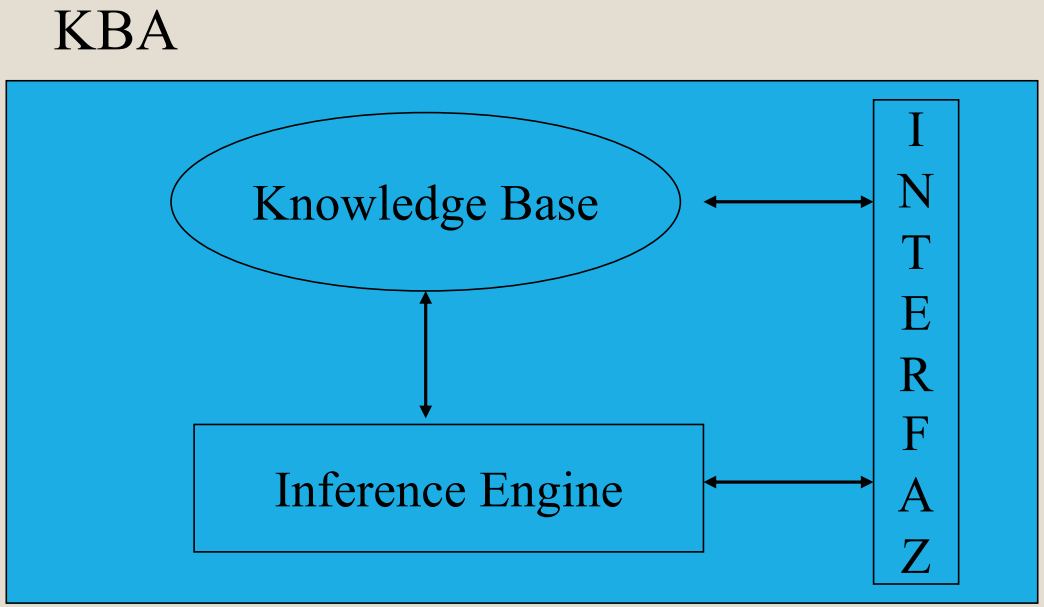
KNOWLEDGE BASED AGENTS (KBA)

Knowdelge usage

- Knowdlege is specially useful in partial observable environments.
- Goal: to infer “hidden” states:
  - What are the possible effects of actions?
  - Applications: Medical Diagnosis, Path planning for robots, etc …
- Flexibility, adaptation, …

KBA Archicteture



General Algorithm

function KBA(p:perception) **returns** action

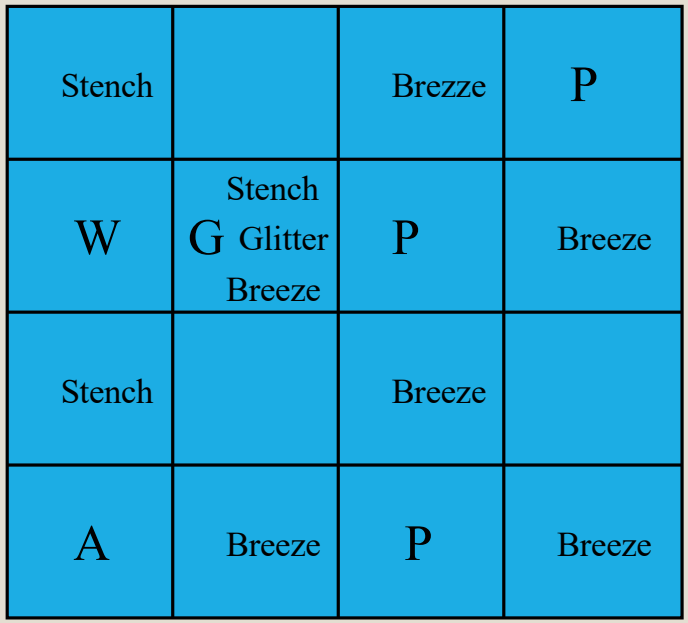
static: KB: Knowledge base
t: counter (time, initially = 0)

TELL(KB,MAKE-PERCEPT-SENTENCE(p,t))
action ← ASK(KB,MAKE-ACTION-QUERY(t))
TELL(KB,MAKE-ACTION-SENTENCE(accíón,t))
t ← t+1
return action

Is Knowledge useful?

