

Problem 6: Implement “*Hunt the Wumpus*”

Implement the version of *Hunt the Wumpus* as shown in the lecture:

- There are +1000 points if you leave cave with the gold, −1000 points, if you get eaten by the Wumpus or you fall into a pit, −1 for each action performed and −10 points for shooting the arrow.
- The world consists of a 4×4 grid of rooms numbered from [1, 1] to [4, 4]. The position of the wumpus and gold are randomly equally distributed over all fields except the start field, each field except [1, 1] can contain a pit with probability 0.2.
- There are the actions *Forward* (F), *TurnLeft* (L), *TurnRight* (R), *Grab* (G), *Shoot* (S) and *Climb* (C). Precondition for (G) is, that the player is in the same room as the gold, (S) fires the single arrow in the direction of the player’s gaze and either hits the wumpus (and kill him) or the wall. If the player is running into a wall, she stays in the same field.
- For each field in which the player is located, a sensor sequence with the information [*Stench*, *Breeze*, *Glitter*, *Bump*, *Scream*] is delivered. If one or more of the values are not applicable, *None* will be returned instead.

4								
3								
2								
1		G						
		S > B						
		V						
		1		2		3		4

Score: 0
Percept: [S, N, G, N, N]
Action (F, L, R, G, S or C)?

V stands for *visited*,
S for *stench*,
B for *breeze*,
G for *glitter*,
>, <, ^, v view direction of the player

Problem 7: Implementation of a propositional KB

Implement a function *TELL* for adding new sentences to the *KB*, and a function *ASK*, with which you can check whether a sentence is entailed by the *KB*.

Use

1. CNF for representing sentences of the *KB* and queries to the *KB* and implement propositional logical resolution as inference mechanism,
2. Propositional Horn clauses for sentences of the *KB* and for queries to the *KB* and implement forward chaining to compute entailments.

Use both methods to solve *Hunt the Wumpus*.

Notes: Represent logical formulas as strings and put clauses as {P11, -G22, W34} and horn formulae as {P=>Q}, {L,M=>-P} or {A}. True and False should be represented as **true** or **false**, respectively.