We say a group is invariably generated by a set of elements if any conjugates of those elements generates the group. Eberhard, Ford and Green built upon the work of many others and showed that, as $n \to \infty$, the probability that $S_n$ is invariably generated by a random set of elements is positive if there are four random elements, but goes to zero if we pick three random elements. This result gives rise to a nice Monte Carlo algorithm for computing Galois groups of polynomials. We will extend this result for $S_n$ to the finite classical groups using the correspondence between classes of maximal tori of classical groups and conjugacy classes of their Weyl groups. (Received July 03, 2018)