CS224 Lab No: 6

Section No: 1

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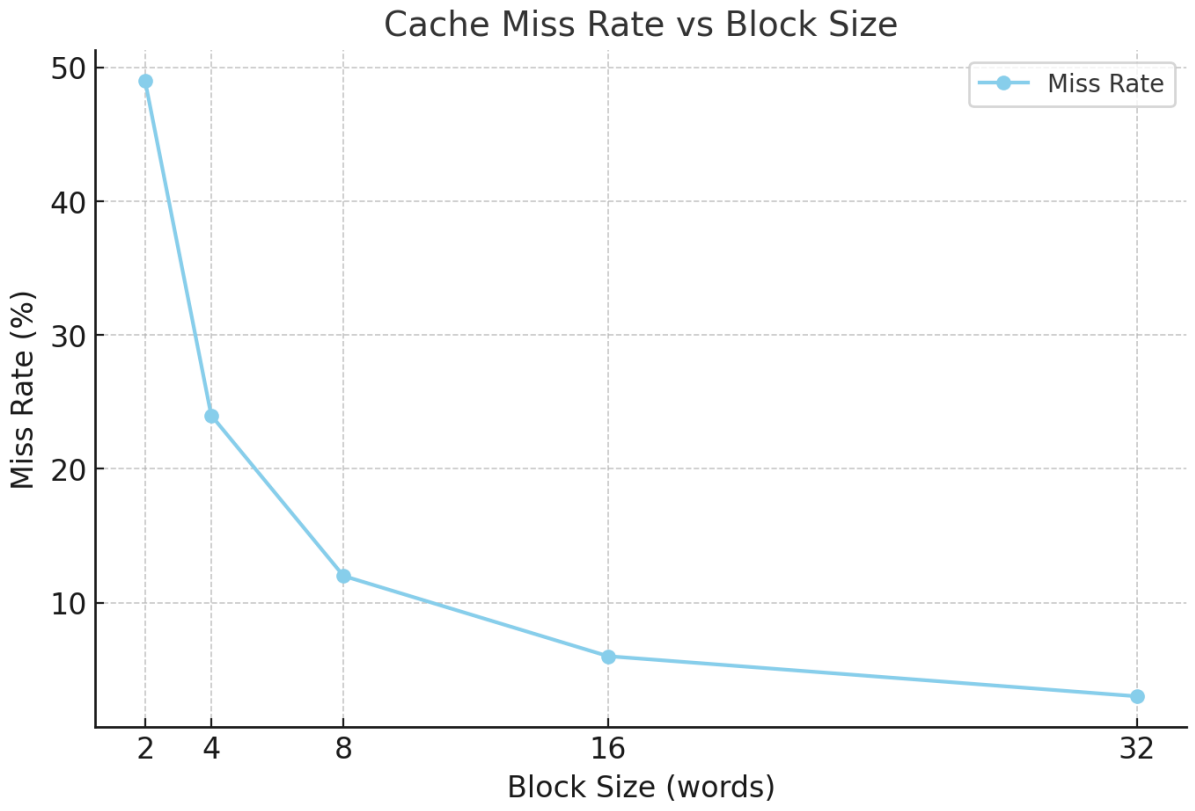
22202709

1-Matrix size: 50

a) Direct Mapped

Row-major addition (50 x 50)

Block Size (words)	Cache Size 256 byte	Cache Size 512 byte	Cache Size 1024 byte	Cache Size 2048 byte	Cache Size 4096 byte
2	%51 hit rate 2638 hit 2522 miss	%51 hit rate 2638 hit 2522 miss	%51 hit rate 2638 hit 2522 miss	%51 hit rate 2638 hit 2522 miss	%51 2638 hit 2522 miss
4	%76 hit rate 1264 miss 3896 hit	%76 hit rate 1264 miss 3896 hit	%76 hit rate 1264 miss 3896 hit	%76 hit rate 1264 miss 3896 hit	%76 hit rate 1264 miss 3896 hit
8	%88 hit rate 633 miss 4527 hit	%88 hit rate 633 miss 4527 hit	%88 hit rate 633 miss 4527 hit	%88 hit rate 633 miss 4527 hit	%88 hit rate 633 miss 4527 hit
16	%94 hit rate 318 miss 4842 hit	%94 hit rate 318 miss 4842 hit	%94 hit rate 318 miss 4842 hit	%94 hit rate 318 miss 4842 hit	%94 hit rate 318 miss 4842 hit
32	%97 hit rate 162 miss 4998 hit	%97 hit rate 162 miss 4998 hit	%97 hit rate 162 miss 4998 hit	%97 hit rate 162 miss 4998 hit	%97 hit rate 162 miss 4998 hit



