1. What is a prefix array in C?
   1. **An array that contains the sum of all elements up to a specific index**
   2. An array that stores the first element of the original array
   3. An array that contains the maximum element up to a specific index
   4. An array that stores the difference between adjacent elements
2. What is the purpose of using a prefix array?
   1. To store the frequency of elements in an array
   2. **To compute the cumulative sum of elements efficiently**
   3. To find the maximum element in an array
   4. To sort the elements in an array
3. What is the time complexity for computing a prefix array?
   1. O(1)
   2. **O(n)**
   3. O(log n)
   4. O(n^2)
4. Which of the following is a prefix array for the array [1, 2, 3, 4, 5]?
   1. [1, 2, 3, 4, 5]
   2. **[1, 3, 6, 10, 15]**
   3. [2, 4, 6, 8, 10]
   4. [5, 4, 3, 2, 1]
5. What is the purpose of a frequency array in C?
   1. To store the sum of all elements in an array
   2. To compute the average of elements in an array
   3. **To count the occurrences of elements in an array**
   4. To store the product of all elements in an array
6. Which data structure is commonly used to implement a frequency array?
   1. **Array**
   2. Linked list
   3. Stack
   4. Queue
7. What is the time complexity for computing a frequency array?
   1. O(1)
   2. **O(n)**
   3. O(log n)
   4. O(n^2)
8. Which of the following is a correct frequency array for the array [1, 2, 2, 3, 3, 3]?
   1. **[1, 2, 2, 3, 3, 3]**
   2. [1, 1, 1, 1, 1, 1]
   3. [1, 2, 3, 4, 5, 6]
   4. [1, 0, 1, 0, 1, 0]
9. What is the purpose of finding the maximum element in a frequency array?
   1. To compute the average frequency of elements
   2. **To find the mode of the dataset**
   3. To determine the range of elements
   4. To sort the elements in increasing order
10. Which of the following is true regarding prefix arrays and frequency arrays?
    1. Prefix arrays are used for counting the occurrences of elements, while frequency arrays are used for storing cumulative sums.
    2. **Prefix arrays are used for storing cumulative sums, while frequency arrays are used for counting the occurrences of elements.**
    3. Prefix arrays and frequency arrays are the same and can be used interchangeably.
    4. Prefix arrays and frequency arrays are unrelated concepts in C programming.
11. What is the result of prefix sum calculations if the initial array contains negative numbers?
    1. **The prefix sum array will contain negative numbers.**
    2. The prefix sum array will contain positive numbers.
    3. The prefix sum array will contain zeros.
    4. The prefix sum array will not be affected by negative numbers.
12. Which of the following is an advantage of using prefix arrays?
    1. They provide constant-time access to individual array elements.
    2. They can be used to efficiently compute the average of array elements.
    3. They eliminate the need for loops in array processing.
    4. **They allow quick computation of sum ranges within the array.**
13. What is the primary benefit of using a frequency array?
    1. It allows constant-time access to array elements.
    2. It provides efficient sorting of array elements.
    3. **It allows counting occurrences of elements in an array.**
    4. It simplifies the computation of prefix sums.
14. Which of the following operations can be performed efficiently using prefix arrays?
    1. Finding the maximum element in the array.
    2. Finding the minimum element in the array.
    3. Computing the average of the array elements.
    4. **Calculating the sum of elements in a given range.**
15. In a prefix array, what is the value at index 0?
    1. The sum of all elements in the array.
    2. The difference between the first and last element in the array.
    3. The product of all elements in the array.
    4. **The value of the first element in the array.**
16. What is the main advantage of using a frequency array over iterating through an array to count occurrences?
    1. **Reduced time complexity.**
    2. Improved memory efficiency.
    3. Simplicity of implementation.
    4. Elimination of duplicate elements.
17. How can a prefix maximum difference array be used to find the difference between the maximum and minimum elements in a given range?
    1. **Subtract the prefix maximum difference of the starting index from the prefix maximum difference of the ending index**
    2. Add the prefix maximum difference of the starting index to the prefix maximum difference of the ending index
    3. Multiply the prefix maximum difference of the starting index by the prefix maximum difference of the ending index
    4. Divide the prefix maximum difference of the starting index by the prefix maximum difference of the ending index
18. What is a prefix minimum difference array?
19. **An array that stores the difference between the maximum and minimum elements up to a given index**
20. An array that stores the difference of all elements up to a given index
21. An array that stores the sum of all elements up to a given index
22. An array that stores the product of all elements up to a given index
23. How can a prefix minimum difference array be used to find the difference between the maximum and minimum elements in a given range?

