

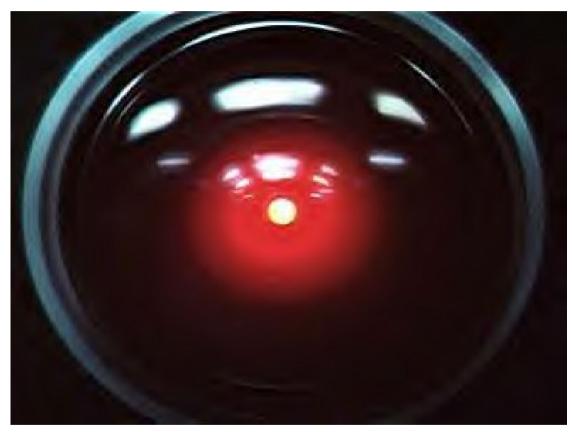
CP365 Artificial Intelligence

Introductions

Syllabus and Calendar

http://personalwebs.coloradocollege.edu/~mwhitehead/courses/2015/CP365/syllabus.html

Movie Al



2001: A Space Odyssey

I'm afraid I can't do that, Dave.

What is AI?

How do we define intelligence?

Human-like vs. rational

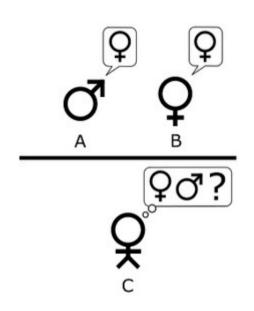
Intelligence without environment?

Can a computer ever do something it wasn't explicitly programmed to do?



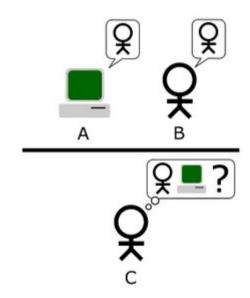
Imitation Game

- 3 Players
 - 1 woman (A), 1 man (B), 1 either sex (C)
- A and B leave the room
- C writes down questions
 - Notes are secretly passed to A and B
 - They write down their answers
- C attempts to guess which is the man based on their answers
 - A tries to trick C
 - B tries to help C



The Turing Test

 Player tries to determine which responder is human and which is a computer



Chat Bots

jabberwacky.com cleverbot.com

Beyond the Turing Test



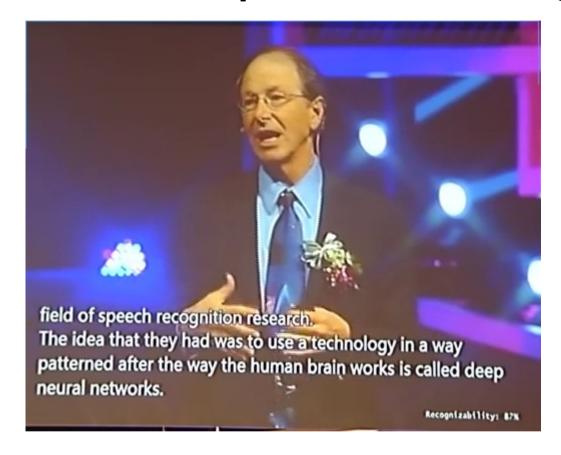
scientificamerican.com

Areas of AI – Natural Language Processing



http://www.youtube.com/watch?v=7kOEmupSHB8&feature=relmfu

Areas of AI – Speech Recognition



Microsoft Speech Recognition https://www.youtube.com/watch?v=Nu-nlQqFCKg

Areas of AI – Computer Vision

Describes without errors





A group of young people playing a game of frisbee.



A herd of elephants walking across a dry grass field.

Describes with minor errors



Two dogs play in the grass.



Two hockey players are fighting over the puck.



A close up of a cat laying on a couch.

Somewhat related to the image



A skateboarder does a trick on a ramp.



A little girl in a pink hat is blowing bubbles.



