

UML

Introductory Example

Let's formalize it in Logic

1. Which Alphabet?

Person (x)

Student (x)

Course (x)

takes (x, y)

2. What are we saying
in the diagram?

$\forall x. \text{Student}(x) \rightarrow \text{Person}(x)$

$\forall x. (\exists y. \text{takes}(x, y)) \rightarrow \text{Student}(x)$

$\forall y. (\exists x. \text{takes}(x, y)) \rightarrow \text{Course}(y)$

Person

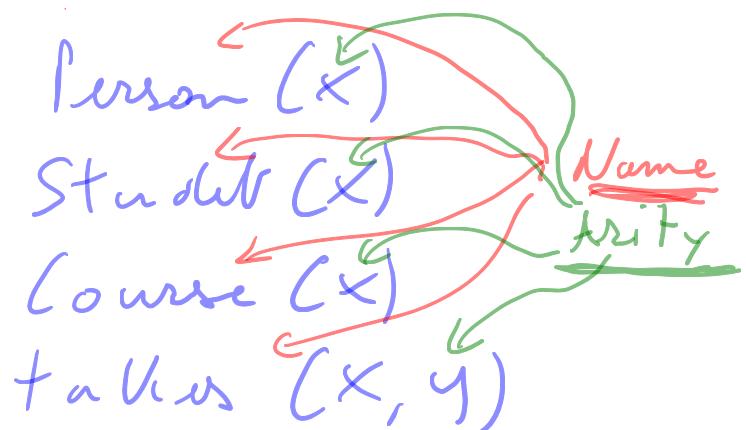
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NB takes has arity 2,
while Student has arity 1

but $\alpha(x) = \exists y. \text{takes}(x, y)$ has arity 1!
(it "projects out" the second component of $\text{takes}(x, y)$)



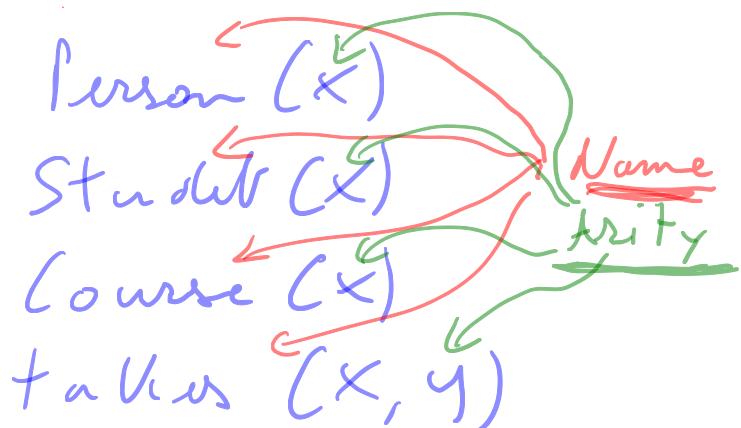
VARL



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$$\forall x. (\exists y. \text{talkes}(y, x)) \rightarrow \text{Course}(x)$$

is identical to
var names do not count

Person

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3. Let's say something about specific individuals

Student (john)
constants

takes (john, math)

Person (mary)

} extensional knowledge

} intensional knowledge

4. Now we can draw "inferences" (ie "logical implications")

e.g.: $\vdash F \text{ Person(john)}$ while

but also: $\vdash F \text{ Course(math)}$ $\vdash \nexists F \text{ Student(mary)}$