COMP9020 Problem Set 6

Kai Engelhardt

September 14, 2015

1 Relations

Exercise 1 Let P be a partial order on a domain S of n elements, and Q its associated quasi-order. Describe the difference $P \setminus Q$ (as a subset of $S \times S$).

Exercise 2 Define relation R on $\mathcal{P}(U)$ for some set U where ARB iff $|A \cap B| \geq 1$. When is R transitive?

Exercise 3 Define $R \subseteq \mathbb{R} \times \mathbb{R}$ where $(a, b) \in R$ iff $b + 0.5 \geq a \geq b - 0.5$. Is R a (a) partial order? (b) total order? (c) equivalence relation?

Exercise 4 Define a relation $R \subseteq \mathbb{R} \times \mathbb{R}$ where $(a, b) \in R$ iff either $a \leq b - 0.5$ or $a = b$. Show that R is a partial order, but not a total order.