

Practical No. 02

Exam Seat No:

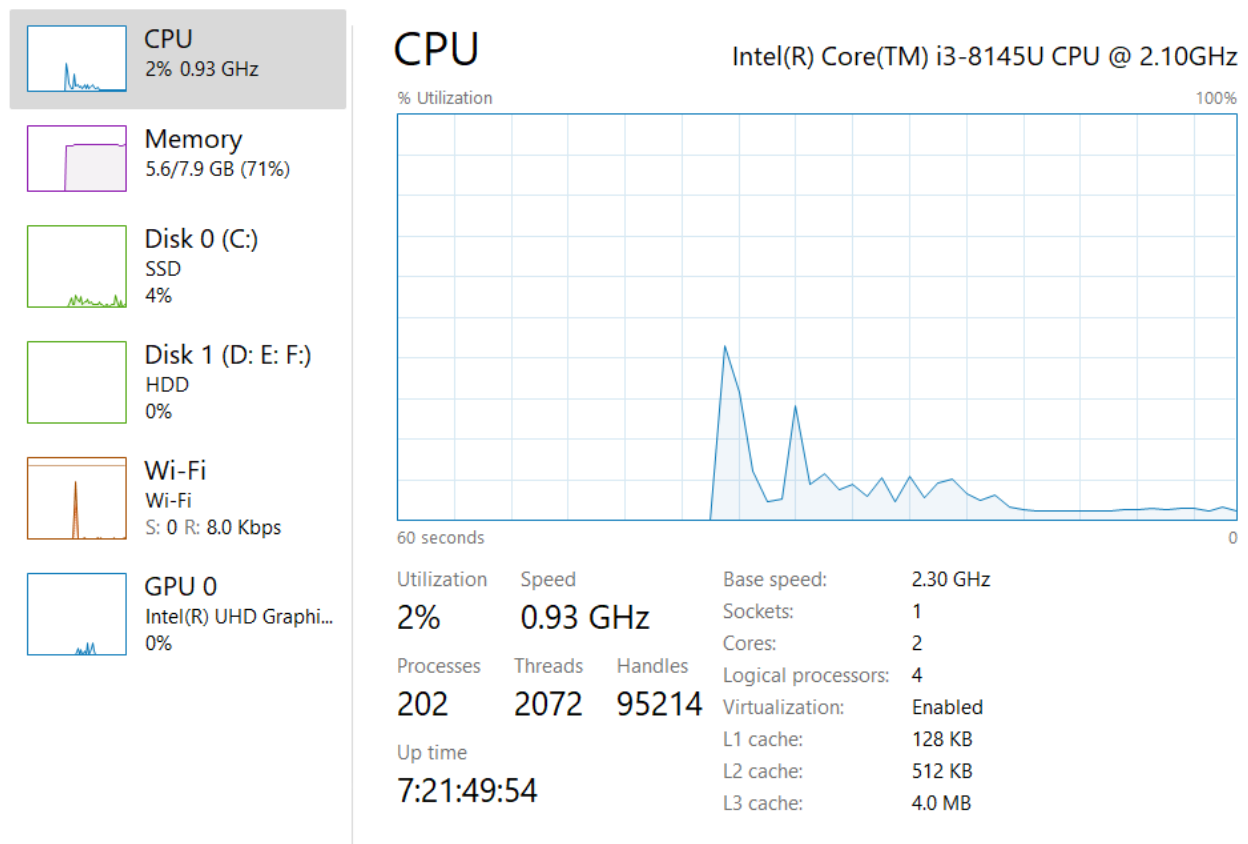
1. 2019BTECS00033 – Teknath K jha

Title of practical:

openMp program for :

