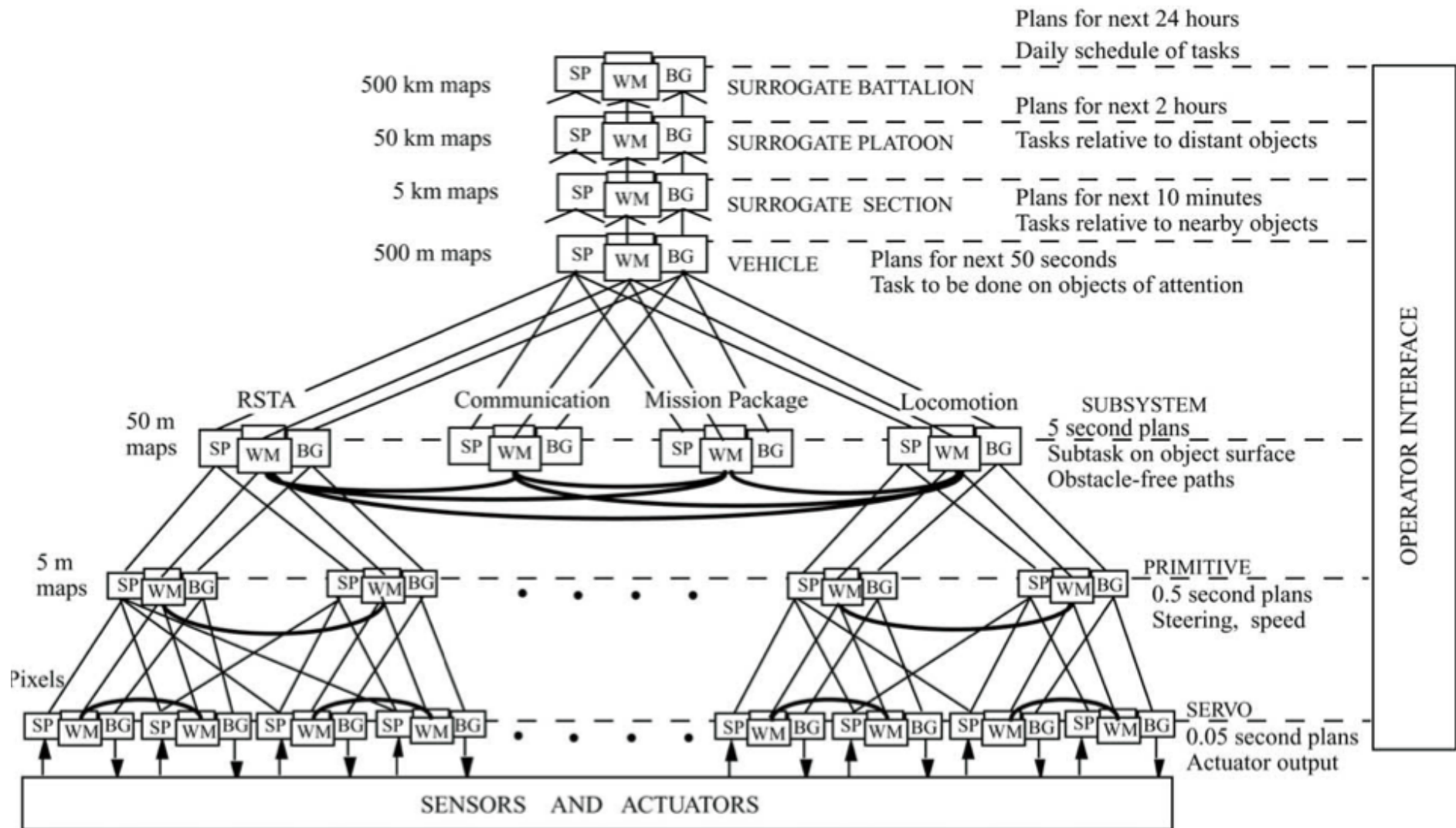
Scales in the Hierarchy

- General, deterministic, persistent, slow, human readable
- Specialised, stochastic, transient, fast, unreadable

