09-0: **Overview**

- So far, we've talked about search, which is a means of considering alternative possibilities.
  - The way in which problem states were represented was typically pretty straightforward.
- The other aspect of many AI problems involves representing possible states.
- Our choice of representation influences:
  - The problems our agent is able to solve.
  - The sorts of environments an agent can deal with.
  - The complexity of search
  - The sophistication of our agent.

09-1: **Knowledge Representation**

- Choices we'll look at include:
  - Logic-based approaches
    - Propositional logic
    - First-order logic
    - Ontologies
  - Logic is a flexible, well-understood, powerful, versatile way to represent knowledge.
  - Often fits with the way human experts describe their world
  - Facts are either true or false
  - Has a hard time dealing with uncertainty.

09-2: **Declarative vs. Procedural**

- Agents maintain a knowledge base that allows them to reason about a problem.
- Knowledge is represented as facts and relations
- Inference is typically performed automatically.
- This is sometimes called programming at the knowledge level.
- Specify facts known by an agent, along with goals.
- Programming focus is on encoding knowledge

09-3: **Wumpus World**

- R & N use the Wumpus World as an example domain.
- Environment: 4x4 grid of rooms.
  - Gold in one room, wumpus in another
  - Pits in some rooms
- Actions: Move forward, turn left, turn right, shoot arrow,grab gold.
- Sensors: Perceive stench, perceive breeze, perceive gold, sense wall, hear wumpus death.