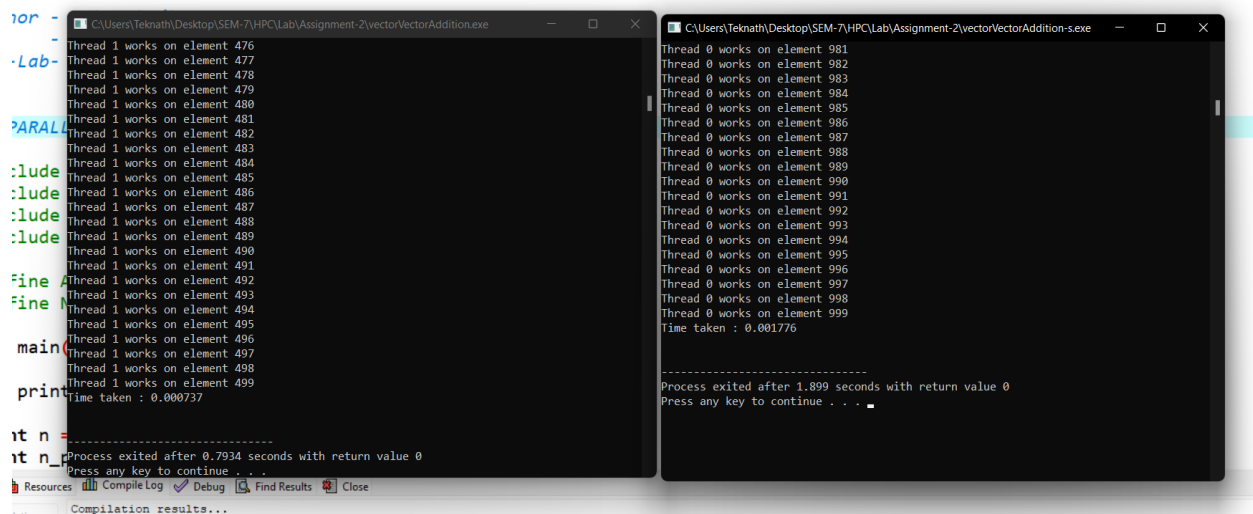
- 1) Vector Vector Addition
- 2) Vector Scalar Addition

MY SYSTEM CONFIGURATION :



A) Problem Statement 1: Vector Vector Addition :

