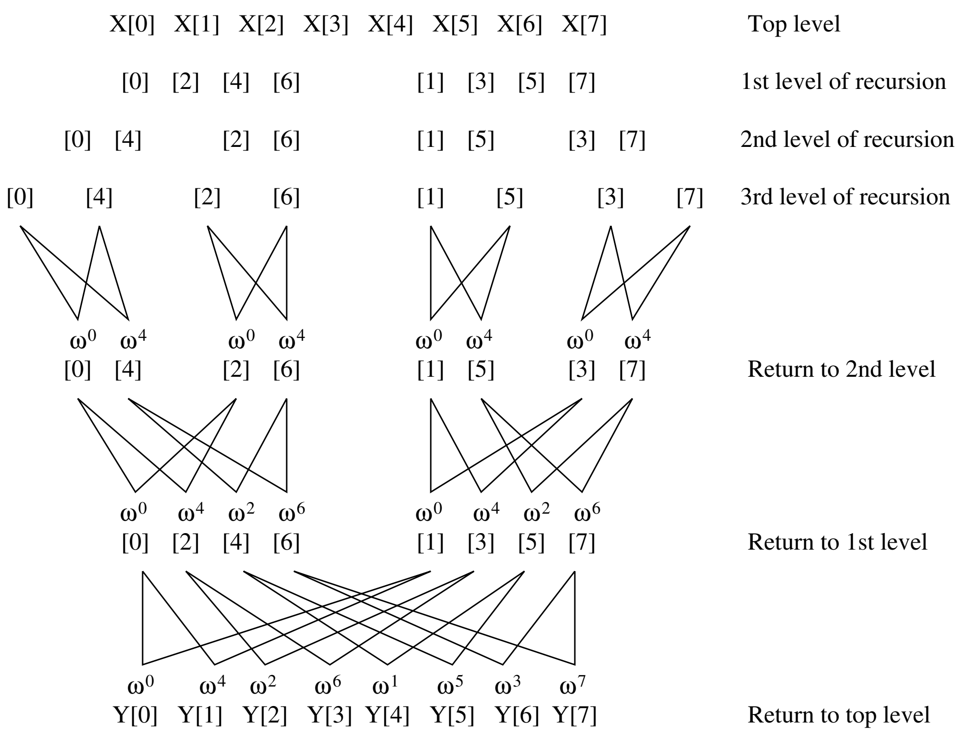


Figure 13.1 A recursive 8-point unordered FFT computation.

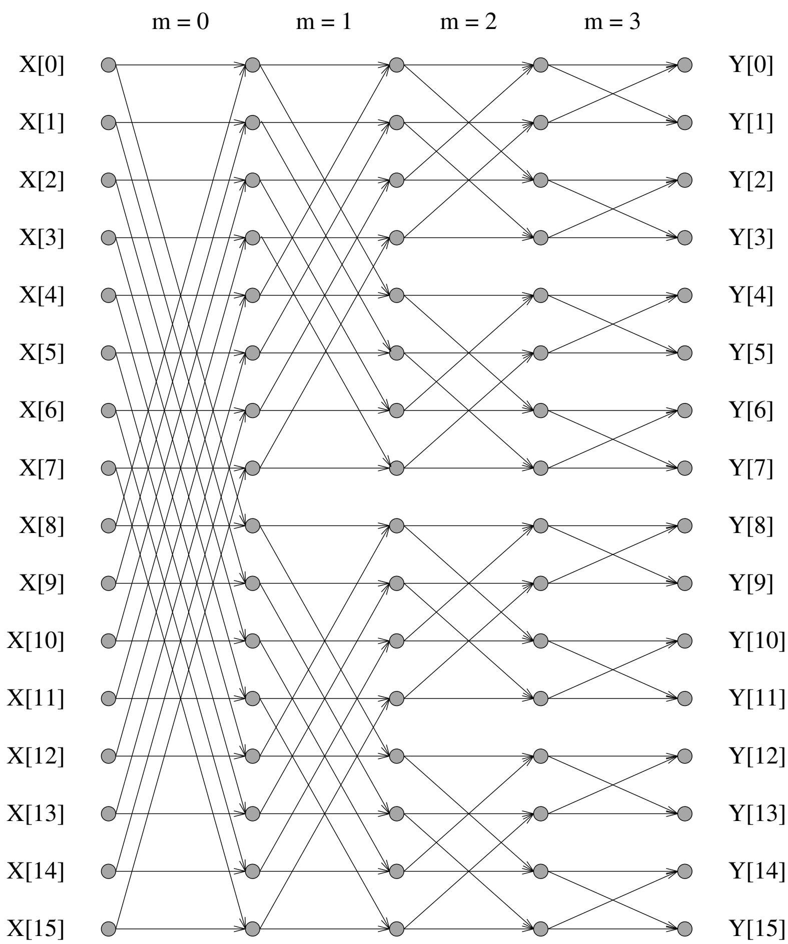


Figure 13.2 The pattern of combination of elements of the input and the intermediate sequences during a 16-point unordered FFT computation.

