To see that the *Perfect Assembly* problem is in NP we use the sequence forming the perfect assembly as the certificate. It is easy to check that a given sequence forms a perfect assembly.

To show that the problem is NP-complete, we show that *Hamiltonian Path* $\leq_P$ *Perfect Assembly*. Given an arbitrary instance of the *Hamiltonian Path* problem $G = (V, E)$, we use $\ell = 1$ and use 2 letters $v_{in}$ and $v_{out}$ for each node $v$ in $G$. The set $S$ of required sequences will be $S = \{v_{in}v_{out}$ for all $v \in V\}$, so a perfect assembly corresponds to ordering the nodes of the graph $G$. We set $T$ of possible corroborating strings will correspond to edges of $E$. Let $T = \{v_{out}w_{in}$ for edges $(v, w) \in E\}$. We claim that this instance of *Perfect Assembly* is equivalent to the original *Hamiltonian Path* problem. To prove this assume first that $G = (V, E)$ has a Hamiltonian Path. Order the pairs in $S$ in the order the path traverses the corresponding nodes. This forms a perfect assembly as the edges $(v, w)$ of the path provide the necessary corroborating sequences in $T$. To see the other direction, assume there is a perfect assembly of $S$. This ordering of $S$ corresponds to an ordering of the nodes on $G$, and the ordering is a Hamiltonian path in $G$, as whenever a node $v$ is followed by a node $w$ in the ordering, by the definition of perfect assembly the sequence $v_{in}v_{out}w_{in}w_{out}$ must be corroborated by a sequence $v_{out}w_{in}$ in $T$, and hence $(v, w)$ must be an edge of $G$.

[1] ex47.725.856