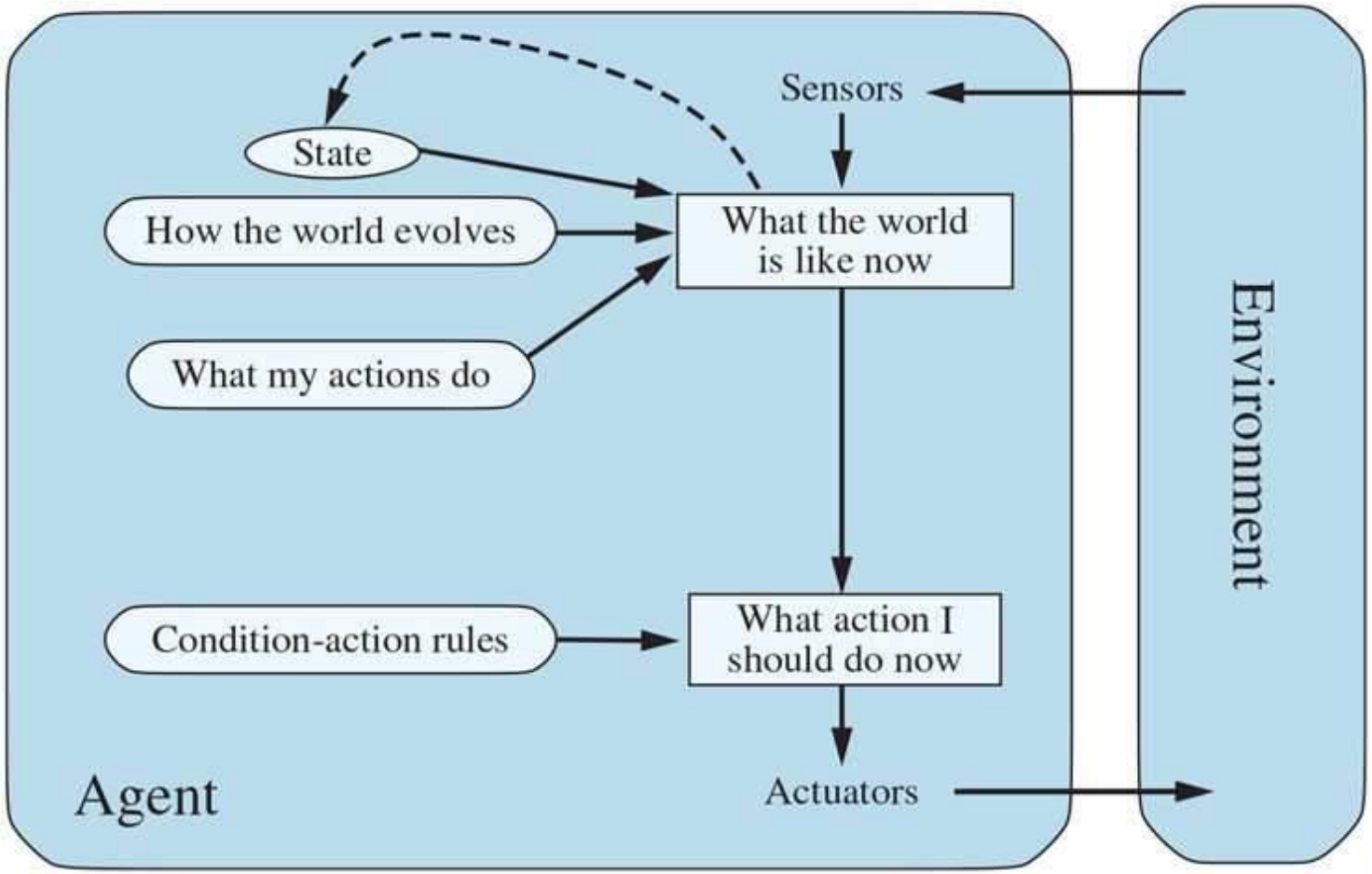
Intelligent Agents

AGENTS AND ENVIRONMENT

Model-based reflex agents

- Maintain **Internal** state that depends on the percept history
- Transition model: Knowledge about “how the world works”
  - Effect of Agent’s actions
  - How the world evolves independently of Agent
- Sensor model: Knowledge about “how the state of the world is reflected in the agent’s percepts”