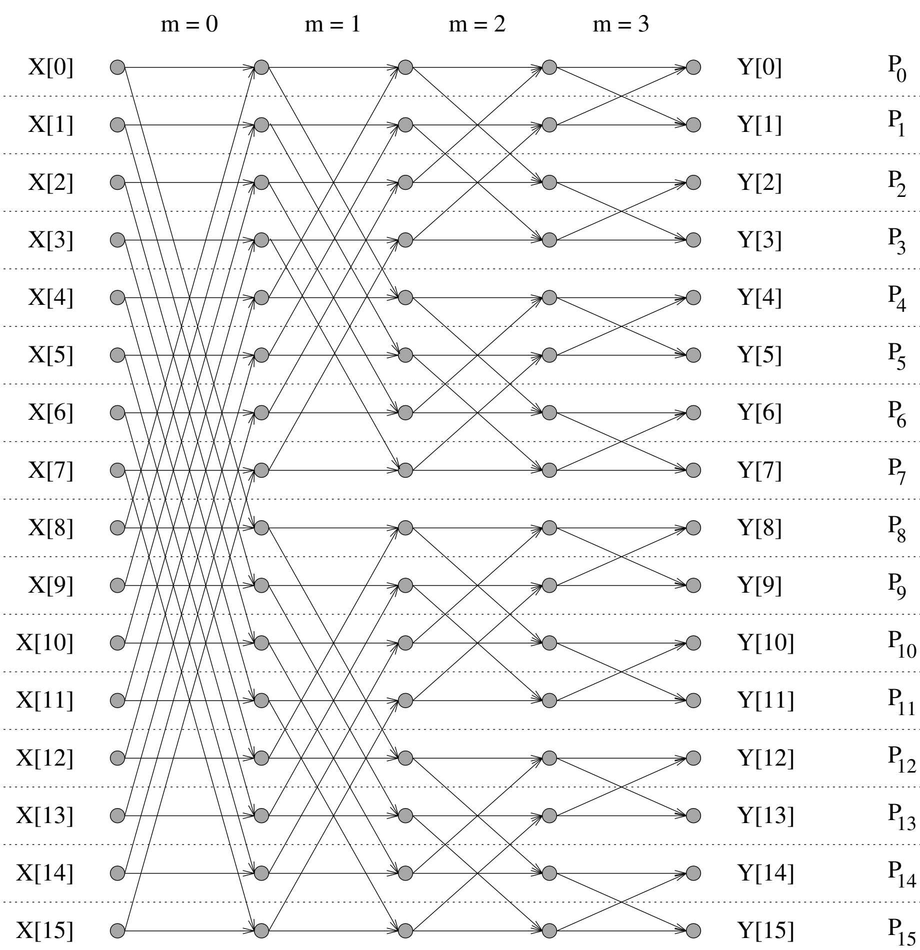


Figure 13.3 A 16-point unordered FFT on 16 processes. P_i denotes the process labeled i.

