



# CSC481 - Welcome!

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# What is AI?

It is the science and engineering of making intelligent machines.



# What is Intelligence?

Intelligence is the *computational* part of the ability to achieve goals in some world.

There are many other definitions of intelligence, here we adopt the computational viewpoint.



# Side Note – Turing Test

- Alan Turing defined artificial intelligence through the Turing Test
  - If a human communicates with an entity over an opaque channel (that is, the human cannot see the entity) and the human cannot distinguish the entity from another human, then the entity is considered intelligent.
- This is a restrictive definition of AI, since it does not admit other goal-oriented behavior such as insect behavior as intelligence.



# Observations

- Various degrees of intelligence occur in people, many animals, and some machines.
- AI does not have to confine itself to biologically observable methods – we can invent new, artificial techniques to make machines intelligent.

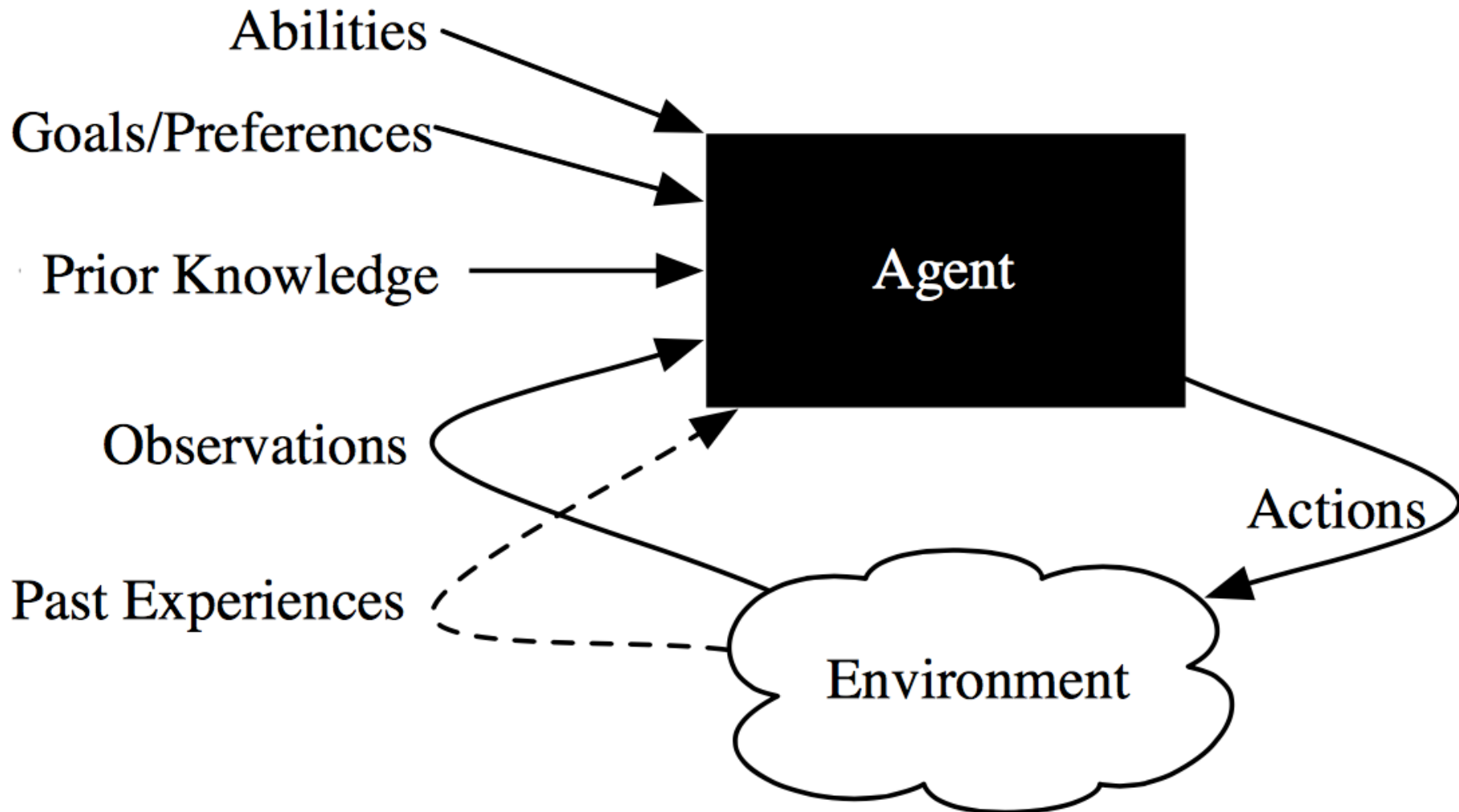


# Programs vs. Agents

- We all have encountered intelligent programs:
  - Programs that find patterns in data (data mining).
  - Programs that learn how to understand spoken words (e.g., cell phones).
  - Recommendation engines (e.g., Amazon).
  - *etc.*
- However, we expect more from agents, we expect that they
  - Operate under autonomous control.
  - Perceive their environment (whatever that might be, consider the webbot, its environment are a bunch of connected computers).
  - Communicate.
  - Persist over prolonged periods of time.
  - Adapt to change.



# Agents





# Inputs to an Agent

- **Abilities** — the set of things it can do
- **Goals/Preferences** — what it wants, its desires, its values,...
- **Prior Knowledge** — what it comes into being knowing, what it doesn't get from experience,...
- **History** of observations (percepts, stimuli) of the environment
  - ▶ (current) **observations** — what it observes now
  - ▶ **past experiences** — what it has observed in the past





# Example Agent: A Robot

- **abilities:** movement, grippers, speech, facial expressions, . . .
- **goals:** deliver food, rescue people, score goals, explore, . . .
- **prior knowledge:** what is important feature, categories of objects, what a sensor tell us, . . .
- **observations:** vision, sonar, sound, speech recognition, gesture recognition, . . .
- **past experiences:** effect of steering, slipperiness, how people move, . . .



# AI Techniques

- Automata – finite state machines
- Searching – A\* path finding algorithm
- Reasoning – propositional logic
- Learning – decision tree induction, neural networks



# Assignments

- Reading
  - Chapter 1
- Install the AI Appliance
  - You will need the VirtualBox application from Oracle
    - [virtualbox.org](http://virtualbox.org)
  - Go to the course resources page for more info