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# **Web-Mining Agents**

## **Cooperating Agents for Information Retrieval**

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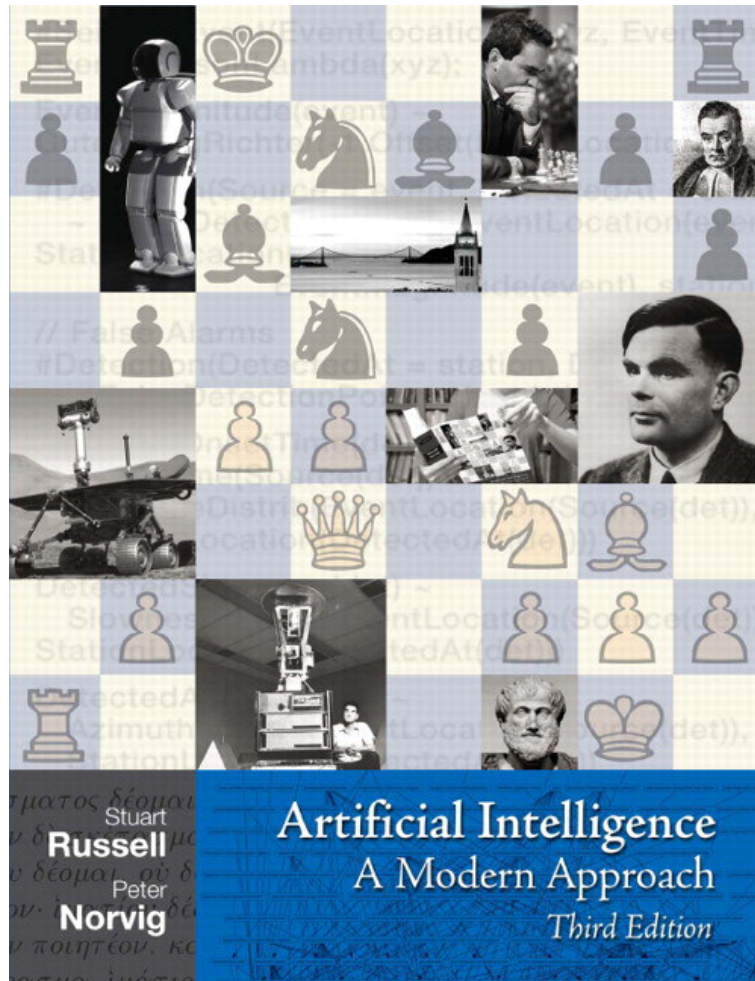


# Organizational Issues

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- **Start:** **Wed**, 19.10., **2-4pm**, IFIS 2032
- **Lab:** Fr. 2-4pm, Building 64, IFIS 2035 (3rd floor) (registration via Moodle right after this class)
- **Assignments** provided via Moodle after class on Thu 6pm.
- **Submission of solutions** by **Wed 2pm**, small kitchen IFIS (one week after provision of assignments)
- **Work on assignments** can/should be done in **groups of 2** (pls. indicate name&group on submitted solution sheets)
- In **lab classes on Friday**, we discuss assignments from current week and understand solutions for assignments from previous week(s)

