Exercise 4
deadline 9.2.2006
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1. Show that the Bayan, baseline, and omega networks (slide L4-48) have the self-routing property.

2. For the 8×8 Benes network, use the looping algorithm to find the paths for the following permutation:

input	1	2	3	4	5	6	7	8
output	3	6	2	1	8	4	5	7

3. Consider the following scale up by a factor of l for a three stage factoring of a rearrangeable network via $N = p \times q$ as shown in slide 3-68. Suppose now we replace each edge by l edges, each $p \times p$ switch by an $lp \times lp$ switch, and each $q \times q$ switch by $lq \times lq$ switch. Show that the resulting $lN \times lN$ switch is rearrangeable. Furthermore, show that the above scale up has unneccessary crosspoints for constructing $lN \times lN$ rearrangeable network. (Hint: Consider an equivalent $lN \times lN$ Clos network.)

4. Consider a symmetric 6×6 SSS-switch where 1st and 3rd stages are composed of 2×2 switching blocks.

   (a) Determine the size and number of 2nd SBs.

   (b) Draw a graph presentation for the switch.

   (c) Allocate paths for connections $t_1 \rightarrow r_3$, $t_2 \rightarrow r_6$, $t_4 \rightarrow r_1$, and $t_6 \rightarrow r_5$.

5. A 2×2 crossbar has 4 crosspoints. How many crosspoint settings (valid and invalid) there are? Use the results of Ex-2 b) and c) to determine how many legimate point-to-point and multicast connection patterns there are. Give the crossbar setup for connection patterns as logical truth tables ('0' crosspoint open, '1' crosspoint connected).