¿¿¿

The Wumpus World



PEAS Specification

- Performance:
  - 1000 for picking up the gold
  - -1000 for falling into a pit or being esten by the stinky Wumpus
  - -1 for each action taken
  - -10 for using up the arrow

PEAS Specification

- Environment:
  - A 4 x 4 grid of squares
  - Specification of squares: [x,y]
  - The agent always startrs in [1,1]
  - The locations of the gold and the wumpus are chosen randomly (with a uniform distribution)
  - Each square other than the start can be a pit, with probability 0.2

PEAS Specification

- Actuators:
  - Move forward (without effect if there is a wall in fron of the agent).
  - Turn 90° (left or right)
  - The agent dies a miserable death if it enters a square containing a pit or a live wumpus! (it is safe, albeit smelly, to enter a square with a dead wumpus).
  - Action Grab can be used to pick up the gold.
  - Action Shoot can be used to fire an arrow.

PEAS Specification

- Sensors to perceive:
  - Stench
  - Breeze
  - Glitter
  - Bump (against the wall)
  - Scream (death of the wumpus)
- Percept = <St,Br,G,Bu,Sc>

Environment properties

- Observable?
- Deterministic?
- Episodic?
- Estatic?
- Discret?
- Single agent?

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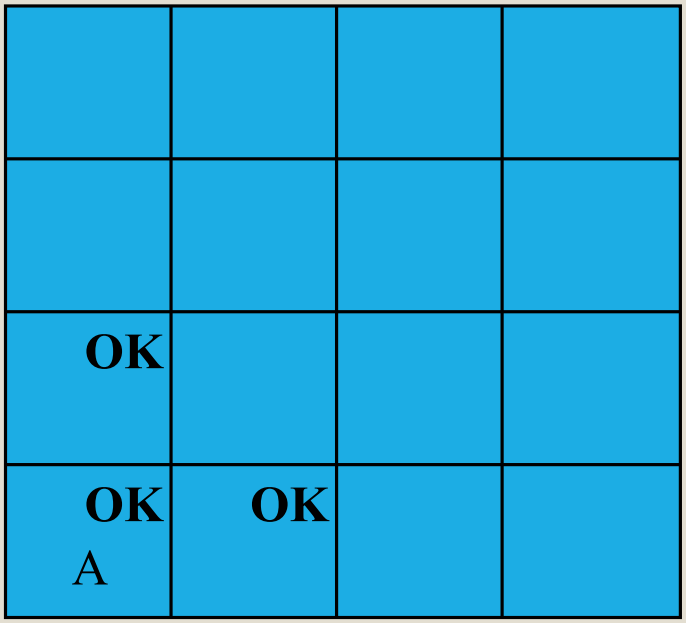
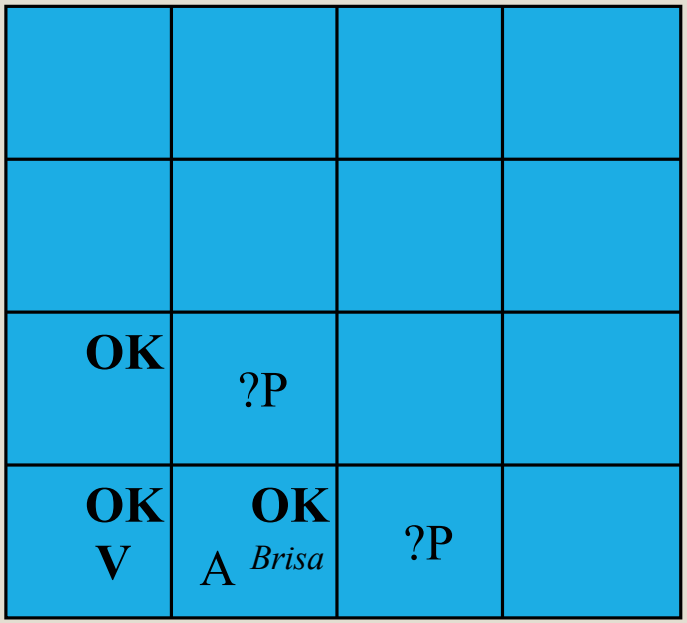
- Episodic? No, sequential.
- Estatic? Yes, pits and wumpus do not move.
- Discret? Yes!
- Single agent? Yes, the wumpus is just like a characteristic of the environment (just like a pit).

