CS224
Section No.: 1
Spring 2021
Lab No.: 6
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Report 1

These calculations were made regarding the Matrice dimension as 100x100.
A)

Table 1: Miss rates and number of misses at given parameters by Column-Major Fashion

Cache Block Size (words)	Cache Size (bytes)				
	1024	2048	4096	8192	16384
16	10114 misses 95%	10114 misses 95%	8575 misses 80%	8575 misses 80%	8575 misses 80%
32	10111 misses 95%	10111 misses 95%	10111 misses 95%	9343 misses 88%	9343 misses 88%
64	10108 misses 95%	10108 misses 95%	10108 misses 95%	10108 misses 95%	9724 misses 91%
128	7906 misses 74%	7906 misses 74%	7906 misses 74%	7906 misses 74%	7906 misses 74%
256	4004 misses 38%	4004 misses 38%	4004 misses 38%	4004 misses 38%	4004 misses 38%

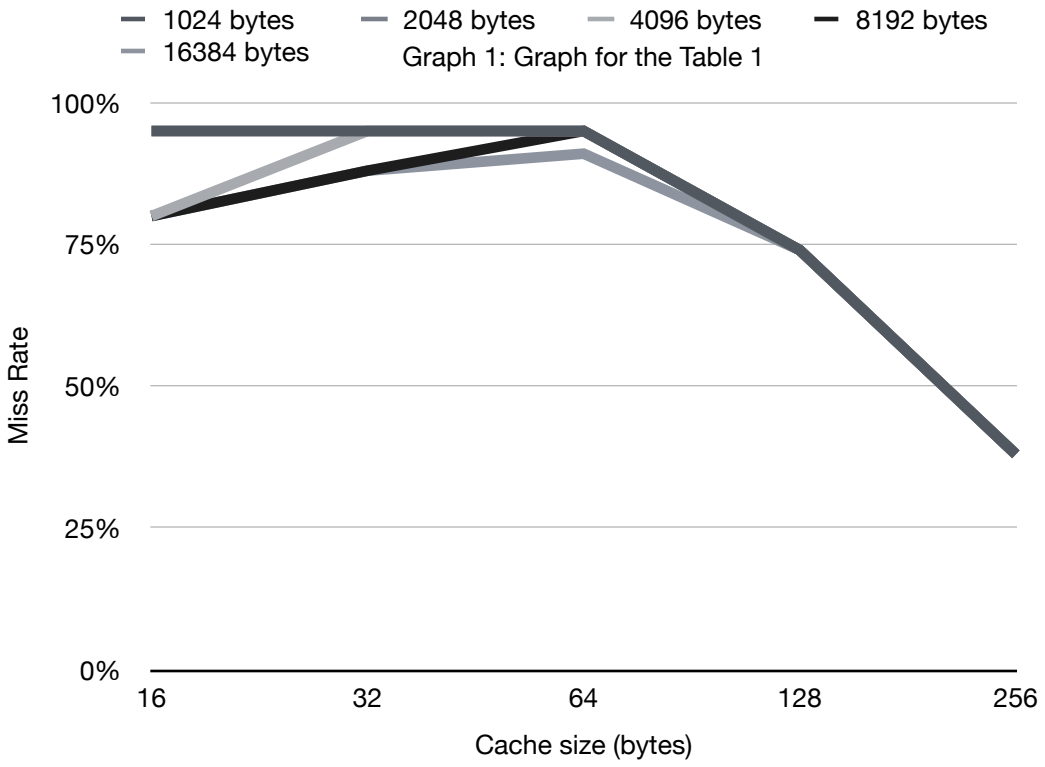
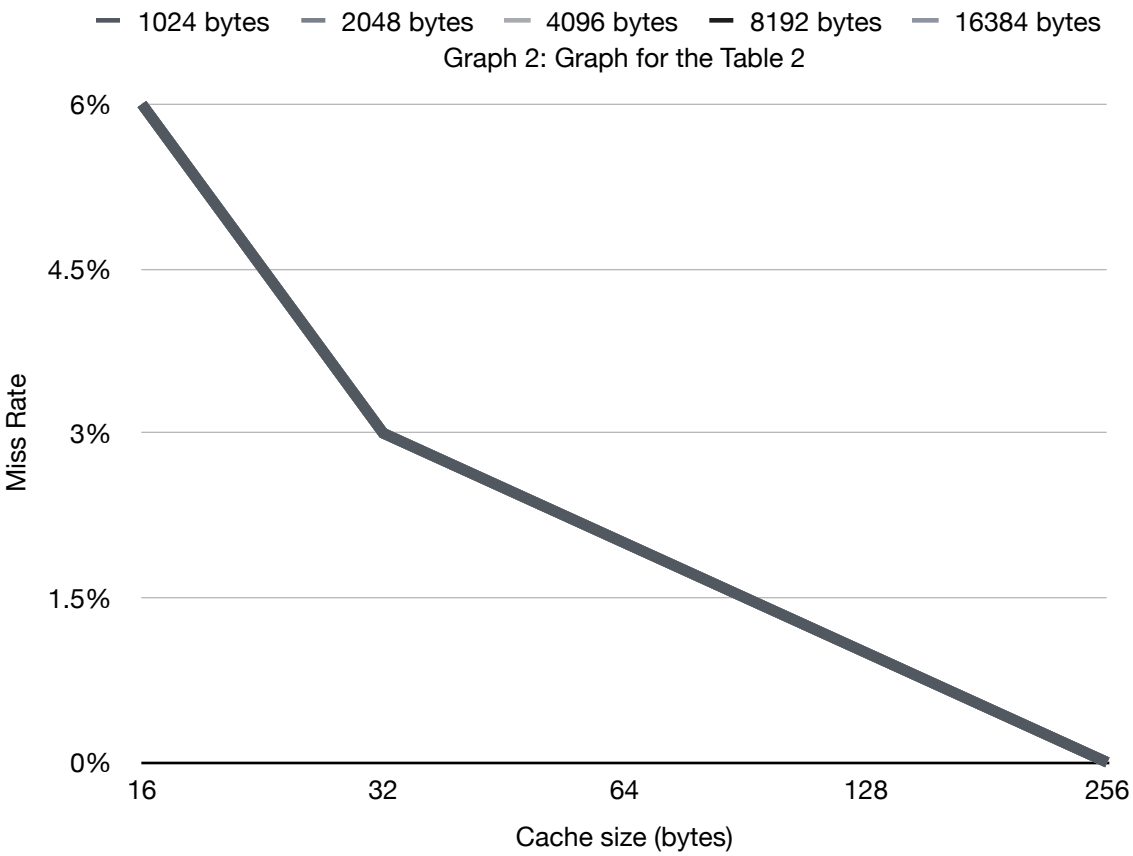