**a) Subtract the prefix minimum difference of the starting index from the prefix minimum difference of the ending index**

b) Add the prefix minimum difference of the starting index to the prefix minimum difference of the ending index

c) Multiply the prefix minimum difference of the starting index by the prefix minimum difference of the ending index

d) Divide the prefix minimum difference of the starting index by the prefix minimum difference of the ending index

1. Which of the following operations can be performed efficiently using a prefix maximum difference array?

a) Finding the median of elements in a given range

b) Finding the mode of elements in a given range

c) Finding the maximum element in a given range

**d) Finding the difference between the maximum and minimum elements in a given range**

1. Which of the following operations can be performed efficiently using a prefix minimum difference array?

a) Finding the median of elements in a given range

b) Finding the mode of elements in a given range

c) Finding the minimum element in a given range

**d) Finding the difference between the maximum and minimum elements in a given range**

1. What is the purpose of a frequency count array?

a) To calculate the sum of elements in a given range efficiently

b) To calculate the product of elements in a given range efficiently

c) **To find the frequency of each element in the original array**

d) To find the maximum element in a given range efficiently

1. What is the time complexity to calculate the frequency of each element in the original array using a frequency count array?

a) O(1)

**b) O(n)**

c) O(log n)

d) O(n log n)

1. How can a frequency count array be used to find the most frequent element in a given range?
   1. **Find the element with the highest frequency count in the given range**
   2. Find the element with the lowest frequency count in the given range
   3. Find the median frequency count in the given range
   4. Find the mode frequency count in the given range
2. How can a frequency count array be used to find the least frequent element in a given range?
   1. Find the element with the highest frequency count in the given range
   2. **Find the element with the lowest frequency count in the given range**
   3. Find the median frequency count in the given range
   4. Find the mode frequency count in the given range
3. What is the purpose of a prefix maximum count array?
   1. To calculate the sum of elements in a given range efficiently
   2. To calculate the product of elements in a given range efficiently
   3. **To find the maximum frequency count of any element up to a given index**
   4. To find the minimum frequency count of any element up to a given index
4. What is the time complexity to construct a prefix maximum count array of size n?
   1. **O(n)**
   2. O(n^2)
   3. O(log n)
   4. O(1)
5. How can a prefix maximum count array be used to find the maximum frequency count of any element in a given range?
   1. **Find the prefix maximum count of the ending index and subtract the prefix maximum count of the starting index**
   2. Find the prefix maximum count of the starting index and add the prefix maximum count of the ending index
   3. Find the prefix maximum count of the starting index and subtract the prefix maximum count of the ending index
   4. Find the prefix maximum count of the ending index and divide it by the prefix maximum count of the starting index
6. What is the purpose of a prefix minimum count array?
   1. To calculate the sum of elements in a given range efficiently
   2. To calculate the product of elements in a given range efficiently
   3. **To find the minimum frequency count of any element up to a given index**
   4. To find the maximum frequency count of any element up to a given index
7. What is the time complexity to construct a prefix minimum count array of size n?
   1. **O(n)**
   2. O(n^2)
   3. O(log n)
   4. O(1)
8. How can a prefix minimum count array be used to find the minimum frequency count of any element in a given range?
   1. **Find the prefix minimum count of the ending index and subtract the prefix minimum count of the starting index**
   2. Find the prefix minimum count of the starting index and add the prefix minimum count of the ending index
   3. Find the prefix minimum count of the starting index and subtract the prefix minimum count of the ending index
   4. Find the prefix minimum count of the ending index and divide it by the prefix minimum count of the starting index
9. Which of the following operations can be performed efficiently using a prefix maximum count array?
   1. Finding the median of elements in a given range
   2. Finding the mode of elements in a given range
   3. **Finding the maximum frequency count of any element in a given range**
   4. Finding the minimum frequency count of any element in a given range