Assignment No. 03

Title : Implement min, max, sum and Average operations using parallel Reduction

objective: To understand the concept of parallel reduction and how it can be used to perform basic mathematical operations on given data set

Theory :

Parallel Reduction :

Here's a function-wise manual on how to understand and run the sample C++ program that demonstrates how to implement min, max, sum and Average operations using parallel reduction.

1) min - Reduction

The function takes in a vector of integers as input and finds the minimum value in the vector using parallel reduction.

The openMP reduction clause is used with the 'min' operator to find the minimum values across all thread.

2) max - Reduction

The function takes in a vector or integer as input and finds the maximum value

in the vector using parallel reduction

The openmp reduction clause is
the max operator to find the maximu
all thread.

3) sum - Reduction

The function takes in a vect
or integer as input and find the su
the values in the vector using paralle

The openmp reduction clause is
the '+' operator to find the sum across

4) Average Reduction

The function takes in a vector
integer as input and find the average
the values in the vector using parallel

The openmp reduction clause
with '+' operator to find the avera
all thread.

5) main

The Function initializes a vector of integers with some values.

The Function call the min reduction, max reduction, sum-reduction & average reduction functions on the input vector to find the corresponding values.

The final minimum, maximum, sum and average values are printed to the console.

6) Compiling & Running the program:

Compile the program:

you need to use a c++ compiler that supports openmp, such as g++ or clang. open a terminal and navigate to the directory where your program is saved. Then compile

```
$ g++ -fopenmp program.cpp -o program
```

This command compiles your program and creates an executable file named "program". The "-fopenmp" flag tells the compiler to enable openmp.

Run the program

To run the program, simply type
of the executable file in terminal and
enter:

```
$ ./program
```

Conclusion:

We have implemented the min, max
average operations using reduction in
openmp. Parallel reduction is a powerf
that allows us to perform these operati
large and more efficiently by dividing th
among all threads running in parallel
presented a code example that demons
implementation of these operations us
reduction in with openmp.