Majority coloring of a digraph is a coloring of its vertices such that for each vertex $v$, at least half of the out-neighbors of $v$ have different colors than $v$. A digraph $D$ is majority $k$-choosable if for any assignment of lists of colors of size $k$ to the vertices there is a majority coloring of $D$ from these lists. We prove that every finite digraph is majority 4-choosable. This gives a positive answer to a question posed recently by Kreutzer, Oum, Seymour, van der Zypen, and Wood in [1]. We obtain this result as a consequence of a more general theorem, in which majority condition is profitably extended. For instance, the theorem implies also that every finite digraph has a coloring from arbitrary lists of size three, in which at most $2/3$ of the out-neighbors of any vertex share its color. This solves another problem posed in [1], and supports an intriguing conjecture stating that every digraph is majority 3-colorable. Finally, we prove some results for infinite digraphs.

Keywords: majority coloring, unfriendly partition, majority $k$-choosability, digraph, infinite digraph.

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References