b) Fully Associative Mapped

Cache size: 256 byte

	Block Size (words)	**Direct Mapped**	**Fully Associative Mapped (with LRU)**	**Fully Associative Mapped (without LRU)**
Poor	2	%51 hit rate 2638 hit 2522 miss	%51 hit rate 2522 miss 2638 hit	%51 hit rate 2522 miss 2638 hit
Medium	8	%88 hit rate 633 miss 4527 hit	%88 hit rate 633 miss 4527 hit	%88 hit rate 634 miss 4526 hit
Good	32	%97 hit rate 162 miss 4998 hit	%97 hit rate 162 miss 4998 hit	%97 163 miss 4997 hit

Rates for direct mapped and fullt associae are the same. The reason for this is that the only factor that hiss and miss rate depends on is block size. The results should be proportional to 1/ block size.

If we compare LRU and random access, the results are very much the same, but the LRU ones have a few more hits, this might be caused since they follow a proper strategy instead of doing random.

c) N-way Set Associative

Cache size: 256 byte

	Block Size (words)	**N = 2**	**N = 4**	**N = 8**	**N = 16**
Poor	2	%51 hit rate 2638 hit 2522 miss	%51 hit rate 2638 hit 2522 miss	%51 hit rate 2638 hit 2522 miss	%51 hit rate 2638 hit 2522 miss
Medium	8	%88 hit rate 633 miss 4527 hit	%88 hit rate 633 miss 4527 hit	%88 hit rate 633 miss 4527 hit	%88 hit rate 633 miss 4527 hit
Good	32	%97 hit rate 162 miss 4998 hit	%97 hit rate 162 miss 4998 hit	%97 hit rate 162 miss 4998 hit	%97 hit rate 162 miss 4998 hit

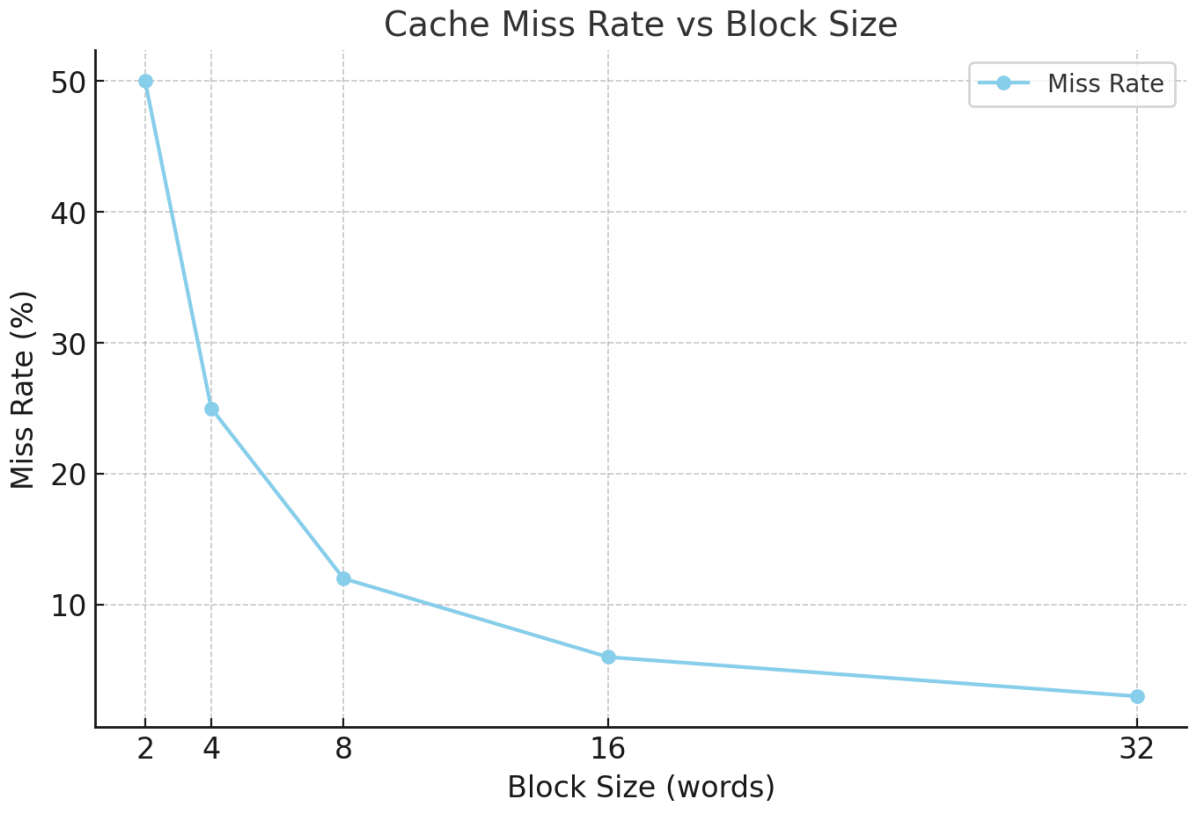
Also here, as in the results above, everything depends on the block size again, the rest of the things don't make a difference, and the miss rate is again proportional to 1/block size.

