1 Translations into predicate logic

Translate the following English sentences into predicate logic, providing a key for the translation. If the sentence is ambiguous, be sure to give all possible translations. Provide unambiguous English paraphrases for the different meanings, and say which expressions of predicate logic correspond to which meanings. You do not need to worry about tense; in (1c), for example, you can translate *will like* as a single predicate.

(1) a. Mo didn't see any students.
b. No student read a book by Dostoevsky or Tolstoy except Lou. (*Be careful!*)
c. If a student reads *Crime and Punishment*, he will like it.

Remember that one of the goals of translating sentences into predicate logic is to capture as much detail as possible. That means that you should translate as many parts of the sentence into appropriate terms of logic as possible, avoiding abbreviations. For example, even though the verb phrase *eat the bagel* could be translated as a single one-place predicate EAT-THE-BAGEL, it is more accurate to translate the verb as a two-place predicate EAT and the direct object as an argument term *b*.

2 Most

In class we discussed the analysis of sentences with numeral determiners like *two, three* etc. Specifically, we said that a sentence like (2a) has the translation into predicate logic in (2b), where TWO is a quantifier, D is the one-place predicate *is a dog*, and S is the one-place predicate *is smart*.

(2) a. Two dogs are smart.
b. TWO$x[D(x) \wedge S(x)]$

We further said that the truth conditions of the quantifier TWO are as in (3).

(3) TWO$x[\phi]$ is true if and only if there are two objects e_1 and e_2 in the model such that substituting e_1 and e_2 for x in ϕ makes ϕ true.

Now consider the determiner *most*, as in (4).

(4) Most dogs are smart.

A. Give a precise characterization of the the truth conditions of sentences of the form *Most N are P*. You can use regular English, just make your definition as precise and clear as possible.

B. Can we extend the analysis of numerals to *most*? If so, say how. Specifically, say how a sentence like (4) would be translated into predicate logic, and provide an explicit statement of the truth conditions for the quantifier corresponding to the English word *most*. That is, provide a statement like (3), replaceing TWO with whatever symbol you use to represent *most*.

If we can't extend the analysis of numerals to *most*, say why not. That is, say specifically what the problem with predicate logic is — what is missing from our system as set up so far? How would we need to modify the system in order to accurately represent the meaning of *most*?

3 Adjectives

A. Translate (5) into predicate logic, being sure to define all your symbols. Use your translation to explain why (5) entails both of the sentences in (6).

(5) Jorge is an Argentinian jockey.

(6) a. Jorge is a jockey.
b. Jorge is Argentinian.

B. Now consider (7). Does (7) entail both (8a) and (8b)? Justify your response using appropriate tests and examples.

(7) Jorge is a tall jockey.

(8) a. Jorge is a jockey.
b. Jorge is tall.

C. What do the different entailment properties of (5) and (7) say about the semantic analysis of adjectives like *Argentinian* vs. adjectives like *tall*? Can these two adjectives be assigned exactly the same sort of meanings? That is, can they be represented using the same sorts of expressions in predicate logic (1-place predicates, 2-place predicates, whatever)? If so, then how do we explain their different entailments? If not, say clearly and precisely how these two adjectives should be semantically distinguished, and say how this distinction explains their entailment patterns.

In answering this question, you may want to consider additional adjectives and additional sentence types. Find some that behave like *Argentinian* and some that behave like *tall*, and try to come up with a generalization about the crucial differences in meaning between the two classes that can be used to explain the differences in entailments observed above. You should also consider these adjectives in other contexts to see if you can find some important differences between them. For example, *Argentinian* (with the meaning 'from Argentina/of Argentinian nationality', as in (5)), unlike *tall* does not have a comparative form:

(9) a. ??Jorge is a more Argentinian jockey than Gino.
b. Jorge is a taller jockey than Gino.

Note: In answering Part C, you do not need to formulate your response in predicate logic — clear prose will be enough. However, you may find that trying to figure out exactly how to characterize the semantic differences between *Argintinian* vs. *tall* in terms of predicate logic representations may help you in coming up with a precise and explicit statement of how these adjectives differ from each other semantically.