

DS Assignment-2

Q.1. ex:-

2	4	3	6	8	array
↓	↓	↓	↓	↓	
6	1	10	4	1	
↓	↓	↓	↓	↓	
6	5	11	1	1	
↓	↓	↓	↓	↓	
10	.	13	.	1	
↓	↓	↓	↓	↓	
3	array

Total number of unsorted array is n & each contain each contain n distinct element.

Time complexity to find median from an array is $O(n)$
 Since, there is ' n ' such array. Therefore total time complexity to find medians of all arrays is $O(n^2)$

Store the n medians in an array. find the medians of the array with time complexity of $O(n)$.

$$T(n) = O(n^2) + O(n) \approx O(n^2) \checkmark$$

25	65	12	45	8	9	10	6	21
----	----	----	----	---	---	----	---	----

K=12

8	9	10	6	12	25	65	45	21
---	---	----	---	----	----	----	----	----

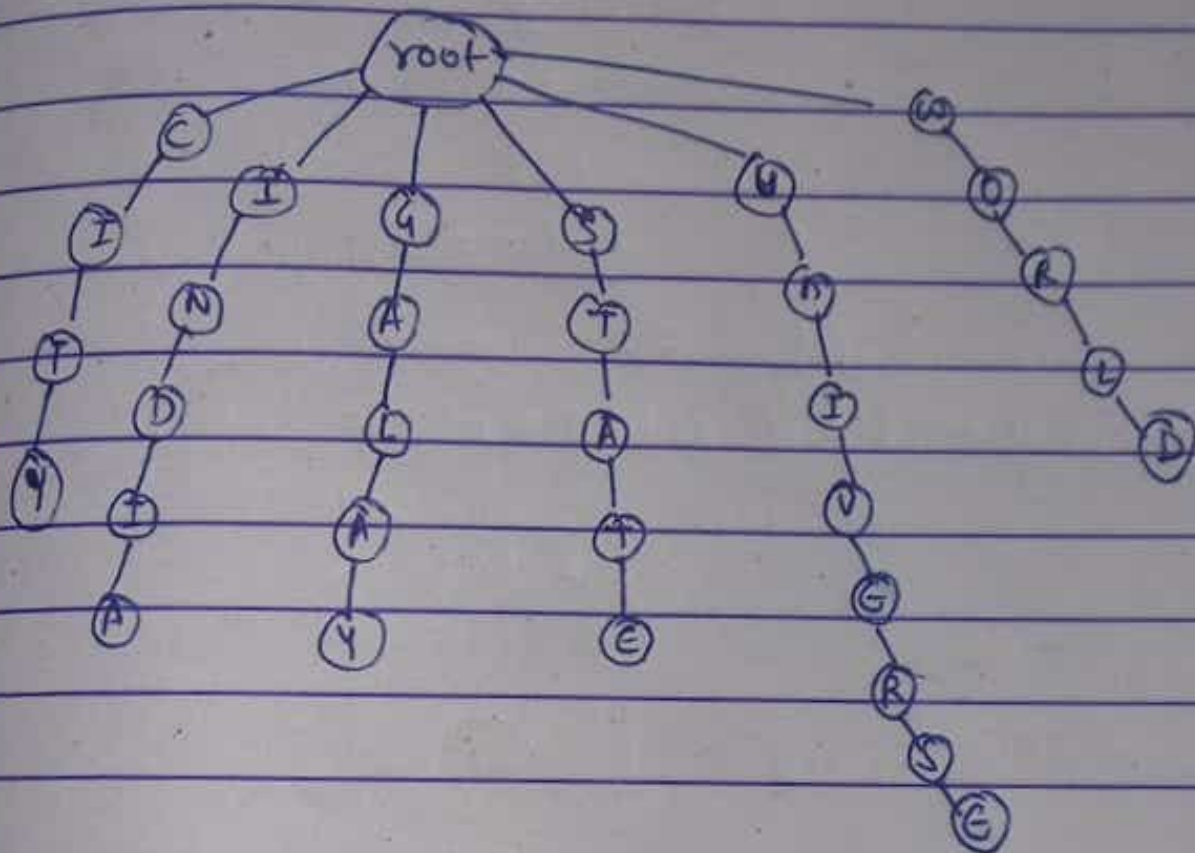
K=9

8	6	9	10
---	---	---	----

10

smallest
4th ~~largest~~ no..