A red motorcycle parked on the side of the road.

Unrelated to the image



A dog is jumping to catch a frisbee.



A refrigerator filled with lots of food and drinks.



A yellow school bus parked in a parking lot.

Areas of AI — Robotics



https://www.youtube.com/watch?v=M8YjvHYbZ9w

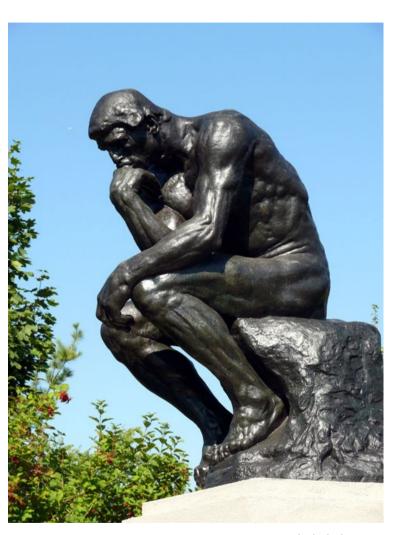
Areas of AI – Knowledge Representation



http://sw.opencyc.org/concept/Mx4rvVjBlJwpEbGdrcN5Y29ycA

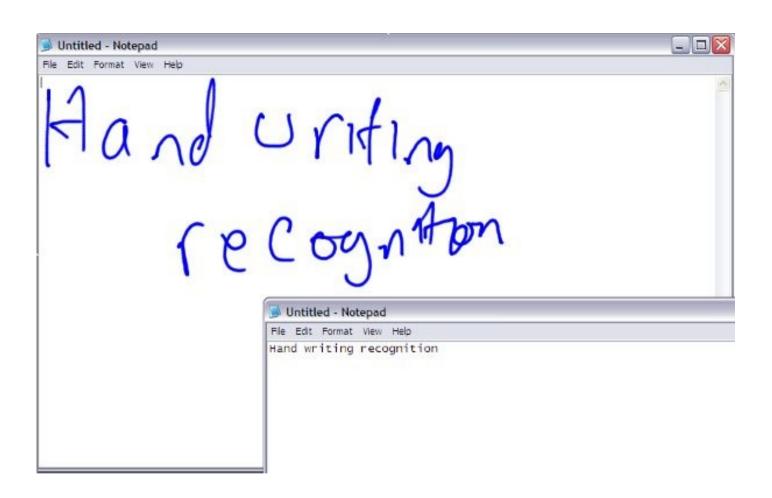
Areas of AI – Logical Reasoning

All men are mortal Socrates is a man. Therefore, Socrates is mortal.



smarthelathshop.com

Areas of AI – Machine Learning



What AI tasks have been accomplished?

- What AI tasks have been accomplished?
- What AI tasks will be accomplished pretty soon (under 25 years)?

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- What AI tasks will be accomplished pretty soon (under 25 years)?
- What AI tasks will be accomplished, but not for a long time (over 25 years)?
- What tasks are beyond the capabilities of AI anytime in the future?

Shifting Goals of Al

"A computer will never be able to do X."

Computer does X.

"Oh, doing X doesn't require real intelligence."



Shifting Goals of Al

"A computer will never b to do X."

"There are no solvable Al problems!"

Computer does X.

"Oh, doing X doesn't require real intelligence."



