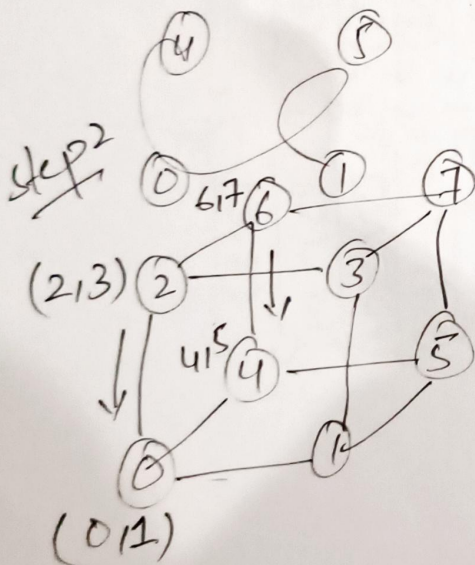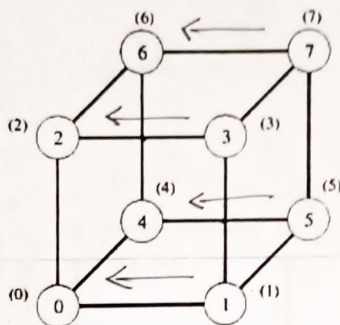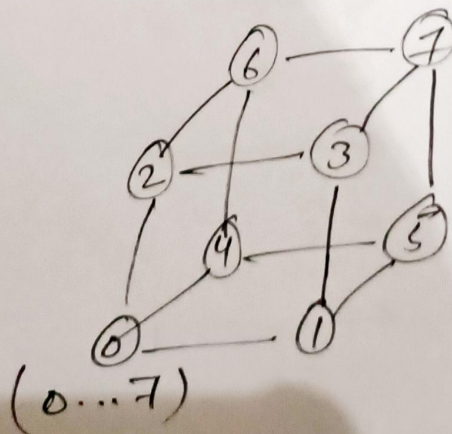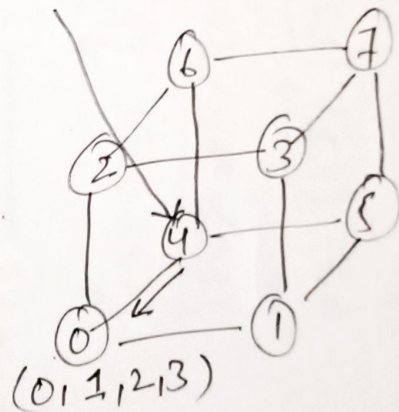# Quiz 3

