Agents
What’s an agent?

- Russell and Norvig:
  
  “An agent is anything that can be viewed as perceiving its environment through sensors and acting on that environment through actuators.” (p. 32)

- Examples:
  - Automatic driver
  - Internet shopper
  - Backgammon player
  - Chemical plant controller
  - Spam detector
The agent and the environment

An agent:

- Works in a particular environment
- Has goals
- Perceives the environment
- Performs actions to achieve its goals.
Example: the automated driver

- Performance measures?
- Environment:
  - Roads, other traffic, pedestrians, weather
- Actuators:
  - Steering, accelerator, brake, turn signal, horn
- Sensors:
  - Cameras, LIDAR, RADAR, GPS, engine and motion sensors, microphone
Example: the automated driver

- Possible performance measures:
  - Safe, fast, legal, comfortable trip.
- Environment:
  - Roads, other traffic, pedestrians, weather
- Actuators:
  - Steering, accelerator, brake, turn signal, horn
- Sensors:
  - Cameras, LIDAR, RADAR, GPS, engine and motion sensors, microphone
Agent structure

- **Agent**: architecture + program
- **The agent program**: maps percepts to actions
- The agent program receives as input the current percept and returns an action for the agent’s actuators.
**Goal-based agents**

- Our automated-driver agent needs to get somewhere: it has a *goal*. Chooses actions to achieve goal.

- **Search** and **planning** are subfields of AI devoted to finding a sequence of actions that achieve the agent’s goals.
Utility-based agents

- Utility function maps a (sequence of) state(s) onto a real number.
- Certain goals can be reached in different ways.
  - Some are better, have a higher utility.
- Improves on goals:
  - Selecting between conflicting goals
  - Select appropriately between several goals that have varying probability of success.