Table 2: Miss rates and number of misses at given parameters by Row-Major Fashion

Cache Block Size (words)	Cache Size (bytes)				
	1024	2048	4096	8192	16384
16	640 misses 6%	640 misses 6%	640 misses 6%	640 misses 6%	640 misses 6%
32	324 misses 3%	324 misses 3%	324 misses 3%	324 misses 3%	324 misses 3%
64	165 misses 2%	165 misses 2%	165 misses 2%	165 misses 2%	165 misses 2%
128	85 misses 1%	84 misses 1%	84 misses 1%	84 misses 1%	84 misses 1%
256	45 misses 0%	44 misses 0%	44 misses 0%	44 misses 0%	44 misses 0%



Graph 2: Graph for the Table 2

B)
I selected these values from Table 1 for the following rates:

Good Hit Rate: Cache Size (bytes) - 8192 bytes and Cache Block Size (words) 256.

Table 3

Direct Mapped	Fully Associative - LRU	Fully Associative - Random
4005 Misses 38% Miss Rate	4005 Misses 38% Miss Rate	4005 Misses 38% Miss Rate

Medium Hit Rate: Cache Size (bytes) - 8192 bytes and Cache Block Size (words) 128.

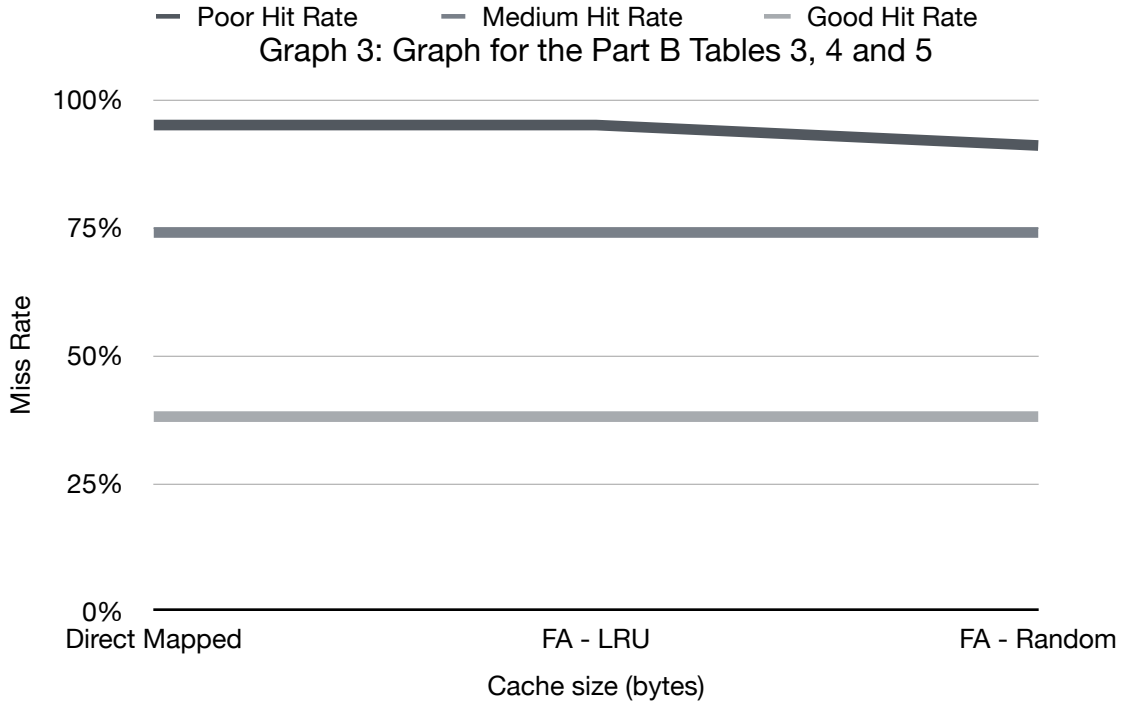
Table 4

Direct Mapped	Fully Associative - LRU	Fully Associative - Random
7906 Misses 74% Miss Rate	7905 Misses 74% Miss Rate	7857 Misses 74% Miss Rate

Poor Hit Rate: Cache Size (bytes) - 4096 bytes and Cache Block Size (words) 64.

Table 5

Direct Mapped	Fully Associative - LRU	Fully Associative - Random
10114 Misses 95% Miss Rate	10114 Misses 95% Miss Rate	9669 Misses 91% Miss Rate



Graph 3: Graph for the Part B Tables 3, 4 and 5

C)

Good Hit Rate: Cache Size (bytes) - 8192 bytes and Cache Block Size (words) 256.

Table 6: Misses and Miss Rates of Good Hit Rate N-way Set Associate

Set Size			
1	**2**	**4**	**8**
4004 Misses 38% Miss Rate	3994 Misses 37% Miss Rate	3989 Misses 37% Miss Rate	3987 Misses 37% Miss Rate

Medium Hit Rate: Cache Size (bytes) - 8192 bytes and Cache Block Size (words) 128.

Table 7: Misses and Miss Rates of Medium Hit Rate N-way Set Associate

Set Size				
1	**2**	**4**	**8**	**16**
7905 Misses 74% Miss Rate	7881 Misses 74% Miss Rate	7875 Misses 74% Miss Rate	7859 Misses 74% Miss Rate	7851 Misses 74% Miss Rate

Poor Hit Rate: Cache Size (bytes) - 4096 bytes and Cache Block Size (words) 64.