Comparison with sequential :



```
for - C:\Users\Teknath\Desktop\SEM-7\HPC\Lab\Assignment-2\vector\VectorAddition.exe
- Lab- Thread 1 works on element 476
- Lab- Thread 1 works on element 477
- Lab- Thread 1 works on element 478
- Lab- Thread 1 works on element 479
- Lab- Thread 1 works on element 480
- Lab- Thread 1 works on element 481
- Lab- Thread 1 works on element 482
- Lab- Thread 1 works on element 483
- Lab- Thread 1 works on element 484
- Lab- Thread 1 works on element 485
- Lab- Thread 1 works on element 486
- Lab- Thread 1 works on element 487
- Lab- Thread 1 works on element 488
- Lab- Thread 1 works on element 489
- Lab- Thread 1 works on element 490
- Lab- Thread 1 works on element 491
- Lab- Thread 1 works on element 492
- Lab- Thread 1 works on element 493
- Lab- Thread 1 works on element 494
- Lab- Thread 1 works on element 495
- Lab- Thread 1 works on element 496
- Lab- Thread 1 works on element 497
- Lab- Thread 1 works on element 498
- Lab- Thread 1 works on element 499
- Lab- Time taken : 0.000737

it n -----
it n Process exited after 0.7934 seconds with return value 0
it n Press any key to continue . . .

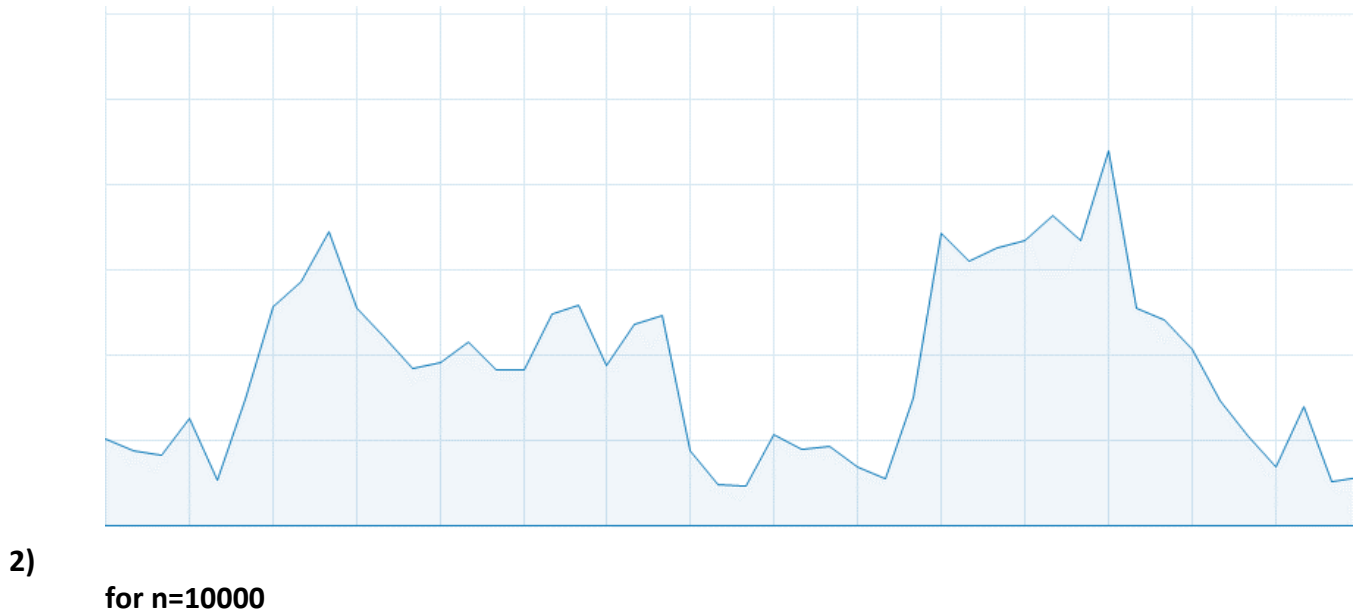
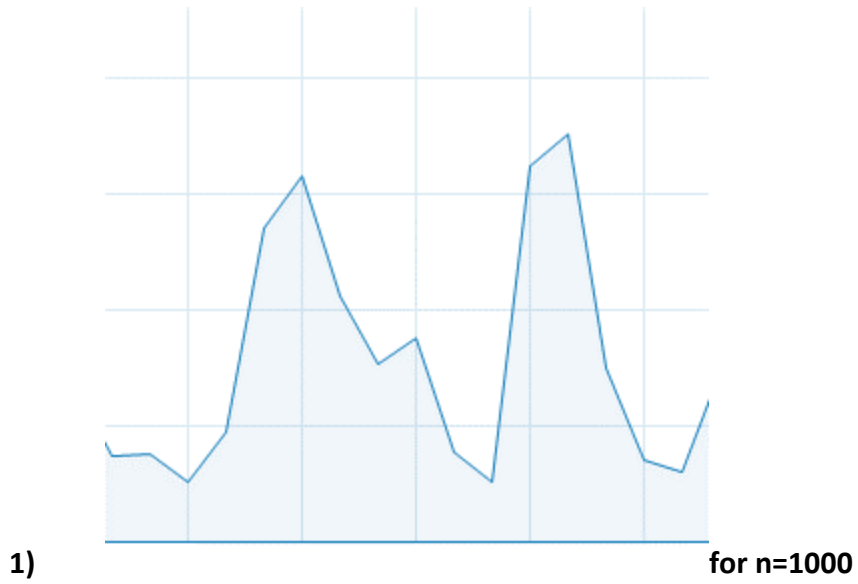
Resources Compile Log Debug Find Results Close
Compilation results...
```

