24 January 2026 9:58 pm

1877. Minimize Maximum Pair sum in Array

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Maximum Pair sum - if we have Pairs (1,5), (2,3) and (4,4) the maximum Pair sum = (6,5,8) = 8.

We have given array of even length n Pair up elements into n/2 such that:

- Each elements of nums is in exactly one pair.
- Maximum Pair sum is minimized.

Return the minimized Maximum Pair Sum.

Ex:- nums = [3,5,2,3] , output = 7

Pairs = (3,3) and (5,2)

Max (3+3 , 5+2) = 7

more ex:-

Ex:- [3,5,2,3] , o/p = 7

Possible Pairs = [3,5] , [2,3]

0 5 → 1

→ (3,3) , (5,2]

6 7 = 7

ex:- [3,5,4,2,4,6] , o/p = 8

(3,5) , (4,2) , [4,6)

8 7 10 → 10

(3,4) (5,2) (4,6)

7 7 10 = 10

(6,2) [4,4) (5,3) -

8 8 8 → 8

Goal: make largest Pair-sum as small as possible. How max can be minimized.

↳ If we select the largest no. with smaller one then only we can get the balanced sum.

Approach: we sort array and then take Pair as one from start and one from end. it will work.

nums = [3,5,4,2,4,6]

sort → [2,3,4,4,5,6]

(2,6) (3,5) (4,4) → max (8,8,8) = 8

nums = [3,5,2,3]

sort → [2,3,3,5]

(2,5) (3,3)

max (7,6) = 7

```
int minPairSum(vector<int>& nums) {
    sort(nums.begin(), nums.end());
    left = 0, right = n-1;
    int maxi = 0;
    while(left < right){
        maxi = max(maxi, nums[left] +
            nums[right]);
        left++;
        right--;
    }
    return maxi;
}
```

Time Complexity → O(n log n)
sorting + traverse

If we have given " Minimize Maximum Maximize minimum " keyword in problem then use " Binary Search ".