The Wumpus World



Percepción= [F,F,F,F,F]

The Wumpus World



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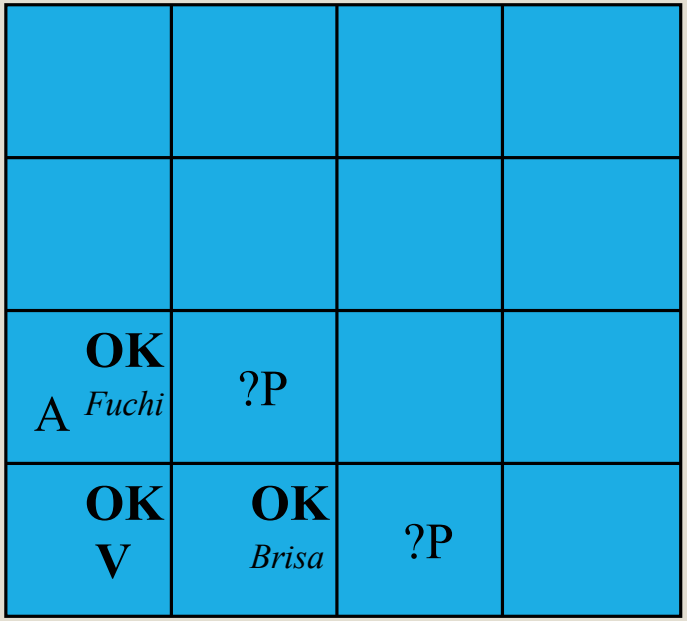
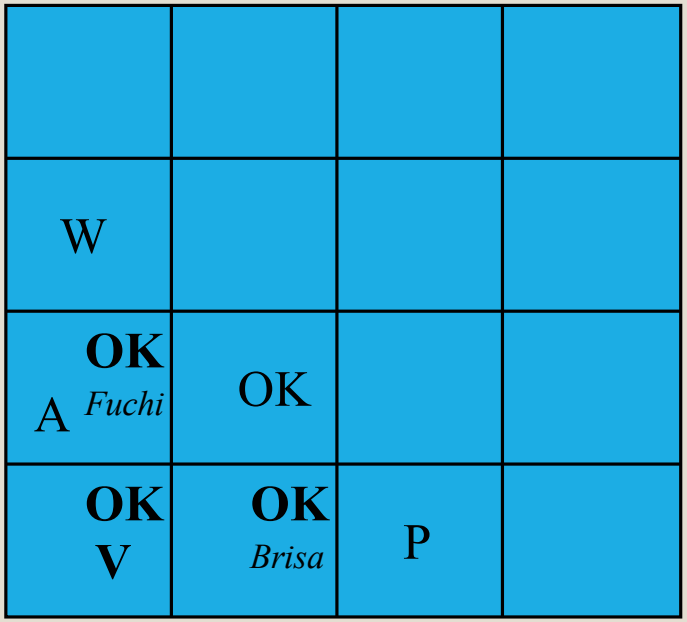
The Wumpus World



Percepción= [V,F,F,F,F]

Un KBA para acabar con el WUMPUS



Percepción= [V,F,F,F,F]