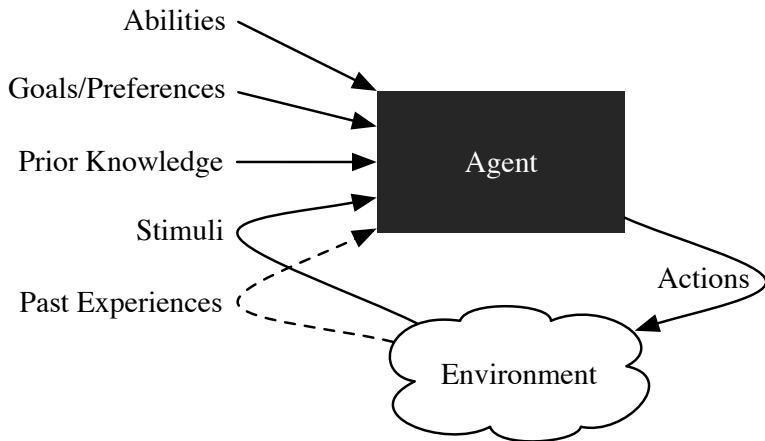


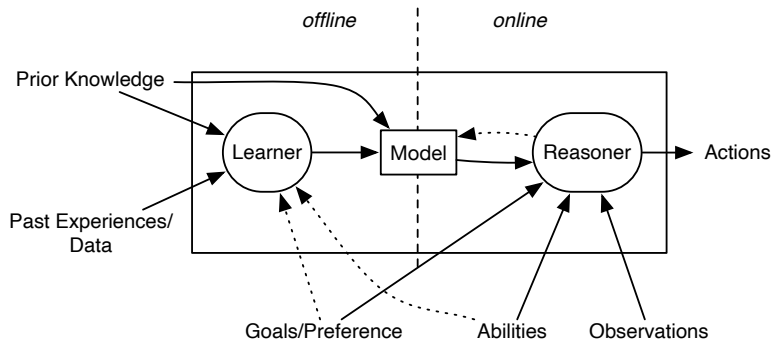
Review: What is Artificial Intelligence?

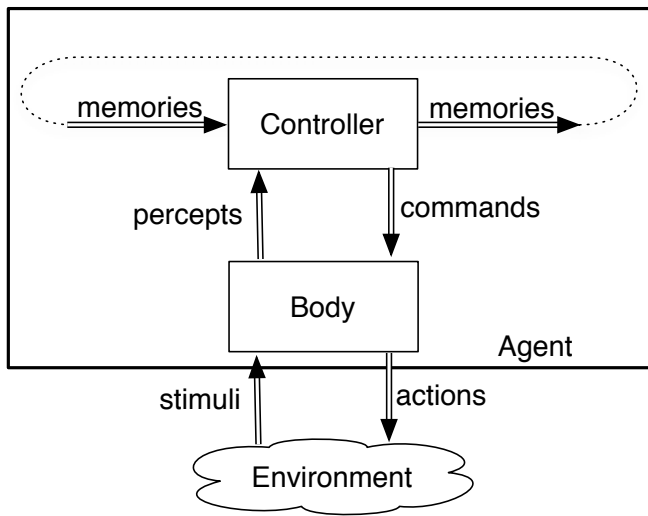
- Artificial Intelligence is the synthesis and analysis of computational agents that act intelligently.
- An agent is something that acts in an environment.
- An agent acts intelligently if:
 - ▶ its actions are appropriate for its goals and circumstances
 - ▶ it is flexible to changing environments and goals
 - ▶ it learns from experience
 - ▶ it makes appropriate choices given perceptual and computational limitations

Review: Agents acting in an environment

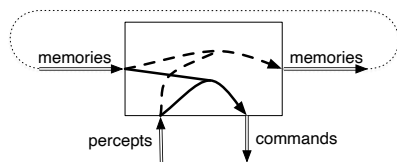


Inside Black Box

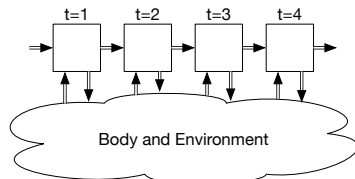




Functions implemented in a controller



(a)

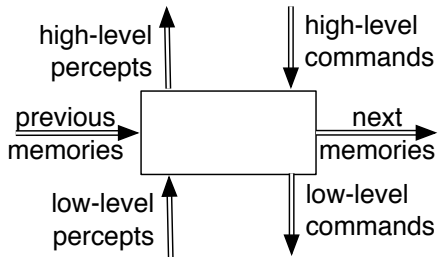
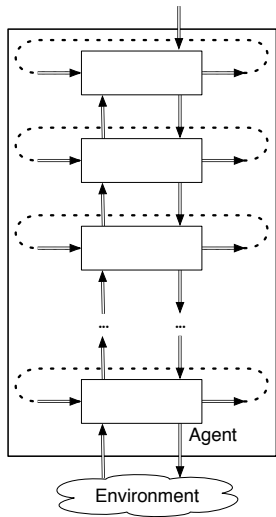


(b)

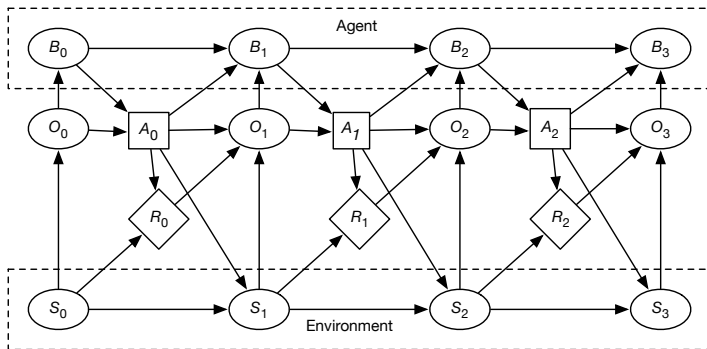
For discrete time, a controller implements:

- **belief state function** returns next belief state / memory.
What should it remember?
- **command function** returns commands to body.
What should it do?

Hierarchical Robotic System Architecture



Partial Observability



B_i agent's belief state at time i .

A_i agent's action.

O_i is what the agent observes.

R_i is the reward.

S_i is the world state.