HW1, extra-credit problem: Let $f_1, \dots, f_k$ be a finite collection of homogeneous G-inv't elements generating $\mathbb{C}[V]\,\mathbb{C}[V]^G_+$. The common set of zeroes of $f_1, \dots, f_k$ is $\{0\}$ b/c the G-inv't elements separate the orbits. So the preimage of $0 \in \mathbb{C}^k$ under $V \xrightarrow[(f_1, \dots, f_k)]{} \mathbb{C}^k$ is 0. It follows that this morphism is finite. Therefore all fibers are finite. The morphism is also G-invariant. It follows that all G-orbits are finite. But $G \subset GL(V)$, hence $G^\circ = \{1\}$ and G is finite.