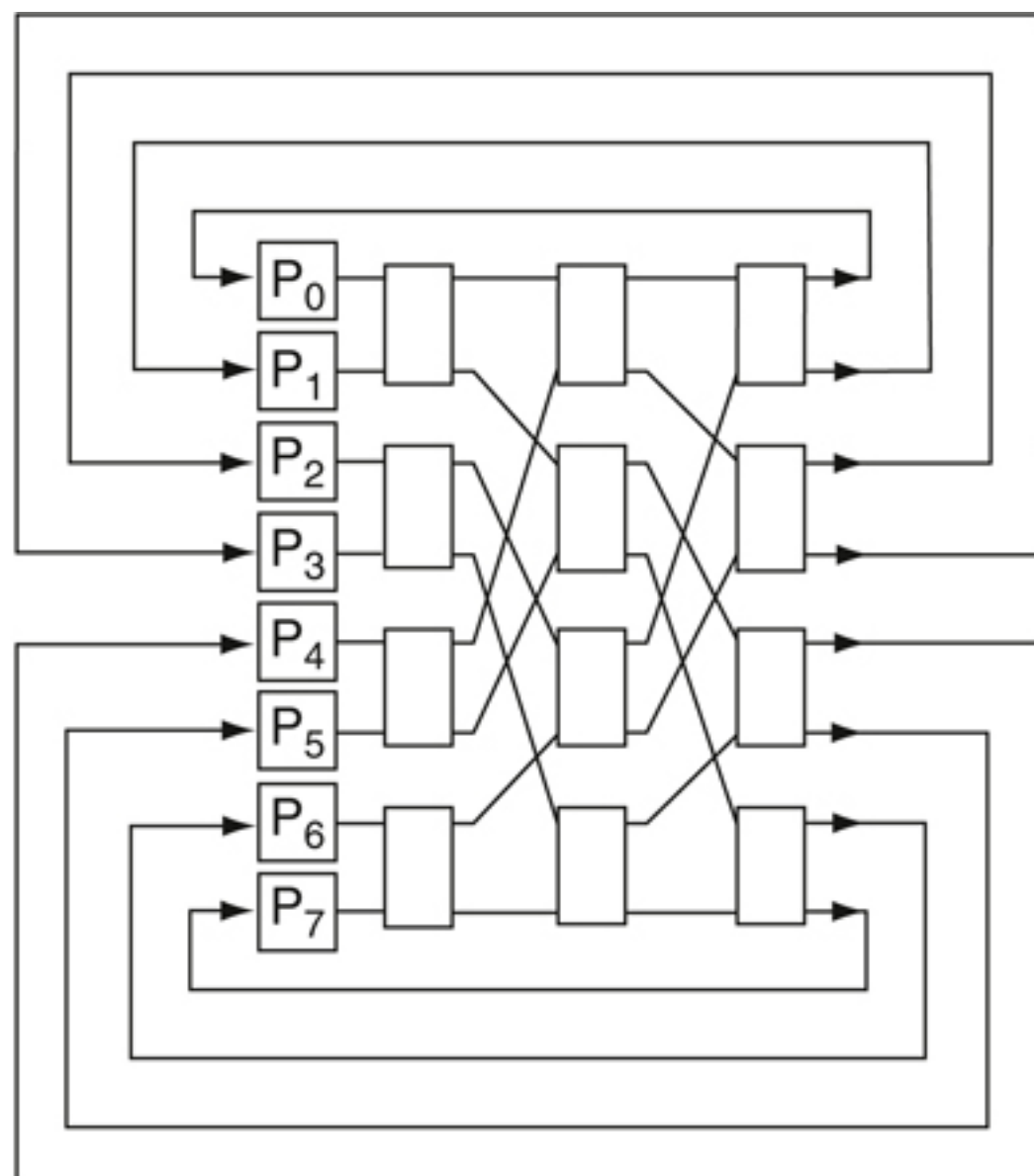
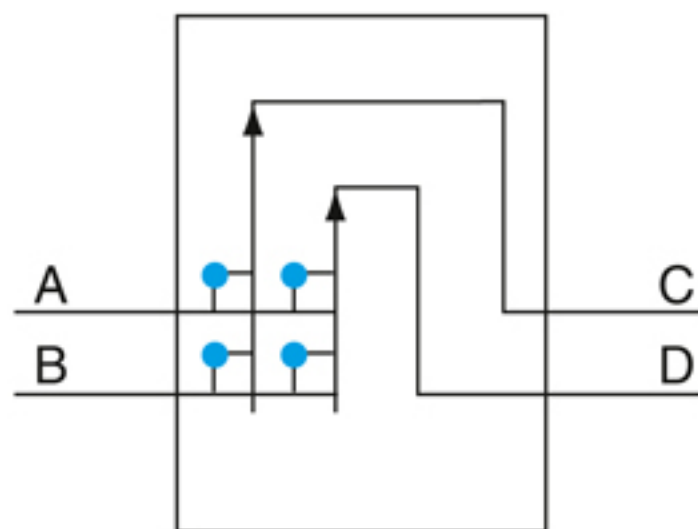


a. Crossbar



b. Omega network



c. Omega network switch box

**FIGURE 6.16 Popular multistage network topologies for eight nodes.** The switches in these drawings are simpler than in earlier drawings because the links are unidirectional; data comes in at the left and exits out the right link. The switch box in c can pass A to C and B to D or B to C and A to D. The crossbar uses  $n^2$  switches, where  $n$  is the number of processors, while the Omega network uses  $2n \log_2 n$  of the large switch boxes, each of which is logically composed of four of the smaller switches. In this case, the crossbar uses 64 switches versus 12 switch boxes, or 48 switches, in the Omega network. The crossbar, however, can support any combination of messages between processors, while the Omega network cannot.