**OPERATING SYSTEM ASSIGNMENT 5 (VIVEK KUMAR)**

**SimpleMultithreader: Using Multithreading with Ease using C++**

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**Detailed Implementation:**

For this assignment, we needed to simply abstract the work for multithreading programming. In the multithreading.h header file, two functions namely parallel-for was made with different parameter list (method overloading).

void parallel\_for(int low, int SIZE, std::function<void(int)> &&lambda, int NTHREADS) ;

void parallel\_for(int low1, int SIZE1, int low2, int SIZE2, std::function<void(int, int)> &&lambda, int NTHREADS);

The cpp file provided would have called these functions passing the basic function through lambda feature.The assignment was all about knowing the threading technique and use of lambda expression.

For threading of 1st method, these were the important methods :

void func1(thread\_args1 \*args1);

void \*thread\_func1(void \*ptr);

void parallel\_for(int low, int SIZE, std::function<void(int)> &&lambda, int NTHREADS)

{

pthread\_create(&tid1[i][j], NULL, thread\_func1, (void \*)&args1[i][j]);

Pthread\_join

}

Similar was the second method, which needed to work with 2D array for which we made 2D threads.

We have worked out with unequal chunk size. Lets say array size is 50, and 3 threads are to be created, so its implemented in a way that the first 2 threads take chunk of 50/2=16, while the last one would take for the rest 16+(50 %3)=18.

We have also included the threshold threading concept, like if we find its no better (or worse) using threading upto a certain size of array, you can set that value and it will do sequential upto that threshold,

#include <ctime> was used to calculate the time taken by individual threads and overall execution of program and #include <functional> for storing lambda expression in structure.

**Contribution:**

Prince (2022378) → Threading system calls, Time calculations,

Prajil (2022359) → Lambda exp, Worked out with the unequal chunk size,

Github link: <https://github.com/Prince22378/OS-Assignments-2023.git>