CS4811
April 3, 2017
Monday 1

Previous class: (FOL)
first order logic and inference.

sunny-today $\rightarrow$ I'm happy today

$\forall d$ sunny$(d) \rightarrow$ happy-I(d)

~~$\forall\exists d$~~
$\forall d \, \forall p$ sunny$(d) \rightarrow$ ~~happy(d, dur~~ happy-during(d, p)

KB

facts
rules
in
FOL

facts
rules

inferences

$\forall$ is a big AND

All people who are graduating are happy. ②

All happy people smile.

John Doe is graduating.

proof: John Doe is smiling.

$\leftrightarrow$

$\rightarrow$

$\forall x \quad gr(x) \rightarrow h(x)$

$\forall x \quad h(x) \rightarrow s(x)$

$g(J)$

prove: $s(J)$

negate and add to KB

$\neg s(J)$

eliminate $\rightarrow$

rule $p \rightarrow q \equiv \neg p \vee q$

$\forall x \quad \neg gr(x) \vee h(x)$

$\forall x \quad \neg h(x) \vee s(x)$

$g(J)$

$\neg s(J)$

$\forall x \quad \neg gr(x) \vee h(x)$

$\forall y \quad \neg h(y) \vee s(y)$

$g(J)$

$\neg s(J)$

$\neg gr(x) \vee h(x)$

$\neg h(y) \vee s(y)$

$g(J)$

$\neg s(J)$

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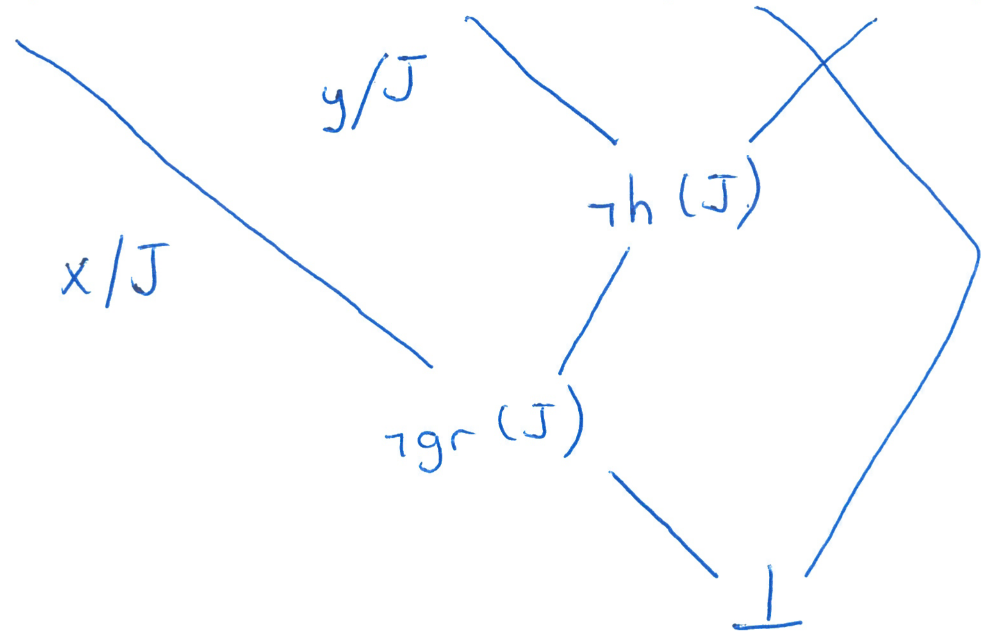
1. $\neg gr(x) \vee h(x)$ 2. $\neg h(y) \vee s(y)$ 3. $g(J)$ 4. $\neg s(J)$



Example (2)

$\forall x \quad gr(x) \rightarrow h(x)$

$\forall x \quad h(x) \rightarrow s(x)$

$\exists x \quad gr(x)$

prove : $\exists x \quad s(x)$ $\neg(\exists x \quad s(x))$

$\forall x \quad \neg gr(x) \vee h(x)$

$\forall x \quad \neg h(x) \vee s(x)$

$\exists x \quad gr(x)$ $\forall x \quad \neg s(x)$

$\neg(\exists x \quad s(x))$

$\forall x \quad \neg gr(x) \vee h(x)$

$\forall x \quad \neg h(x) \vee s(x)$

$gr(k)$

$\forall x \quad \neg s(x)$

1. $\neg gr(x) \vee h(x)$
2. $\neg h(y) \vee s(y)$
3. $gr(k)$
4. $\neg s(z)$