

# CS324-Artificial Intelligence

## Lecture 2: Intelligent Agents

Waheed Noor

Computer Science and Information Technology,  
University of Balochistan,  
Quetta, Pakistan

# Outline

1 Intelligent Agent

2 Agents and Environments

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# Intelligent Agent Characteristics

- Perceive
- Reason
- Choose
- Act
- Achieve goals
- Learn
- Reflect
- Communicate
- Organize

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2 Agents and Environments

# Agents and Environments

An agent can

- perceive its environment through its sensors
- represent aspects of its environment and reason with the representation to predict consequences of its actions
- act on its environment through its effectors
- make rational choices
- learn from experience
- communicate with other agents: signals, signs, language
- interact with other agents: cooperation, competition
- display autonomous, purposeful behavior

# Identify Intelligent Agents

Which of the following is an agent?

- A spell checker
- A payroll program
- An email program
- A web portal
- A thermostat
- A physician's diagnostic assistant
- An electronic stock trader
- An autonomous vehicle
- A personal information assistant

# A Simple Agent

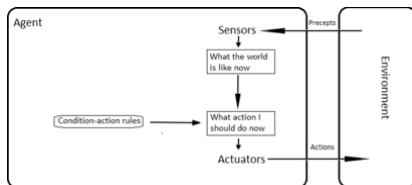


Figure : A Simple Reflex Agent

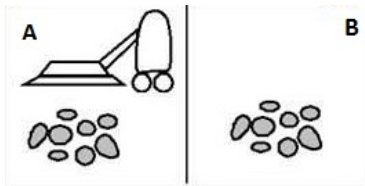
- Whatever an agent perceives from its environment will be added to it's percept sequence.
- Agent behavior is described by agent function that maps percept sequence to actions

$$f : P \mapsto A$$

- Agent function is internally implemented by a program.



# Vacuum-world Agent

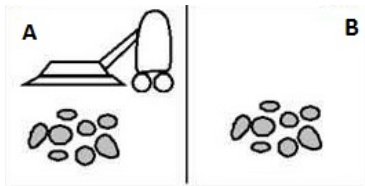


- **Percept:** Location and Status, e.g. [A, Dirty]
- **Action:** Left, Right, Suck, No-Operation

## Agent Program

```
function REFLEX-VACUUM-AGENT ([location, status]) return an action
if status == Dirty then return Suck
else if location == A then return Right
else if location == B then return Left
```

# Vacuum-world Agent



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# Quiz 1

Q:1

How Turing test examine the intelligence of a system. Why it is good and why it is bad.

Q:2

Define two characteristics of intelligent behavior.

Q:3

Describe rationality.

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# References I



Stuart Russell and Peter Norvig.

*Artificial Intelligence: A Modern Approach.*

Pearson Education, Inc, USA, second edition, 2003.



George F. Luger.

*Artificial Intelligence: Structures and Strategies for Complex Problem Solving.*

Addison-Wesley Publishing Company, USA, 6th edition, 2008.