Types and Programming Languages week1

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1 Do the exercises at the end of the Ch02 lecture notes

1. Let $f(n) = 1 + 2 + ... + n$

   $g(n) = \frac{n(n+1)}{2}$

   (a) What do you need to do to prove that $f = g$ extensionally? Answer in 2 sentences or less.

   I will need to set a base case, then assume that $f = g$, then I will need to prove for $k + 1$ from there I will need to make a direct comparison from one solution that I got from $k + 1$ in g to f.

   (b) Prove that f and g are extensionally equal.

   $f(n) = 1 + 2 + ... + n = \sum_{i=1}^{n} i$

   B.C.

   $n = 1$

   $\sum_{i=1}^{1} i = 1$

   $\frac{1(1+1)}{2} = 1$

   I.H.

   $\sum_{i=1}^{k} = \frac{k(k+1)}{2}$

   The same should hold for $k + 1$

   $\sum_{i=1}^{k+1} i = \sum_{i=1}^{k} i + k + 1$

   $\frac{k+1(k+1)+1}{2}$

   R.C.

   $\frac{k(k+1)}{2} + k + 1$

   $\frac{k(k+1)+2(k+1)}{2}$

   $\frac{(k+1+1)(k+1)}{2}$

   I did something wrong

2.

   (a) What do you need to do to prove that the principle of strong induction is equivalent to the principle of induction? Answer in two sentences or less.

I believe I would need to prove that .... actually I don't know at this time

(b) Prove that the principle of strong induction is equivalent to the principle of induction.

2 Pierce Exercises: 2.2.6, 2.2.7, 2.2.8

2.2.6

2.2.7

2.2.8