Early AI: Symbolic Logic and Knowledge Representation

MYCIN – Automatically Identifying Blood Infections

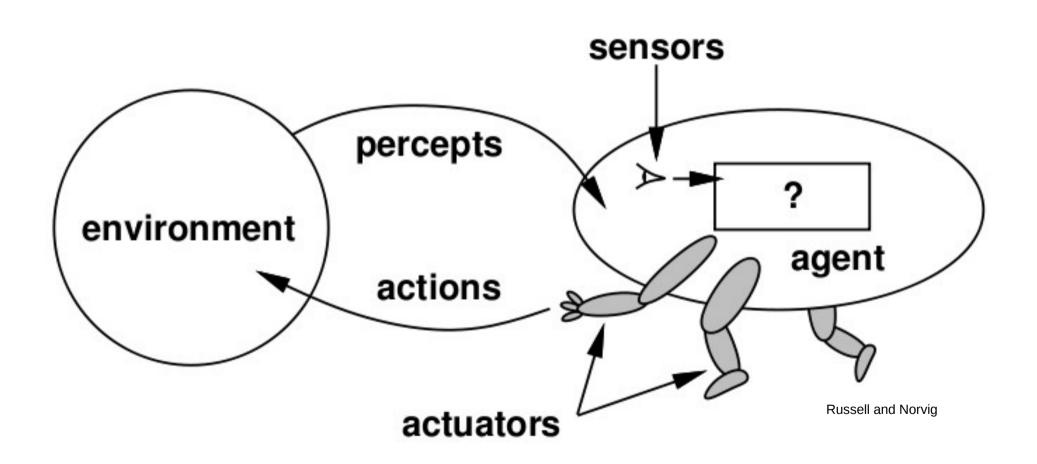
IF the stain of the organism is gram-positive **AND** the morphology of the organism is coccus **AND** the growth conformation of the organism is clumps **THEN** (0.7) the identity of the organism is *staphyloccus*

Modern AI: Data Driven

Computer science rocks! It is my favorite subject!

Computer science akta pahtapahti jinish! Eta amar shobtheke priyo bishoy!

Intelligent Agents

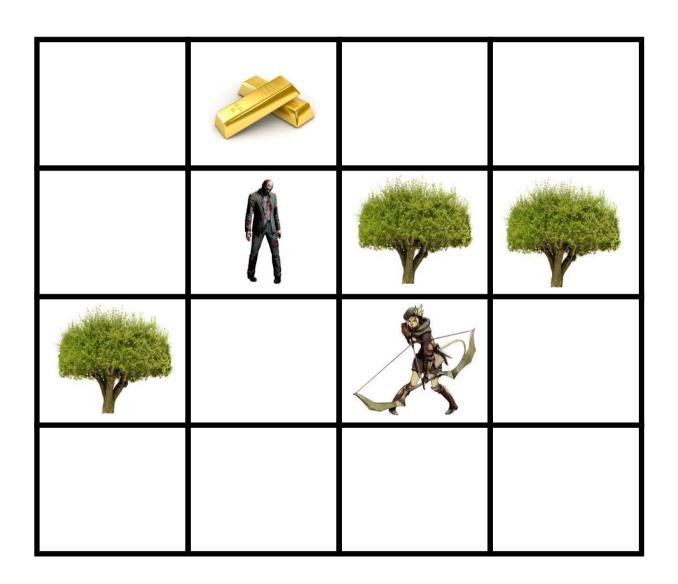


Agent Function

Agent needs to map environmental perceptions onto actions.

