Insert at end of page 69

Now the problem HAMILTONIAN PATH can be represented by the language

$$\{\mathrm{bin}(G) \mid G \text{ has a Hamiltonian path}\} \subseteq \{0,1\}^*$$

PROPER COLORING by

$$\{\mathrm{bin}(k)\$\mathrm{bin}(G) \mid G \text{ has a proper } k\text{-coloring}\} \subseteq \{0,1,\$\}^* \ .$$

Via an appropriate binary encoding of finite alphabets, it suffices to consider languages over a binary alphabet $\{0,1\}$, so we will assume all languages to confine to this for the rest of this section.

$\mathcal{P}$ The class $\mathcal{P}$ (of polynomially recognizable languages) is the set of all languages over $\{0,1\}$ such that there is a polynomial time algorithm A with

$$L = \{w \mid A \text{ accepts } w\} \ .$$

'Polynomial time' means that there is a polynomial p_A such that A terminates on any input w in at most $p_A(|w|)$ steps.