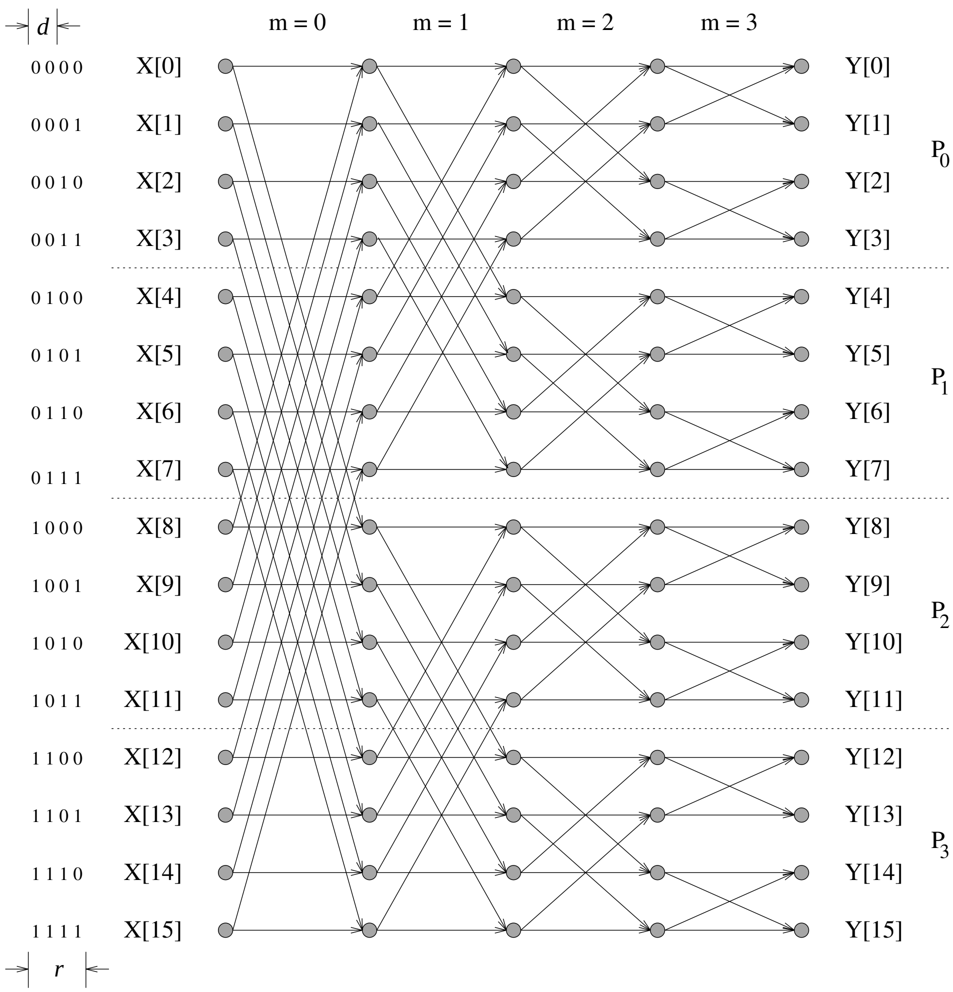


Figure 13.4 A 16-point FFT on four processes. P_i denotes the process labeled i. In general, the number of processes is $p = 2^d$ and the length of the input sequence is $n = 2^r$.

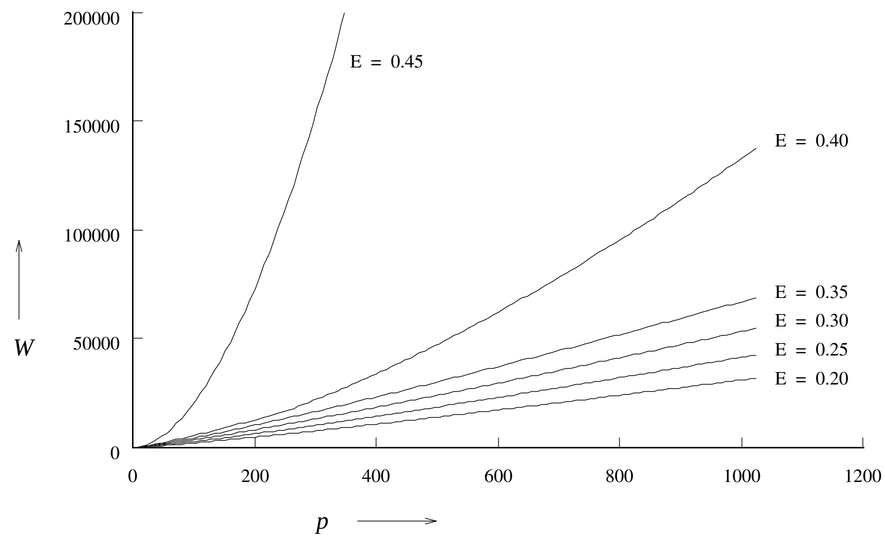


Figure 13.5 Isoefficiency functions of the binary-exchange algorithm on a hypercube with $t_c = 2$, $t_w = 4$, and $t_s = 25$ for various values of E.

