Semantics Fall 2005

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Assignments, Part 2.

Ex 2.1 Let 'O' stand for the relation of owning, 'C', 'D' and 'F' for the property of being a car, a donkey and a farmer, respectively. Let 'p' denote Pedro. Calculate the truth conditions of the formulae to the right to show that they codify the truth conditions of the corresponding sentence on the left:

① *Pedro owns something.* $\exists$ x p O x

② *Someone owns everything.* $\exists$ x $\forall$ y x O y

Also, calculate the truth conditions of the following formula and render it into natural English.

③ $\forall$ x C x $\rightarrow \neg$ D x.

Ex 2.2 (With the conventions of the previous exercise.) Give all possible formal renderings of the following sentences (even if you think that some of the scopings do not match your intuitions):

① *Every farmer owns a donkey.*

② *Some farmer does not own every car.*

③ *No farmer owns every car.*

Give the scopes for the various readings of the first sentence. There are readings of the second and the third sentence which are equivalent. Which ones are they?

Ex 3.3 (a) Let 'P' stand for the property of being a penguin, and 'F' for the property of being able to fly. We have seen that the sentence 'Every penguin flies.' can be rendered as $\mathbf{every}_{x}\{P\ x\}\ F\ x$. Show that it can also be rendered as

$$\forall\ x\ P\ x \rightarrow F\ x$$

(b) Based on the previous, suggest a formula equivalent to $\mathbf{every}_{x}\{\varphi\}\psi$ using $\forall$ in place of **every**.

Ex 4.4 Draw the phrase structure of the following formula:

$\neg$**exists**$_x$\{D x & S x\} P x