Table 8: Misses and Miss Rates of Medium Hit Rate N-way Set Associate

Set Size				
1	**2**	**4**	**8**	**16**
22658 Misses 98% Miss Rate	22657 Misses 98% Miss Rate	22657 Misses 98% Miss Rate	22657 Misses 98% Miss Rate	22656 Misses 98% Miss Rate

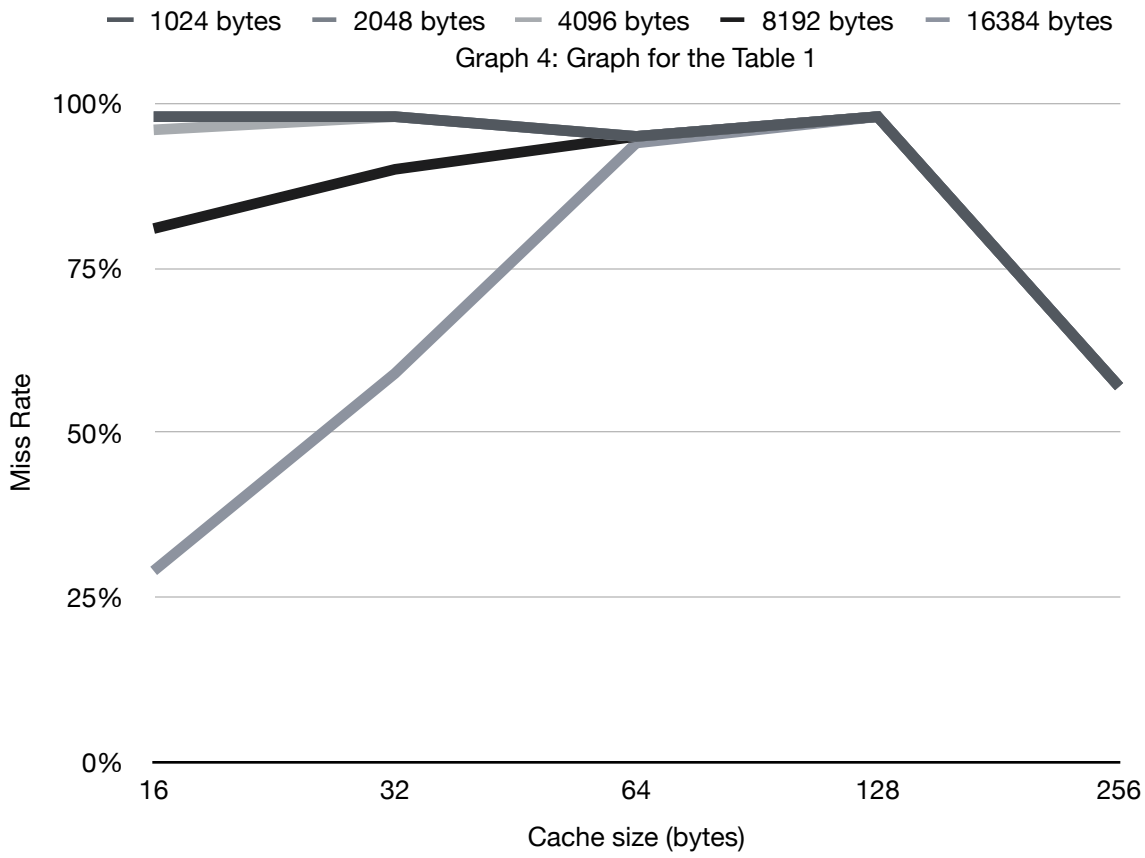
Report 2

These calculations were made regarding the Matrice dimension as 150x150.

A)

Table 9: Miss rates and number of misses at given parameters by Column-Major Fashion

