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**Margaret M. Bayer\*** (bayer@math.ku.edu), Department of Mathematics, University of Kansas, 1460 Jayhawk Boulevard, Room 405, Lawrence, KS 66045-7523. *Shelling and  $h$ -vectors of certain nonsimplicial polytopes*. Preliminary report.

A shelling of a simplicial polytope results in a partition of the face lattice into intervals, each of which is a Boolean lattice. The numbers of Boolean lattices of the various dimensions form the  $h$ -vector. A simple combinatorial transformation gives the  $f$ -vector in terms of the  $h$ -vector. The  $h$ -vector also gives the homology ranks of a toric variety associated to the simplicial polytope. This interpretation can be extended to nonsimplicial polytopes to give a definition of the “toric  $h$ -vector” of the polytope. However, in general, the toric  $h$ -vector does not have a nice computation via a shelling of the polytope. Clara Chan found such a shelling computation for the  $h$ -vectors of cubical polytopes. Here we show certain classes of nonsimplicial polytopes where shelling the facets in colex order produces a partition of the face lattice into intervals, each of which is a Boolean lattice. The numbers of Boolean lattices of the various dimensions form a “shelling  $h$ -vector,” which in these cases is between the 0-vector and the toric  $h$ -vector. The  $f$ -vector is obtained from the shelling  $h$ -vector as in the simplicial case. The polytopes include the ordinary polytopes and other polytopes discovered by Bisztriczky as generalizations of cyclic polytopes. (Received August 15, 2005)