

L1F19BSCS0322

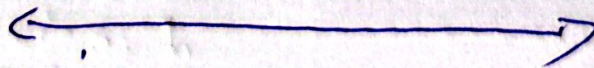
Answer:

To perform the all-to-all broadcast operation for vector $B = [1, 2]$ in a hypercube network, let's assume the hypercube network has N nodes, where N is the power of 2.

There will be 3 iterations.

- \rightarrow 1 iteration sender node [1] receiver node [2]
[1-2]
- \rightarrow 2 iteration sender Node [1, 2] receiver node
[3, 4] [3-4]
- \rightarrow 3 iteration sender node [1, 2, 3, 4]
receiver node [5, 6, 7, 8]
[5-8]
- $\rightarrow \{ 1 \rightarrow 2, 3 \rightarrow 4, 5 \rightarrow 8 \}$

Since B has 2 elements and the hypercube network has 8 nodes, the minimum number of iteration required will $\log_2 8 = 3$



PART B

One to all scatter operation in a cube network for the array $A = \{a, b, c, d, e, f, g, h\}$

Cube network

Node 0: a

Node 1: b

Node 2: c

Node 3: d

Node 4: e

Node 5: f

Node 6: g

Node 7: h

Reduction

Node 1 sends b to Node 0 [1→0]

Node 3 sends d to Node 2 [3→2]

Node 5 sends f to Node 4 [5→4]

Node 7 sends h to Node 6 [7→6]

updated

1st iteration

Node 1: b

Node 2: d

Node 3: d

Node 4: f

Node 5: f

Node 6: h

Node 7: h

2nd iteration

Node 2 sends d to Node 0 [2→0]

Node 6 sends h to Node 4 [6→4]

update

Node 0: a, b, d

Node 2: d

Node 3