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 $x_{0}, x_{1}, x_{2}, \cdots \in A$ (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 $c$ )?

