

## PHI 340 Homework: Relevance Logic

Due: Dec 15, 2005

1. A *multiset* is a set where we individuate each copy of an object. So, for example,  $\{1, 2, 1\}$  is not the same multiset as  $\{1, 2\}$ . For multisets  $X$  and  $Y$ , let the semicolon denote multiset union. Which of the structural rules SR6, SR7, SR8 does it obey?

2. Show that

$$P \rightarrow Q \vdash \neg Q \rightarrow \neg P$$

in DW.

3. Show in two ways that the sentence  $(P \rightarrow Q) \vee (Q \rightarrow P)$  is valid in the language RM. First, show it by natural deduction. Second, show it directly by arguing about truth values in Sugihara's matrix.
4. Show that the sentence  $P \rightarrow (Q \rightarrow P)$  is not valid for RM.
5. Use natural deduction to derive  $P \rightarrow (P \rightarrow P)$  in RM.
6. Use natural deduction to derive  $\vdash (P \rightarrow \neg P) \rightarrow \neg P$  in CPL. But write out the full details, and show where you use the structural rules!