("*coupling terms*")

$$\alpha\#V_1$$

("*initializing term*")

$$v_n\#\beta$$

("*finalizing term*")

For every $i = 1, \ldots, k$, the following string is a shortest common super-string for the scroll terms associated with adjacency list $L(v) = [w_1, \ldots, w_k]$:

$$\mathrm{scroll}(L(v), w_i) = Vw_iVw_{i+1}V \ldots w_{k-1}Vw_kVw_1Vw_2 \ldots Vw_{i-1}Vw_i$$

This is clear as always a maximum possible overlap of 2 characters between consecutive strings is achieved. Note that any string $\mathrm{scroll}(L(v), w_i)$ contains twice as many characters as there are outgoing edges at node v, plus two further characters, as initial node w_i is repeated at the end.

As an example, consider node v with adjacency list $L(v) = [a, b, w, c, d]$ and node w occurring in $L(v)$ with adjacency list $L(w) = [e, f, g, h]$. Selecting node w as initial node in the first scroll string, and, for example, node e as initial node in the second scroll string, we obtain:

$$\mathrm{scroll}(L(v), w) = VwVcVdVaVbVw$$
$$\mathrm{scroll}(L(w), e) = WeWfWgWhWe\ .$$

Using coupling string $w\#W$, we may join these two strings in such a way that maximum overlap of one character left and one character right of $w\#W$ is achieved. Note that this maximum overlap between any two such scroll strings and coupling string is possible if and only if node w appears in $L(v)$, and we used $\mathrm{scroll}(L(v), w)$ with w as start node.

$$\mathrm{scroll}(L(v), w)\#\mathrm{scroll}(L(w), e) = VwVcVdVaVbVw\#WeWfWgWhWe$$

Lemma 5.35.
Assume that $w_1, w_2, \ldots, w_n$ is a Hamiltonian path from node v_1 to node v_n in the considered graph. Then the following string S is a common super-string (even a shortest one, but this does not matter here) for the scroll, coupling, initializing, and finalizing terms associated with the graph.

$$S = \alpha\#scroll(L(w_1), w_2)\#scroll(L(w_2), w_3)\# \ldots \#scroll(L(w_{n-1}), w_n)\#\beta$$

It length is $2m + 3n$ (note that n was the number of nodes, and m was the number of edges).