Largest Pair Sum

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Platform	GeeksForGeeks
difficulty	Easy
tags	Array Maths
language	C++
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link	https://www.geeksforgeeks.org/problems/pair-sum--120604/1
Completion	☑

Intuition

The problem is about finding the sum of the two largest elements in an array. To achieve this in an efficient way, we can maintain two variables to track the largest (`maxi`) and second-largest (`sMaxi`) elements. As we traverse the array, we update these two variables based on the current element.

Approach

1. Initialize `maxi` and `sMaxi` with the first two elements of the array. Swap them if necessary to ensure `maxi` is the larger of the two.
2. Traverse the rest of the array from the third element.
3. For each element, check if it's larger than `maxi`. If so, update `sMaxi` to `maxi` and set `maxi` to the current element.
4. If the element is not larger than `maxi` but is larger than `sMaxi`, update `sMaxi` to the current element.
5. At the end of the loop, the sum of `maxi` and `sMaxi` will be the result.

Complexity

Time Complexity:

- The time complexity is **O(n)**, where `n` is the size of the array. This is because we iterate over the array once.

Space Complexity:

- The space complexity is **O(1)** because we are using a constant amount of extra space for `maxi`, `sMaxi`, and a few other temporary variables.

Code

```
class Solution {
  public:
    int pairsum(vector<int> &arr) {
        int maxi = arr[0];
        int sMaxi = arr[1];
        if(sMaxi > maxi) swap(maxi, sMaxi);
```

```
        for(int i = 2; i < arr.size(); i++){
            if(arr[i] > maxi){
                sMaxi = maxi;
                maxi = arr[i];
            }
            else if(arr[i] > sMaxi){
                sMaxi = arr[i];
            }
        }

        return maxi + sMaxi;
    }
};
```