

Heap Coding Questions

◆ Basic Level (Understanding Heap Operations)

1. Insert into Max Heap

- Implement insertion in a Max Heap. Print the heap array after each insertion.

2. Delete Root from Min Heap

- Implement deletion of the root in a Min Heap. Show the heap after each step.

3. Build Heap

- Given an unsorted array, convert it into a Max Heap using the **heapify process**.

4. Heap Sort

- Implement Heap Sort using a Max Heap.

5. Check Heap Property

- Given a binary tree (array representation), check if it satisfies the Max Heap property.

◆ Medium Level (Problem-Solving with Heaps)

6. Kth Largest Element in an Array

- Input: `nums = [3, 2, 1, 5, 6, 4]`, `k = 2` → Output: 5.

7. Kth Smallest Element in an Array

- Similar to above but with Min Heap.

8. Sort a Nearly Sorted Array (K-Sorted Array)

- Given an array where every element is at most k places away from its sorted position, sort it using a heap.

9. Merge K Sorted Arrays

- Input: $[[1, 4, 5], [1, 3, 4], [2, 6]]$ → Output: $[1, 1, 2, 3, 4, 4, 5, 6]$.

10. Find the K Closest Numbers

- Given an array and a number x , find the k closest numbers to x using a heap.

◆ Hard Level (Advanced / Company-Level)

11. Median of a Running Stream

- Continuously add numbers from a stream and print the median at each step using two heaps.

12. Top K Frequent Elements

- Input: $nums = [1, 1, 1, 2, 2, 3]$, $k = 2$ → Output: $[1, 2]$.

13. Minimum Cost to Connect Ropes

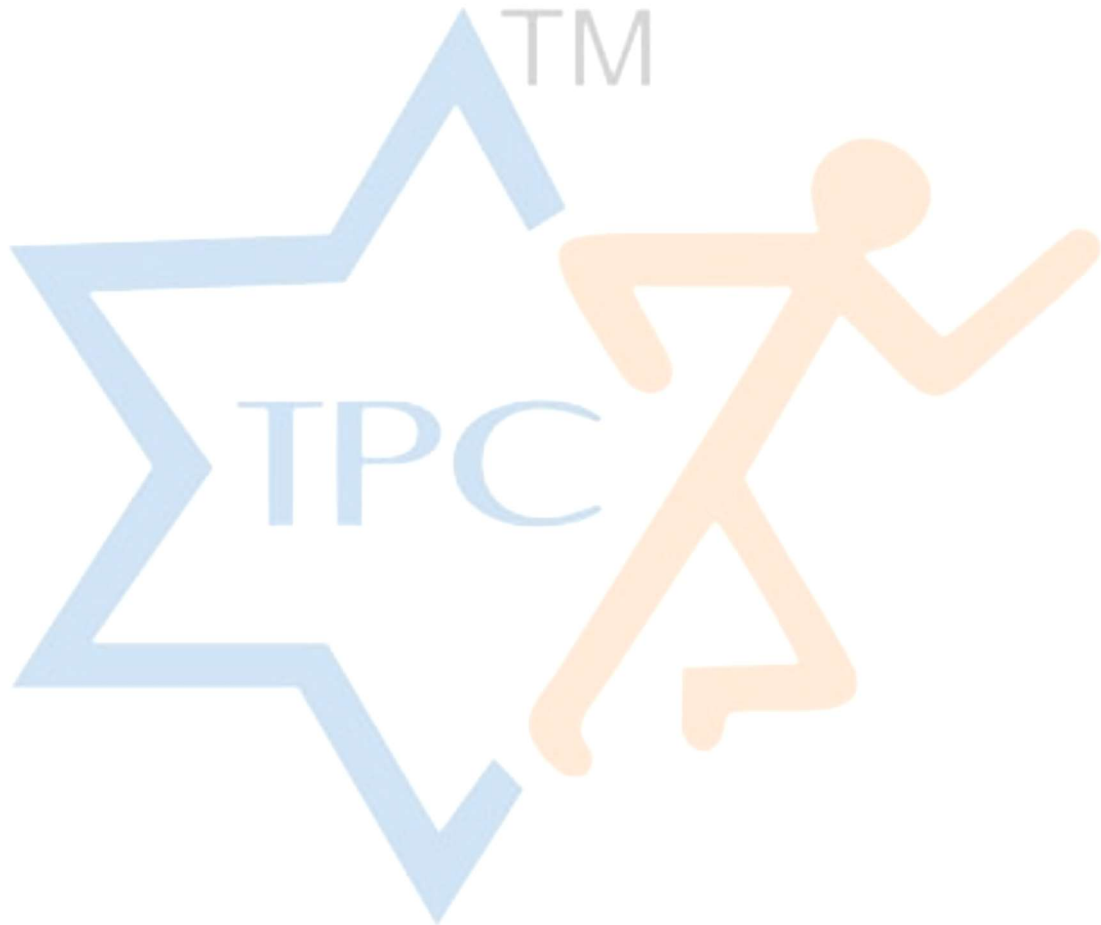
- Input: $[4, 3, 2, 6]$ → Output: 29 (because $(2+3=5) + (5+4=9) + (9+6=15) = 29$).

14. Reorganize String

- Rearrange a string so that no two adjacent characters are the same using a Max Heap.

15. Task Scheduler

- Given tasks and cooldown time, find the minimum intervals required to finish all tasks using a heap.



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