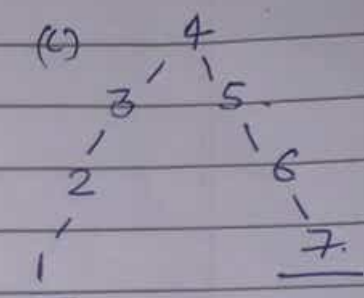
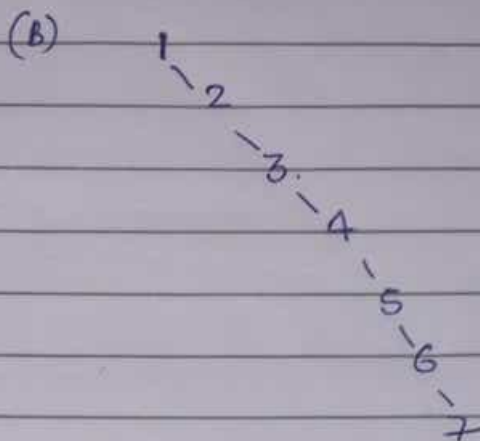
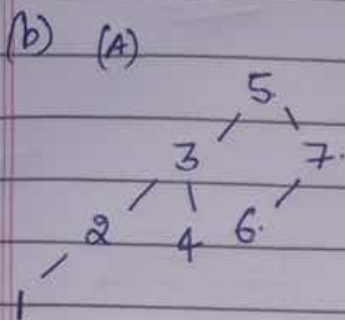
Q.2. Use Trie data structure -



display all words it takes $(n \log n)$ ✓

Ans 3 (a) maximum Height of Binary tree = n

$$\text{minimum Height} = \frac{\text{floor}(\log_2(n)) + \text{floor}(\log_2(n+1))}{2} = \text{floor}(\log_2(n+1))$$

