**MA 614 – Homework 21**
**Due Friday, March 11**

Your answers should be detailed explanations in quality mathematical English. You must type your homework in LaTeX.

1. Let $a_n$ be the number of ways of doing the following: Partition the elements of $[n]$ into nonempty blocks, then partition the blocks themselves into nonempty "superblocks."
   (a) Determine the egf for $a_n$.
   (b) Calculate $a_3$ and confirm this value by explicitly enumerating all possibilities.
2. Find the egf and an expression for the number of permutations of $[n]$ having no 2-cycles.
3. Suppose we have a room with $n$ children which are distinguishable. The children gather into circles by holding hands, and one child stands in the center of each circle. A circle may consist of as few as one child clasping his or her hands around the other child at the center of the circle. Let $h_n$ be the number of ways this can be done. Find the egf for $h_n$.