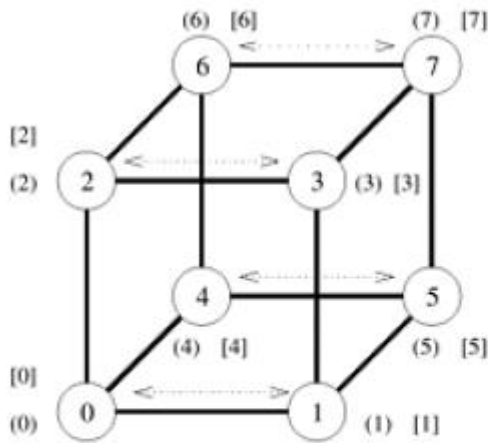
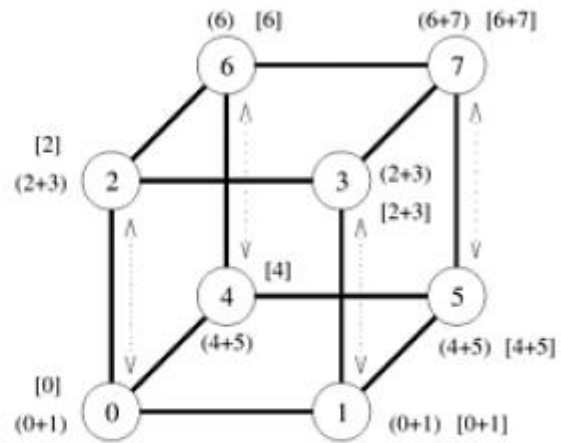


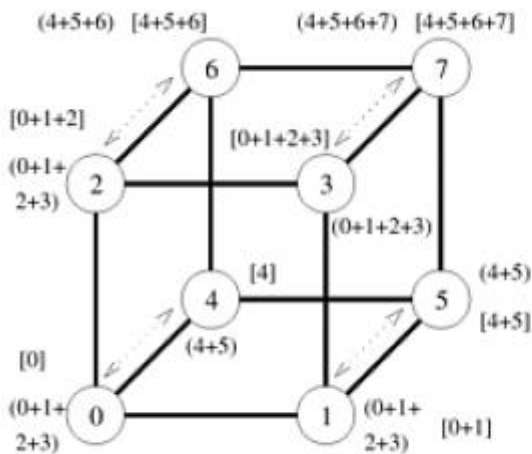
All-Reduce and Prefix Sum Operation



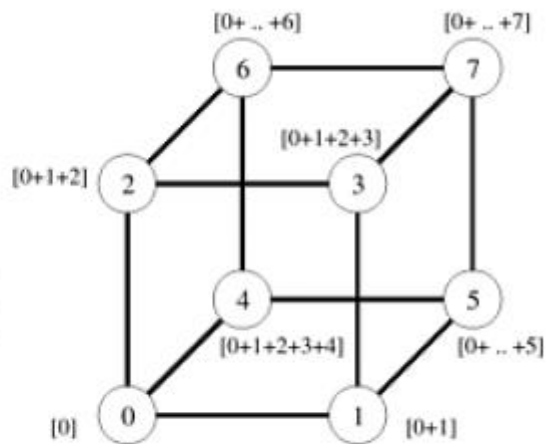
(a) Initial distribution of values



(b) Distribution of sums before second step

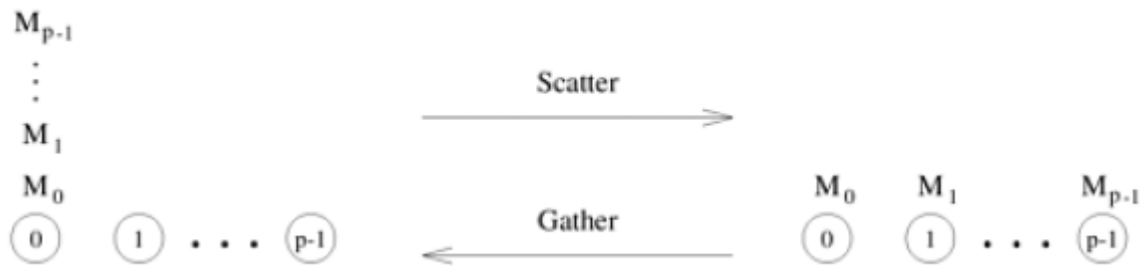


(c) Distribution of sums before third step

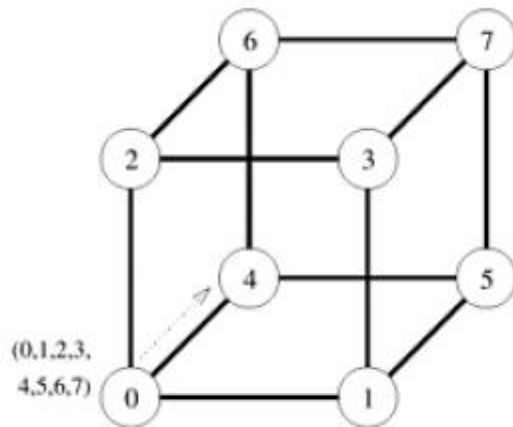


(d) Final distribution of prefix sums

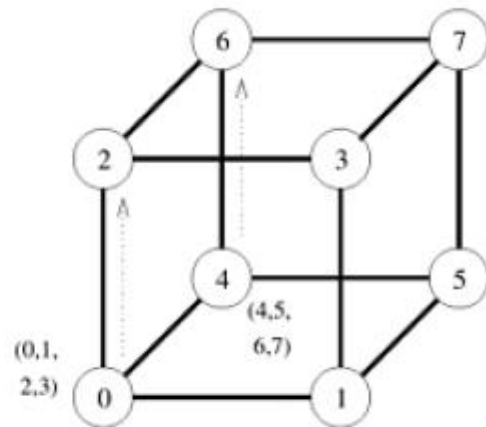
Scatter and Gather



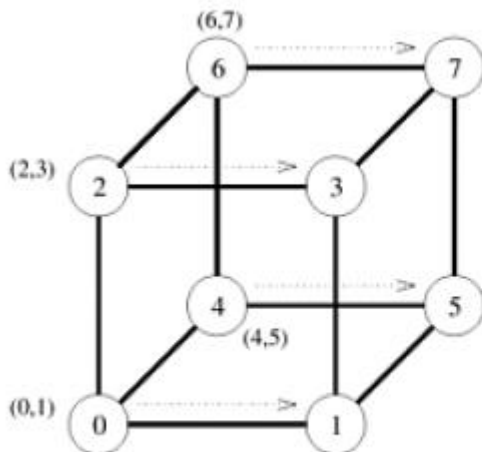
Scatter operation on an eight-node hypercube



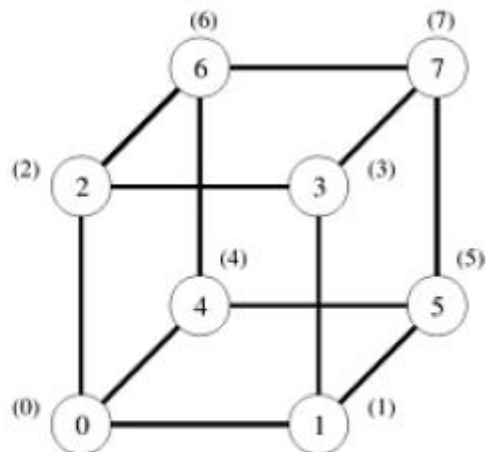
(a) Initial distribution of messages



(b) Distribution before the second step



(c) Distribution before the third step



(d) Final distribution of messages