Hwk 7 prep

1) Pg. 6-6, exercises 2 and 3.

6-6 2) Suppose $f(n) = g(\hat{f}(n))$.
Show $f \in PR(g)$.

$f(0) = \ldots$

$f(n+1) = \ldots$

Compare with the proof of Theorem 6.6.

6-6 3) Show the Fibonacci function is PR.

Should not be difficult now.

2) Follow the form of the proof of Theorem 1.13.

In doing so, you construct a witness.

How does your witness compare to $\overline{K}$?

3) Very similar to the algorithm from Thm 8.9, but you must avoid repetitions!

Note: B is s/comp $\Leftrightarrow$ $B = ran(g)$, for some $g \in \mathcal{G}$-Comp

Example use of the Thm 8.9 alg.

Say $B = \{0, 5, 8\}$

and
- $g(0)$ takes 2 steps to halt,
- $g(5)$ takes 3 steps to halt,
- $g(8)$ takes 10 steps to halt.

Let's "trace" through the algorithm, and see the list after each "stage".

After stage 0: []

After stage 1: [] — $g(0)$ did run, but did not halt in 1 step.

After stage 2: [0]

After stage 3: [0, 0] — Here we ran $g(0)$, $g(1)$, $g(2)$ and $g(3)$ for 3 steps each. $g(0)$ halted.

After stage 4: [0, 0, 0]

were already in the list

After stage 5: [0, 0, 0, 0, 5]

g(0) halted in less than 5 steps.

g(5) halted in 5 steps.

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After stage 8:

stage 2 3 4 5 6 7 8

[0, 0, 0, 0, 5, 0, 5, 0, 5, 0, 5]

8 is not added yet, as g(8) did not halt in 8 steps.

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After stage 10:

g(8) did halt in 10 steps.

[0, 0, 0, 0, 5, 0, 5, 0, 5, 0, 5, 0, 5, 0, 5, 8]