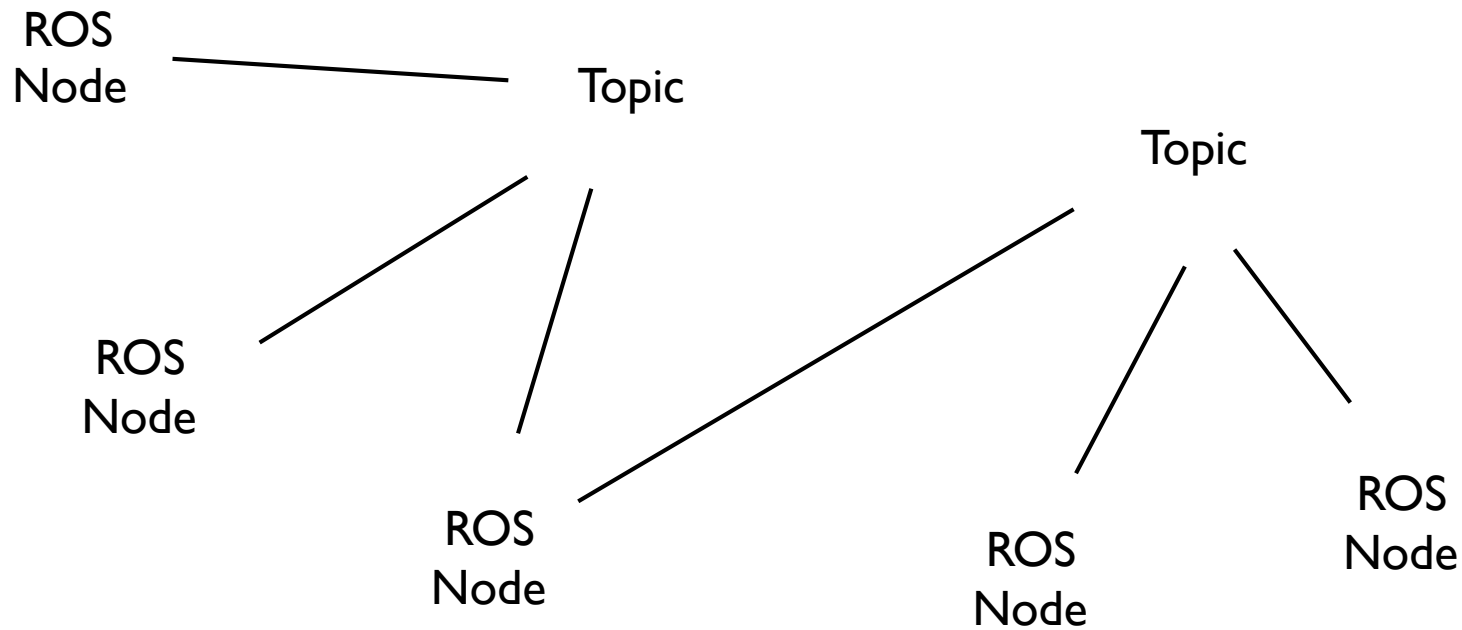
Nilsson's Triple Tower



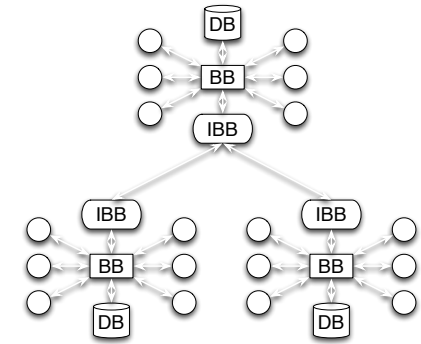
RCS (Albus)



Robot Operating System (ROS)



