Note Title 8/16/2014

PROP: RE_{FIN} IS COMPUTABLY IDENTIFIABLE.

PROOF: NEED FIND A COMP. FCTN, f, THAT IDENTIFIES EVERY TEXT FOR EVERY LANGUAGE IN RE_{FIN}.

LET $h: \mathbb{N} \to \mathbb{N}$ BE COMP. FCTN. S.T.

$h(i)$ = INDEX FOR FINITE SET ENCODED BY i.

PROGRAM FOR h:

INPUT i.

1. FIND $d_0, \dots, d_k$ SUCH THAT $i = 2^{d_0} + \dots + 2^{d_k}$.
2. COMPUTE THE INDEX OF "INPUT n IF $n = d_0, \dots, d_k$ OUTPUT 1 ELSE $\uparrow$"
3. OUTPUT THE INDEX

PROGRAM THAT COMPUTES f

INPUT σ

FIND $D = rng\,\sigma$ (BY DECODING σ).

$[\sigma = (0, 2, 17, 2)]$

FIND i_D.

COMPUTE $h(i_D)$, AND OUTPUT RESULT.

*NOTE: TO SHOW RE_{FIN} IS IDENTIFIABLY, ALL WE NEED IS A LEARNING FUNCTION:

$f(\sigma)$ = least e that is an index for $rng\,\sigma$.

WE WRITE THE PROGRAMS (ABOVE) TO SHOW THAT RE_{FIN} IS COMPUTABLE IDENTIFIABLE.

- IDENTIFICATION OF TEXTS:

Examples.

- Let $t = (2, 4, 6, 6, 6, \dots)$
- Let $s = (0, 1, 2, 3, 4, 5, \dots)$
- Let $r = (2, 2, 2, 3, 3, 3, 4, 4, 4, \dots)$
- Let $f(\sigma)$ = the least index for $rng(\sigma)$.
- Let $g(\sigma) = 5$.
- Let $h(\sigma)$ = the smallest i so that $rng(\sigma) \subseteq W_i$.

f id's t, but not s or r.

g ONLY ID'S texts for W_5.

h id's s, BUT not t or r (probably).

IDENTIFICATION OF LANGUAGES (MUST ID ALL POSSIBLE TEXTS)

1. Let $L = \{2, 4, 6\}$. Which learning functions identify L?
2. What does g identify?
3. Let n_0 be an index for $L = \{0, 1\}$. Does h identify L?

- Let $f(\sigma) =$ the least index for $rng(\sigma)$.
- Let $g(\sigma) = 5$.
- Let

$$h(\sigma) = \begin{cases} n_0 & \text{if } \sigma \text{ does not end in a 1} \\ lh(\sigma) & \text{otherwise} \end{cases}$$

f id's $L = \{2,4,6\}$ AND $L = \{0,1\}$.

g id's W_5 (WHATEVER THAT IS)

h doesn't id anything.