

CS-575 Parallel Programming
Spring 2022

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Project Name: #Project-4

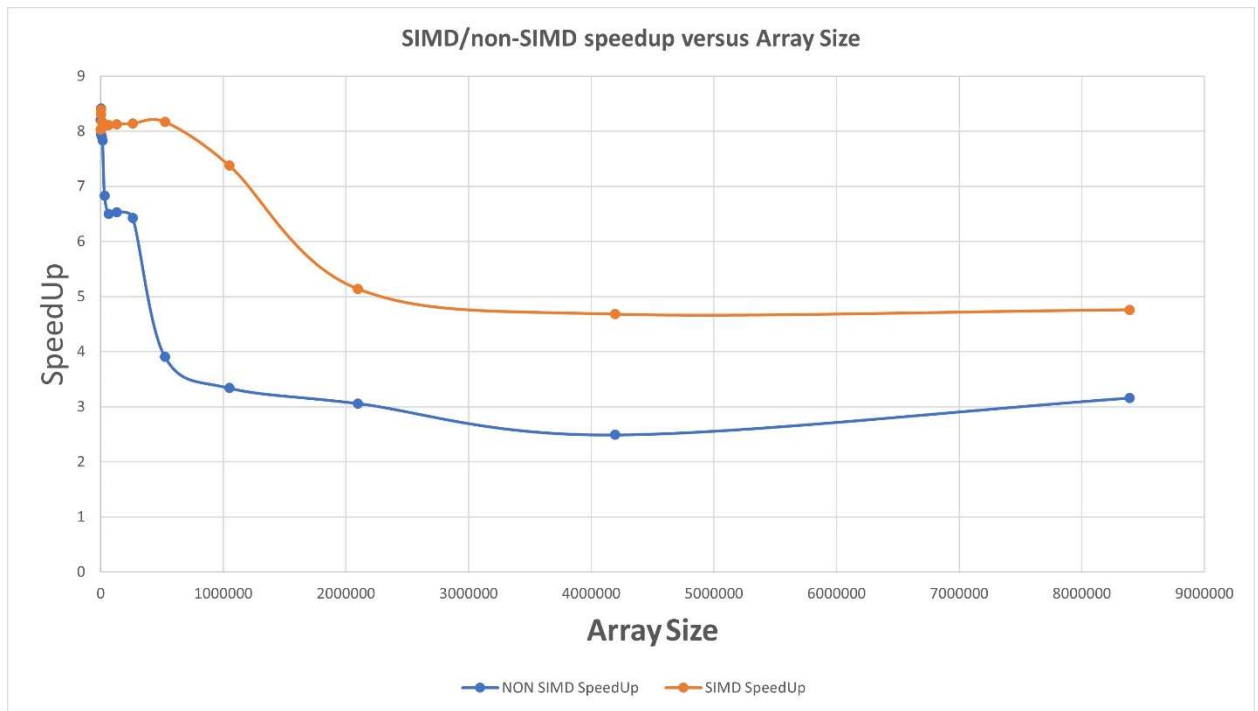
1. What machine you ran this on?

I have executed the project-4 code on the flip server “flip.engr.oregonstate.edu”.

2. Show the table of performances for each array size and the corresponding speedups

ArraySize	nonsimd_megamults	simd_megamults	nonsimd_speedup	nonsimd_addmults	simd_addmults	simd_speedup
1024	180.81	1484.82	8.21	182.83	1467.97	8.03
2048	181.54	1527.63	8.41	183.67	1527.1	8.31
4096	181.3	1439.86	7.94	184.1	1544.53	8.39
8192	181.4	1433.87	7.9	184.78	1510.32	8.17
16384	120.91	946.27	7.83	123.22	1005.81	8.16
32768	120.79	824.69	6.83	123.22	997.78	8.1
65536	120.99	786.62	6.5	123.2	999.01	8.11
131072	120.48	786.23	6.53	122.7	997.88	8.13
262144	119.79	769.67	6.43	122.62	998.67	8.14
524288	219.41	765.91	3.49	226.66	1851.31	8.17
1048576	219.85	733.3	3.34	222.89	1645.03	7.38
2097152	219.8	672.26	3.06	222.83	1144.84	5.14
4194304	214.99	535.18	2.49	221.44	1035.89	4.68
8388608	217.63	687.35	3.16	216.88	1032.17	4.76

3. Show the graph of SIMD/non-SIMD speedup versus array size (two graphs each with one curve).



4. What patterns are you seeing in the speedups?

For SIMD and Non-SIMD speedups starting with the array size with 1KB (1024) and the max size is 8MB (8388608). The Maximum speedup value for SIMD is achieved at size 2048 with 8.41 and for non-SIMD is 8.39 for the size 4096. The speedup of non-SIMD drops faster than SIMD as the Array Size increases. After the minimal value is reached for a certain point of time till the maximum size of array is reached the speedup for both SIMD and non-SIMD is managed to be in a constant level.

5. Are they consistent across a variety of array sizes?

The speedup pattern of both SIMD and non-SIMD are not consistent in the beginning of the graph where initial Array size is 1024. Later, it decreases up to a level at 262144 and remains same until the maximum size of array i.e., 8388608 is reached.

6. Why or why not, do you think?

The SIMD is very fast and achieves the speedup of 8 or more when the array size is less. As the size increases, the value starts fluctuating and decreasing because of the overhead. This leads to more wait time because the memory fetching will be slow due to the overhead occurred.