Parallel and Distributed Computing - CS 3006

Q1: Following is the 8-node hypercube after the scatter operation has been completed. Your task is to perform the gather operation on the hypercube. Mention all steps for maximum marks.
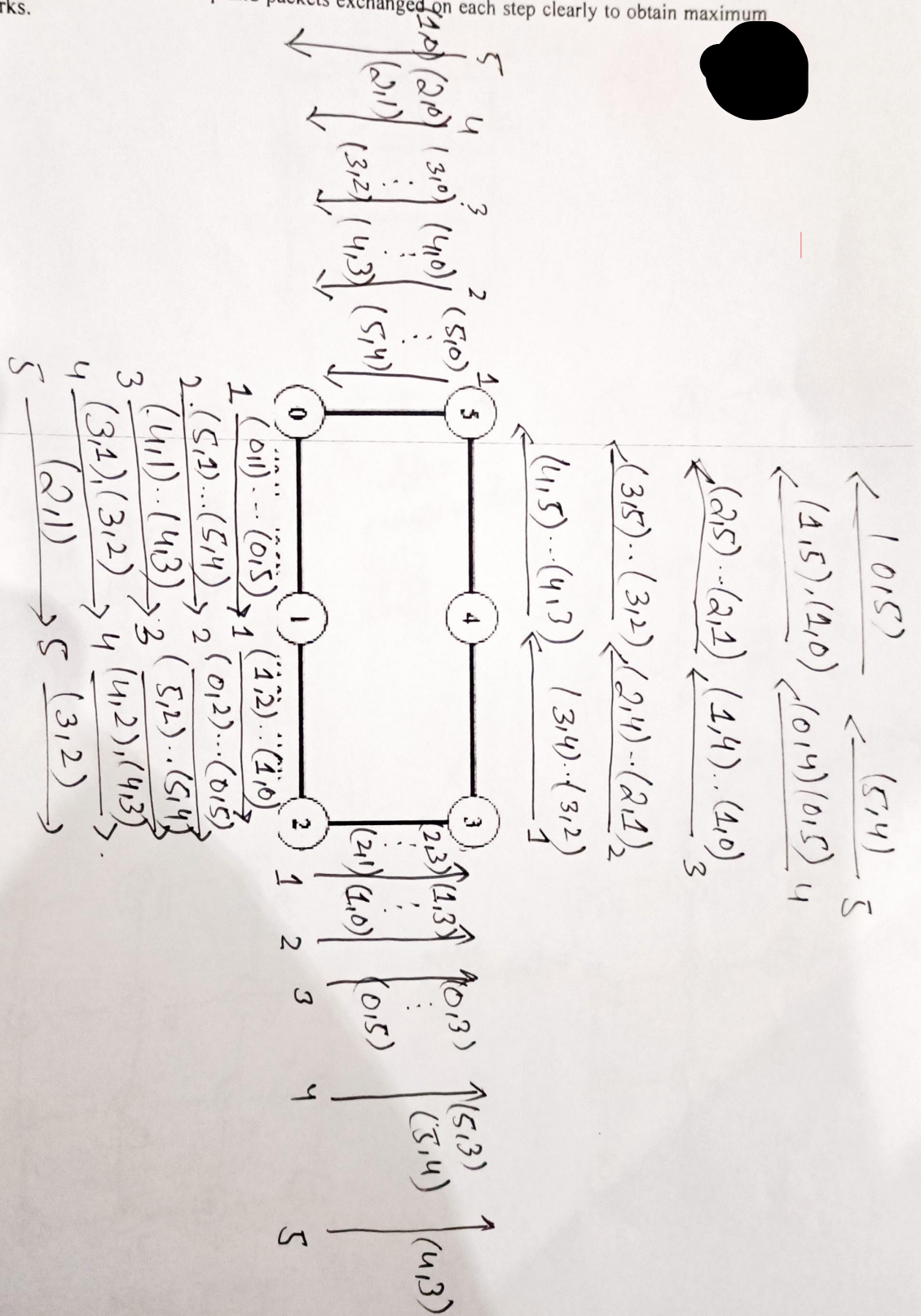
step 1.

step 2

(2,3)

(0,1)

(4,5,6,7)

step 3.

(0,1,2,3)

(0...7)

Q2: Perform All to All personalized communication on the following 6 node ring on the diagram. Mention each step and packets exchanged on each step clearly to obtain maximum marks.

5   4   3   2   1

(2,0) (3,0) (4,0) (5,0)
(1,0)
(2,1) (3,2) (4,3) (5,4)

0 ——— 1 ——— 2

5 ——— 4 ——— 3

| (0,5) |
(1,5)·(1,0) (0,4)(0,5) 4
(4,5)·(4,0) (0,4)(0,5)
(2,5)·(2,1) (1,4)·(1,0) 3
(3,5)·(3,2) (2,4)·(2,1) 2
(4,5)·(4,3) (3,4)·(3,2) 1

1 (0,1)···(0,5) (1,2)···(1,0)
2 (5,1)···(5,4) (0,2)···(0,5)
3 (4,1)···(4,3) (5,2)···(5,4)
4 (3,1)·(3,2) (4,2),(4,3)
5 (2,1) (3,2)

(2,3)···(1,3) (0,3) (5,3)
(2,1)(1,0) (0,5) (3,4) (4,3)

