

HW #3 ex #1

Every politician is rejected by some voters

$$\forall x (Px \rightarrow \exists y (\forall y \wedge Ryx)) \quad \text{consequent reading}$$

$$\exists y (\forall y \wedge \forall x (Px \rightarrow Ryx)) \quad \text{inverse scope}$$

(note $Rxy \sim x$ rejects y .)

Alex is upset as soon as everyone is noisy.

$$(\forall x (Px \rightarrow Nx) \rightarrow \cup a)$$

A child is confident only if no adult lies to him.

A child = any child: generic/universal interp.

X only if Y: $X \rightarrow Y$ T_x : x is ^{trustful} confident

$$\forall x (Cx \rightarrow (Tx \rightarrow \forall y (Ay \rightarrow \neg Lyx)))$$

alt: $\forall x ((Cx \wedge Tx) \rightarrow \forall y (Ay \rightarrow \neg Lyx))$

alternative for "no adult lies to x ":

$$\neg \exists y (Ay \wedge Lyx)$$

The moon has exactly two satellite

let's assume that "the moon" behaves like a proper noun: represented by an individual constant.

G_{ab} : a gravitate around b

$$\exists x \exists y ((S_x \wedge S_y \wedge G_{xm} \wedge G_{ym})$$

$$\wedge x \neq y$$

$$\wedge \forall z ((S_z \wedge G_{zm}) \rightarrow (z=x \vee z=y))$$

When a problem is solved by all students, it should be suppressed.

Donkey sentence

$$\forall x ((P_x \wedge \forall y (S(y) \rightarrow S_yx)) \rightarrow R_x)$$

R_x : x should be suppressed.

The compositional procedure produces an open proposition:

$$(\exists x (P_x \wedge \forall y (S(y) \rightarrow S_yx)) \rightarrow R_x)$$

free

All the newspapers which don't have readers will disappear if they don't find a buyer.

$$\forall x (Nx \rightarrow (\neg \exists y (Py \wedge Ryx) \rightarrow$$

$$(\neg \exists z (Bz \wedge Fxz) \rightarrow Dx)))$$

(Various natural variants from the equivalence $(A \rightarrow (B \rightarrow C))$ & $((A \wedge B) \rightarrow C)$.)

Either everyone takes a drink, or no one does.

$$(\forall x (Px \rightarrow \exists y (Dy \wedge Txy)))$$

$$\vee \neg \exists x (Px \wedge \exists y (Dy \wedge Txy))$$

Someone who refuses that everybody loves her should see a doctor.

Two aspects of this sentence are beyond our expressive power: (1) refuse + propositional argument (second order), (2) modal + intensional reacting.

We can propose instead:
Everyone who is unhappy when everybody loves her will see a doc.