2-Matrix size: 100

a) Direct Mapped

Row-major addition

Block Size (words)	Cache Size 256 byte	Cache Size 512 byte	Cache Size 1024 byte	Cache Size 2048 byte	Cache Size 4096 byte
2	%50 hit 10022 miss 10138 hit	%50 hit 10022 miss 10138 hit	%50 hit 10022 miss 10138 hit	%50 hit 10022 miss 10138 hit	%50 hit 10022 miss 10138 hit
4	%75 hit 5014 miss 15146 hit	%75 hit 5014 miss 15146 hit	%75 hit 5014 miss 15146 hit	%75 hit 5014 miss 15146 hit	%75 hit 5014 miss 15146 hit
8	%88 hit 2507 miss 17653 hit	%88 hit 2507 miss 17653 hit	%88 hit 2507 miss 17653 hit	%88 hit 2507 miss 17653 hit	%88 hit 2507 miss 17653 hit
16	%94 hit 1254 miss 18906 hit	%94 hit 1254 miss 18906 hit	%94 hit 1254 miss 18906 hit	%94 hit 1254 miss 18906 hit	%94 hit 1254 miss 18906 hit
32	%97 hit 630 miss 19530 hit	%97 hit 630 miss 19530 hit	%97 hit 630 miss 19530 hit	%97 hit 630 miss 19530 hit	%97 hit 630 miss 19530 hit



b) Fully Associative Mapped

Cache size: 256 byte

	Block Size (words)	**Direct Mapped**	**Fully Associative Mapped (with LRU)**	**Fully Associative Mapped (without LRU)**
Poor	2	%50 hit 10022 miss 10138 hit	%50 hit rate 10022 miss 10138 hit	%50 hit rate 10022 miss 10138 hit
Medium	8	%88 hit 2507 miss 17653 hit	%88 hit rate 2507 miss 17653 hit	%88 hit rate 2507 miss 17653 hit
Good	32	%97 hit 630 miss 19530 hit	%97 hit rate 630 miss 19530 hit	%97 hit rate 630 miss 19530 hit

Rates for direct mapped and fullt associae are the same. The reason for this is that the only factor that hiss and miss rate depends on is block size. The results should be proportional to 1/ block size.

If we compare LRU and random access, the results are very much the same, but the LRU ones have a few more hits, this might be caused since they follow a proper strategy instead of doing random.

c) N-way Set Associative

Cache size: 256 byte

	Block Size (words)	**N = 2**	**N = 4**	**N = 8**	**N = 16**
Poor	2	%50 hit 10022 miss 10138 hit	%50 hit 10022 miss 10138 hit	%50 hit 10022 miss 10138 hit	%50 hit 10022 miss 10138 hit
Medium	8	%88 hit 2507 miss 17653 hit	%88 hit 2507 miss 17653 hit	%88 hit 2507 miss 17653 hit	%88 hit 2507 miss 17653 hit
Good	32	%97 hit 630 miss 19530 hit	%97 hit 630 miss 19530 hit	%97 hit 630 miss 19530 hit	%97 hit 630 miss 19530 hit

Also here, as in the results above, everything depends on the block size again, the rest of the things don't make a difference, and the miss rate is again proportional to 1/block size.