Report

I. Implementation

The current implementation is divided into three functions: main, linear_operation, and openmp_operation. The "main" function starts by generating random doubles between -50.0 and 50.0 for value pairs of widths and heights. Then, it calls the "linear_operation" function and "openmp_operation" function and passes in the generated value pairs of widths and heights into each function respectively. For each function call, the execution time and the return value are being recorded. The calling and recording processes are repeated a certain number of iteration and the results will be averaged over all iterations.

The "linear_operation" function calculates the total area linearly by looping over value pairs of width and height and multiply them together. The resulting value gets accumulated in variable called **total** and the variable get returned at the end of the loop.

The "openmp_operation" function also calculates the total area for given value pairs of width and height by splitting the workload onto multiple threads. Then, each thread is responsible for calculating the area for a given pair of width and height. Finally, at the end of the thread, all area values get accumulated and the sum of area gets returned.

II. Compilation Steps

```
g++ -o main .\main.cpp -fopenmp

.\main.exe
```

III. Speedup

Given 100000 pairs of widths and heights and 100000 iterations, the speedup is approximately 2.01 times.