Introduction to Artificial Intelligence

Assignment 2

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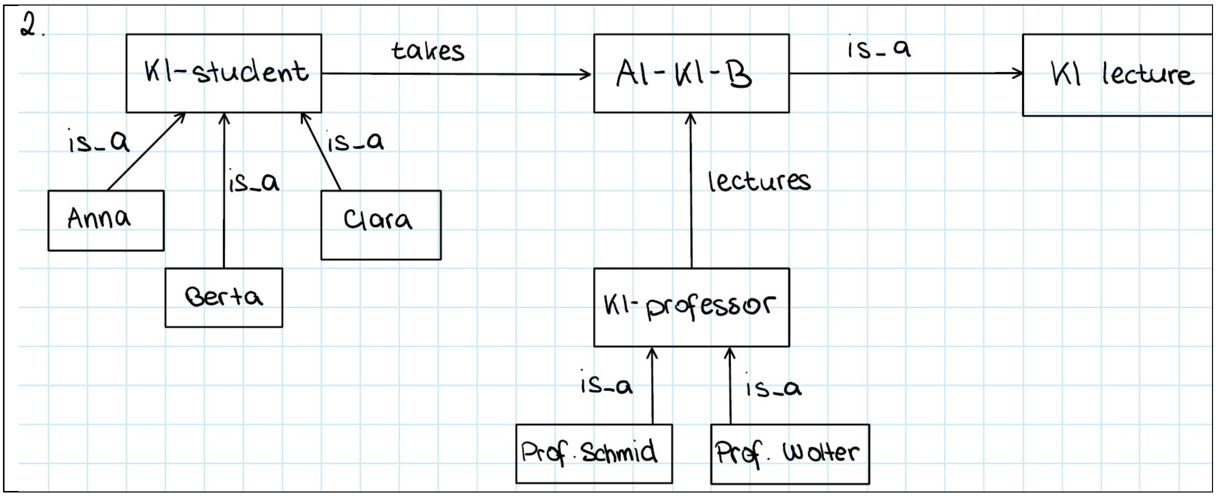
Task 1

1.

(cdef AI-Professor (and PROFESSOR (c-some Module AI-KI-B)))

2.



3.

is_a(Y,KI-Student) ∧ takes(KI-Student,Z) => takes(Y,Z)

is_a(X,KI-Professor) ∧ lectures(KI-Professor,Z) => lectures(X,Z)

takes(Y,Z) ∧ lectures(X,Z) => lectures(X,Y)

with X ∈ professor and Y ∈ student

4.

Assuming that every KI-Professor “knows” every student they teach to, $\text{teaches}^{-1} \subseteq$ knows holds. Say teaches(Y,Z) is the case, with Z in this case being a concrete lecture and is-a(Z,KI-Lecture) being true. From the Semantic Network from task 2 one can also see that takes(KI,Student, Z), granted one assigns to “Z” the ‘value’ “AI-KI-B”. Via is-a(KI-Student,P) and assuming P is a “real” person with e.g. the value “Anna” one can see that going transitively from a KI-Professor down the route of what they teach, a KI-Student will be “connected” transitively to the KI-Professor teaching a lecture. So basically a KI-Professor is connected (and in the physical world sees and thus gets to know) a KI-Student necessarily if he teaches a KI-lecture. This grants that a KI-Professor can reasonably be connected to a KI-Student via “knows”, making $\text{teaches}^{-1} \subseteq$ knows true. The ‘direction’, so whether it’s just teaches or teaches^{-1} only matters for distinguishing which set is a subset of the other here. The underlying principle is merely about the transitive connection between two entities “KI-Professor” and “KI-Student”.

Task 2

1.

X = $\{k_1, k_2, \ldots, k_m\}$

D = $\{D_1\} = \{1, 2, \ldots, n^2\}$

∀V∈X: dom(V) = D_1

C = {sits-on(k_i, d_j), occupies(k_i,d_j) with i ≤ m and j ≤ n^2, ∀l∈{1,...m}\{i}.occupies(k_l,d_j) ≠ sits-on(k_i, d_j) with i ≤ m}

The last constraint describes how any given king (k_i) must not sit on any square not “occupied” by only himself. As a consequence, no king may be placed on a square “occupied” by another king.

“occupies” means that a king covers said squares, so if another chess piece (king) were to enter the occupied/covered square, the entering piece would get eliminated upon the next move.