PHILOSOPHY 210

(PELLETIER, Fall 2007)

Assignment #6

Directions: Answer all questions. This HW is worth 8-1/3% of your grade.

The HW is due *in class* (beginning) on 30 November (Friday). No late assignments -- if you are not finished, turn in what you have for partial marks. I would appreciate it very much if you would do your work independently. Write neatly, staple your pages together, and please put your **name and student ID** on the HW.

I. The following arguments are invalid. Find a countermodel for each. That is, describe a universe and a valuation function [what our text calls an Interpretation] that will make all the premises true and the conclusion false. In doing so, show how your model does the trick.

1. ∀x∀y∃zF^3xyz ∴ ∀y∃zF^3zyz
2. (sort of tricky) ∀x∃yFxy ∴ ∃x∃y(Fxy & Fyx)
3. (hard) ∃x(Fax & ~Fbx), ∀x∃yFxy, ∀x∀y(Fxy⊃~Fyx) ∴ ∃x(Fxa v Fxb)

II. Construct derivations in PD+ for the following arguments.

4. ∃x(Px&∀y(Dy⊃~Lxy)), ∀x(Ux⊃Dx) ∴ ∃x(Px&∀y(Uy⊃~Lxy))
5. (∀x(Fx⊃Gx) v ∃x(Ix&Hx)), ∀x(Ix⊃~Hx) ∴ (∃xFx⊃∃x(Gx&Fx))
6. ∀z(Hz⊃(Rzz⊃Gz)), ∀z(Gz⊃Bz) & ∀z~Bz ∴ ∀w∃z ~(Hz&Rzw)
7. ∀x∀y∃w∀zH^6(wwxyzz) ∴ ∃y∀w∃x H^6(xxwyxx)
8. (v. hard) ∀z∃y∀x(Fxy ≡ (Fxz&~Fxx)) ∴ ~∃z∀xFxz
9. (hard) ∀x((Gx&~∀y(Fxy⊃Hxy)) ⊃ ~∃z(Izx&~Jzx)), ∀x(Px⊃∀y(Kyx⊃Fyx)), ∀x(∃y(Lxy&Hxy)⊃~∃yFxy), ~∃x∃y(Lxy&~Iyx) ∴ ∀x(Gx⊃∀y((Py&Lxy&Kxy)⊃Jyx))

III. Using the PLI (predicate logic with identity) symbolize the following, using the given scheme of abbreviation.

10. No monogamous person has more than one spouse. (P: x is a person; M: x is monogamous; S: x is a spouse of y)
11. Alfred is the only member of the class who can read Greek. (M: x is a member of y; R: x can read y; a: Alfred; c: the class; g: Greek)
12. Pergolesi was the most promising composer of his time. (P: x is more promising than y; L: x lives at the same time as y; C: x is a composer; p: Pergolesi)
13. The fastest fish is fitter than the fattest fish. (F: x is a fish; S: x is faster than y; I: x is fitter than y; A: x is fatter than y)

IV. If D: x is a dog; O: x is owned by y; j: Jeff; n: Nina, how many dogs does Jeff own, according to the following formulas? (be sure to add 'at least', 'at most', 'exactly')

14. ∃x∃y(Dx&Dy&Oxj&Oyj)
15. ∀x(Dx⊃(~Oxj v x=n))
16. ∀x∀y∀z((Dx&Dy&Dz)⊃((Oxj&Oyj&Ozj)⊃(x=y v x=z v y=z)))