Homework 5   (due Thursday 27 September)

Exercises 18:4 (1.5.20 from Syllabus) and Exercise 1.6.9. from the Syllabus.

18:4. Prove that $K \leq_1$ Fin. [30 pts]

> HINT. See p. 187 from Syllabus (Hints to exercises.)

1.6.9. Obtain an effective numbering ψ which is *not* acceptable as follows: Define

$$
\begin{array}{rcl}
\psi_{\langle 0,q \rangle}(0) & = & \text{undefined} \\
\psi_{\langle p+1,q \rangle}(0) & = & p \\
\psi_{\langle p,q \rangle}(x) & = & \varphi_q(x), \quad \text{if } x > 0
\end{array}
$$

Show that $\{\psi_n\}_{n \in \omega} = \mathcal{P} = \{\text{all partial computable functions}\}$ but that ψ is not acceptable. [30pts]

> HINT. Show that if there is a computable function g such that $\psi_{g(x)} = \varphi_x$ then we can decide the halting problem.