Let G be a finite group, and call a sequence $\{g_i \in G\}_{i=1}^{|G|-1}$ a *Hamiltonian walk* if for each $g \in G$ there exists some $i \geq 0$ such that the n-th partial product $p_n = g$ where $p_n = g_1 \cdot g_2 \cdots g_n$.

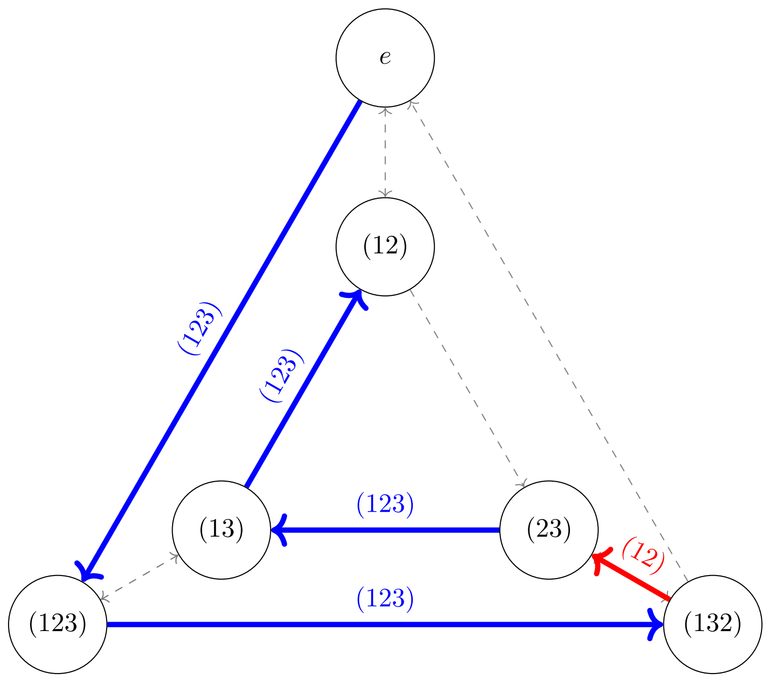

Figure 1: An example showing that the sequence $((123), (123), (12), (123), (123))$ is a palindromic Hamiltonian walk for S_3, where $p_0 = e$, $p_1 = (123)$, $p_2 = (132)$, $p_3 = (23)$, $p_4 = (13)$, and $p_5 = (12)$.

Question. Does every finite group have a Hamiltonian walk that is a palindrome?

Related.

1. If not, does every finite group have a Hamiltonian walk whose reversal is also a Hamiltonian walk?
2. Is there an efficient way to compute how many *essentially different* Hamiltonian walks G has?
3. For a group G, what proportion of Hamiltonian walks are reversible?
4. Does every finite semigroup have a reversible Hamiltonian walk?

References.

Problem 79.

`https://math.stackexchange.com/q/3706654/121988`