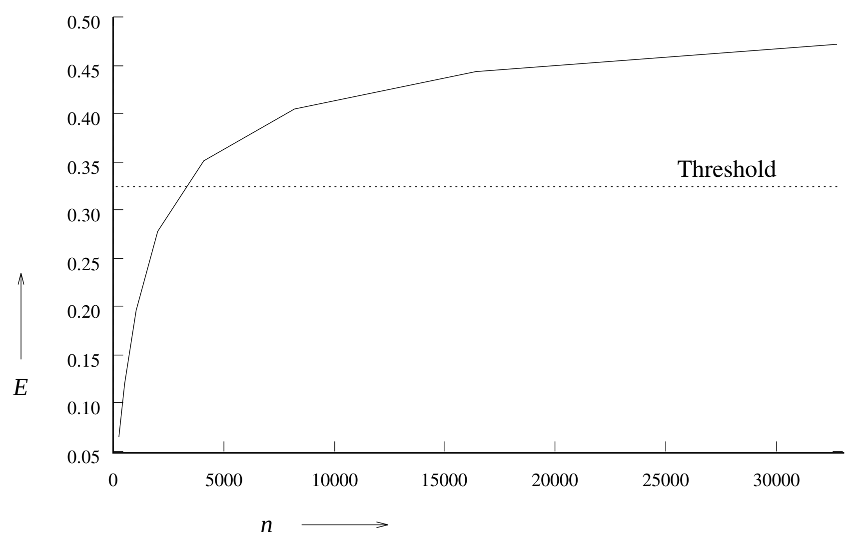


Figure 13.6 The efficiency of the binary-exchange algorithm as a function of n on a 256-node hypercube with $t_c = 2$, $t_w = 4$, and $t_s = 25$.

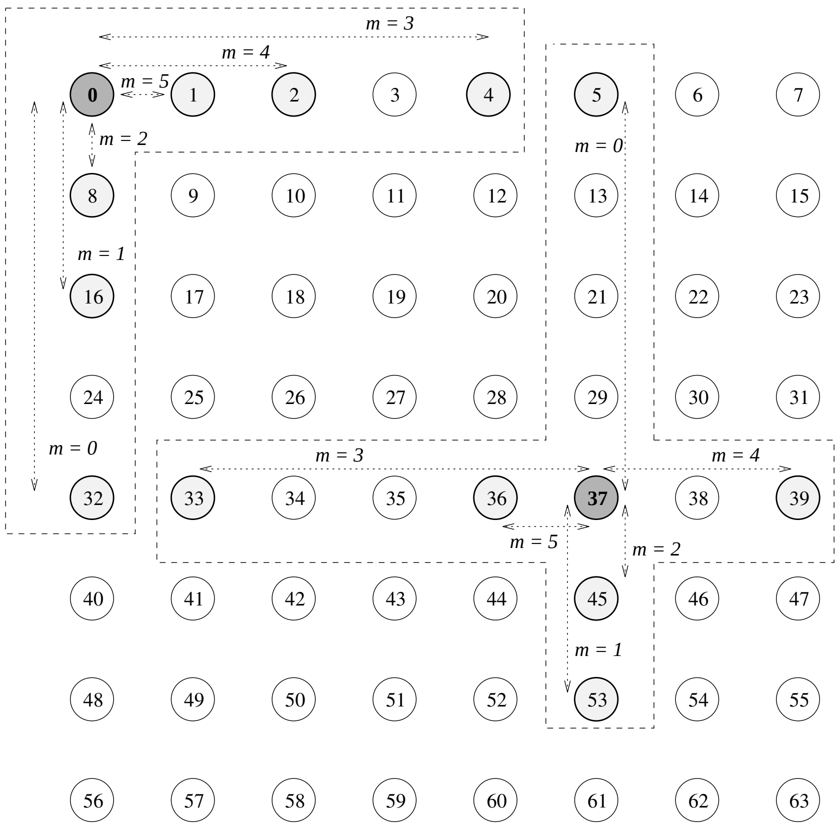


Figure 13.7 Data communication during an FFT computation on a logical square mesh of 64 processes. The figure shows all the processes with which the processes labeled 0 and 37 exchange data.