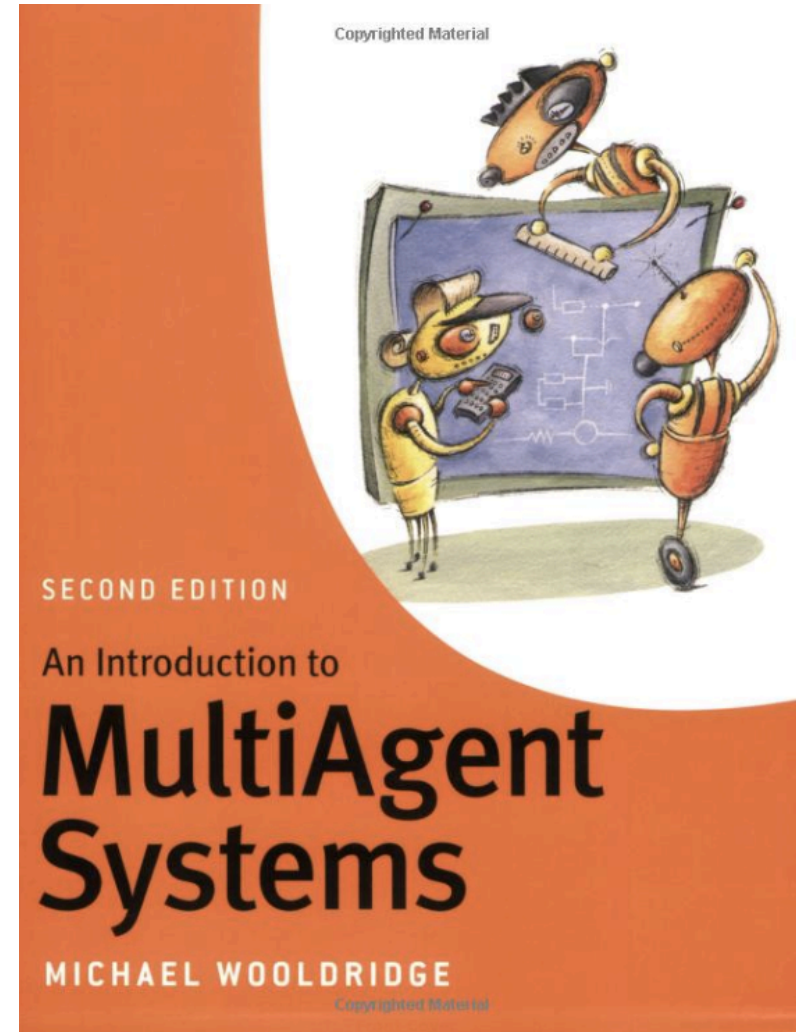
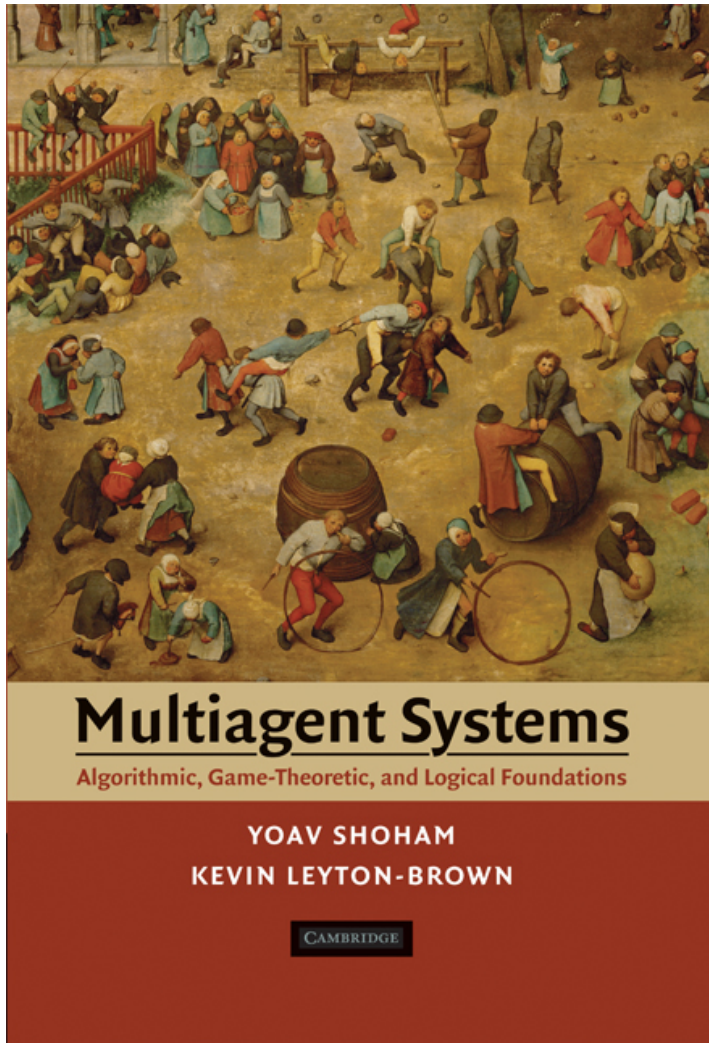
# Literature