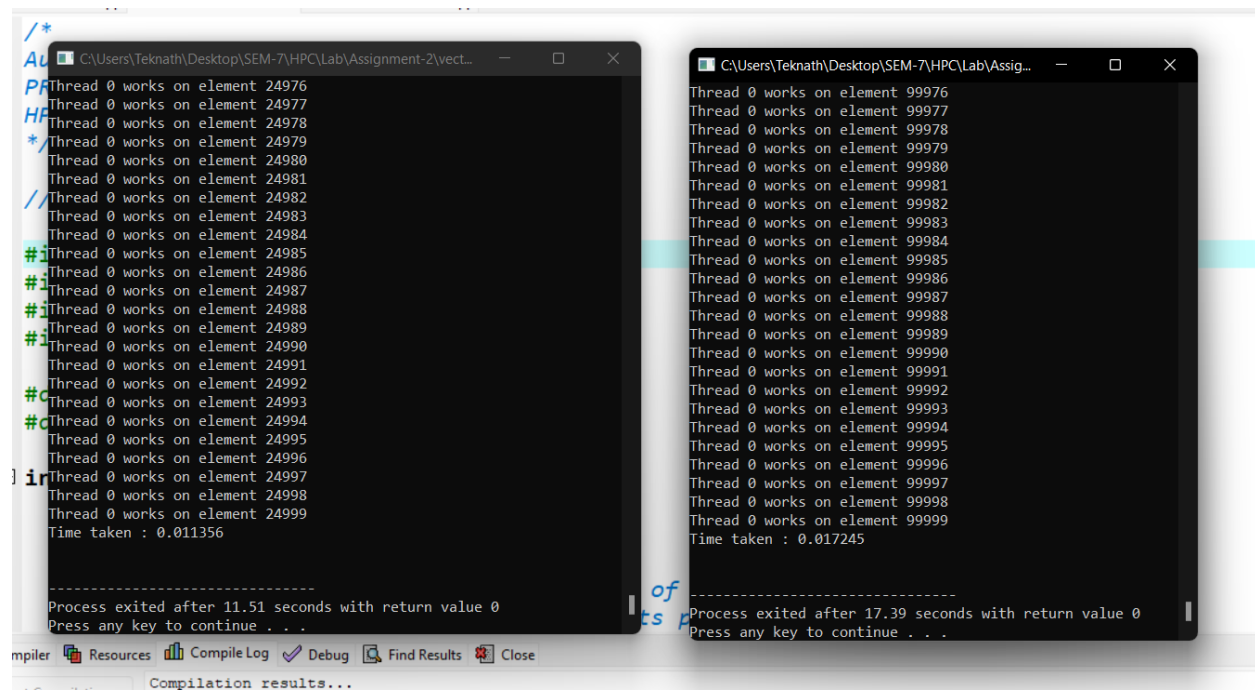
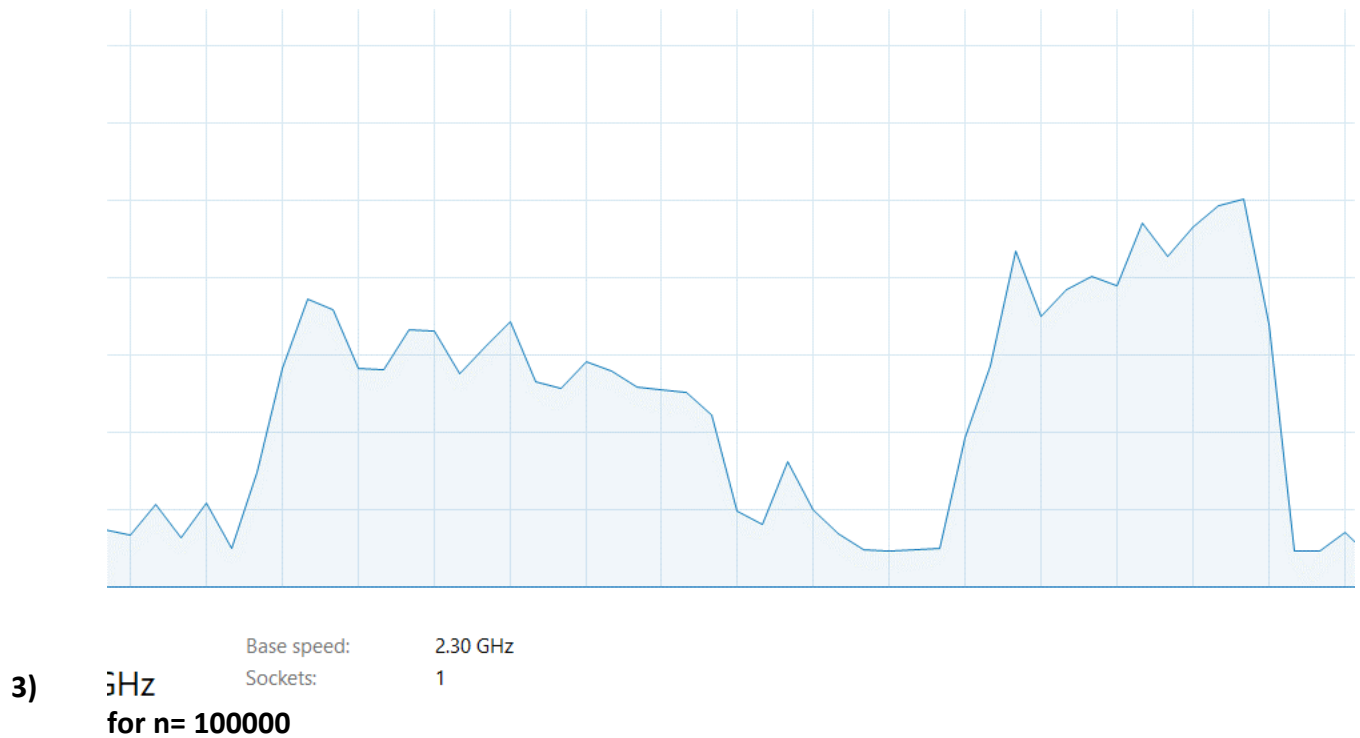
```
C:\Users\Teknath\Desktop\SEM-7\HPC\Lab\Assignment-2\vector\VectorAddition-s.exe
Thread 0 works on element 981
Thread 0 works on element 982
Thread 0 works on element 983
Thread 0 works on element 984
Thread 0 works on element 985
Thread 0 works on element 986
Thread 0 works on element 987
Thread 0 works on element 988
Thread 0 works on element 989
Thread 0 works on element 990
Thread 0 works on element 991
Thread 0 works on element 992
Thread 0 works on element 993
Thread 0 works on element 994
Thread 0 works on element 995
Thread 0 works on element 996
Thread 0 works on element 997
Thread 0 works on element 998
Thread 0 works on element 999
Time taken : 0.001776

-----
Process exited after 1.899 seconds with return value 0
Press any key to continue . . .
```

