MATH 583, Dr. Z. , **Suggested Final Projects**

Due: Monday, May 12, 2003, 10am.

Do your assigned project, or make-up your own of comparable difficulty.

David B.: Write a Maple program that inputs a pair of Young tableaux of the same shape, and outputs a permutation, via the inverse of the Robinson-Schenstead correspondence.

Konrad B.: Write a Maple program that computes the characteristic polynomials of the transfer matrices between pairs of bases from $\{e, m, h, p, s\}$, and research their behavior.

Rohan F.: Write a Maple program that does Schutzenberger's *jeu de taquin* (section 3.7). Try to animate the movement.

Roman H.: Program the Franzblau-Zeilberger bijection that proves the hook-length formula (look up the paper that appeared in J. Algorithm, c. 1983)

Mohamud M.: Program the Greene-Nijenhuis-Wilf algorithm in ex. 17 of Sagan's chapter.

TT ("Ike"): Extend the Maple program in **SF** that counts the number of Young tableaux of a given shape to counting 3D tableaux of "shape" $\lambda_1, \lambda_2, \ldots, \lambda_r$, where each λ_i is a partition.

Vincent V.: Program the [NPS] algorithm described in section 3.10 and its inverse.

Michael W.: Write a Maple program that computes the Macdonald polynomials from their definition via orthogonality relations. First do it for Schur polynomials, and then modify it with parameters q and t.

Marcin: Extend the RS program to the Robinson-Schenstead-Knuth Correspondence (see Knuth's "Art of Computer programming, v. 3"). Also write a program to compute the Schur polynomials $s_\lambda(x_1, \ldots, x_r)$, using the combinatorial interpretation in terms of weight-enumerators of column-strict tableaux of shape λ with entries that are $\{1, 2, \ldots, r\}$.