**Minimize the Difference**

You are given an array **arr** of size **n**. You have to remove a **subarray**of size **k** , such that the difference between the maximum and minimum values of the **remaining array** is **minimized**.  
Find the **minimum** value obtained after performing the operation of the removal of the subarray and return it.

**Example 1:**

**Input**:  
n = 5  
k = 3  
arr = {1, 2, 3, 4, 5}  
**Output:**   
1  
**Explanation:**   
We can remove first subarray of length 3(i.e. {1, 2, 3}) then remaining array will be {4,5} and the difference of maximum and minimum element will be **1** i.e 5 - 4 = **1**

**Example 2:**

**Input**:  
n = 6  
k = 3  
arr = {2, 3, 1, 4, 6, 7}  
**Output:**   
2  
**Explanation:**  
If we remove the subarray {2,3,1} then remaining array will be {4,6,7} and the difference = 7-4 = 3  
If we remove the subarray {3,1,4} then remaining array will be {2,6,7} and the difference = 7-2 = 5  
If we remove the subarray {1,4,6} then remaining array will be {2,3,7} and the difference = 7-2 = 5  
If we remove the subarray {4,6,7} then remaining array will be {2,3,1} and the difference = 3-1 = 2  
So the answer will be min(3,5,5,2) = **2**

**Your Task:**You have to complete the function **minimizeDifference( )**, which takes two integers **n** and **k** and an integer array **arr** of size n. You have to return the **minimum difference** of maximum and minimum elements of the remaining array after removing one k length subarray of it.

**Expected Time Complexity:** O(n)  
**Expected Auxiliary Space:** O(n)

**Constraints:**2 <= n <= 105  
1 <= k <= n-1  
0 <= arr[i] <= 109

class Solution {

public:

int minimizeDifference(int n, int k, vector<int> &arr) {

// code here

vector<int> post\_max(n);

vector<int> post\_min(n);

post\_min[n-1] = arr[n-1];

post\_max[n-1] = arr[n-1];

for(int i = n-2; i>= 0; --i) {

post\_max[i] = max(arr[i] , post\_max[i+1]);

post\_min[i] = min(arr[i] , post\_min[i +1]);

}

int min\_diff = post\_max[k] - post\_min[k];

int p\_min = arr[0];

int p\_max = arr[0];

for( int i = 1; i<n-k; ++i) {

int curr\_min = max(p\_max , post\_max[i+k]) - min(p\_min , post\_min[i+k]);

min\_diff = min( min\_diff , curr\_min);

p\_max = max(arr[i] , p\_max);

p\_min = min(arr[i] , p\_min);

}

min\_diff = min( min\_diff , p\_max - p\_min);

return min\_diff;

}

};

Link : <https://www.geeksforgeeks.org/problems/minimize-the-difference/1>