0 1 2 3 4 5

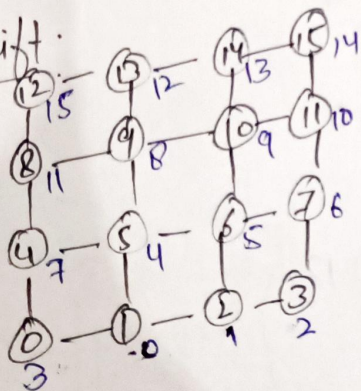Q3: You are provided with the following 16 node mesh. Your task is to perform circular shift operation on the mesh where q = 7. Perform and mention each step clearly to obtain maximum marks.
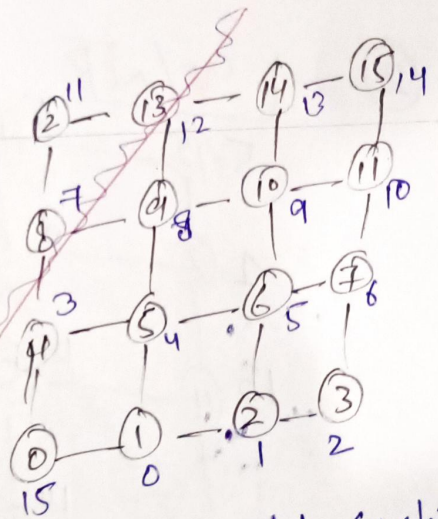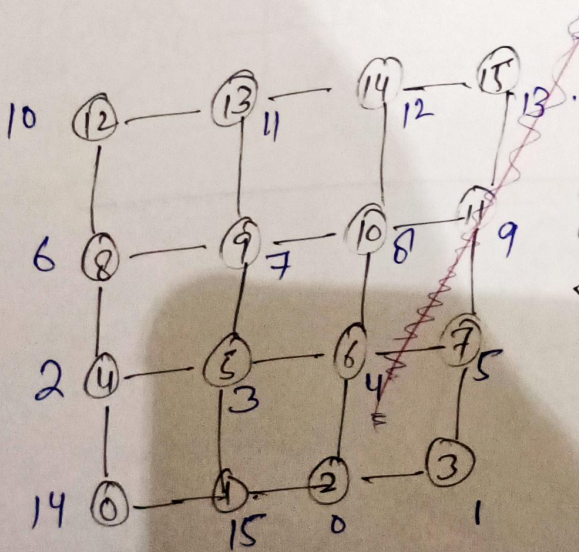

$q = 7.$
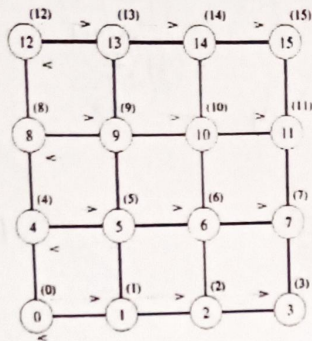
① $q \cdot / \cdot \sqrt{p} = 7 \cdot / \cdot 4 = 3.$

1st shift:

after compensatory col shift

↓ 2nd step (1 shift)

after compensatory col shift ⟵

Next page

First diagram (left, top):

(12) — (13) — (14) → (15) 12
13   10   11
| | | |
(8) — (9) — (10) — (11) 8
 9   6   7
| | | |
(4) — (5) — (6) — (7) 4
 5   2   3
| | | |
(0) — (1) — (2) — (3)
 1   14   15   0

compensatory coloumn shift →

Second diagram (right, top):

9 (12) — (13) — (14) —×— (15) 12
          10   11
| | | |
5 (8) — (9) — (10) — (11) 8
          6   7
| | | |
1 (4) — (5) — (6) — (7) 4
          2   3
| | | |
13 (0) — (1) — (2) — (3)
     14   15   0

(2) $\lfloor \text{ov} / NP \rfloor = \lfloor 7/4 \rfloor = 1$

Third diagram (bottom):

5 (12) —6— (13) — (14) 7 (15) 8
| | |
1 (8) —2— (9) — (10) 3 — (11) 4
| | | |
13 (4) —14— (5) —15— (6) — (7) 0
| | | |
9 (0) —10— (1) — (2) — (3) 12
                  11