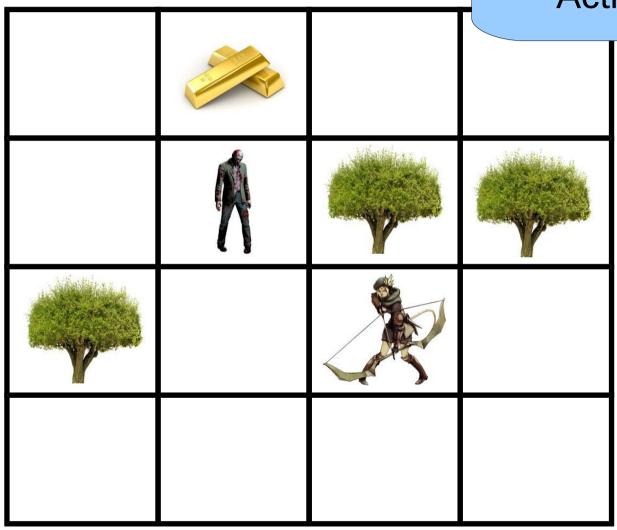
$$f: P^* \to A$$

RPG World



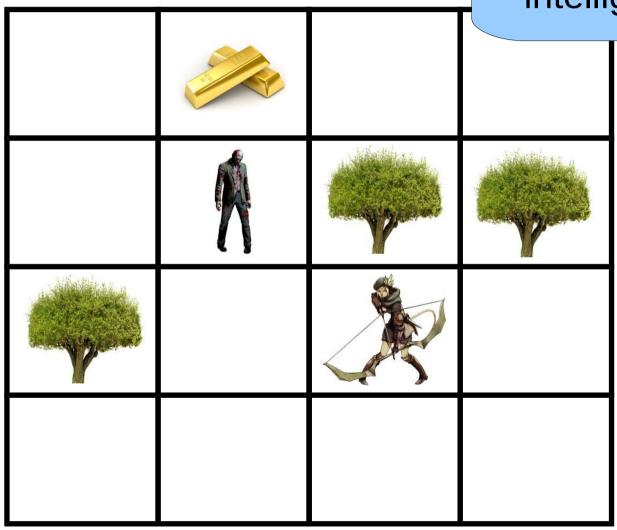
RPG World

Percepts? Actions?



RPG World

Rationality or intelligence?



Robotic Arm World

Rationality measure? Environment? Actuators? Sensors?



Automatic Shopping Bot World

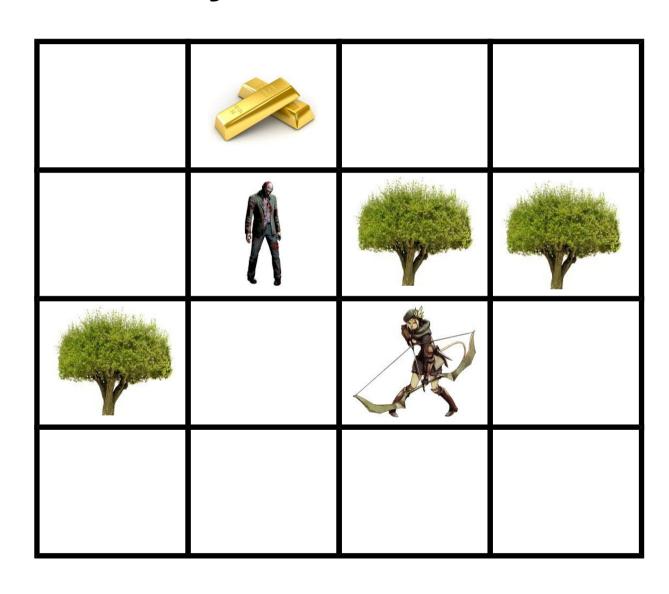


Performance/rationality measure? Environment?

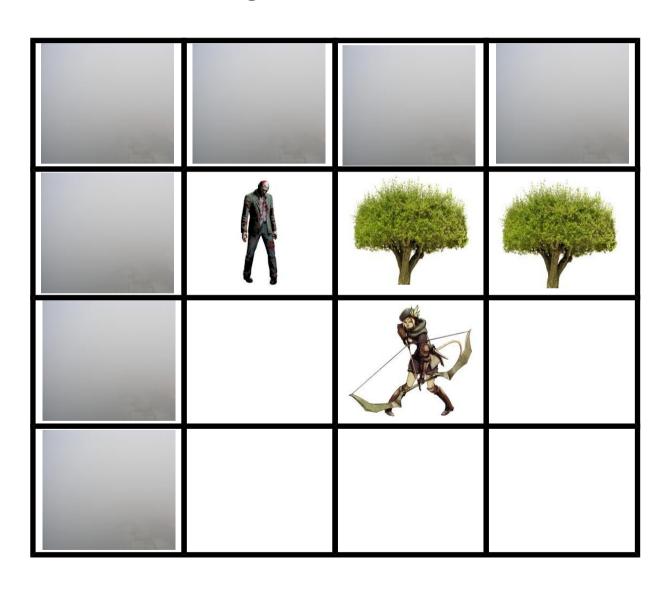
Actuators?

