Philosophy 230

Wesleyan University
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Handout 1b

Monadic Predicates, Names, Free Variables, Extensions, and Quantifiers

I. Non-truth-functionally valid arguments

A. 1. All men are mortal.
   2. Socrates is a man.
   3. THEREFORE, Socrates is mortal.

B. 1. All whales are mammals.
   2. Roscoe is a whale.
   3. THEREFORE, Roscoe is a mammal.

C. 1. Frege is a German logician.
   2. THEREFORE, something is a German logician

II. Predicates and Extensions

A. A *predicate* is a pattern of words that recur in many statements. The following are three patterns each discernible in 3 sentences:

   1. Bill Clinton is a man
   2. Madonna is a man
   3. Socrates is a man

   4. Brutus killed Brutus
   5. Antony killed Antony
   6. Caesar killed Caesar

   7. Frege is European and Frege is a logician
   8. Russell is European and Russell is a logician
   9. Quine is European and Quine is a logician

B. The patterns are

   1. "① is a man".
   2. "① killed ①".
   3. "① is European and ① is a logician".

C. Predicates express properties.

D. A predicate carries one or more blank places with it that is to be filled with names, and when it is filled, the result is a statement which ascribes the property expressed by the predicate to the object denoted by the name.

E. If an object has the property expressed by a predicate, then the statement that results from putting a name of that object in the blank spaces of the predicate is $\top$. In this case we say that the predicate is *true of* the object. The set of objects that has the property expressed by a predicate (=the set of objects that the predicate is true of) is called the *extension* of the predicate.

III. Names, Free Variables, and Open Sentences

A. *Free variables* are arbitrary unspecified names.

B. A sentence containing a free variable is called an *open sentence*.

C. Open sentences have no truth-values unless we *assign* an object to the free variable.

D. Symbol for assignment: ":="

IV. The Universal Quantifier

A. A translation that reveals truth conditions

1. All men are mortal
2. No matter what object, x, one considers, if x is a man, then x is mortal
3. For any object, x, if x is a man, then x is mortal
4. For any object x, (x is a man) $\supset$ (x is mortal)
5. $(\forall x)$((x is a man) $\supset$ (x is mortal))

B. Truth conditions of universally quantified sentences:
A sentence which begins with "$(\forall x)$", and continues with an open sentence in which the variable "x" occurs, is true just in case that open sentence is true no matter what object is assigned to the variable "x"

C. A blind alley:

1. Everything that is a man is also mortal
2. For every object x, (x is a man).(x is mortal)

V. The Existential Quantifier

A. A translation that reveals truth conditions

1. Something is a German logician.
2. There is at least one thing such that it is German and it is a logician.
3. There is at least one thing, x, such that x is German and x is a logician.
4. $(\exists x)$(x is German and x is a logician)

B. Truth conditions of existential quantified sentences:
A sentence which begins with "$(\exists x)$", and continues with an open sentence in which the variable "x" occurs, is true just in case that open sentence is true when at least one object is assigned to the variable "x".

VI. Scope differences

A. Existential quantifications

1. $(\exists x)$((x is wise).(x is a philosopher))

2. $(\exists x)(x \text{ is wise}).(\exists x)(x \text{ is a philosopher})$

B. Universal quantifications

1. $(\forall x)(x \text{ is human} \supset x \text{ is mortal})$
2. $(\forall x)(x \text{ is human}) \supset (\forall x)(x \text{ is mortal})$

VII. Quantificational paraphrase

A. Every bird flies.

B. Each insect has six or eight legs.

C. Some people are tall.

D. Franz does not like all Beethoven quartets

E. A candidate who avoids substantive issues does well in American politics.

F. Any candidate who avoids substantive issues does well in American politics.

G. Only sopranos could be heard.