**Practical 3 : Parallel Reduction**

#include <iostream>

#include <vector>

#include <omp.h>

#include <climits>

#include <cstdlib>

using namespace std;

void min\_reduction(vector<int>& arr) {

int min\_value = INT\_MAX;

#pragma omp parallel for reduction(min: min\_value)

for (int i = 0; i < arr.size(); i++) {

if (arr[i] < min\_value) {

min\_value = arr[i];

}

}

cout << "Minimum value: " << min\_value << endl;

}

void max\_reduction(vector<int>& arr) {

int max\_value = INT\_MIN;

#pragma omp parallel for reduction(max: max\_value)

for (int i = 0; i < arr.size(); i++) {

if (arr[i] > max\_value) {

max\_value = arr[i];

}

}

cout << "Maximum value: " << max\_value << endl;

}

void sum\_reduction(vector<int>& arr) {

int sum = 0;

#pragma omp parallel for reduction(+: sum)

for (int i = 0; i < arr.size(); i++) {

sum += arr[i];

}

cout << "Sum: " << sum << endl;

}

void average\_reduction(vector<int>& arr) {

int sum = 0;

#pragma omp parallel for reduction(+: sum)

for (int i = 0; i < arr.size(); i++) {

sum += arr[i];

}

cout << "Average: " << (double)sum / arr.size() << endl;

}

void print\_arr(vector<int>&arr){

if(arr.size() > 20 ){

for(int i=0;i<20;i++){

std::cout<<arr[i]<<" ";

}

}else{

for(int i=0;i<arr.size();i++){

std::cout<<arr[i]<<" ";

}

}

}

int main() {

std::cout<<"This is Atharva Pingale's code";

std::cout<<"\nPractical 3 : Parallel Reduction\n";

vector<int> arr;

int n;

cout<<"Enter the size of the vector : ";

cin>>n;

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

int random\_value = rand() % 99999;

arr.push\_back(random\_value);

}

std::cout<<"Printing first 20 elements of Vector : \n";

print\_arr(arr);

std::cout<<"\n";

#pragma omp parallel

{

#pragma omp single

{

min\_reduction(arr);

max\_reduction(arr);

sum\_reduction(arr);

average\_reduction(arr);

}

}

return 0;

}

**Output :**





