Hwk 7 review

1) Pg. 6-6 Ex. 2/

$$\tilde{f}(0) = 1$$

$$\begin{aligned}
\tilde{f}(n+1) &= [f(0), \ldots, f(n)] \\
&= [\underline{f(0), \ldots, f(n-1)}, f(n)] \\
&= \tilde{f}(n) * p_n^{f(n)} \\
&= \tilde{f}(n) \frown [f(n)] \\
&= \tilde{f}(n) \frown p_0^{f(n)}
\end{aligned}$$

Pg. 6-6 Ex. 3/ By exercise 2.

2) Pg. 8-4, Ex./

Suppose that ~~G-SCOMP=~~

$$G\text{-SCOMP} = \{p_1, p_2, \ldots, p_n, \ldots\} = \mathcal{P}(\mathbb{N})$$

We will exhibit a predicate

$$p \notin \{p_1, p_2, \ldots, p_n, \ldots\},$$

hence showing a contradiction, so that

$$G\text{-SCOMP} \neq \mathcal{P}(\mathbb{N})$$

3) Theorem 8.10 /

Modify the algorithm from Thm 8.9, replacing

"add i to the list"

with

"add i to the list if it was not already in the list".

Hwk 8 review

1) 8-7 Ex 2/

$\Leftarrow$: By Thm 8.7

$\Rightarrow$: if B is infinite,
by Thm 8.10.

if B is finite,
construct f as in Thm 8.10,
but now f will not
be total.

2) Pg. 8-8 Ex 1 /

No.

Assume there is a universal predicate for G - COMP-PRED, call it P.

Let $P_n = \lambda x \cdot P(n, x)$.

Then $P_0, P_1, P_2, \ldots$ would be an effective listing of G-COMP-PRED.

i.e. $\{P_0, P_1, P_2, \ldots\} = $ G-COMP-PRED

Define $h(x) = \neg P(x, x)$.

Then $h \in$ G-COMP-PRED, but $h \notin \{P_0, P_1, \ldots\}$.

Pg. 8-8 Ex. 3/

Theorem 8.10

By ~~Pg. 8-6 Ex. 2~~, if

$\{y \mid \varphi_y \text{ is total}\}$

is s/comp, then it would be the range of a total 1-1 comp. function, call that f.

Then f is an effective listing of $\{y \mid \varphi_y \text{ is total}\}$, i.e. an effective listing of G_r-TComp.