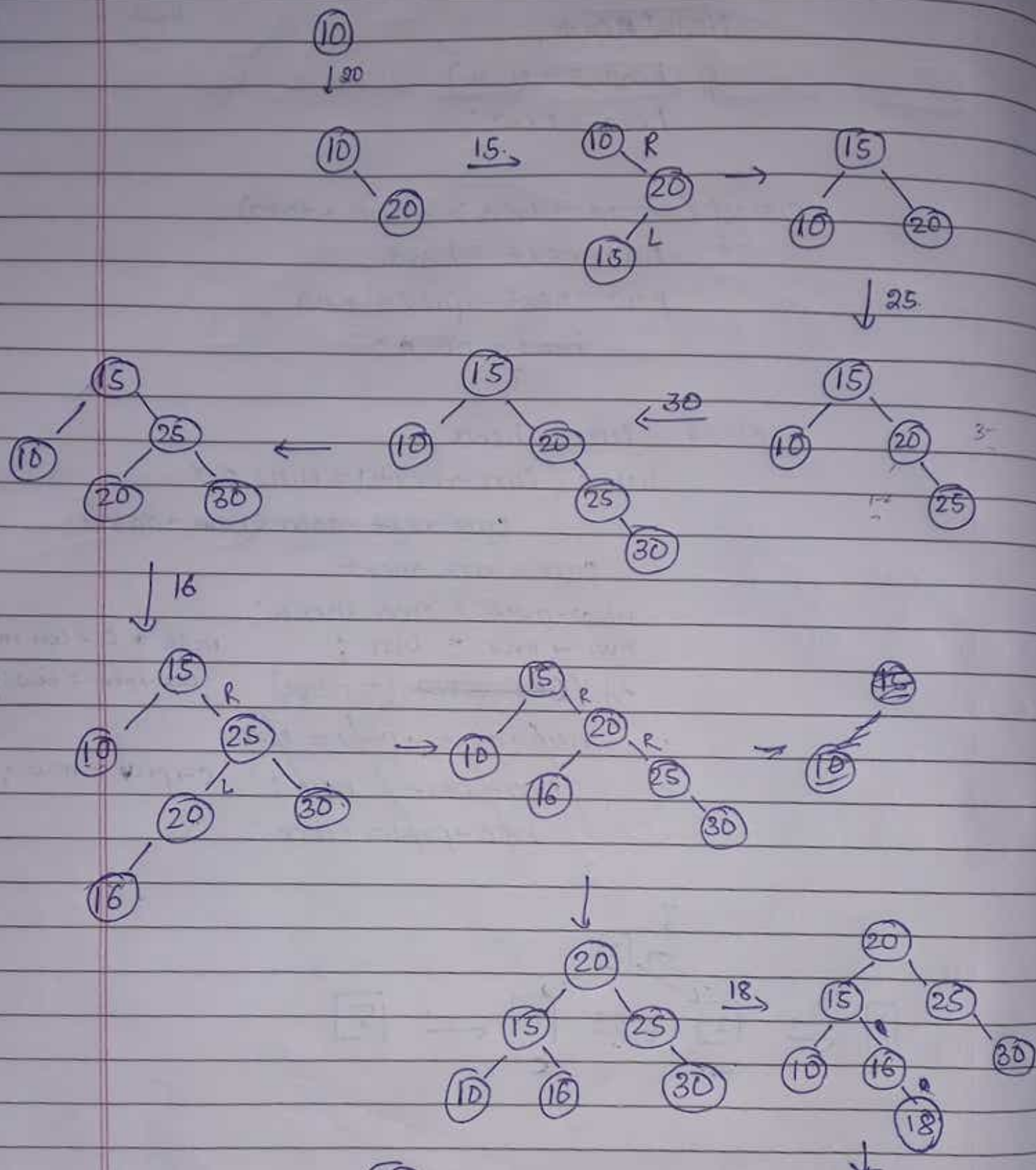


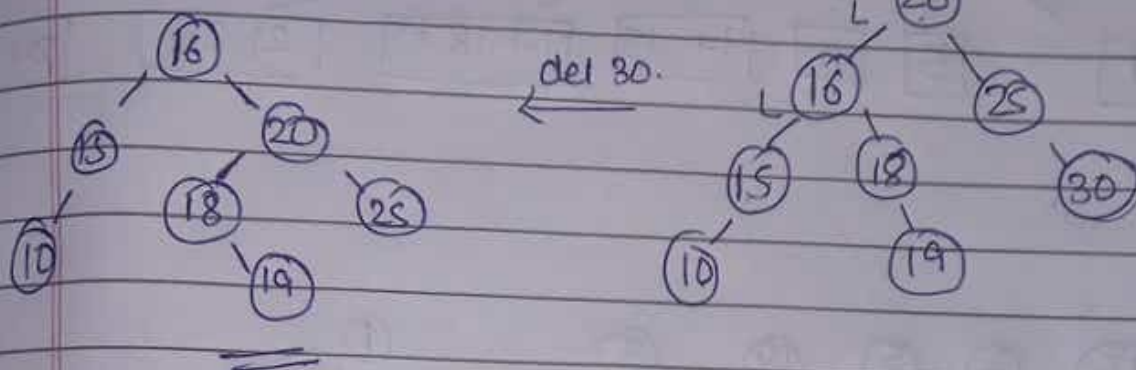
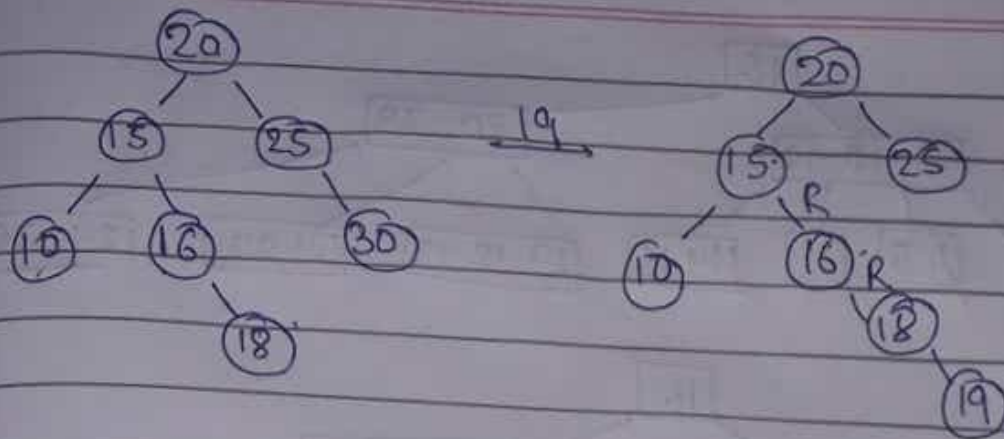
(c) max Height of K-ary = N

$$\text{min Height of K-ary} = \frac{\log_k(N+1)}{\log_k(k)} = \text{ceil}(\log_k(N+1))$$