In below images 1st peak is of sequential and later is of parallel program :

Images from CPU Utilization Task Manager :



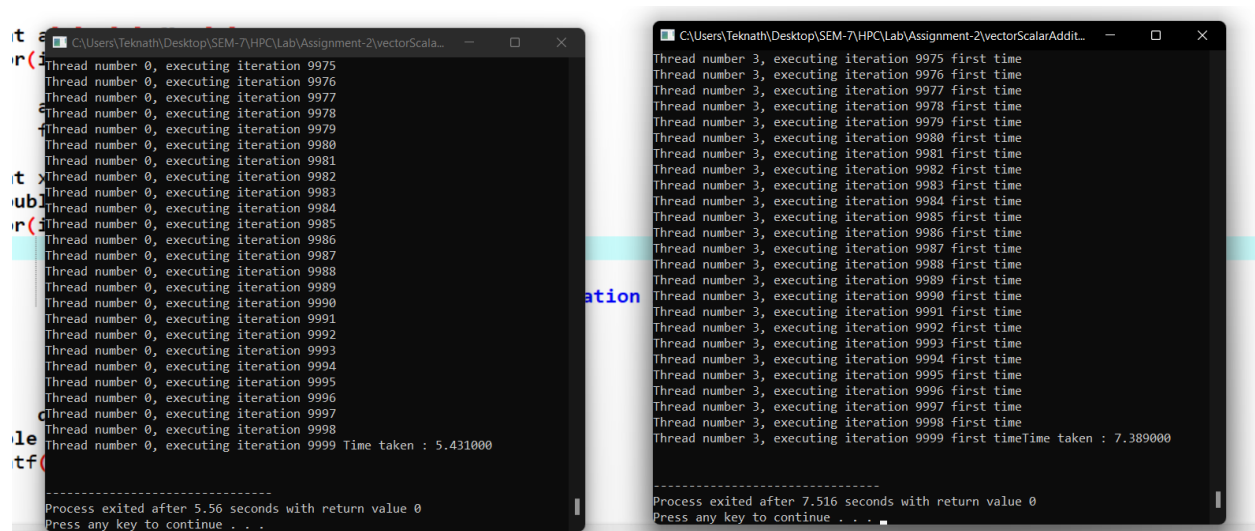


Here sequential takes 0.01725 and parallel takes 0.011356 clock ticks

Conclusion : my sequential program uses less CPU and parallel program uses more UPU for same program and same number of instruction Sets.