Blackboards

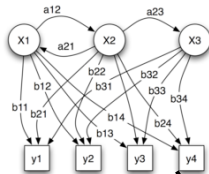


- Agents communicate by posting objects to blackboard
- Objects are timestamped and logged to a database
 - enables introspection and learning
- An agent subscribes to objects of specified types
- Agent is activated when object of the right type is posted

audio input



speech recognition



natural language processing

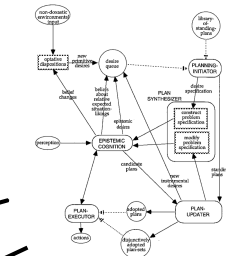
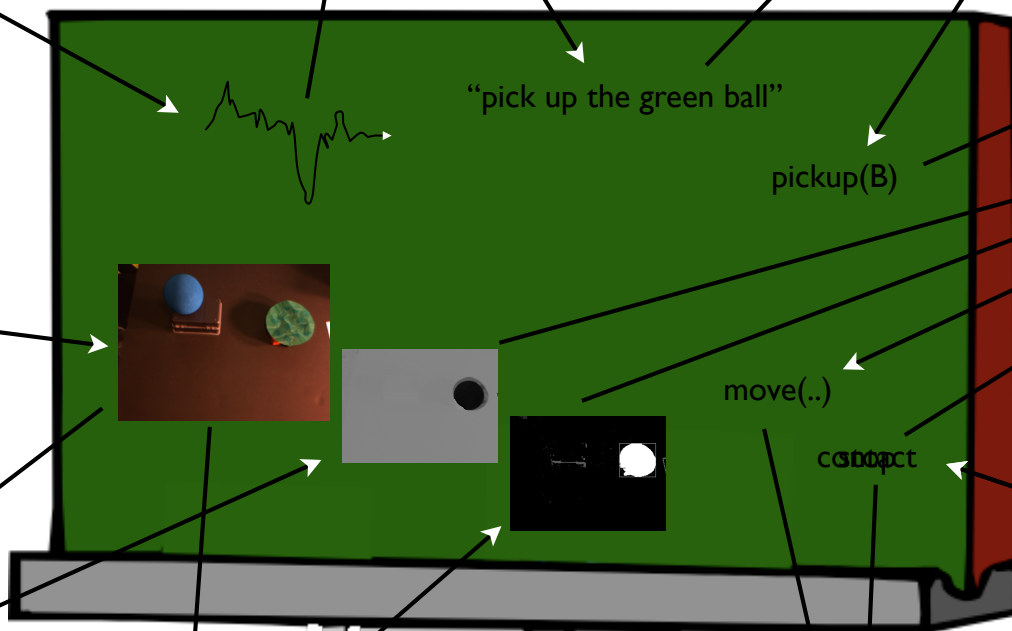
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<postal-address> ::= <name-part> <street-address>
<name-part> ::= <personal-part> <last-name> <opt-jr>
<personal-part> ::= <first-name> | <initial> "."
<street-address> ::= <opt-apt-num> <house-num> <street>
<zip-part> ::= <town-name> ", " <state-code> <ZIP-code>
<opt-jr-part> ::= "Sr." | "Jr." | <roman-numeral> | ""

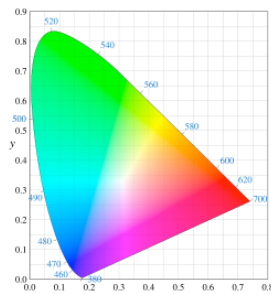
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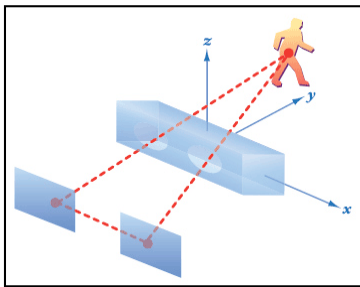
stereo camera



planner



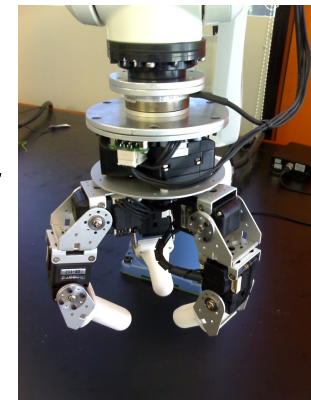
colour recognition



depth analysis



motor actions



tactile sensors