Model-based reflex agents



Model-based reflex agents

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function MODEL-BASED-REFLEX-AGENT(percept) returns an action
  persistent: state, the agent's current conception of the world state
              transition_model, a description of how the next state depends on
                    the current state and action
              sensor_model, a description of how the current world state is reflected
                    in the agent's percepts
              rules, a set of condition–action rules
              action, the most recent action, initially none

  state ← UPDATE-STATE(state, action, percept, transition_model, sensor_model)
  rule ← RULE-MATCH(state, rules)
  action ← rule.ACTION
  return action
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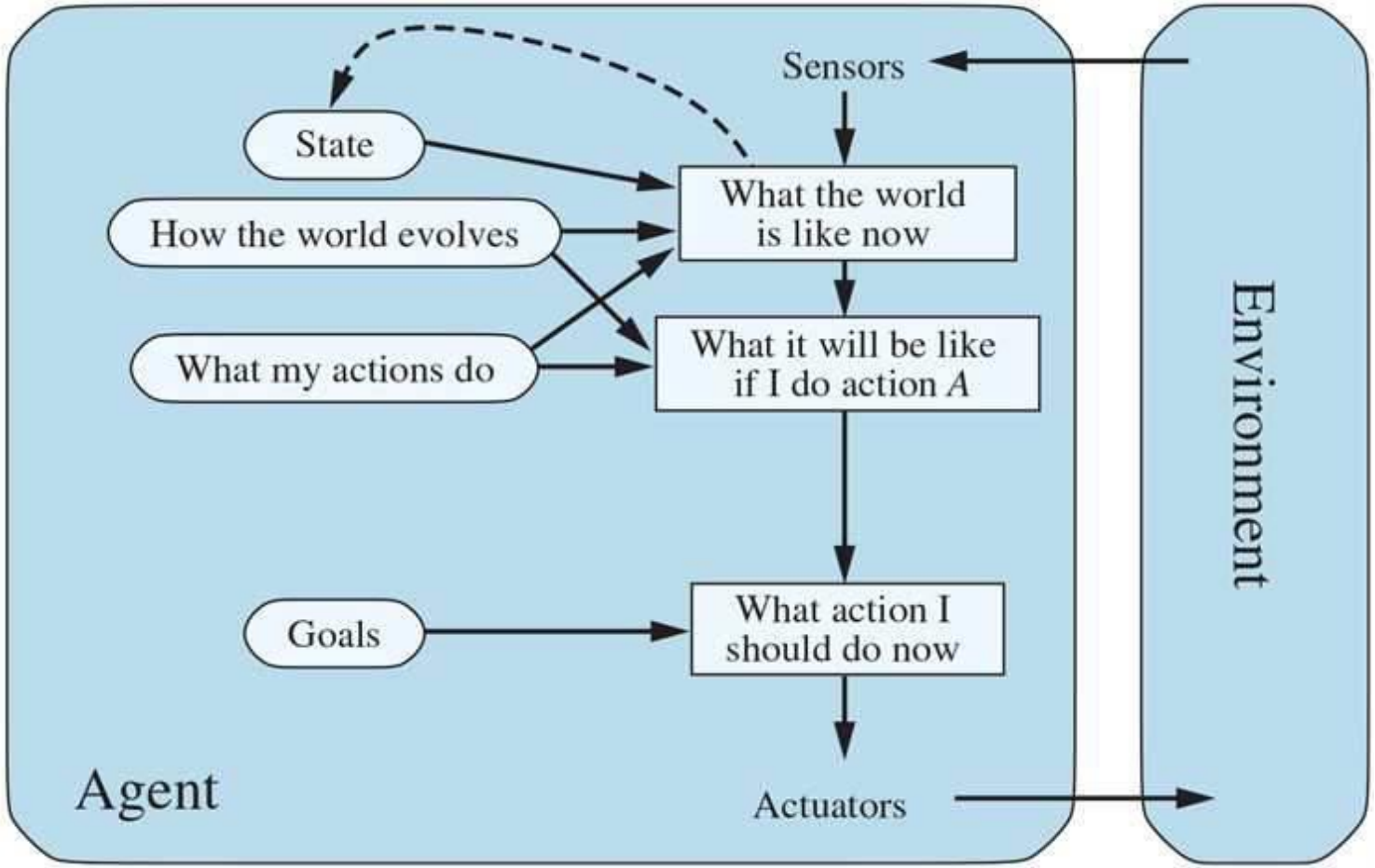
Goal-based agents

- What will happen if I do such-and-such?
- Will that make me happy?
- Reflex agent vs Goal-based agent
- Search and Planning



