

# Human Reasoning and Computational Logic

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## Problem 6.1

Consider the following two programs:

$$\mathcal{P}_{fly} = \{fly \leftarrow bird \wedge \neg abnormal, bird \leftarrow \top\}$$

and

$$\mathcal{P}_{irr} = \{abnormal \leftarrow irregular, irregular \leftarrow abnormal\}.$$

1. Compute the least fixed point of Fitting's immediate consequence operator  $\Psi_{\mathcal{P}}$ , where

- (a)  $\mathcal{P} = \mathcal{P}_{fly}$

- (b)  $\mathcal{P} = \mathcal{P}_{fly} \cup \mathcal{P}_{irr}$

2. Compute the least fixed point of Stenning and van Lambalgen's immediate consequence operator  $\Phi_{\mathcal{P}}$ , where

- (a)  $\mathcal{P} = \mathcal{P}_{fly}$

- (b)  $\mathcal{P} = \mathcal{P}_{fly} \cup \mathcal{P}_{irr}$

## Problem 6.2

Show that the following proposition holds:

**Proposition 6** Every continuous mapping is monotonic.

Does the other direction hold? Motivate your answer.

## Problem 6.3

Show that the following lemma holds:

**Lemma 10** Let  $X$  be a directed set and  $Y$  be a finite subset of  $X$ . Then  $X$  contains an upper bound of  $Y$ .

## Problem 6.4

Show that the following proposition holds:

**Proposition 12** Let  $C$  be a finite complete partial order and  $f$  a monotonic mapping on  $C$ . Then  $f$  is continuous.