Chapters 2, 6, 13, 15- 17

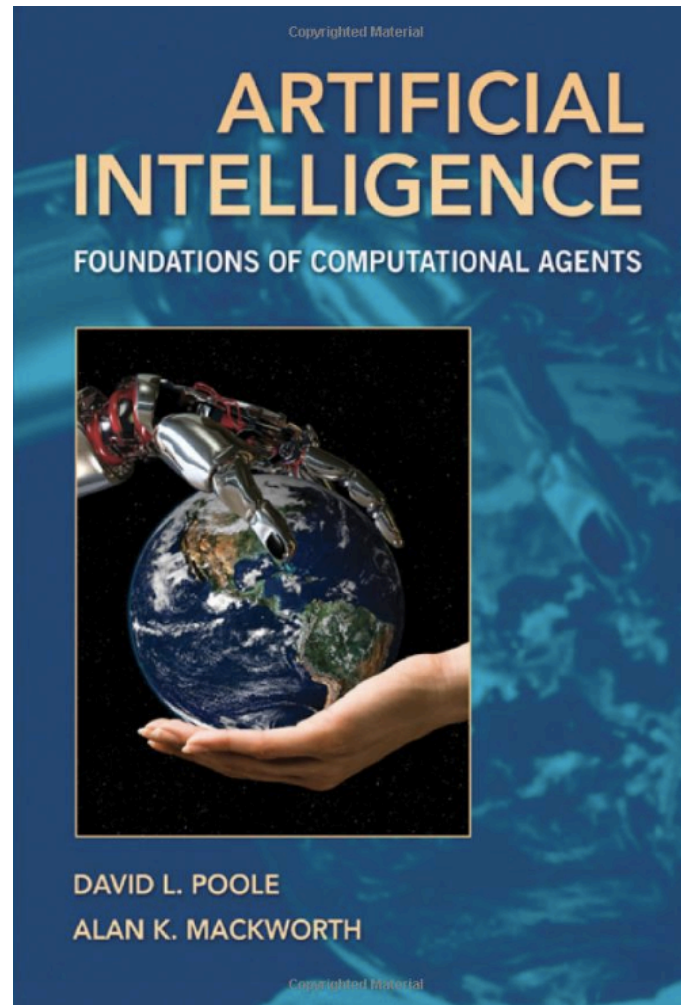
<http://aima.cs.berkeley.edu>

# Literature



# Literature

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# What is an Agent?

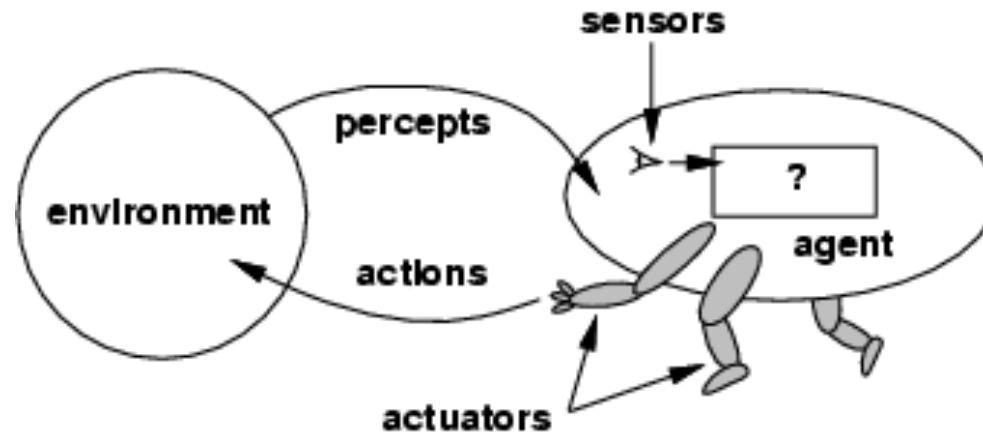
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- An **agent** is anything that can be viewed as **perceiving** its **environment** through **sensors** and **acting** upon that environment through **actuators**
- **Human agent:**  
eyes, ears, and other organs for sensors; hands, legs, mouth, and other body parts for actuators
- **Robotic agent:**  
cameras and infrared range finders for sensors; various motors for actuators
- **Software agent:**  
interfaces, data integration, interpretation, ...



# Agents and environments

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- The **agent function** maps from percept histories to actions:  
 $[f: P^* \rightarrow A]$
- The **agent program** runs on the physical **architecture** to produce  $f$
- Agent = architecture + program

# Balancing Reactive and Goal-Oriented Behavior

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- We want our agents to be **reactive**, responding to changing conditions in an appropriate (timely) fashion
- We want our agents to systematically work towards **long-term goals**
- These two considerations can be **at odds** with one another
  - Designing an agent that can balance the two remains an open research problem
  - E.g.: Achieve **maximum freedom of action** if there is no specific short-term goal (e.g., **keep batteries charged**)



# Social Ability

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- The real world is a **multi-agent** environment: we cannot go around attempting to achieve goals without taking others into account
- Some goals can only be achieved with the **cooperation** of others
- **Social ability** in agents is the ability to interact with other agents (and possibly humans) via some kind of **agent-communication language** ...
- ... with the goal to let other agents to make **commitments** (of others) or **reinforcements** (about its own behavior)
- Need to represent and reason about **beliefs about other agents**

# Rational Agents

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- **Rational Agent:** For each possible percept sequence, a rational agent
  - should select an action
  - that is expected to maximize its local performance measure,
  - given the evidence provided by the percept sequence and
  - whatever built-in knowledge the agent has.
- **Rational = Intelligent ?**

# Autonomous Agents

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- **Rationality** is **distinct from omniscience** (all-knowing with infinite knowledge)
- **Computing the best action** usually **intractable**
- **Rationality is bounded**
- Agents can perform actions in order to modify future percepts so as to **obtain useful information** (information gathering, exploration)
- An agent is **autonomous** if its behavior is determined by its own "experience" (with ability to learn and adapt)
  - What matters for the "experience" is the
    - **percept sequence** (which the agents can determine), the
    - **state representation**, and the
    - **"computational success"** of computing the best action as well as learning and adapting for the future