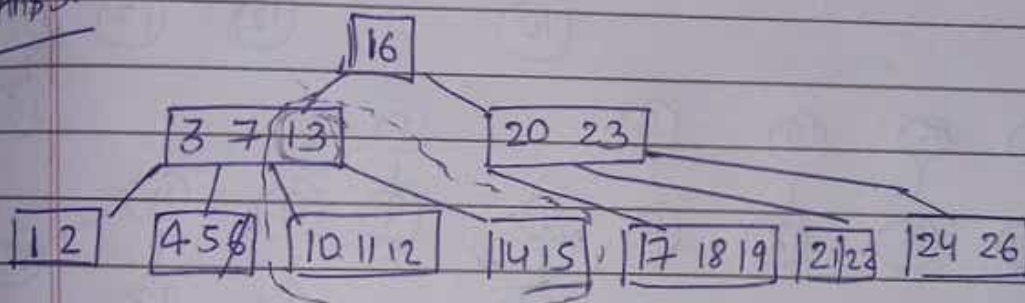
$$= \text{ceil}(\log_m((m-1)n+1)) - 1$$

Ans 4 10, 20, 15, 25, 30, 16, 18, 19

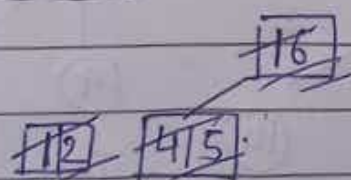
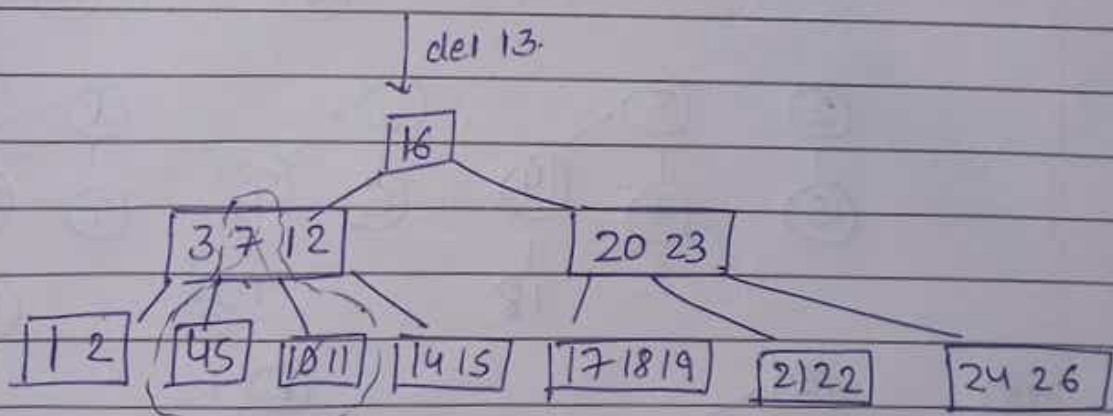


