

Specifications of the computer:

Quad core Intel I5 processor

Running Ubuntu through a Live USB (4GB)

Primary Memory: 4GB

It gives Segmentation Fault if $N > 820$. Hence restricted N to 820.

Serial code Characteristics:

value of N	Time taken(s)
100	0.02
200	0.07
400	0.57
600	2
800	5.37
820	7.66

OpenMP code Characteristics: (2 threads)

value of N	Time taken(s)
100	0.01
200	0.08
400	0.61
600	2.15
800	5.7
820	7.39

OpenMP code Characteristics: (4threads)

value of N	Time taken(s)
100	0.03
200	0.16
400	1.19
600	4.24
800	10.89
820	12.61

OpenMP code Characteristics: (8threads)

value of N	Time taken(s)
100	0.04
200	0.15
400	1.2
600	4.22
800	10.61
820	11.65

OpenMP code Characteristics: (16threads)

value of N	Time taken(s)
100	0.02
200	0.14
400	1.22

600	4.24
800	10.66
820	11.73

MPI code Characteristics (1 process)

Value of N	Time taken (s)
100	0.05
1000	22.5
3000	721

MPI code Characteristics (2 processes)

Value of N	Time taken (s)
100	0.06
1000	9
3000	305

MPI code Characteristics (4 processes)

Value of N	Time taken (s)
100	1
1000	9.5
3000	260

MPI code Characteristics (8 processes)

Value of N	Time taken (s)
100	1.2
1000	9.5
3000	245

MPI code Characteristics (16 processes)

Value of N	Time taken (s)
100	1.3
1000	10.5
3000	290