Practical 2

The Grinch is given the job of partitioning 2n players into two teams of n players each. Each player has a numerical rating that measures how good he/she is at the game. He seeks to divide the players as unfairly as possible, so as to create the biggest possible talent imbalance between team A and team B. Show how the Grinch can do the job in O(n log n) time.

Solution:

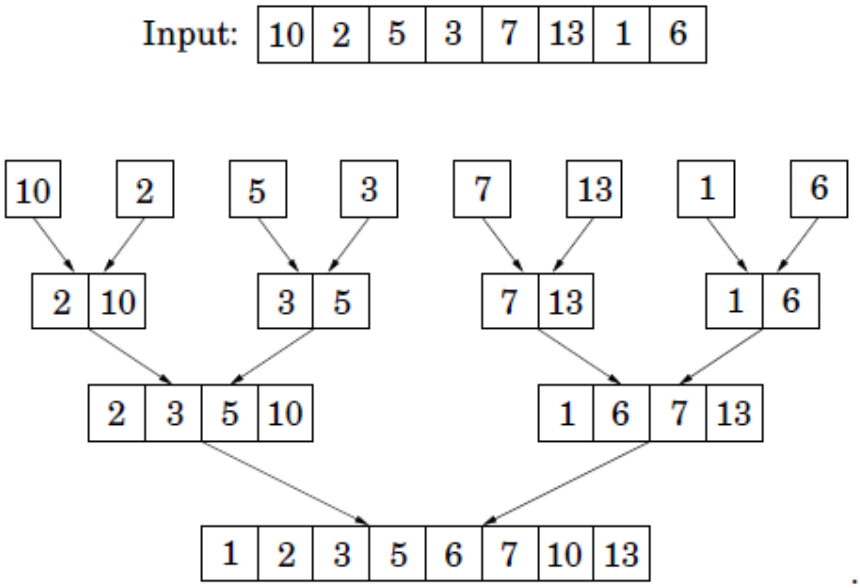
Player	Rating	Team A	Team B
P1	8	Y	
P2	3	Y	
P3	4		Y
P4	5	Y	
P5	1		Y
P6	2	Y	
P7	7		Y
P8	6		Y
		18	18

TeamA=1+2+3+4=10, Team B= 5+6+7+8=26 (Worst case)

Team A=8+3+5+2=18, Team B=4+1+7+6=18 (Best Case)

Sort the players using any sorting algorithm with O(nlogn) worst case time complexity(e.g. mergesort). The firstnplayers will be on teamA, the secondnplayers will be onteamB

Sorting Algorithms	**Time Complexity**			**Space Complexity**
	Best Case	**Average Case**	**Worst Case**	**Worst Case**
Bubble Sort	Ω(N)	Θ(N^2)	O(N^2)	O(1)
Selection Sort	Ω(N^2)	Θ(N^2)	O(N^2)	O(1)
Insertion Sort	Ω(N)	Θ(N^2)	O(N^2)	O(1)
Quick Sort	Ω(N log N)	Θ(N log N)	O(N^2)	O(N)
Merge Sort	Ω(N log N)	Θ(N log N)	O(N log N)	O(N)
Heap Sort	Ω(N log N)	Θ(N log N)	O(N log N)	O(1)


Input:
10 2 5 3 7 13 1 6
10 2 5 3 7 13 1 6
2 10 3 5 7 13 1 6
2 3 5 10 1 6 7 13
1 2 3 5 6 7 10 13