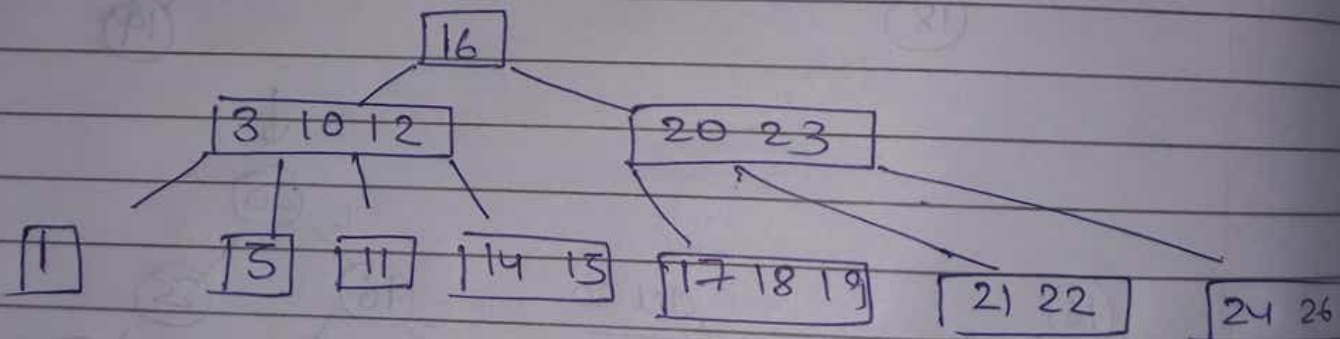
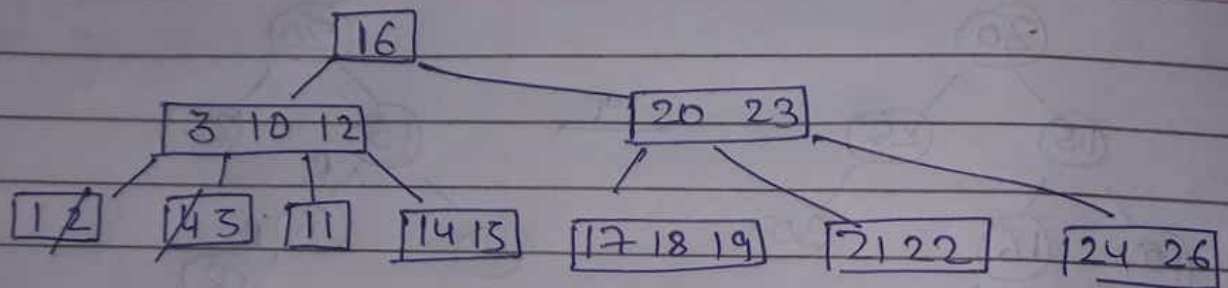


Ans 5



$$\min(m_i) - 1 = 1$$





Q.6. ① List-of-paths \leftarrow ComputeAllpaths (G, Src, Dest)

