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#include <iostream>

#include <cstdlib>

#include <omp.h>

using namespace std;

void bubble(int \*, int);

void swap(int &, int &);

void bubble(int \*a, int n)

{

    for (int i = 0; i < n; i++)

    {

        int first = i % 2;

#pragma omp parallel for shared(a, first)

        for (int j = first; j < n - 1; j += 2)

        {

            if (a[j] > a[j + 1])

            {

                swap(a[j], a[j + 1]);

            }

        }

    }

}

void swap(int &a, int &b)

{

    int temp;

    temp = a;

    a = b;

    b = temp;

}

int main()

{

    // cout << "\n\nName: Shriharsh Deshmukh\nRoll No.62 \t Div.A\n\n";

    int \*a, n;

    cout << "\nEnter total number of elements: ";

    cin >> n;

    a = new int[n];

    cout << "\nEnter elements: ";

    for (int i = 0; i < n; i++)

    {

        cin >> a[i];

    }

    bubble(a, n);

    cout << "\nSorted array is:\n";

    for (int i = 0; i < n; i++)

    {

        cout << a[i] << " ";

    }

    cout << endl;

    delete[] a;

    return 0;

}

// Run Commands (Ubuntu Terminal):

// g++ -fopenmp  3\_Bubble\_Sort.cpp -o bubble\_sort

//  ./bubble\_sort

// Run Commands (VS Code):

// g++ -fopenmp -o bubble\_sort 3\_Bubble\_Sort.cpp

// .\bubble\_sort

Output:

PS D:\Downloads\LPV\3\_Parallel Bubble Sort and Merge sort> .\merge\_sort.exe

Enter number of elements: 10

Enter the elements: 1 2 5 6 4 3 8 7 6 5

Sorted array:

1 2 3 4 5 5 6 6 7 8

Performance Metrics:

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Sequential Time: 0 seconds

Parallel Time : 0.013 seconds

Speedup : 0

Efficiency : 0