An Example of Perception System

Indistinguishable environments

- Imagine two environmental states $e_1, e_2 \in Env$, such that
  - $e_1 \neq e_2$ and
  - $see(e_1) = see(e_2)$
- Such environments are different, but as far as agents are concerned they are indistinguishable!
  - The environments are mapped to the same percept
  - The agent would receive the same perceptual information from different environment states
  - Agents cannot tell them apart…

Indistinguishable environments

- Environment states consisting of
  - Boolean variable **temp** set to true if the temperature of the room is above 35° Celsius (otherwise **temp** is false)
  - Boolean variable **smoke** set to true if smoke has been detected in the environment (otherwise **smoke** is false)
- The full set of environment states is

$$\{\underbrace{\langle \textbf{temp}, \textbf{smoke} \rangle}_{e_1}, \underbrace{\langle \textbf{temp}, \textbf{smoke} \rangle}_{e_2}, \underbrace{\langle \textbf{temp}, \textbf{smoke} \rangle}_{e_3}, \underbrace{\langle \textbf{temp}, \textbf{smoke} \rangle}_{e_4}\}$$

- The *see* function of a thermostat agent is:

$$see(e) = \begin{cases} p_1 \text{ if } e = e_1 \text{ or } e = e_2 \\ p_2 \text{ if } e = e_3 \text{ or } e = e_4 \end{cases}$$