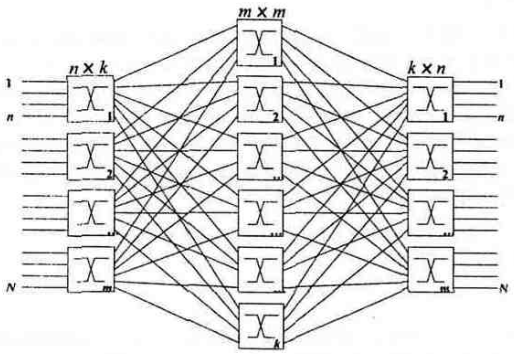
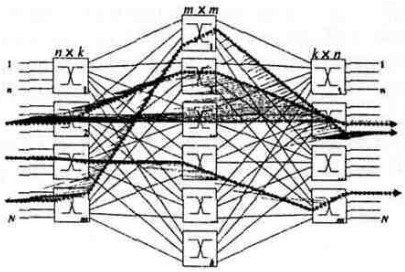
EE Quals 2004
Professor Nick McKeown

Q1: An Algorithm for a Switching Network
Consider the N-input and N-output switching network shown below. New connections are added one at a time between a single unoccupied input and a single unoccupied output.



For example, here is the same switching network with three connections.



a) Write down N as a function of n and m.
b) In general, is k larger, smaller, or equal to n? Explain.
c) What is the minimum value of k (as a function of n) such that a new connection can always be added when its input and output are unoccupied?
d) Do you think the value of k depends on whether connections are all together, or one at a time (in an arbitrary order)?