Introduction to Logic: Worksheet 4

1. Symbolize the following sentences, where:
   UD: A pack of cards
   Rx: x is red
   Bx: x is black
   Cx: x is a club
   Sx: x is a spade

   (a)   Some cards are red.
   (b)   No cards are both clubs and spades.
   (c)   All and only black cards are clubs or spades.
   (d)   Not all black cards are clubs, but all clubs are black.

   4 marks

2. *Unambiguously* render the following sentences into *fluent* English, where:
   UD: Everyone
   Lxy: x likes y
   o: Oscar
   e: Elmo

   (a)   (∃x) Lxe
   (b)   (∀y) ~ Lyo
   (c)   (∀y)(∃x) Lxy
   (d)   ~ (∃x)(∀y) Lyx
   (e)   (∀x)[Lox ⊃ Lxe]
   (f)   ~ (∀x) ~ (∃y) Lyx

   6 marks

3. Symbolize the following sentences, stating the universe of discourse and interpretations for all predicates.

   (a)   Boo doesn't scare anyone.
   (b)   Any child not scared by Sullivan is not scared by any monster.
   (c)   Those children that aren't scared by any monster scare all monsters.
   (d)   Every lecturer has read at least one philosophy book.
   (e)   No lecturer has read all philosophy books.
   (f)   Some students haven't read any philosophy books.
   (g)   There's no philosophy book that some student has read but no lecturer.
   (h)   Some philosophy books only been read by their authors.

   8 marks

Symbolize the following sentences, indicating the ambiguities, and giving alternative readings for each (possibly more than two in some cases):
   UD: Everything

   (a)   Someone wins every raffle.
   (b)   If John invites someone to the party, he'll be unpopular.
   (c)   A politician can fool all of the people some of the time.

   8 marks