Abstract: Any compact 3-manifold $M$ has a complexity $c(M)$, which is a nonnegative integer number and which is defined as the number of true vertices of a minimal almost simple spine $P$ of $M$. The complexity has many good properties. In particular, it behave well with respect to cutting $M$ along surfaces. Namely, if $M_F$ is obtained from $M$ by cutting along an incompressible surface $F \subset M$, then $c(M_F) \leq c(M)$. However, this useful property has a shortcoming: the inequality is not strong. So we cannot use it for inductive proofs. We improve that by defining extended complexity $\bar{c}(M)$. It is not a number anymore, but a finite tuple of nonnegative integers. The tuples are considered in lexicographical ordering. We prove that if $F$ is essential, then $\bar{c}(M_F) < \bar{c}(M)$. We apply the extended complexity for proving the algorithmic classification theorem for Haken 3-manifolds.