Lecture 4

k-Tape TM

A structure M = (K, Σ, δ, s) with transition function: δ: $K \times \Sigma^k \to K \cup \{y, n, h\} \times \Sigma^k \times \{\leftarrow, \rightarrow, -\}^k$

Def: Let $F : \mathbb{N}^k \to \mathbb{N}$ be a function, such that a k-tape TM M exists, which on inputs <($n_1, \ldots, n_k$)>, where | <($n_1, \ldots, n_k$)>| = l, terminates after at most $f(l)$ steps with output $M(n_1, \ldots, n_k) =< F(n_1, \ldots, n_k) >$ then we say $F \in TIME(f(l))$

Proposition: Let $F \in TIME_k(f(l))$ then $F \in TIME_1(O(f^2(l)))$. Whatever can be computed with k-tapes can also be computed with a single tape machine.