

Lab Session 2

OpenMp

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```
dianapalafox@Dianas-MBP Lab2 % ./openmp_simple
Hello World
Hello World
Hello World
Hello World
Hello World
Hello World
Hello World
Hello World
Hello World
dianapalafox@Dianas-MBP Lab2 % Export OMP_NUM_THREADS=4
zsh: command not found: Export
dianapalafox@Dianas-MBP Lab2 % export OMP_NUM_THREADS=4
dianapalafox@Dianas-MBP Lab2 % g++ -fopenmp -o openmp_simple openmp_simple.c
dianapalafox@Dianas-MBP Lab2 % ./openmp_simple
Hello World
Hello World
Hello World
Hello World
dianapalafox@Dianas-MBP Lab2 % export OMP_NUM_THREADS=10
dianapalafox@Dianas-MBP Lab2 % ./openmp_simple
Hello World
Hello World
Hello World
Hello World
Hello World
Hello World
Hello World
Hello World
Hello World
Hello World
dianapalafox@Dianas-MBP Lab2 % export OMP_NUM_THREADS=4
dianapalafox@Dianas-MBP Lab2 % ./openmp_simple
Hello World
Hello World
Hello World
Hello World
dianapalafox@Dianas-MBP Lab2 % █
```

INTRODUCTION

For this lab we had to run OpenMp API.

1. OpenMP hello world

We can see with `export OMP_NUM_THREADS=4` we can change the number of threads we have hence printed out.

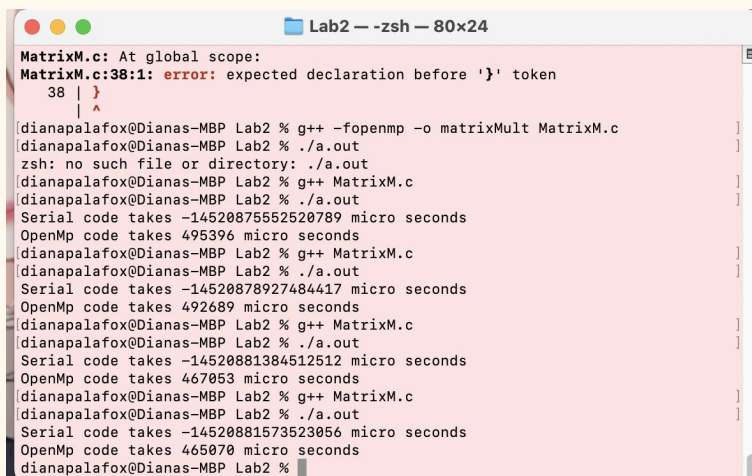
2. Hello world Extension

Here we print out the threads using the APIS `omp_get_num_threads()` and `omp_get_thread_num()`;

```
dianapalafox@Dianas-MBP Lab2 % vim openmp_simple.c
dianapalafox@Dianas-MBP Lab2 % g++ -fopenmp -o openmp_simple openmp_simple.c
dianapalafox@Dianas-MBP Lab2 % ./openmp_simple
thread_id is:thread_id is:thread_id is:3hello world
thread_id is:0hello world
total number of threads is4thread!:
2hello world
1hello world
dianapalafox@Dianas-MBP Lab2 % vim openmp_simple.c
```

3. Parallelization of matrix vector multiplication

Here we use different APIs to create the vector multiplication. Following we use is `#pragma omp parallel for 3.1` and `3.2 #pragma omp parallel for schedule(static) num_threads(threads)` and `#pragma omp parallel for schedule(dynamic) num_threads(threads)`



```
MatrixM.c: At global scope:
MatrixM.c:38:1: error: expected declaration before '}' token
 38 | }
    | ^
dianapalafox@Dianas-MBP Lab2 % g++ -fopenmp -o matrixMult MatrixM.c
dianapalafox@Dianas-MBP Lab2 % ./a.out
zsh: no such file or directory: ./a.out
dianapalafox@Dianas-MBP Lab2 % g++ MatrixM.c
dianapalafox@Dianas-MBP Lab2 % ./a.out
Serial code takes -14520875552520789 micro seconds
OpenMp code takes 495396 micro seconds
dianapalafox@Dianas-MBP Lab2 % g++ MatrixM.c
dianapalafox@Dianas-MBP Lab2 % ./a.out
Serial code takes -14520878927484417 micro seconds
OpenMp code takes 492689 micro seconds
dianapalafox@Dianas-MBP Lab2 % g++ MatrixM.c
dianapalafox@Dianas-MBP Lab2 % ./a.out
Serial code takes -14520881384512512 micro seconds
OpenMp code takes 467053 micro seconds
dianapalafox@Dianas-MBP Lab2 % g++ MatrixM.c
dianapalafox@Dianas-MBP Lab2 % ./a.out
Serial code takes -14520881573523056 micro seconds
OpenMp code takes 465070 micro seconds
dianapalafox@Dianas-MBP Lab2 %
```