

## Array Practice Questions

### Basic Level (1-20)

**1. Find the maximum element in an array.**

- Input: [1, 2, 3, 4, 5]
- Output: 5

**2. Find the minimum element in an array.**

- Input: [4, 2, 7, 1, 9]
- Output: 1

**3. Reverse the elements of an array.**

- Input: [1, 2, 3, 4, 5]
- Output: [5, 4, 3, 2, 1]

**4. Find the sum of all elements in an array.**

- Input: [1, 2, 3, 4, 5]
- Output: 15

**5. Count the number of even and odd elements in an array.**

- Input: [1, 2, 3, 4, 5]
- Output: Even: 2, Odd: 3

**6. Print the elements of an array in alternate positions.**

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

**7. Find the second largest element in an array.**

- Input: [12, 35, 1, 10, 34, 1]
- Output: 34

**8. Find the second smallest element in an array.**

- Input: [12, 13, 11, 15, 14]
- Output: 12

**9. Merge two sorted arrays.**

- Input: [1, 3, 5] and [2, 4, 6]
- Output: [1, 2, 3, 4, 5, 6]

10. **Check if an array is sorted.**
  - Input: [1, 2, 3, 4, 5]
  - Output: True
11. **Find the largest sum contiguous subarray (Kadane's Algorithm).**
  - Input: [-2, -3, 4, -1, -2, 1, 5, -3]
  - Output: 7
12. **Left rotate an array by one position.**
  - Input: [1, 2, 3, 4, 5]
  - Output: [2, 3, 4, 5, 1]
13. **Left rotate an array by k positions.**
  - Input: [1, 2, 3, 4, 5], k=2
  - Output: [3, 4, 5, 1, 2]
14. **Right rotate an array by one position.**
  - Input: [1, 2, 3, 4, 5]
  - Output: [5, 1, 2, 3, 4]
15. **Find the frequency of each element in an array.**
  - Input: [1, 2, 2, 3, 3, 3]
  - Output: {1: 1, 2: 2, 3: 3}
16. **Move all zeros to the end of an array.**
  - Input: [0, 1, 0, 3, 12]
  - Output: [1, 3, 12, 0, 0]
17. **Find the intersection of two arrays.**
  - Input: [1, 2, 2, 1], [2, 2]
  - Output: [2, 2]
18. **Find the union of two arrays.**
  - Input: [1, 2, 2, 1], [2, 3]
  - Output: [1, 2, 3]
19. **Remove duplicates from an array.**
  - Input: [1, 2, 2, 3, 4, 4, 5]

- Output: [1, 2, 3, 4, 5]

**20. Find the element that appears only once in an array where all others appear twice.**

- Input: [2, 3, 5, 4, 5, 3, 4]
- Output: 2

### **Intermediate Level (21-40)**

**21. Find the missing number in an array of size  $n$  containing elements from 1 to  $n+1$ .**

- Input: [1, 2, 4, 6, 3, 7, 8]
- Output: 5

**22. Find the duplicate number in an array of  $n+1$  integers where each integer is between 1 and  $n$ .**

- Input: [1, 3, 4, 2, 2]
- Output: 2

**23. Rearrange an array so that `arr[i]` becomes `arr[arr[i]]`.**

- Input: [4, 0, 2, 1, 3]
- Output: [3, 4, 2, 0, 1]

**24. Find all pairs in an array that sum to a given value  $x$ .**

- Input: [1, 5, 7, -1],  $x=6$
- Output: [(1, 5), (7, -1)]

**25. Find the maximum product of two integers in an array.**

- Input: [1, 20, -1, -30]
- Output: 600

**26. Implement a function to perform a binary search on a sorted array.**

- Input: [1, 2, 3, 4, 5],  $key=3$

- Output: 2 (index)

27. **Sort an array of 0s, 1s, and 2s without using extra space (Dutch National Flag problem).**

