1116-05-378 **Richard P. Stanley***, Department of Mathematics, University of Miami, Coral Gables, FL 33124. *Combinatorics and Smith normal form.* Preliminary report.

Let A be an $n \times n$ matrix over a commutative ring R with identity. If there exist $n \times n$ matrices P and Q invertible over R such that $B = PAQ$ is a diagonal matrix $\mathrm{diag}(\alpha_1, \ldots, \alpha_n)$, where $\alpha_i | \alpha_{i+1}$ in R for $1 \leq i \leq n-1$ (where $\alpha | 0$ for all $\alpha \in R$), then we call B a *Smith normal form* (SNF) of A. Over a PID an SNF always exists and is unique up to multiplication by units. We will give a survey of some combinatorial aspects of SNF. The two main topics are (1) the distribution of the SNF of a random integer matrix, and (2) interesting examples of the SNF of combinatorially defined matrices. (Received August 28, 2015)