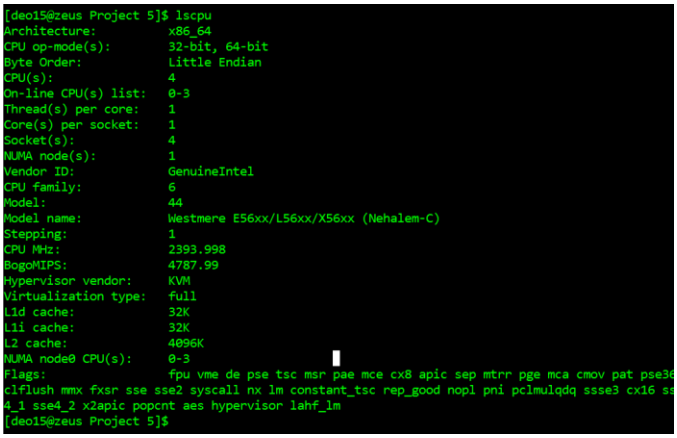
1)

A) lscpu of zeus…



C)

ArraySize (Bytes)	Row Compute Time (Seconds)	Row (Mega_elements/sec)	Column Compute Time (Seconds)	Column (Mega_elements/sec)
4000000	0.0060	166.226	0.0086	116.508
100000000	0.1674	149.333	0.4106	60.887
576000000	1.1251	127.987	4.1146	34.997
1600000000	3.6404	109.878	22.4997	17.778

Row first computes faster than Column first and computes more mega_elements/sec than column first. As the size grows the compute times increase dramatically in column first.

D)

In my code I tried to simulate the cold and warm cache by looping my code multiple times with different sizes but I was not able to see any real differences in the timings.

2)

A)

Frequency of error: 4/10000

Erroneous result: Sum = 300000.000000

Why? With a lack of synchronization, threads may be accessing data while others could be writing to that same data thus giving erroneous results.

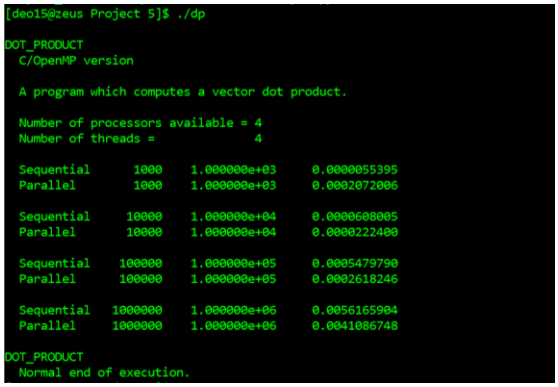
Lock prevented all erroneous results!

B)

	Runtime (seconds)
Serial	0.0349
pThreads	0.0161

3)

A)



Vector Length	Speed up	Efficiency
1000	0.026734961	0.00668374
10000	2.733835432	0.683458858
100000	2.092924042	0.52323101
1000000	1.367007776	0.341751944

B)

‘i’ is private because it wouldn’t make sense for each thread to be working on the same index of the array as you would want to parallelize the array for more efficiency.