- Input: [0, 1, 2, 1, 0, 2, 0, 1]
- Output: [0, 0, 0, 1, 1, 1, 2, 2]

28. **Find the common elements in three sorted arrays.**

- Input: [1, 5, 10], [2, 3, 5], [5, 6, 7]
- Output: [5]

29. **Rotate a square matrix 90 degrees clockwise.**

- Input:

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```
1 2 3
4 5 6
7 8 9
```

- Output:

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```
7 4 1
8 5 2
9 6 3
```

30. **Find the longest consecutive sequence in an array.**

- Input: [100, 4, 200, 1, 3, 2]
- Output: 4 (sequence: 1, 2, 3, 4)

31. **Find the kth largest element in an array.**

- Input: [3, 2, 1, 5, 6, 4], k=2
- Output: 5

32. **Find the kth smallest element in an array.**

- Input: [7, 10, 4, 3, 20, 15], k=3
- Output: 7

33. **Rearrange the array in alternating positive and negative items.**
- Input: [1, 2, 3, -4, -1, 4]
  - Output: [1, -4, 2, -1, 3, 4]
34. **Find the subarray with a given sum.**
- Input: [1, 4, 20, 3, 10, 5], sum=33
  - Output: [20, 3, 10]
35. **Find the median of two sorted arrays of equal size.**
- Input: [1, 3, 8, 9, 15], [7, 11, 19, 21, 18]
  - Output: 11
36. **Sort an array based on frequency of elements.**
- Input: [4, 5, 6, 5, 4, 3]
  - Output: [4, 4, 5, 5, 6, 3]
37. **Count pairs in an array with a given difference.**
- Input: [1, 5, 3, 4, 2], diff=3
  - Output: 2 (pairs: (1, 4), (2, 5))
38. **Find if there is a subarray with 0 sum.**
- Input: [4, 2, -3, 1, 6]
  - Output: Yes (subarray: [2, -3, 1])
39. **Implement an algorithm to find the majority element.**
- Input: [3, 3, 4, 2, 4, 4, 2, 4, 4]
  - Output: 4
40. **Sort an array of strings based on length.**
- Input: ["apple", "banana", "kiwi", "cherry"]
  - Output: ["kiwi", "apple", "cherry", "banana"]

**Hard Level (41-50)**

41. **Find the maximum length of subarray having equal number of 0s and 1s.**
- Input: [0, 0, 1, 0, 1, 1]
  - Output: 4
42. **Find the triplet that sum to a given value.**
- Input: [12, 3, 4, 1, 6, 9], sum=24
  - Output: (12, 3, 9)
43. **Find the minimum number of swaps required to sort the array.**
- Input: [4, 3, 2, 1]
  - Output: 2
44. **Maximum product subarray.**
- Input: [6, -3, -10, 0, 2]
  - Output: 180
45. **Given an array of  $n$  elements, find the maximum  $j - i$  such that  $arr[j] > arr[i]$ .**
- Input: [34, 8, 10, 3, 2, 80, 30, 33, 1]
  - Output: 6
46. **Find the smallest subarray with sum greater than a given value.**
- Input: [1, 4, 45, 6, 10, 19], sum=51
  - Output: 3 (subarray: [4, 45, 6])
47. **Implement a program to merge  $k$  sorted arrays.**
- Input: [[1, 3, 5], [2, 4, 6], [0, 9, 10, 11]]
  - Output: [0, 1, 2, 3, 4, 5, 6, 9, 10, 11]
48. **Find the maximum of all subarrays of size  $k$ .**
- Input: [1, 3, 1, 2, 0, 5],  $k=3$
  - Output: [3, 3, 2, 5]
49. **Print all subarrays with 0 sum.**

- Input: [6, 3, -1, -3, 4, -2, 2, 4, 6, -12, -7]
- Output: Multiple subarrays

50. **Count the number of subarrays with a sum equal to k.**

- Input: [10, 2, -2, -20, 10], sum=-10
- Output: 3

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