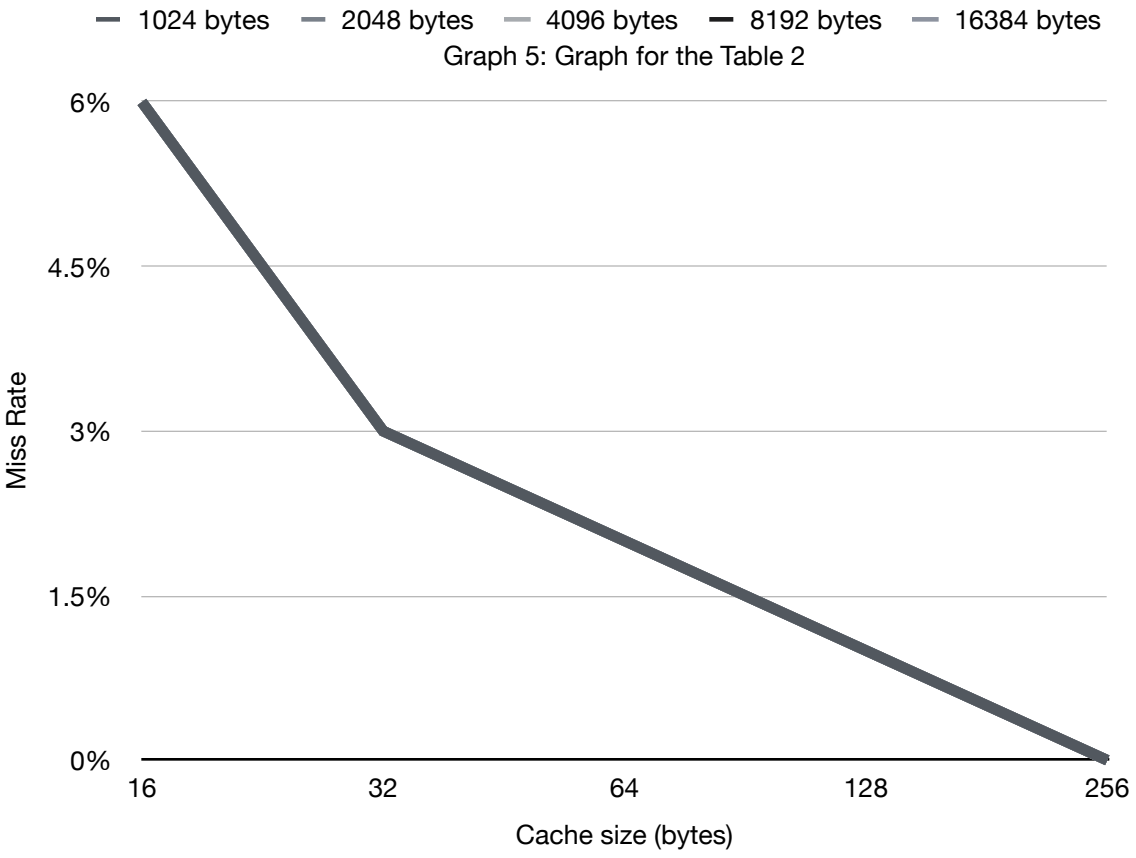
Cache Block Size (words)	Cache Size (bytes)				
	1024	2048	4096	8192	16384
16	22664 misses 98%	22664 misses 98%	22217 misses 96%	18843 misses 81%	6704 misses 29%
32	22661 misses 98%	22661 misses 98%	22661 misses 98%	20779 misses 90%	13706 misses 59%
64	22658 misses 95%	22658 misses 95%	22658 misses 95%	22658 misses 95%	21788 misses 94%
128	22656 misses 98%	22655 misses 98%	22655 misses 98%	22655 misses 98%	22655 misses 98%
256	13327 misses 57%	13326 misses 57%	13326 misses 57%	13326 misses 57%	13326 misses 57%



Graph 4: Graph for the Table 1

Table 10: Miss rates and number of misses at given parameters by Row-Major Fashion

Cache Block Size (words)	Cache Size (bytes)				
	1024	2048	4096	8192	16384
16	1421 misses 6%	1421 misses 6%	1421 misses 6%	1421 misses 6%	1421 misses 6%
32	715 misses 3%	715 misses 3%	715 misses 3%	715 misses 3%	715 misses 3%
64	360 misses 2%	360 misses 2%	360 misses 2%	360 misses 2%	360 misses 2%
128	181 misses 1%	181 misses 1%	181 misses 1%	181 misses 1%	181 misses 1%
256	93 misses 0%	92 misses 0%	92 misses 0%	92 misses 0%	92 misses 0%



Graph 5: Graph for the Table 2

B)
I selected these values from Table 1 for the following rates:

Good Hit Rate: Cache Size (bytes) - 16384 bytes and Cache Block Size (words) 16.

Table 11

Direct Mapped	Fully Associative - LRU	Fully Associative - Random
6704 Misses 29% Miss Rate	1562 Misses 7% Miss Rate	3042 Misses 13% Miss Rate

Medium Hit Rate: Cache Size (bytes) - 8192 bytes and Cache Block Size (words) 256.