Sensors?

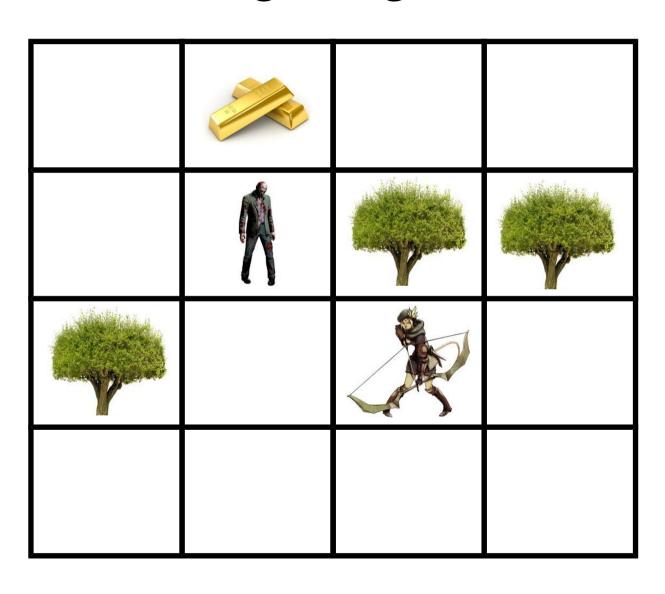
Properties of Environments: Fully Observable



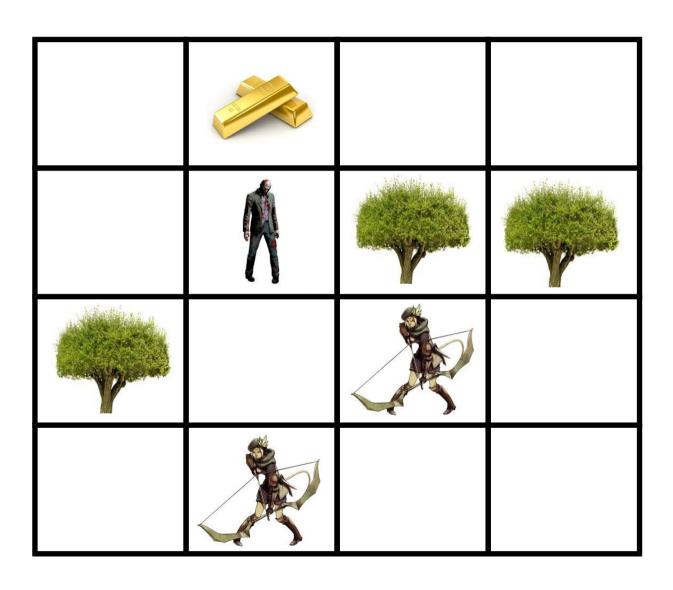
Properties of Environments: Partially Observable