Although time calculation is negligible as it is small program .

Problem Statement 2: Vector Scalar Addition



```
Thread number 0, executing iteration 9975
Thread number 0, executing iteration 9976
Thread number 0, executing iteration 9977
Thread number 0, executing iteration 9978
Thread number 0, executing iteration 9979
Thread number 0, executing iteration 9980
Thread number 0, executing iteration 9981
Thread number 0, executing iteration 9982
Thread number 0, executing iteration 9983
Thread number 0, executing iteration 9984
Thread number 0, executing iteration 9985
Thread number 0, executing iteration 9986
Thread number 0, executing iteration 9987
Thread number 0, executing iteration 9988
Thread number 0, executing iteration 9989
Thread number 0, executing iteration 9990
Thread number 0, executing iteration 9991
Thread number 0, executing iteration 9992
Thread number 0, executing iteration 9993
Thread number 0, executing iteration 9994
Thread number 0, executing iteration 9995
Thread number 0, executing iteration 9996
Thread number 0, executing iteration 9997
Thread number 0, executing iteration 9998
Thread number 0, executing iteration 9999 Time taken : 5.431000

Process exited after 5.56 seconds with return value 0
Press any key to continue . . .
```

```
Thread number 3, executing iteration 9975 first time
Thread number 3, executing iteration 9976 first time
Thread number 3, executing iteration 9977 first time
Thread number 3, executing iteration 9978 first time
Thread number 3, executing iteration 9979 first time
Thread number 3, executing iteration 9980 first time
Thread number 3, executing iteration 9981 first time
Thread number 3, executing iteration 9982 first time
Thread number 3, executing iteration 9983 first time
Thread number 3, executing iteration 9984 first time
Thread number 3, executing iteration 9985 first time
Thread number 3, executing iteration 9986 first time
Thread number 3, executing iteration 9987 first time
Thread number 3, executing iteration 9988 first time
Thread number 3, executing iteration 9989 first time
Thread number 3, executing iteration 9990 first time
Thread number 3, executing iteration 9991 first time
Thread number 3, executing iteration 9992 first time
Thread number 3, executing iteration 9993 first time
Thread number 3, executing iteration 9994 first time
Thread number 3, executing iteration 9995 first time
Thread number 3, executing iteration 9996 first time
Thread number 3, executing iteration 9997 first time
Thread number 3, executing iteration 9998 first time
Thread number 3, executing iteration 9999 first timeTime taken : 7.389000

Process exited after 7.516 seconds with return value 0
Press any key to continue . . .
```