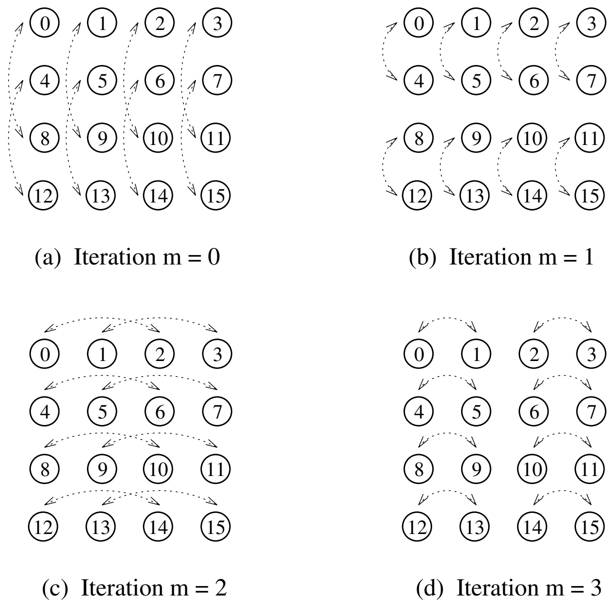
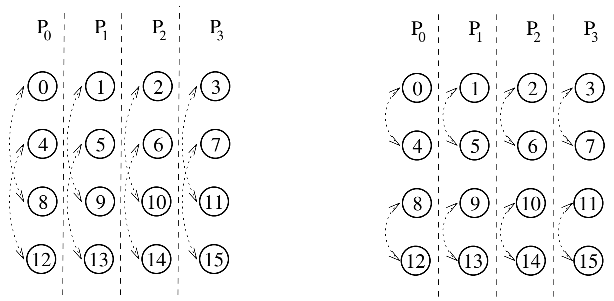
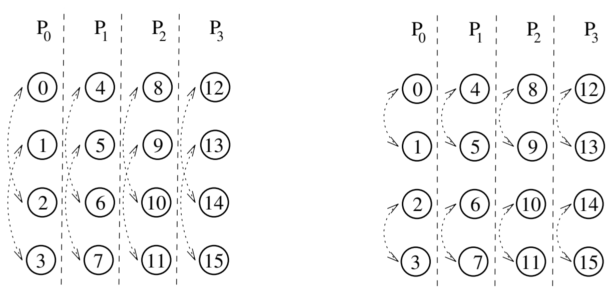


Figure 13.8 The pattern of combination of elements in a 16-point FFT when the data are arranged in a 4×4 two-dimensional square array.



(a) Steps in phase 1 of the transpose algorithm (before transpose)



(b) Steps in phase 3 of the transpose algorithm (after transpose)

Figure 13.9 The two-dimensional transpose algorithm for a 16-point FFT on four processes.

