CSCI 330 Spring 1999
QUIZ 5
Assigned Thursday 99/1/28

What follows is a (slightly edited) long quote from the following paper. Backus, John. "Can Programming be Liberated from, the von Neumann Style? A Functional Style and Its Algebra of Programs." *Communications of the ACM*, 21, 8 (September 1977), pp.613-641. (Reprinted in *ACM Turing Awards Lectures: The First Twenty Years.* New York: ACM Press, 1987.

In the passage below, Backus discusses a program that was presented in class on Tuesday. What does the program do?

Answer: Multiply two matrices. (The program is called *mm*.)

> This program ... does not name its arguments or any intermediate results; contains no variables, no loops, no control statements nor procedure delcarations; has no initialization instructions; is not word-at-a-time in nature; is hierarchically constructed from simpler components; uses generally applicable housekeeping forms and operators (e.g., αf (`@ f`), distl, distr, trans); is perfectly general; yields $\perp$ (?) whenever its argument is inappropriate in any way; does not constrain the order of evaluation unnecessarily (all applications of *ip* can be done in parallel or in any order); and, using algebraic laws (see below), can be transformed into more "efficient" or more "explanatory" programs (e.g., one that is recursively defined). None of these properties hold for the typical von Neumann ... program.