Study Exercises

To assist you with thinking about the topics of this assignment and about how to solve the problems, we provide the following suggestions for exercises. You may work on them on your own or with classmates (or both) as you choose. When you get stuck, please feel free to ask an instructor or IA. How many exercises you work on is entirely up to you. We do suggest, however, that knowing the answers is NOT the important part. The important part is to practice finding such answers yourself.

Note:

- When you do get to the assignment questions above, work individually. As if they were an exam in the PAC.
- Please do NOT submit answers to these exercises with your assignment. They will simply get in the way of marking.

SE 1.
Give proofs in Natural Deduction for each of the following. Also explain why each corresponding entailment holds.

(a) \{((\exists x \alpha) \lor (\exists x \beta))\} \vdash (\exists x (\alpha \lor \beta)).
(b) \{ (\exists x (\alpha \lor \beta)) \} \vdash ((\exists x \alpha) \lor (\exists x \beta)).
(c) \{ (\exists x (\alpha \lor \beta)) \} \vdash ((\exists x \alpha) \land (\exists x \beta)).
(d) \{ (\forall x (\alpha \lor \beta)) \} \vdash ((\forall x \alpha) \land (\forall x \beta)).
(e) \{ ((\forall x \alpha) \land (\forall x \beta)) \} \vdash (\forall x (\alpha \land \beta)).
(f) \{ ((\forall x \alpha) \lor (\forall x \beta)) \} \vdash \forall x (\alpha \lor \beta).

SE 2.
Huth and Ryan, Exercises 2.3, Problem 1

SE 3.
Huth and Ryan, Exercises 2.3, Problem 2

SE 4.
Huth and Ryan, Exercises 2.3, Problem 3

SE 5.
Huth and Ryan, Exercises 2.3, Problem 4

SE 6.
Huth and Ryan, Exercises 2.3, Problem 5
SE 7.
Huth and Ryan, Exercises 2.3, Problem 6

SE 8.
Huth and Ryan, Exercises 2.3, Problem 7

SE 9.
Huth and Ryan, Exercises 2.3, Problem 11