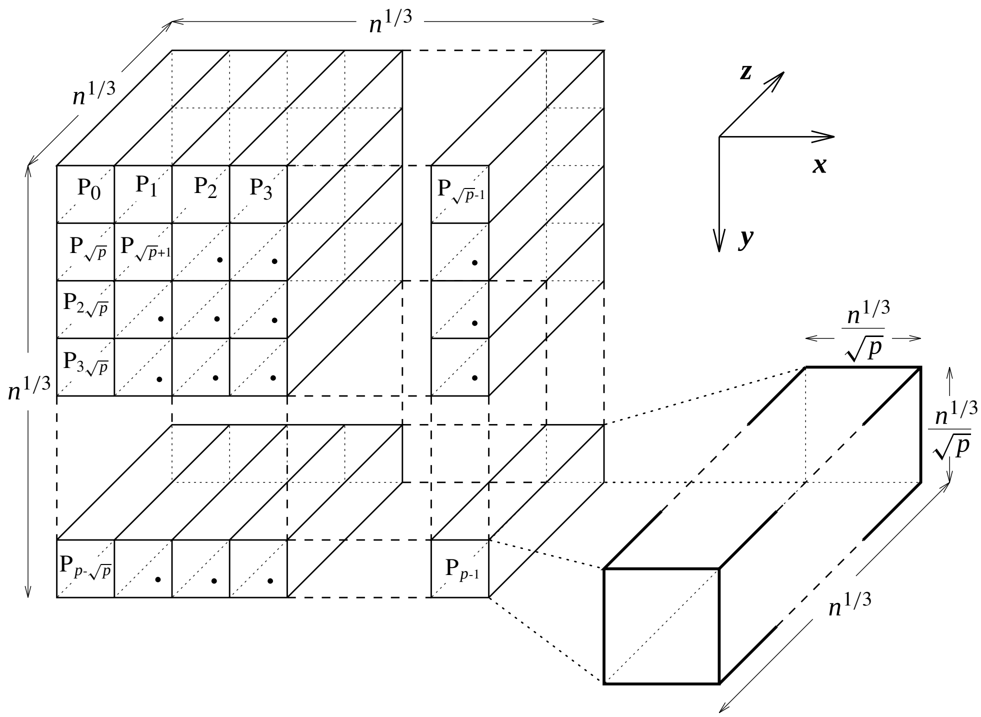
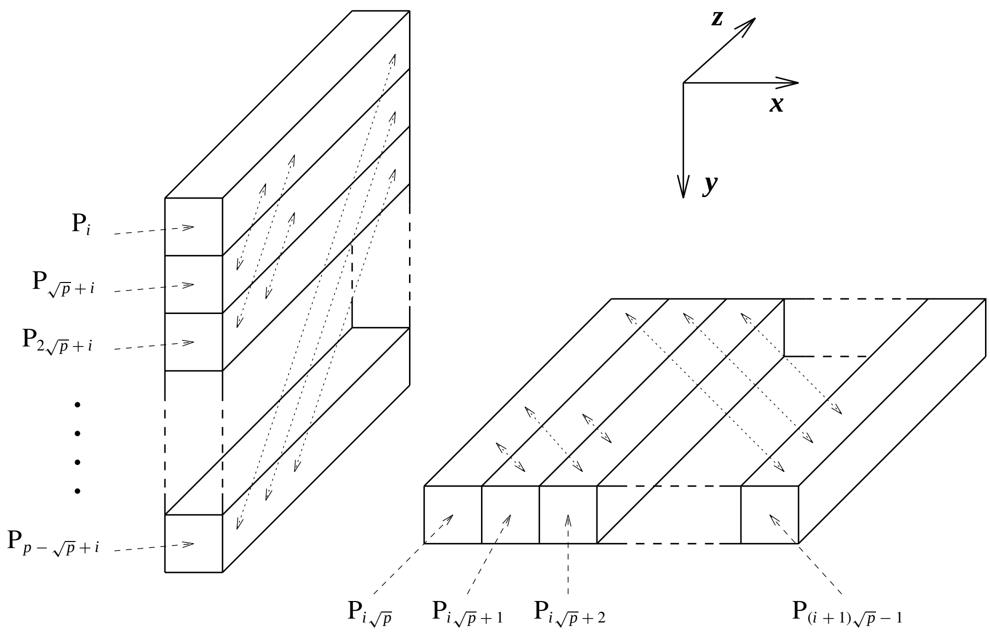


Figure 13.10 Data distribution in the three-dimensional transpose algorithm for an n-point FFT on p processes ($\sqrt{p} \leq n^{1/3}$).



(a) Transpose in the i^{th} column of processors during phase 2

(b) Transpose in the i^{th} row of processors during phase 4

Figure 13.11 The communication (transposition) phases in the three-dimensional transpose algorithm for an n-point FFT on p processes.

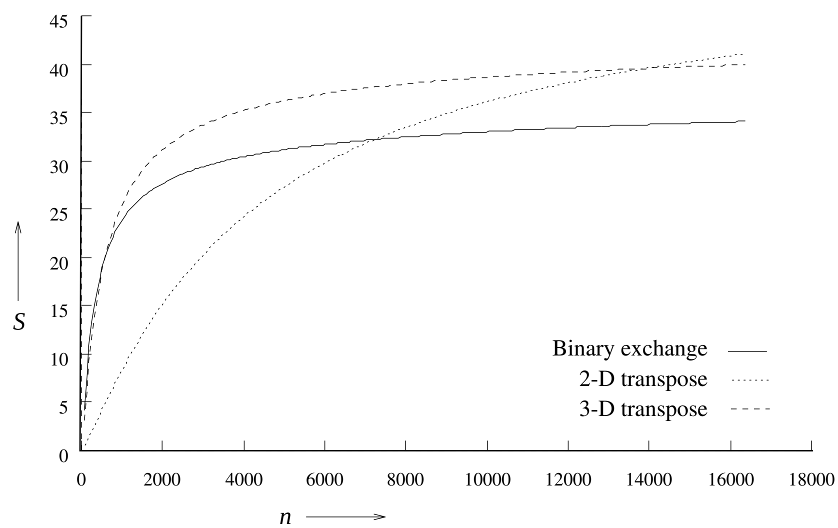


Figure 13.12 A comparison of the speedups obtained by the binary-exchange, 2-D transpose, and 3-D transpose algorithms on a 64-node hypercube with $t_c = 2$, $t_w = 4$, and $t_s = 25$.