

**Exercise Sheet 3**  
**CS 2210 Logic for Computer Scientists (Hitzler)**  
**Solutions due: Tuesday February 3, 2015, 11am**

**Exercise 15** Give  $B_P$  for  $P$  as in Example 1.2.19. How many elements does  $I_P$  have?

**Exercise 16** For the program  $P$  in Example 1.2.18, compute the following.

(a)  $T_P(\{p(c), q(c, c)\})$

(b)  $T_P(B_P)$

**Exercise 17** With respect to Example 1.2.18, verify that  $B_P$  is a pre-fixed point of  $T_P$ .

**Exercise 18** Give three pre-fixed points and one fixed point of the  $T_P$ -operator for  $P$  as in Exercise 14.

**Exercise 19** Compute  $T_P \uparrow n$  for all  $n \in \mathbb{N}$  and  $T_P \uparrow \omega$  for  $P$  as in Example 1.2.19.

**Exercise 20** Compute  $T_P \uparrow n$  for all  $n \in \mathbb{N}$  and  $T_P \uparrow \omega$  for  $P$  as in Exercise 14.

**Exercise 21** Compute  $T_P \uparrow n$  for all  $n \in \mathbb{N}$  and  $T_P \uparrow \omega$  for  $P$  as in Exercise 9.

**Exercise 22** Compute  $T_P \uparrow n$  for all  $n \in \mathbb{N}$  and  $T_P \uparrow \omega$  for  $P$  as in Example 1.2.8.

**Exercise 23** Compute  $T_P \uparrow n$  for all  $n \in \mathbb{N}$  and  $T_P \uparrow \omega$  for  $P$  as in Example 1.2.7.