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Today: Probabilistic analysis; randomized algorithms. §§ 5.{0,1,2,3}.
Next class: Homework 2 due before class. Catch-up and review (Midterm Exam 1 soon).
Reminders: Homework. Newsgroup. Reading. Coding. Practice. Don't fall behind.

1. List the members of your group below. Underline your name.

2. A *derangement* of the sequence $1, 2, \ldots, n$ is a permutation of the sequence in which no element is at its original position. The number of derangements of an n-element sequence is often denoted by $!n$, and called the *subfactorial* of n, by analogy with the $n!$ being the factorial.

   List all derangements of n elements, for each value of $n = 0, 1, 2, 3, 4$.

3. Prove or disprove: $!n = (n-1)(!(n-1)+!(n-2))$ for $n > 1$.

4. Recall the factorial: $n! = n(n-1)!$ for $n > 1$ with $0! = 1$. Prove or disprove: $n! = (n-1)((n-1)! + (n-2)!)$ for $n > 1$.

5. Consider the operation of the algorithm Permute-With-All from the textbook (p. 129) on an input array `A = [1, 2, 3]`.

   (a) List all possible outputs on this input.

   (b) Determine the number of distinct computational histories on this input.

   (c) Does the algorithm produce a uniform random permutation? Why?

   (d) Compute the probability of each output above. [Suggestion: Use distributed computing in your group.]

[additional space for answering the earlier question]