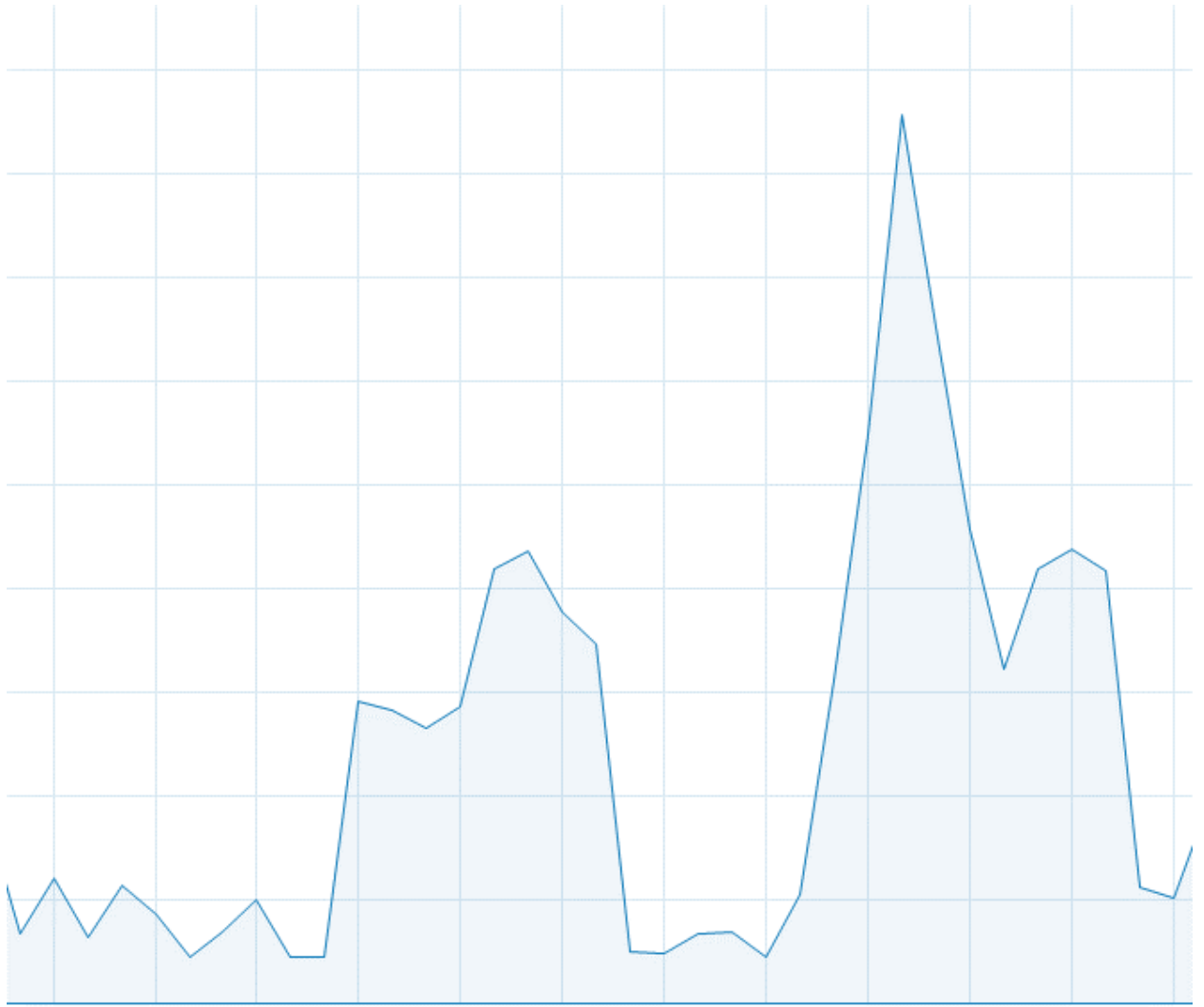
Parallel :7.3 sec Sequential: 5.4sec

So here sequential is faster than parallel.

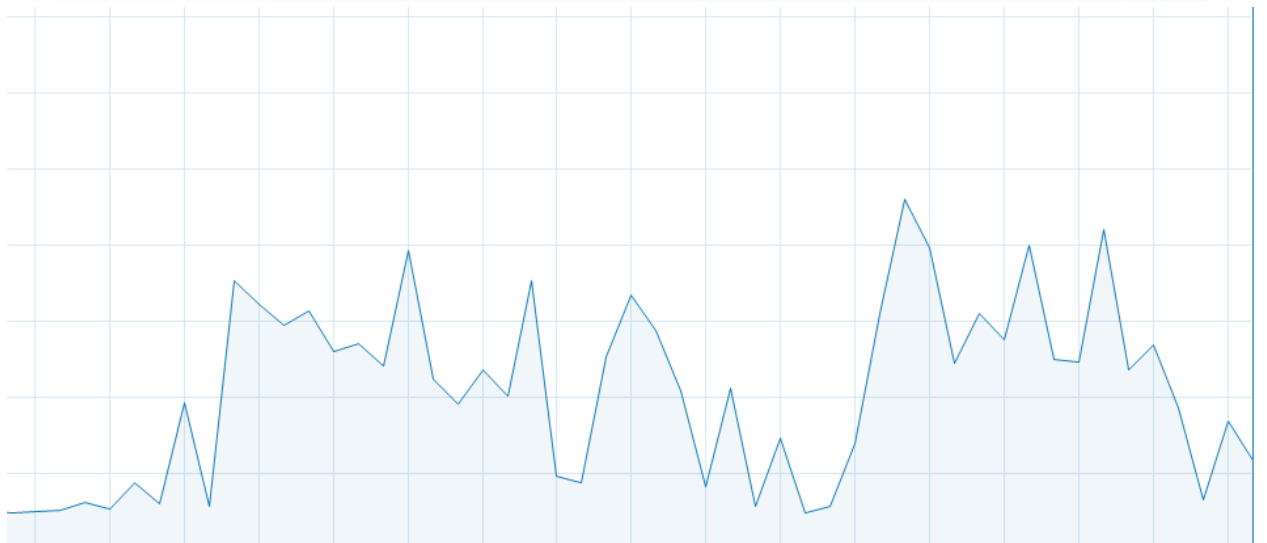
In below images 1st peak is of sequential and later is of parallel program :

