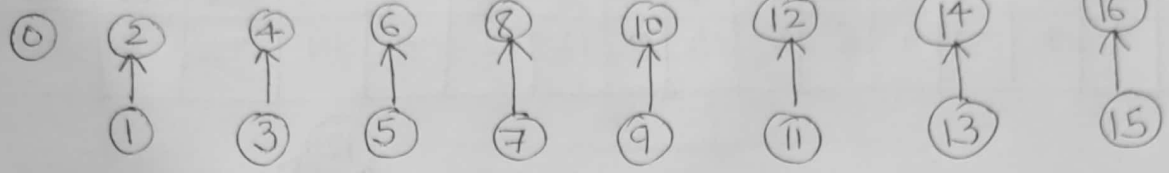
Kumari PUJA → 002100985

Q1

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1

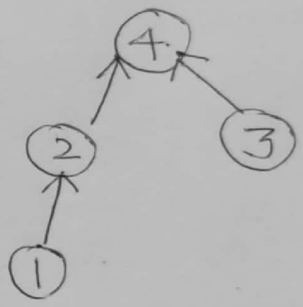


0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
-1	2	-2	4	-2	6	-2	8	-2	10	-2	12	-2	14	-2	16	-2

⇒ Union (1, 3)

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
-1	2	4	4	-4	6	-2	8	-2	10	-2	12	-2	14	-2	16	-2

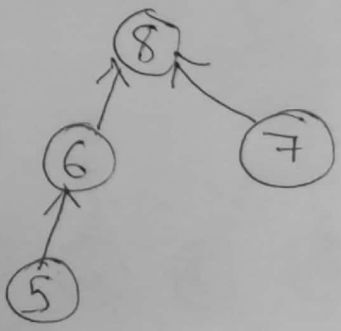
Parent of 3 is 4
Parent of 1 is 2
} Both parents will combine



⇒ Union (5, 7)

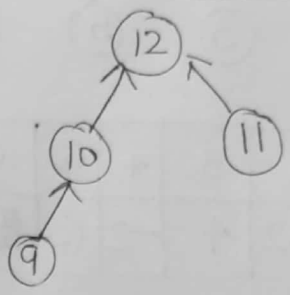
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
-1	2	4	4	-4	6	8	8	-4	10	-2	12	-2	14	-2	16	-2

Parent of 5 is 6
Parent of 7 is 8
} we will combine parents



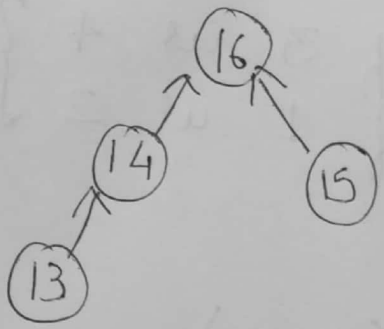
⇒ union (9, 11)

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
-1	2	4	4	-4	6	8	8	-4	10	12	12	-4	14	-2	16	-2



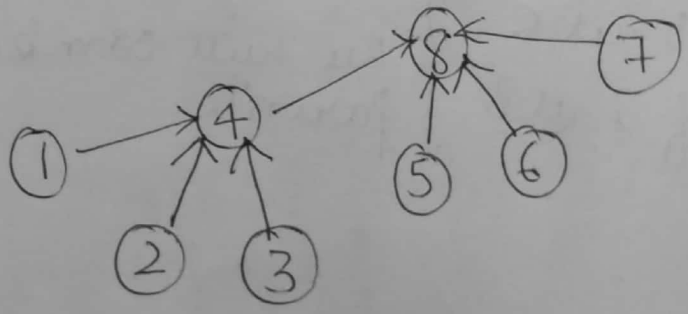
⇒ union (13, 15)

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
-1	2	4	4	-4	6	8	8	-4	10	12	12	-4	14	16	16	-4



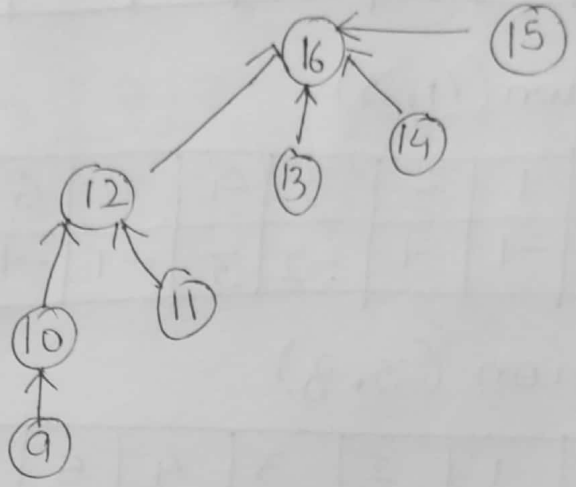
⇒ union (1, 5)

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
-1	4	4	4	8	8	8	8	-8	10	12	12	-4	14	16	16	-4



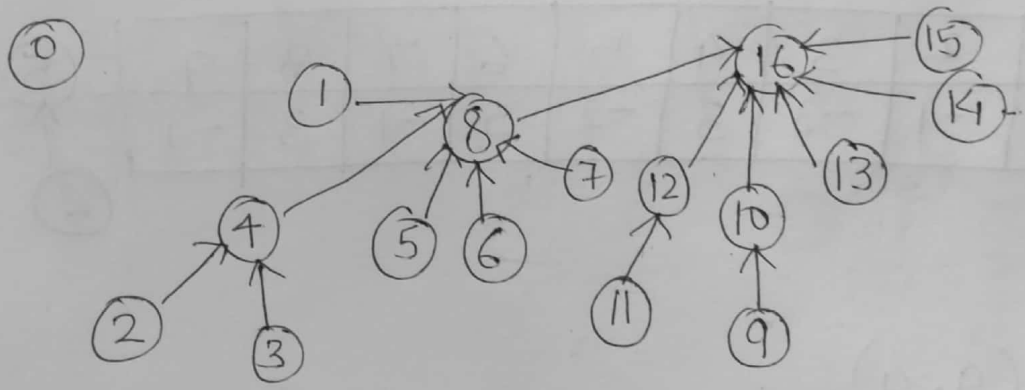
⇒ union (11, 13)

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	4	4	4	8	8	8	8	-8	10	12	12	16	16	16	16	-8



union (1, 10)

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	8	4	4	8	8	8	8	16	10	16	12	16	16	16	16	-16



⇒ S. num (2)
Ans Total number of elements = 16

⇒ S. num (9)
Total number of elements = 16

Q Max hop from last node to parent node is 3 which is equal to max height of tree.

Kumari Puja → 002100985 (4)

(Q2) N = 10

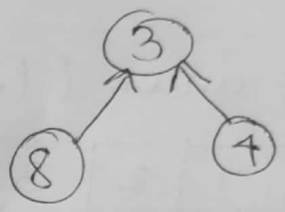
0	1	2	3	4	5	6	7	8	9
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1

⇒ union (4, 3)

0	1	2	3	4	5	6	7	8	9
-1	-1	-1	-2	3	-1	-1	-1	-1	-1

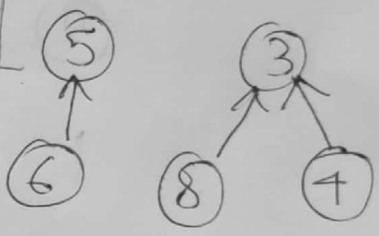
⇒ union (3, 8)

0	1	2	3	4	5	6	7	8	9
-1	-1	-1	-3	3	-1	-1	-1	3	-1



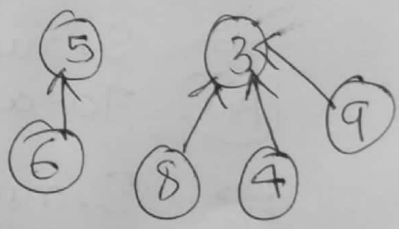
⇒ union (6, 5)

0	1	2	3	4	5	6	7	8	9
-1	-1	-1	-3	3	-2	5	-1	3	-1



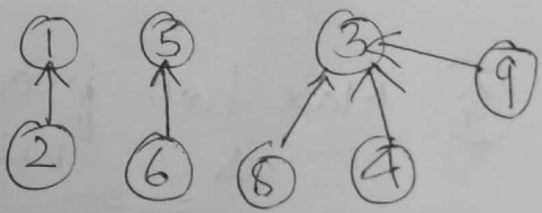
⇒ union (9, 4)

0	1	2	3	4	5	6	7	8	9
-1	-1	-1	-4	3	-2	5	-1	3	3



⇒ union (2, 1)

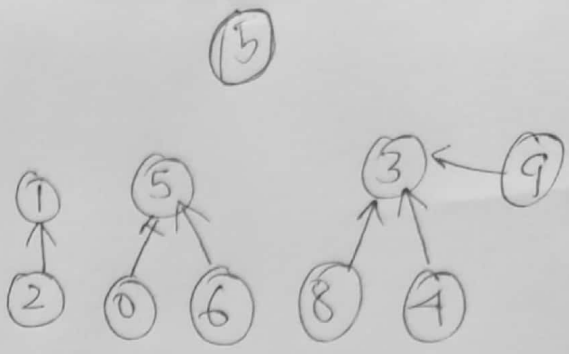
0	1	2	3	4	5	6	7	8	9
-1	-2	1	-4	3	-2	5	-1	3	3



Kumari Puja → 002100985

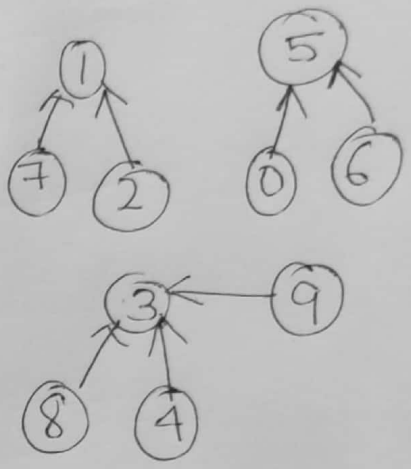
⇒ union (5, 0)

0	1	2	3	4	5	6	7	8	9
5	-2	1	-4	3	-3	5	-1	3	3



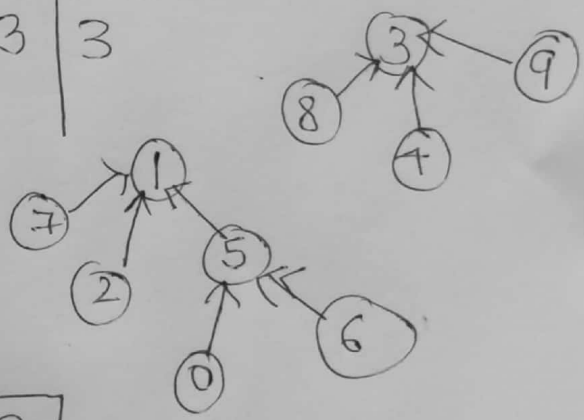
⇒ union (7, 2)

0	1	2	3	4	5	6	7	8	9
5	-3	1	-4	3	-3	5	1	3	3



⇒ union (6, 1)

0	1	2	3	4	5	6	7	8	9
5	-6	1	-4	3	1	5	1	3	3



⇒ union (7, 3)

0	1	2	3	4	5	6	7	8	9
5	-10	1	1	3	1	5	1	3	3

Height of tree is 2