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Code and Sample Outputs

Cosc 320

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**Bubble.cpp:**

#include <iostream>

#include <omp.h>

#include <algorithm>

#include <stdlib.h>

#include <time.h>

using namespace std;

//if you want to change array size you must directly change the value of n in the source code (gives error otherwise)

const int n = 120000;

int main()

{

int threadsize;

cout << "You have " << omp\_get\_max\_threads() << " threads you can use on this machine. Please enter how many threads you would like to use for this parallel program.\n";

cin >> threadsize;

while (threadsize < 0 || threadsize > omp\_get\_max\_threads()) {

cout << "Please enter a number between 1 and " << omp\_get\_max\_threads() << endl;

cin >> threadsize;

}

int arr[n];

int arr1[n];

cout << "Starting non-parallel bubble sort:\n";

for (int i = 0; i < n; i++) {

arr[i] = rand();

}

for (int i = 0; i < n; i++) {

arr1[i] = arr[i];

}

clock\_t time\_req1;

time\_req1 = clock();

for (int i = 0; i < n; i++)

{

int first = i % 2;

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

{

if (arr1[j] > arr1[j + 1])

{

std::swap(arr1[j], arr1[j + 1]);

}

}

}

time\_req1 = clock() - time\_req1;

std::cout << "Processing time for normal bubble of array size " << n << ": " << (float)time\_req1 / CLOCKS\_PER\_SEC << " seconds\n";

cout << "Starting parallel bubble sort with a thread number of " << omp\_get\_max\_threads() << endl;

clock\_t time\_req;

time\_req = clock();

for (int i = 0; i < n; i++)

{

int first = i % 2;

omp\_set\_num\_threads(threadsize);

#pragma omp parallel for default(none),shared(arr,first)

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

{

if (arr[j] > arr[j + 1])

{

std::swap(arr[j], arr[j + 1]);

}

}

}

time\_req = clock() - time\_req;

std::cout << "Processing time for normal bubble of array size " << n << " with " << omp\_get\_max\_threads() << " threads: " << (float)time\_req / CLOCKS\_PER\_SEC << " seconds\n";

cout << "Would you like to print the first 100 items of either the parallel or non parallel array? (1 for parallel, 2 for sequential, any other number for no ";

int choice;

cin >> choice;

if (choice == 1) {

for (int i = 0; i < 100; i++) {

cout << arr[i] << endl;

}

}

else if (choice == 2) {

for (int i = 0; i < 100; i++) {

cout << arr1[i] << endl;

}

}

cout << "Goodbye!\n";

return 0;

}

// Run program: Ctrl + F5 or Debug > Start Without Debugging menu

// Debug program: F5 or Debug > Start Debugging menu

// Tips for Getting Started:

// 1. Use the Solution Explorer window to add/manage files

// 2. Use the Team Explorer window to connect to source control

// 3. Use the Output window to see build output and other messages

// 4. Use the Error List window to view errors

// 5. Go to Project > Add New Item to create new code files, or Project > Add Existing Item to add existing code files to the project

// 6. In the future, to open this project again, go to File > Open > Project and select the .sln file

**Sample Outputs:**