CPU Graphs :

1)



2)



```
C:\Users\Teknath\Desktop\SEM-7\HPC\Lab\Assignment-2\vecor...
Thread number 3, executing iteration 9976 first time
Thread number 3, executing iteration 9977 first time
Thread number 3, executing iteration 9978 first time
Thread number 3, executing iteration 9979 first time
Thread number 3, executing iteration 9980 first time
Thread number 3, executing iteration 9981 first time
Thread number 3, executing iteration 9982 first time
Thread number 3, executing iteration 9983 first time
Thread number 3, executing iteration 9984 first time
Thread number 3, executing iteration 9985 first time
Thread number 3, executing iteration 9986 first time
Thread number 3, executing iteration 9987 first time
Thread number 3, executing iteration 9988 first time
Thread number 3, executing iteration 9989 first time
Thread number 3, executing iteration 9990 first time
Thread number 3, executing iteration 9991 first time
Thread number 3, executing iteration 9992 first time
Thread number 3, executing iteration 9993 first time
Thread number 3, executing iteration 9994 first time
Thread number 3, executing iteration 9995 first time
Thread number 3, executing iteration 9996 first time
Thread number 3, executing iteration 9997 first time
Thread number 3, executing iteration 9998 first time
Thread number 3, executing iteration 9999 first time
Time taken : 5.55
0000
-----
Process exited after 5.682 seconds with return value 0
Press any key to continue . . .
sources Compile Log Debug Find Results Close

C:\Users\Teknath\Desktop\SEM-7\HPC\Lab\Assignment-2\vecor...
Thread number 0, executing iteration 9975
Thread number 0, executing iteration 9976
Thread number 0, executing iteration 9977
Thread number 0, executing iteration 9978
Thread number 0, executing iteration 9979
Thread number 0, executing iteration 9980
Thread number 0, executing iteration 9981
Thread number 0, executing iteration 9982
Thread number 0, executing iteration 9983
Thread number 0, executing iteration 9984
Thread number 0, executing iteration 9985
Thread number 0, executing iteration 9986
Thread number 0, executing iteration 9987
Thread number 0, executing iteration 9988
Thread number 0, executing iteration 9989
Thread number 0, executing iteration 9990
Thread number 0, executing iteration 9991
Thread number 0, executing iteration 9992
Thread number 0, executing iteration 9993
Thread number 0, executing iteration 9994
Thread number 0, executing iteration 9995
Thread number 0, executing iteration 9996
Thread number 0, executing iteration 9997
Thread number 0, executing iteration 9998
Thread number 0, executing iteration 9999
Time taken : 5.565000
-----
Process exited after 5.639 seconds with return value 0
Press any key to continue . . .
```

Here most of time width of sequential is more than parallel which shows time difference.

Conclusion :

In execution : sequential taken 5.56 while parallel taken 5.55 which is considerable difference , further observation of CPU cycles also proves this that parallel is faster than sequential .

Github Link:

<https://github.com/Teknath-jha/HPC-LAB-2019BTECS00033/tree/main/Assignment-2>