Daily Question

(due September 28, 2005) Let $\Sigma = \{\mathsf{a}, \mathsf{b}\}$ and let $B = \{x | \exists w \in \Sigma^*.\ x = ww\}$. In other words, B is the language of all strings that consist of a shorter string that is repeated twice. For example, "aa", "abbababbab" and ϵ are in B, but "aaa", "bbaabbba", and "aabbaa" are not. Prove that B is not regular.