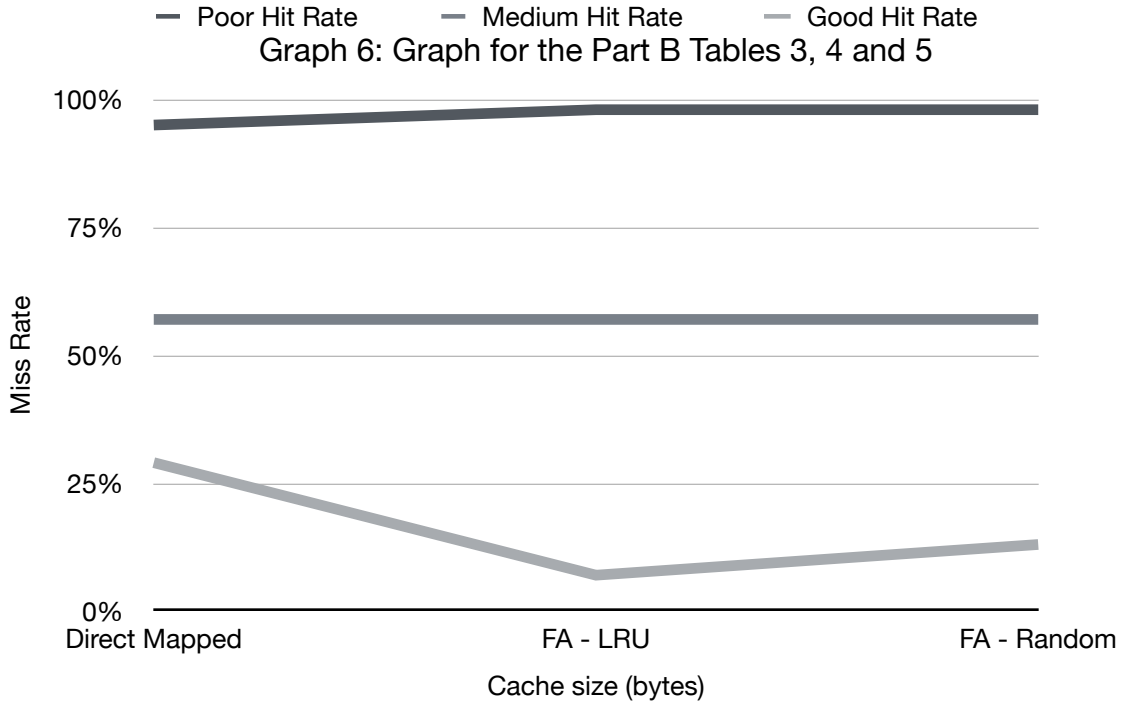
Table 12

Direct Mapped	Fully Associative - LRU	Fully Associative - Random
13326 Misses 57% Miss Rate	13326 Misses 57% Miss Rate	13326 Misses 57% Miss Rate

Poor Hit Rate: Cache Size (bytes) - 4096 bytes and Cache Block Size (words) 128.

Table 13

Direct Mapped	Fully Associative - LRU	Fully Associative - Random
22655 Misses 98% Miss Rate	22655 Misses 98% Miss Rate	22655 Misses 98% Miss Rate



Graph 6: Graph for the Part B Tables 3, 4 and 5

C)

Good Hit Rate: Cache Size (bytes) - 16384 bytes and Cache Block Size (words) 16.

Table 14: Misses and Miss Rates of Good Hit Rate N-way Set Associate

Set Size				
1	**2**	**4**	**8**	**16**
6703 Misses 29% Miss Rate	7682 Misses 23% Miss Rate	2637 Misses 11% Miss Rate	2682 Misses 11% Miss Rate	2973 Misses 13% Miss Rate

Medium Hit Rate: Cache Size (bytes) - 8192 bytes and Cache Block Size (words) 256.

Table 15: Misses and Miss Rates of Medium Hit Rate N-way Set Associate

Set Size			
1	**2**	**4**	**8**
13326 Misses 57% Miss Rate	13326 Misses 57% Miss Rate	13326 Misses 57% Miss Rate	13326 Misses 57% Miss Rate

Poor Hit Rate: Cache Size (bytes) - 4096 bytes and Cache Block Size (words) 128.

Table 16: Misses and Miss Rates of Poor Hit Rate N-way Set Associate

Set Size			
1	**2**	**4**	**8**
22655 Misses 98% Miss Rate	22655 Misses 98% Miss Rate	22656 Misses 98% Miss Rate	22655 Misses 98% Miss Rate