

Assignment 1

Write a program to parallelize the following serial program to add 1024 integers **using pthreads** with 4 threads.

```
#include <iostream>
int main()
{
    int n = 1000;
    double* array = new double[n];
    for(int i = 0; i < n; i++)
        array[i] = i;

    double sum = 0;
    for(int i = 0; i < n; i++)
        sum += array[i];

    double formula_sum = (double)n*(n-1)/2;

    std::cout << "N: " << n << std::endl;
    std::cout << "Loop Sum: " << sum << std::endl; std::cout << "Formula
Sum: " << formula_sum << std::endl;
    delete[] array;
    return 0;
}
```

Essentially, you need to divide the array into four parts with each thread responsible to find the sum of the corresponding part. The first thread then finds the sum of the partial sums.

Repeat this for 1, 2, 4, 8 and 16 threads and write a brief report that includes:

- 1) Description of the experimental set-up (configuration of the computer you used) – 1 Line.
- 2) execution times with 1, 2, 4, 8 and 16 threads (each averaged over 5 runs) - 5 Lines.
- 3) a brief summary (1-2 lines) of your observed trend of execution times.

You need to submit the properly indented C/C++ file (with your roll no. as the file name) with comments on google classroom latest by **Sunday, 16th January, 2022. The report (commented) also has to be included in the same C/C++ file.**

Note: Resubmissions post deadline will not be considered at any cost. Resubmission, if any, has to be submitted by mail with proper justification.