EE – 451 Parallel and Distributed computation

System properties:

VM ware: Ubuntu 16.04
RAM: 4 GB
Memory: 50 GB
Processor: Intel® Core™ i7-6700HQ CPU @ 2.60GHz × 2
OS - type: 64-bit
VM Ware is being run on Windows OS.

Problem 1:

Serial execution time: 0.65561 sec

Using 4 threads, Do / For directive

Execution time for p1a: 0.3325 sec

Using 2 threads, Sections directive

Execution time for p1b: 0.5641 sec

Problem 2:

Using Randomized pivot in both serial and parallel case.
QuickSort serial time: 6.011 sec

QuickSort parallel time: 4.819 sec

Problem 3:

Execution time for various number of threads.

Threads - 1: 3.6946 sec

Threads - 2: 3.21849 sec

Threads - 4: 2.45129 sec

Threads - 8: 2.30555 sec

Comparison with execution time in Programming homework 2,

In Programming 2,
P = 4, Execution Time = 1.229 sec
P = 8, Execution Time = 1.17 sec
Naïve K-means execution time = 1.597 sec

We can see that the earlier version (programming homework 2) of k-means clustering that used iterative thread creation and joining is faster as compared to this k-means clustering. In this method, we use condition variable, along with creating and joining the variable only once.

We can also see that the naïve execution time is also faster as compared to the k-means implementation that uses condition variable.

Input Image:

Output Image: