Universität des Saarlandes
FR 6.2 Informatik

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Exercises for Limits of Computational Learning

http://www.mpi-inf.mpg.de/departments/d1/teaching/ss12/learning/

Assignment 1 Deadline: Wed 24.04.2012, 10am

Assignment 1 *(2pts each) Show the following.*

(a) *For all total computable functions f there is a g total computable such that*

$$\forall^\infty x : g(x) = \min(\text{range}(f));\,[1]$$

(b) *There is a g total computable such that, for all e, $\forall^\infty x : g(x, e) = \min(\text{range}(\varphi_e))$;*[2]

(c) *There is a g total computable such that, for all e, $\forall^\infty x$:*

$$g(e, x) = \begin{cases} 1, & \textit{if } 5 \in \text{range}(\varphi_e); \\ 0, & \textit{otherwise.} \end{cases}$$

Assignment 2 *(2pts) Suppose A is a set of natural numbers such that, for all e, e' with $\varphi_e = \varphi_{e'}$ and $e \in A$, we have $e' \in A$. Show that A is infinite.*

Note that the third exercise is postponed by one week.

[1] The quantifier $\forall^\infty$ means "for all but finitely many."

[2] Note that this is the *effective* or *constructive* version of (a).