

Types and Programming Languages week1

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

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

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

- (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.

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

B.C.

$$n = 1$$

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

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

I.H.

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

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