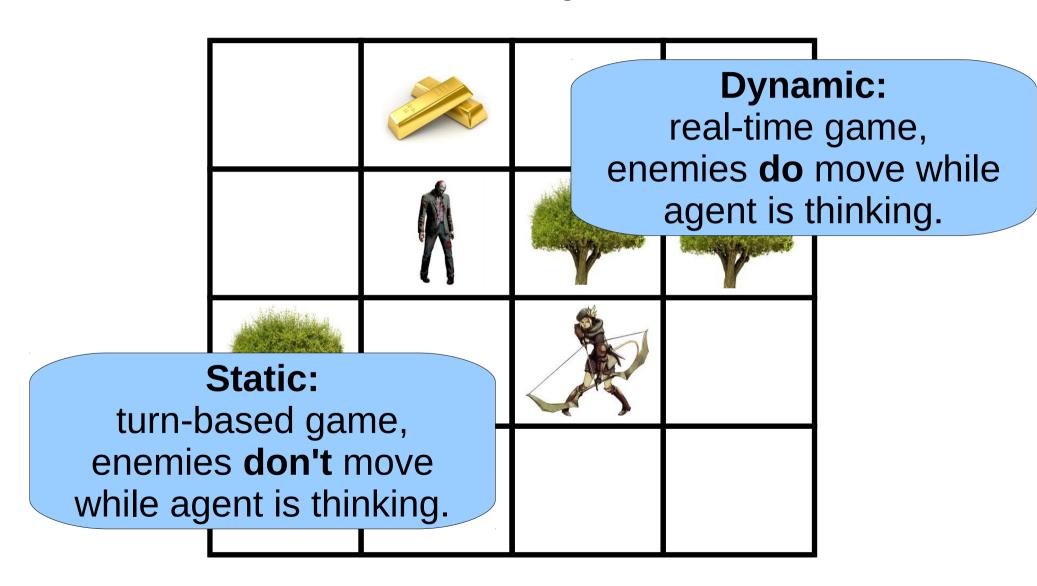
Properties of Environments: Single Agent



Properties of Environments: Multiagent

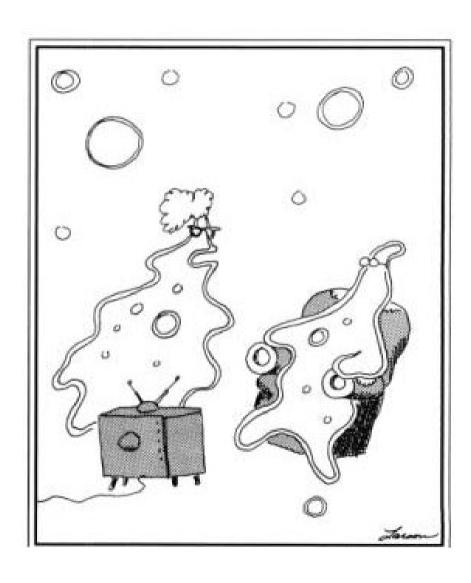


Properties of Environments: Static vs. Dynamic

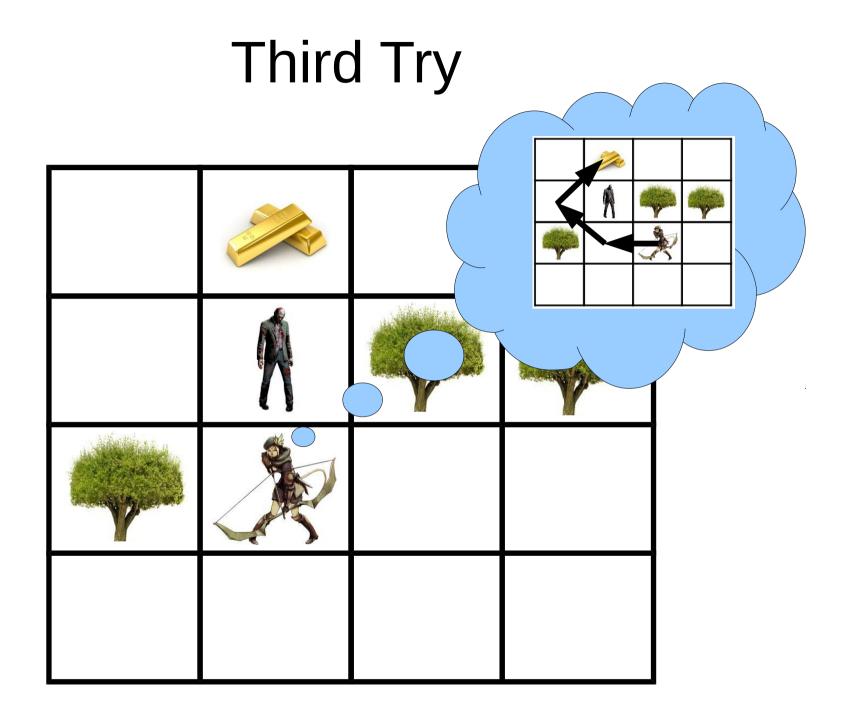


How do we build an intelligent agent?

