



Core Logic

2004/2005; 1st Semester
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Homework Set # 6

Deadline: October 20th, 2004

Exercise 14 (6 points total).

Consider the sentence *tantum omnis philosophus albus est* (“only every philosopher is white”, *i.e.*, every philosopher is white but nothing else is).

- (1) In this sentence, the supposition of *albus* is not *suppositio mobilis*. Why? (2 points)
- (2) Give a modern semantics for the *tantum omnis* construction: suppose we have a universe of discourse X and two predicates $\Phi, \Psi \subseteq X$. Give a formal definition such that

$$\mathbf{tantumomnis}(\Phi, \Psi)$$

is true if and only if *tantum omnis* Φ *est* Ψ (“only every Φ is Ψ ”) (2 points).

- (3) Give a modern semantics for the *omnis praeter* construction: take a universe of discourse X and two predicate $\Phi, \Psi \subseteq X$. Give a formal definition such that

$$\mathbf{omnispraeter}(x, \Phi, \Psi)$$

is true if and only if *omnis* Φ *praeter* x *est* Ψ (“every Φ except for x is Ψ ”) (2 points).

Exercise 15 (8 points total).

If X is any set and $\wp(X)$ is its power set (the set of all subsets of X), we call $Q \subseteq \wp(X)$ a **generalized quantifier**. If $\Phi \subseteq X$ is a predicate on X , we say that $Q\Phi$ holds (in words: “for Q -many x , $\Phi(x)$ holds”) if $\Phi \in Q$.

- (1) Let $\forall := \{X\}$ and $\exists := \{A \subseteq X; A \neq \emptyset\}$. Argue that $\forall\Phi$ and $\exists\Phi$ have the intended meanings “for all x , $\Phi(x)$ holds” and “there is an x such that $\Phi(x)$ holds” (1 point each).
- (2) (Suppose that X is infinite for this part.) Paraphrase the meanings of $Q_0\Phi$, $Q_1\Phi$, and $Q_2\Phi$ in words: $Q_0 := \{A \subseteq X; A \text{ is finite}\}$, $Q_1 := \{A \subseteq X; X \setminus A \text{ is finite}\}$, $Q_2 := \{A \subseteq X; A \text{ is infinite}\}$ (1 point each).
- (3) Fix some $x \in X$ and give a definition of a generalized quantifier op_x that corresponds to the *omnis praeter* construction from **Exercise 14** (3 points).

Exercise 16 (5 points total).

Consider the sophisma

(\star) *omnis homo praeter Socratem excipitur*

(“every man except for Socrates is excepted”).

- (1) Describe a situation in which (\star) is true (1 point).
- (2) Argue informally that (\star) is false (2 points).
- (3) Solve the apparent contradiction by explaining the fallacy as a *secundum quid et simpliciter* (2 points).

Exercise 17 (6 points total).

Consider the following *de obligationibus* dialogue. The underlying assumptions are that the two dialogue partners are in Amsterdam, neither of them is actually the Pope, that the Pope is in Rome, and that the opponent is married. Fill in the answers for the respondent according to Burley’s system of obligations, once for a respondent who knows the underlying assumptions and can do propositional deductions (3 points), and once for a respondent who in addition knows that the Pope is not married and can use that in his reasoning about implications (for example, from “ x is married” he can infer “ x is not the Pope”; 3 points). Explain all of the moves according to the rules of Burley’s *obligationes*.

One of us two is the Pope.

I admit it.

I am married.

— — —

You are in Amsterdam.

— — —

You are the Pope.

— — —

Cedat tempus.