Automata Exercises

Tasks for 13.1.2015

Task 1 Construct a TM that takes an input word w (in any alphabet), shifts it for one position to the right on the tape, and writes a * at the leftmost cell of the tape. Upon termination, the head of the machine should point at the leftmost cell of the tape.

Task 2 Construct a TM for computing the function $f(n) = 2n$ for $n \in \mathbb{N}$ in unary notation where n is represented by $n + 1$ |'s.

Task 3 Construct a TM that computes the function $f(n, m) = n+m$ for $n, m \in \mathbb{N}$ where the input is given in unary notation, i.e., as a word $|^n\#|^m$ on the tape.

Task 4 Construct a TM for deciding the language

$$L = \{a^i b^j c^k \mid i + j = k\}.$$