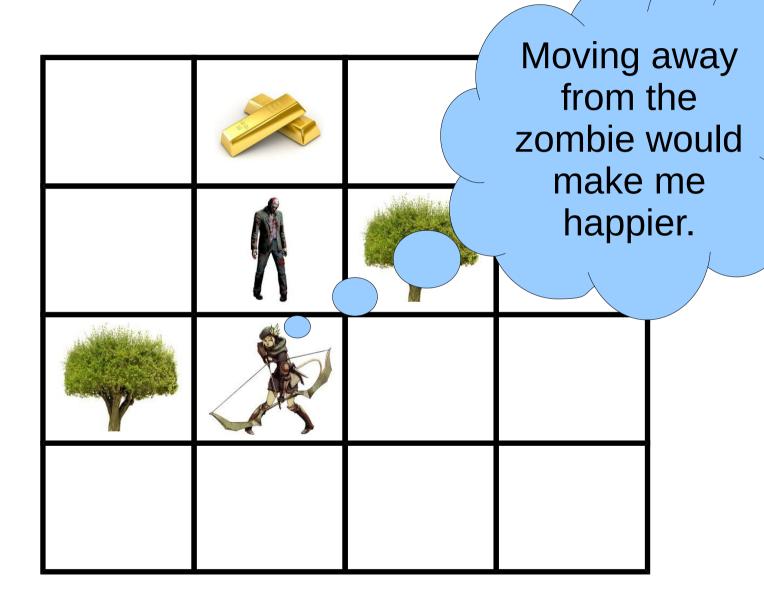
First Try



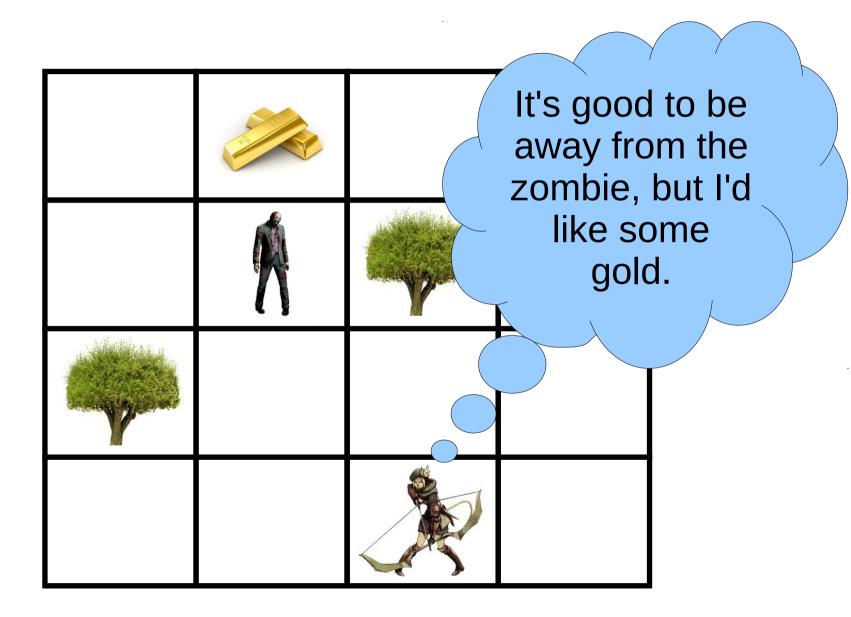
Stimulus, response! Stimulus, response! Don't you ever *think*? Second Try



Fourth Try



Fourth Try



Fifth Try

