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| **Merge 2 sorted subarrays in C++** | |
| #include <iostream>  #include <vector>  using namespace std;  // Function to merge two sorted subarrays within array 'a'  vector<int> mergeTwoSortedSubArray(vector<int>& a, int s, int m, int e) {  vector<int> temp(e - s + 1);  int p1 = s;  int p2 = m + 1;  int p3 = 0;  // Merge elements from two subarrays into temp array  while (p1 <= m && p2 <= e) {  if (a[p1] < a[p2]) {  temp[p3] = a[p1];  p3++;  p1++;  } else {  temp[p3] = a[p2];  p3++;  p2++;  }  }  // Copy remaining elements of the first subarray, if any  while (p1 <= m) {  temp[p3] = a[p1];  p3++;  p1++;  }  // Copy remaining elements of the second subarray, if any  while (p2 <= e) {  temp[p3] = a[p2];  p3++;  p2++;  }  // Copy sorted elements from temp back to original array 'a'  for (int i = 0; i < temp.size(); i++) {  a[s + i] = temp[i];  }  return a;  }  int main() {  // Hard-coded input  vector<int> A = {1, 3, 5, 7, 2, 4, 6, 8};  int s = 0;  int m = 3; // Middle index of the first sorted subarray  int e = 7; // End index of the second sorted subarray  // Merging the two sorted subarrays  vector<int> result = mergeTwoSortedSubArray(A, s, m, e);  // Print the result  cout << "Merged array: ";  for (int num : result) {  cout << num << " ";  }  cout << endl;  return 0;  } | using the input:  A = {1, 3, 5, 7, 2, 4, 6, 8}  s = 0, m = 3, e = 7  This means:   * First sorted subarray = A[0..3] = {1, 3, 5, 7} * Second sorted subarray = A[4..7] = {2, 4, 6, 8}   **🔄 Dry Run Table:**   | **Step** | **p1** | **p2** | **temp[] (after step)** | **Comment** | | --- | --- | --- | --- | --- | | 1 | 0 | 4 | {1} | 1 < 2, so copy 1 from left | | 2 | 1 | 4 | {1, 2} | 2 < 3, so copy 2 from right | | 3 | 1 | 5 | {1, 2, 3} | 3 < 4, so copy 3 from left | | 4 | 2 | 5 | {1, 2, 3, 4} | 4 < 5, so copy 4 from right | | 5 | 2 | 6 | {1, 2, 3, 4, 5} | 5 < 6, so copy 5 from left | | 6 | 3 | 6 | {1, 2, 3, 4, 5, 6} | 6 < 7, so copy 6 from right | | 7 | 3 | 7 | {1, 2, 3, 4, 5, 6, 7} | 7 < 8, so copy 7 from left | | 8 | 4 | 7 | {1, 2, 3, 4, 5, 6, 7, 8} | only 8 left, copy from right |   Now the merged array looks like:  A = {1, 2, 3, 4, 5, 6, 7, 8}  **✅ Final Output:**  Merged array: 1 2 3 4 5 6 7 8 |
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