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*Polyominoes and Graphs Built From Fibonacci Words*,  
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**Abstract**

We introduce the  $k$ -bonacci polyominoes, a new family of polyominoes associated with the binary words avoiding  $k$  consecutive 1's, also called generalized  $k$ -bonacci words. The polyominoes are very entrancing objects, considered in combinatorics and computer science. The study of polyominoes generates a rich source of combinatorial ideas. In this paper we study some properties of  $k$ -bonacci polyominoes. Specifically, we determine their recursive structure and, using this structure, we enumerate them according to their area, semiperimeter, and length of the corresponding words. We also introduce the  $k$ -bonacci graphs, then we obtain the generating functions for the total number of vertices and edges, the distribution of the degrees, and the total number of  $k$ -bonacci graphs that have a Hamiltonian cycle.