Take-Home Final

Philosophy 12A
May 6, 2010

The take-home part of the final exam consists of the four problems on this handout (weighted equally). The take-home final is **due at the in-class the final — 3pm Thursday May 13, 2010** (A1 Hearst Annex).

Please hand in only one exam paper per group.

1 Problem #1

Consider the following LMPL interpretation:

$(\mathcal{I}_1)$

	F	G	H	I
α	$-$	$+$	$+$	$+$
β	$+$	$-$	$+$	$-$

Determine the truth-values of the following three LMPL sentences on interpretation $\mathcal{I}_1$, and (for each of the three sentences) *explain why* they have those truth-values on $\mathcal{I}_1$.

1. $(\forall x)(\forall y)[(Fx \rightarrow (\exists z)Gz) \leftrightarrow (Hx \vee Iy)]$
2. $(\exists x)(\exists y)[(Hx \leftrightarrow (\forall z)Fz) \,\&\, (Gy \rightarrow {\sim}Ix)]$
3. $(\forall x)[(Gx \leftrightarrow (\forall y)Fy) \rightarrow (\forall w)(\exists z)(Fx \leftrightarrow (Hw \vee Iz))]$

2 Problem #2

Show that the following LMPL argument is *in*valid:

$$(\mathcal{A}) \qquad \begin{array}{l} (\forall x)(\forall y)(Fx \rightarrow Gy) \\ (\forall x)Gx \rightarrow [(\exists y)(Hy \,\&\, Iy) \,\&\, (\exists z)(Hz \,\&\, {\sim}Iz)] \\ \therefore (\forall x)(Fx \rightarrow Hx) \end{array}$$

That is: (*i*) describe an LMPL interpretation $\mathcal{I}$ which makes both premises of $\mathcal{A}$ true, but the conclusion of $\mathcal{A}$ false, *and* (*ii*) *explain why* $\mathcal{I}$ makes both premises of $\mathcal{A}$ true, but the conclusion of $\mathcal{A}$ false.

3 Problem #3

Give a natural deduction proof of the following LMPL sequent. You may use SI and TI (but, you don't have to).

$$(\forall x)(\exists y)(Fx \rightarrow Gy) \vdash (\exists x)(\forall y)(Fy \rightarrow Gx)$$

NOTE: This is problem #10 on page 207 of the text (so, it's in my MacLogic problem files).

4 Problem #4

Give a natural deduction proof of the following LMPL sequent. You may use SI and TI (but, you don't have to).

$$(\exists x)(Fx \leftrightarrow Gx), (\forall x)[Gx \rightarrow (Hx \rightarrow Jx)] \vdash (\exists x)Jx \vee [(\forall x)Fx \rightarrow (\exists x)(Gx \,\&\, {\sim}Hx)]$$

NOTE: This is problem #10 on page 203 of the text (so, it's in my MacLogic problem files).

Extra Credit (10 Points Worth)

Give a natural deduction proof of the following LMPL theorem. You may use SI and TI (but, you don't have to). *Extra Credit will **only** be awarded for **correct** (or, very close to correct) proofs* — no extra-credit will be awarded for mere effort.

$$\vdash (\exists x)(\forall y)(\forall z)[(Fy \rightarrow Gz) \rightarrow (Fx \rightarrow Gx)]$$

NOTE: This is problem #9 on page 207 of the text (so, it's in my MacLogic problem files).