On finiteness conditions in groups

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Some of the properties of finite groups may have analogues in broader classes of groups satisfying some restrictions weaker than the finiteness of the number of elements. Such restrictions are called *finiteness conditions*, two classical examples are local-finiteness and periodicity. A group is called *locally finite* if every its finitely generated subgroup is finite. A group is called *periodic* if every its element is of finite order. Obviously, locally finite groups are periodic, and the famous Burnside problem discusses when the opposite is true.

Another example of the finiteness condition would be to state that G is a group of 3-transpositions, i.e. G is generated by a normal set of involutions D such that the order $|xy| \leq 3$ for any $x, y \in D$. This is because a group of 3-transpositions is locally finite, by the classical result.

In the talk I want to give some review on the recent research on finiteness conditions: in particular, on groups with the given set of element orders; on 6-transposition groups, and related research on axial and Majorana algebras; and on groups, generated by a conjugacy class C of elements of order 3 satisfying some restrictions on 2-generated subgroups.