

lab1two.cpp

```
1  #include<iostream>
2  #include <unordered_set>
3  using namespace std;
4  // -----
5  void display(vector<int>vec) {
6      for (int i = 0; i < vec.size(); i++) {
7          cout << vec[i] <<" ";
8      }
9      cout << endl;
10 }
11 void isSorted(vector<int>& vec) {
12     cout << "Array ";
13     cout << endl;
14     display(vec);
15     for (int i = 0; i < vec.size() - 1; ++i) {
16         if (vec[i] > vec[i + 1]) {
17             cout << "Not sorted";
18             return;
19         }
20     }
21     cout <<"Sorted ";
22 }
23 void findSingleElement(vector<int>& nums) {
24     cout << "Array ";
25     cout << endl;
26     display(nums);
27     int result = 0;
28     for (int num : nums) {
29         result ^= num;
30     }
31     cout << "Single element " << result;
32 }
33 void findMultipleElements (vector<int>&nums) {
34     unordered_set<int> seen;
35     vector<int> duplicates;
36     cout << "Array ";
37     cout << endl;
38     display(nums);
39     for (int num : nums) {
40         // If the element is already in the set, it's a duplicate
41         if (seen.find(num) != seen.end()) {
42             duplicates.push_back(num);
43         } else {
44             seen.insert(num);
45         }
46     }
47     cout << "Duplicates ";
48     cout << endl;
49     display(duplicates);
50 }
51 void twoSum(vector<int>& nums, int target) {
52     cout << "Array ";
53     cout << endl;
54     display(nums);
55     unordered_map<int,int> mpp;
56     for(int i = 0; i < nums.size();++i){
57         int left = target - nums[i];
```

```
58     auto it = mpp.find(nums[i]);
59     if(it != mpp.end()){
60         cout << "Elements " << nums[it->second] <<" " << nums[i];
61         return;
62     }
63     else
64     {
65         mpp[left] = i;
66     }
67 }
68 cout << "Elements not found";
69 }
70 void findMinMax(vector<int>&nums){
71     cout << "Array ";
72     cout << endl;
73     display(nums);
74     int min = INT_MAX;
75     int max = INT_MIN;
76     for(auto it : nums){
77         if(it > max)
78             max = it;
79         if(it < min)
80             min = it;
81     }
82     cout << "Minimum " << min <<endl;
83     cout << "Maximum " << max <<endl;
84 }
85 int main()
86 {
87
88     // -----
89     cout << "[i] Check if an array is sorted";
90     cout << endl;
91     vector<int> nums = {1,2,4,5,6,1};
92     isSorted(nums);
93     cout << endl;
94     vector<int> numsOne = {1,2,4,5,6};
95     isSorted(numsOne);
96     cout << endl;
97     cout << endl;
98
99     cout << "[ii] Finding single element in an array";
100    cout << endl;
101    vector<int> numsTwo = {1,2,3,2,1};
102    findSingleElement(numsTwo);
103    cout << endl;
104    cout << endl;
105
106    cout << "[iii] Finding multiple elements in an array";
107    cout << endl;
108    vector<int> numsThree = {1,2,3,2,1,1};
109    findMultipleElements(numsThree);
110    cout << endl;
111    cout << endl;
112
113    cout << "[iv] Finding a pair of elements with sum k ";
114    vector<int> numsFour = {1,2,3,2,1,1};
115    twoSum(numsFour,5);
116    cout << endl;
117    cout << endl;
```

```
118 |  
119 |     cout << "[v] Finding max and min in a single scan; here you should use only  
120 |     single loop to perform both the operations";  
121 |     vector<int> numsFive = {11,32,30,2,4,9};  
122 |     findMinMax(numsFive);  
    | }
```