Data from Cache Lines

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Hit Ratio (Fraction)

config\file	firstTen	simpleIncrease	jumpBy5	jumpBy10	random
8words/4lines	8/10	87/100	8/20	0/10	1/17
4words/8lines	7/10	75/100	0/20	0/10	3/17
4words/4lines	7/10	75/100	0/20	0/10	2/17
2words/10lines	5/10	50/100	0/20	0/10	0/17
10words/2lines	9/10	90/100	10/20	0/10	2/17
2words/2lines	5/10	50/100	0/20	0/10	0/17
10words/10lines	9/10	90/100	10/20	0/10	7/17

Hit Ratio (Percent)

config\file	firstTen	simpleIncrease	jumpBy5	jumpBy10	random
8words/4lines	80%	87%	40%	0%	5.88%
4words/8lines	70%	75%	0%	0%	17.64%
4words/4lines	70%	75%	0%	0%	11.76%
2words/10lines	50%	50%	0%	0%	0%
10words/2lines	90%	90%	50%	0%	11.76%
2words/2lines	50%	50%	0%	0%	0%
10words/10lines	90%	90%	50%	0%	41.17%

Effective Access Time (nsec)

config\file	firstTen	simpleIncrease	jumpBy5	jumpBy10	random

8words/4lines	5.6	4.34	12.8	20	18.94
4words/8lines	7.4	6.5	20	20	16.82
4words/4lines	7.4	6.5	20	20	17.88
2words/10lines	11	11	20	20	20
10words/2lines	3.8	3.8	11	20	17.88
2words/2lines	11	11	20	20	20
10words/10lines	3.8	3.8	11	20	12.58

Analysis

For this experiment, I prepared five test files (included with submission) and ran them through caches with varying cache line sizes and number of lines. The time to access the cache was kept as 2 nsec and the time to access main memory was kept at 20 nsec.

Overall, it seems that the size of the cache lines mattered more than the number. This can be seen most clearly between the 10-2 combinations. The numbers for 10 words were the same regardless of whether the cache had 2 lines or 10 lines. The only exception to this was when random.txt was tested: when the locations being accessed started jumping around, the number of lines mattered more. Even then, the tests with 10 words per line had higher hit ratios and lower effective access times than those with 2 words per line. The number of words per cache line overall is more important to speed and efficiency than the number of cache lines.