Review

- Theme: representation and reasoning.
- Specification of "*what*", not "*how*".
- Searching used to solve problems.

Specification of *what*, not *how*

- We give a semantics to our representations in terms of symbols denoting individuals and relations.
- Symbols refer to the problem domain not the machine.
- Convert a semantic problem into a search problem.
- Reason about a program in terms of its meaning: knowledge level.
- Can use the same representation in many different ways.

Searching

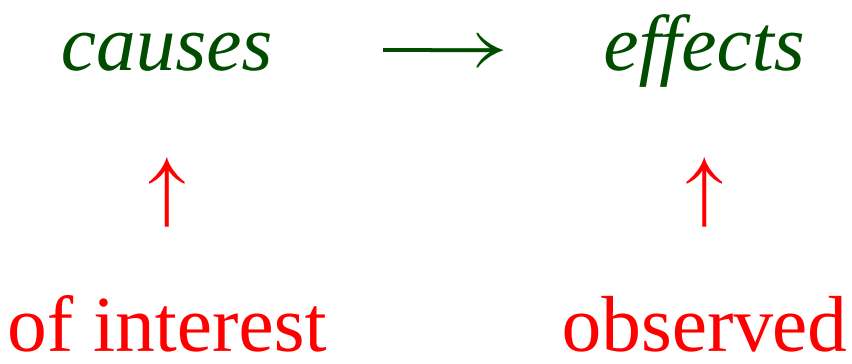
- Convert a problem into a search problem and use general searching techniques.
- Systematic search & nonsystematic search.
- Finding paths in graphs & constraint satisfaction.
- Need extra heuristic knowledge to solve problems efficiently.
- Space-time, speed-accuracy tradeoffs.

Lessons from planning

- There are many different possible representations, each of which make different assumptions. E.g., STRIPS representation and the situation calculus.
- There can be many different search spaces for the same problem.

Causal & Evidential Modeling

Causal modeling:



vision: *scene* $\longrightarrow$ *image*

diagnosis: *disease* $\longrightarrow$ *symptoms*

device status $\longrightarrow$ *output*

Evidential modeling:

$$\textit{effects} \longrightarrow \textit{causes}$$

vision: $\textit{image} \longrightarrow \textit{scene}$

diagnosis: $\textit{symptoms} \longrightarrow \textit{diseases}$

$\textit{output} \longrightarrow \textit{device status}$

Causal & Evidential Reasoning