Good Afternoon, Colleagues
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Are there any questions?
Logistics

- Questions about the syllabus?
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• Class registration and waitlist
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- Problems with the assignment?
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• Last week’s slides are up
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  - Brooks’ reactive robots
  - A more deliberative architecture
  - RoboCup challenge paper
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Words without (accepted) definitions

- Intelligence
- Agent
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All proposed definitions include too much or leave gaps.
Words without (accepted) definitions

- Intelligence
- Agent

All proposed definitions include too much or leave gaps.

But there are examples...
Thermostats

- Are they agents or not?

- How does Wooldridge resolve this?
Intelligent (autonomous) Agents

• Autonomous robot
Intelligent (autonomous) Agents

- Autonomous robot
- Information gathering agent
  - Find me the cheapest?
Intelligent (autonomous) Agents

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- E-commerce agents
  - Decides what to buy/sell and does it
Intelligent (autonomous) Agents

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Intelligent (autonomous) Agents

- Autonomous robot
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  - Find me the cheapest?
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- Air-traffic controller
- Meeting scheduler
- Computer-game-playing agent
Not Intelligent Agents

- Thermostat
- Telephone
- Answering machine
- Pencil
- Java object
Your Agent Examples
Your Agent Examples

- **Automotive**: Stop light, Autonomous Car

- **Physical Control**: Roomba, Automatic sliding door

- **Software**: antivirus software, Google Now, Laptop battery management, Macbook light intensity controller, Parasolid

- **Game/entertainment**: StarCraft SCV, Counterstrike

- **Service**: Stock trading agent
An Example
An Example

- You, as a class, act as a learning agent
An Example

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- **Actions**: Wave, Stand, Clap
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• **Goal**: Find an optimal *policy*
An Example

- You, as a class, act as a learning agent
- **Actions**: Wave, Stand, Clap
- **Observations**: colors, reward
- **Goal**: Find an optimal *policy*
  - Way of selecting actions that gets you the most reward
How did you do it?
How did you do it?

- What is your policy?
- What does the world look like?
Formalizing My Example

Knowns:
Formalizing My Example

Knowns:

- $\mathcal{O} = \{\text{Blue, Red, Green, Black, \ldots}\}$
- Rewards in $\mathbb{R}$
- $A = \{\text{Wave, Clap, Stand}\}$

\begin{align*}
o_0, a_0, r_0, o_1, a_1, r_1, o_2, \ldots
\end{align*}
Formalizing My Example

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\[
\begin{array}{c}
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Unknowns:
Formalizing My Example

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Unknowns:
- $S = 4 \times 3$ grid
- $\mathcal{R} : S \times A \mapsto \mathbb{R}$
- $P = S \mapsto \mathcal{O}$
- $T : S \times A \mapsto S$
Formalizing My Example

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o_i = \mathcal{P}(s_i) \quad r_i = \mathcal{R}(s_i, a_i)\]
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$$o_i = P(s_i) \quad r_i = R(s_i, a_i) \quad s_{i+1} = T(s_i, a_i)$$