return
all path
from src
to dest

② Shortest-path \leftarrow empty list

③ for path in list-of-paths

if Shortest-path is empty do

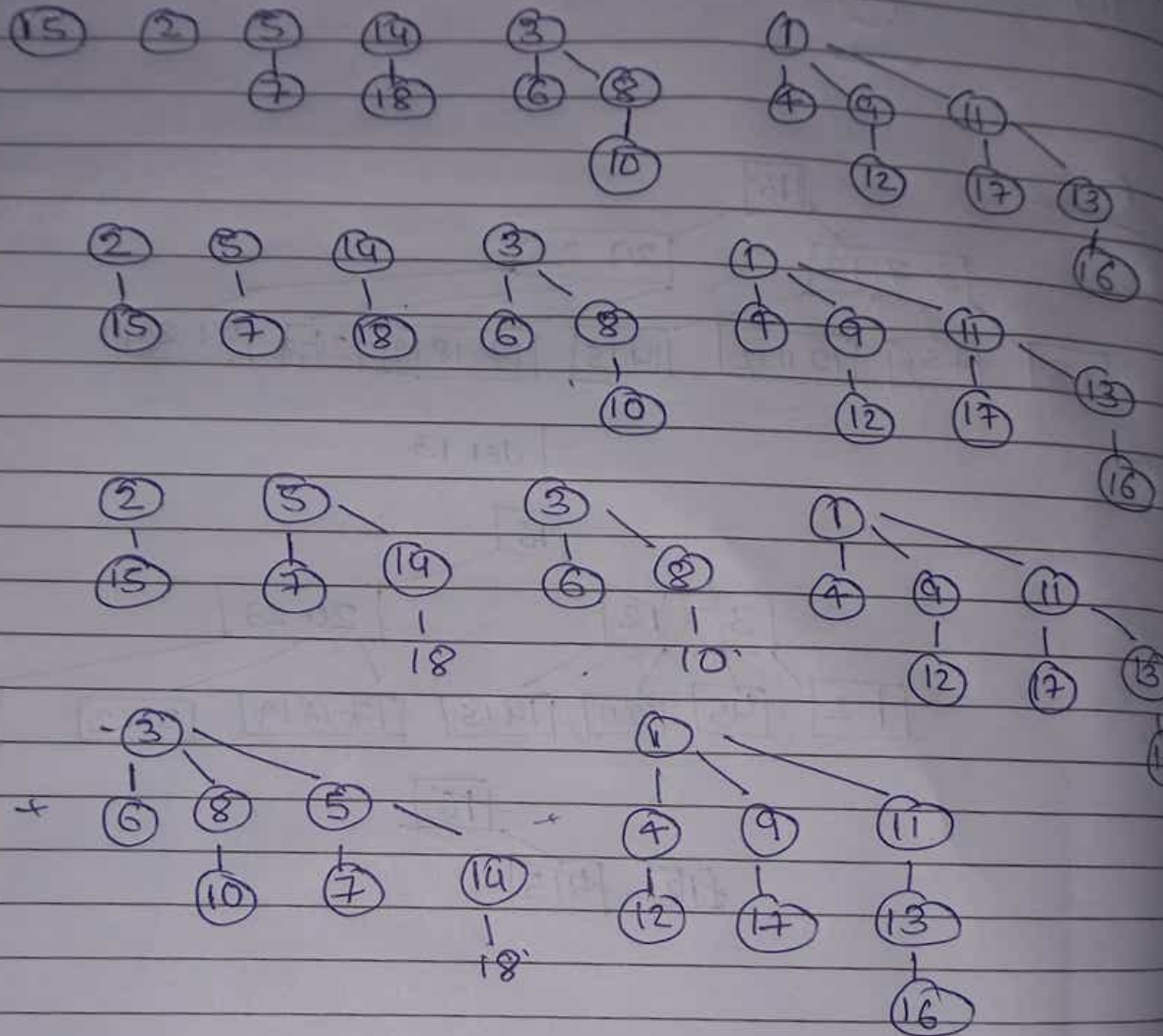
Shortest-path \leftarrow path

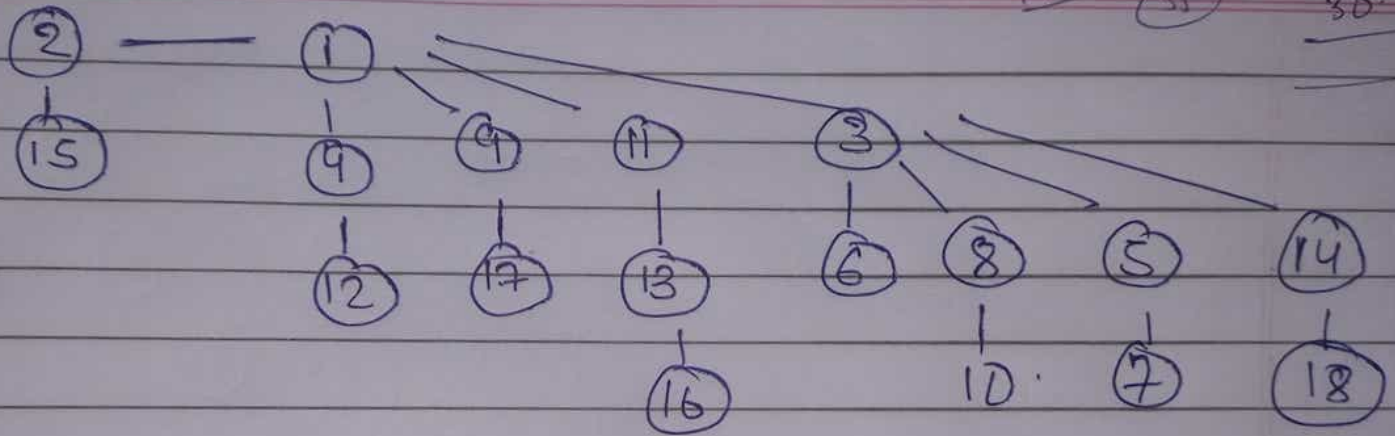
else if Shortest-path.size() > path.size()

Shortest-path \leftarrow path

④ return Shortest-path

Ans 8:





3+6

7.5+

15

✓ Ans