Problem 2.1. (6 pt) Prove that the following problem is PSPACE-complete:

Input: a finite alphabet *A*, a letter $x_0 \in A$, a finite set *X* of tuples of the form (a, j, b, k, c) where *a*, *b*, *c* are letters from *A* and *j*, *k* are natural numbers written in unary (i.e., written as a symbol 1 repeated *j* or *k* times, respectively; observe that *j* and/or *k* can be equal 0);

Question: does there exist an infinite sequence of letters $x_0, x_1, x_2, \dots \in A$ (starting with the given letter) such that for every tuple $(a, j, b, k, c) \in X$ and for every position $i \in \mathbb{N}$, if $x_i = a$ and $x_{i+j} = b$ then $x_{i+j+k} = c$ (in other words, a tuple (a, j, b, k, c) is an implication: if on some position we have a and j positions later we have b, then k more positions later we have c)?