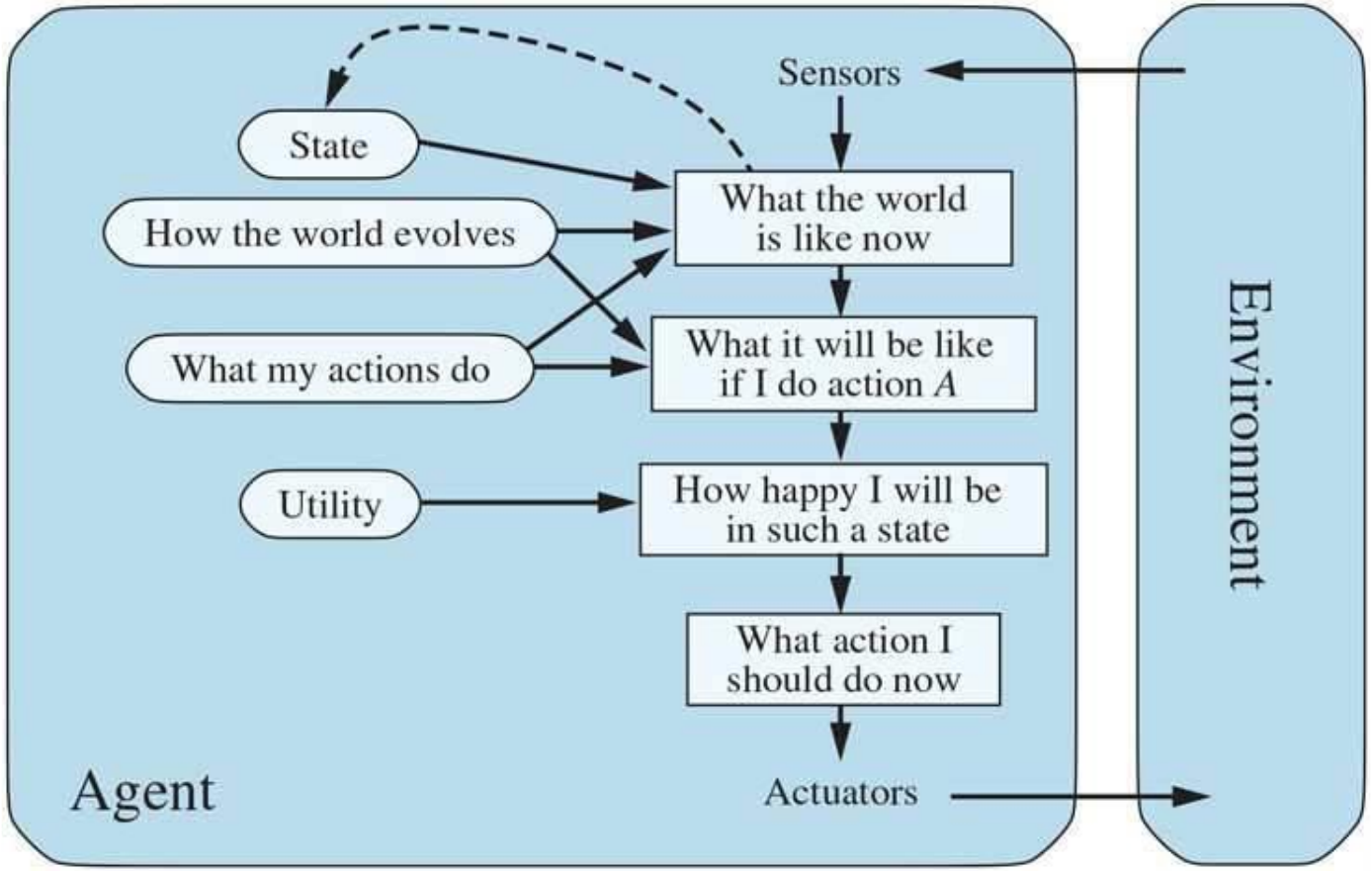
Utility-based agents

- How happy I am? (Utility)
- Utility function: Internalization of the performance measure

- Goal-based agents vs Utility-based agents
  - Conflicting Goals, only some of which can be achieved
  - Several Goals, none of which can be achieved with certainty

- Rational utility-based agent chooses the action that maximizes the expected utility

Utility-based agents



Learning agents

- Learning element: Responsible for making improvements
- Performance element: Responsible for selecting external actions
- Problem generator: Responsible for suggesting actions that will lead to new and informative experiences

How am I going to get it to learn this? ✗

What kind of performance element will my agent use to do this once it has learned how? ✓