```cpp
#include <iostream>
using namespace std;

void merge(int array[], int const left,
        int const mid, int const right)
{
    auto const subArrayOne = mid - left + 1;
    auto const subArrayTwo = right - mid;

    auto *leftArray = new int[subArrayOne],
        *rightArray = new int[subArrayTwo];

    for (auto i = 0; i < subArrayOne; i++)
        leftArray[i] = array[left + i];
    for (auto j = 0; j < subArrayTwo; j++)
        rightArray[j] = array[mid + 1 + j];

    auto indexOfSubArrayOne = 0,
        indexOfSubArrayTwo = 0;


    int indexOfMergedArray = left;



    while (indexOfSubArrayOne < subArrayOne &&
        indexOfSubArrayTwo < subArrayTwo)
    {
        if (leftArray[indexOfSubArrayOne] <=
            rightArray[indexOfSubArrayTwo])
        {
            array[indexOfMergedArray] =
            leftArray[indexOfSubArrayOne];
            indexOfSubArrayOne++;
        }
        else
        {
            array[indexOfMergedArray] =
            rightArray[indexOfSubArrayTwo];
            indexOfSubArrayTwo++;
        }
        indexOfMergedArray++;
    }

    while (indexOfSubArrayOne < subArrayOne)
    {
        array[indexOfMergedArray] =
        leftArray[indexOfSubArrayOne];
        indexOfSubArrayOne++;
```

```
50          indexOfMergedArray++;
51      }
52
53      while (indexOfSubArrayTwo < subArrayTwo)
54      {
55          array[indexOfMergedArray] =
56          rightArray[indexOfSubArrayTwo];
57          indexOfSubArrayTwo++;
58          indexOfMergedArray++;
59      }
60  }
61
62  void mergeSort(int array[],
63              int const begin,
64              int const end)
65  {
66
67      if (begin >= end)
68          return;
69
70      auto mid = begin + (end - begin) / 2;
71      mergeSort(array, begin, mid);
72      mergeSort(array, mid + 1, end);
73      merge(array, begin, mid, end);
74  }
75
76
77  void printArray(int A[], int size)
78  {
79      for (auto i = 0; i < size; i++)
80          std::cout << A[i] << " ";
81      std::cout<<endl;
82  }
83
84
85  int main()
86  {
87      int size;
88      std::cout << "Enter the size of the array: ";
89      std::cin >> size;
90      if (size <= 0) {
91          std::cerr << "Invalid array size. Please enter a positive
              integer." << std::endl;
92          return 1;
93      }
94
95      int array[size];
96
97      std::cout << "Enter the elements of the array:" << std::endl;
```

```
 98      for (int i = 0; i < size; ++i) {
 99          std::cout << "Element " << i + 1 << ": ";
100          std::cin >> array[i];
101      }
102
103
104
105      mergeSort(array, 0, size - 1);
106
107      std::cout << "Sorted array is "<<endl;
108      printArray(array, size);
109      return 0;
110  }
111
```