1. Consider the recursive construction of an $N \times N$ rearrangeably non-blocking Clos network using only $p \times p$ crossbars only.
   (a) Compute the number of crosspoints as a function N and p.
   (b) For large N, show that $p = 3$ minimises the crosspoint count.
2. Compute the crosspoint complexity, logical depth (the number of logical gates in a path), and fan-out (the number of logical gates driven by the input or by any gate in the network) for the following networks.
   (a) The full $N \times N$ crosspoint switch.
   (b) The three stage rearrangeable Clos network constructed using $\sqrt{N} \times \sqrt{N}$ switches.
   (c) The Benes network.
3. A 2×2 crossbar has 4 crosspoints, giving a total of $2^4 = 16$ crosspoint settings. Which of these constitute legimate point-to-point and multicast connection patterns?
4. Show that the Bayan, baseline, and omega networks (slide 5-44) have the self-routing property.
5. 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