Homework, the 2st series

Deadline: 23 April, 23:59.

For a language L over an alphabet $\{a_1, a_2, ..., a_k\}$, let L' consists of those words u, for which there exist some words $u_1, u_2, ..., u_k$ in L, such that the number of occurrences of the letter a_i in the word u equals the length of the word u_i .

Show that L' is in the class P/poly for any language L.