

CS224

Section No: 6

Spring 2021

Lab No: 6

Deniz Semih Özal / 21802414

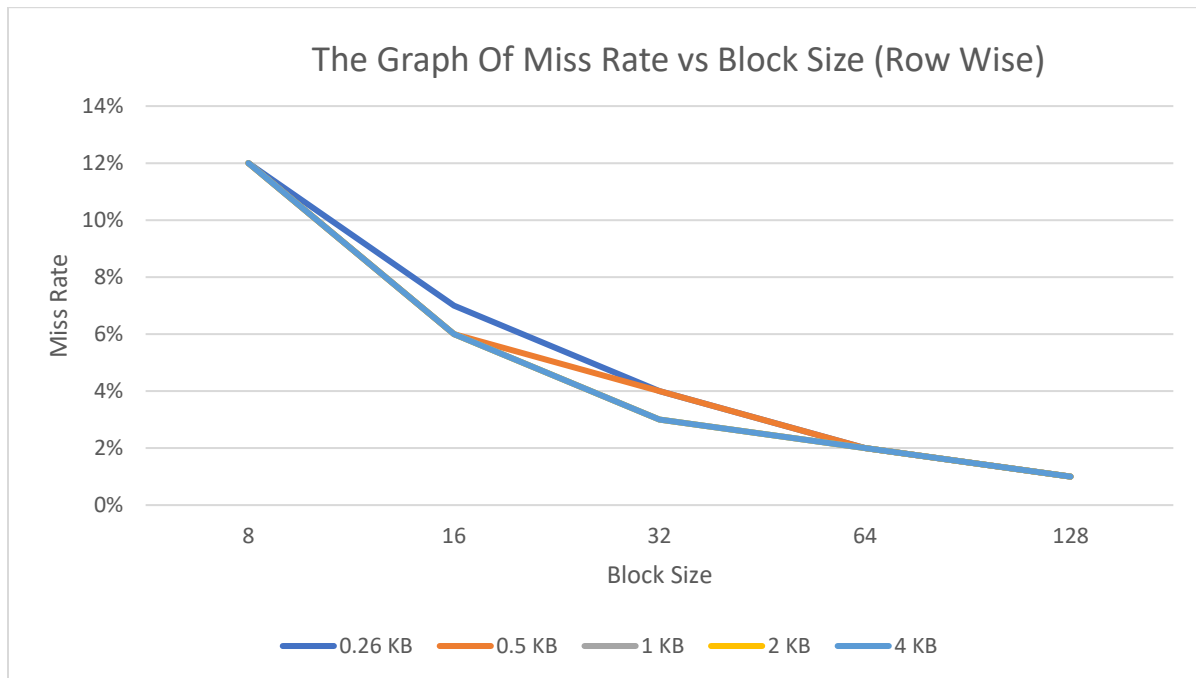
a.1)

Block Size (words) Cache Size (bytes)	8	16	32	64	128
<b>256 (0.26 KB)</b>	Cache Miss Rate: 12% Number Of Misses: 632	Cache Miss Rate: 6% Number Of Misses: 319	Cache Miss Rate: 3% Number Of Misses: 162	Cache Miss Rate: 2% Number Of Misses: 84	Cache Miss Rate: - Number Of Misses: -
<b>512 (0.5 KB)</b>	Cache Miss Rate: 12% Number Of Misses: 632	Cache Miss Rate: 6% Number Of Misses: 319	Cache Miss Rate: 3% Number Of Misses: 162	Cache Miss Rate: 2% Number Of Misses: 84	Cache Miss Rate: 1% Number Of Misses: 44
<b>1024 (1 KB)</b>	Cache Miss Rate: 12% Number Of Misses: 632	Cache Miss Rate: 6% Number Of Misses: 319	Cache Miss Rate: 3% Number Of Misses: 162	Cache Miss Rate: 2% Number Of Misses: 84	Cache Miss Rate: 1% Number Of Misses: 44
<b>2048 (2 KB)</b>	Cache Miss Rate: 12% Number Of Misses: 632	Cache Miss Rate: 6% Number Of Misses: 319	Cache Miss Rate: 3% Number Of Misses: 162	Cache Miss Rate: 2% Number Of Misses: 84	Cache Miss Rate: 1% Number Of Misses: 44
<b>4096 (4 KB)</b>	Cache Miss Rate: 12% Number Of Misses: 632	Cache Miss Rate: 6% Number Of Misses: 319	Cache Miss Rate: 3% Number Of Misses: 162	Cache Miss Rate: 2% Number Of Misses: 84	Cache Miss Rate: 1% Number Of Misses: 44

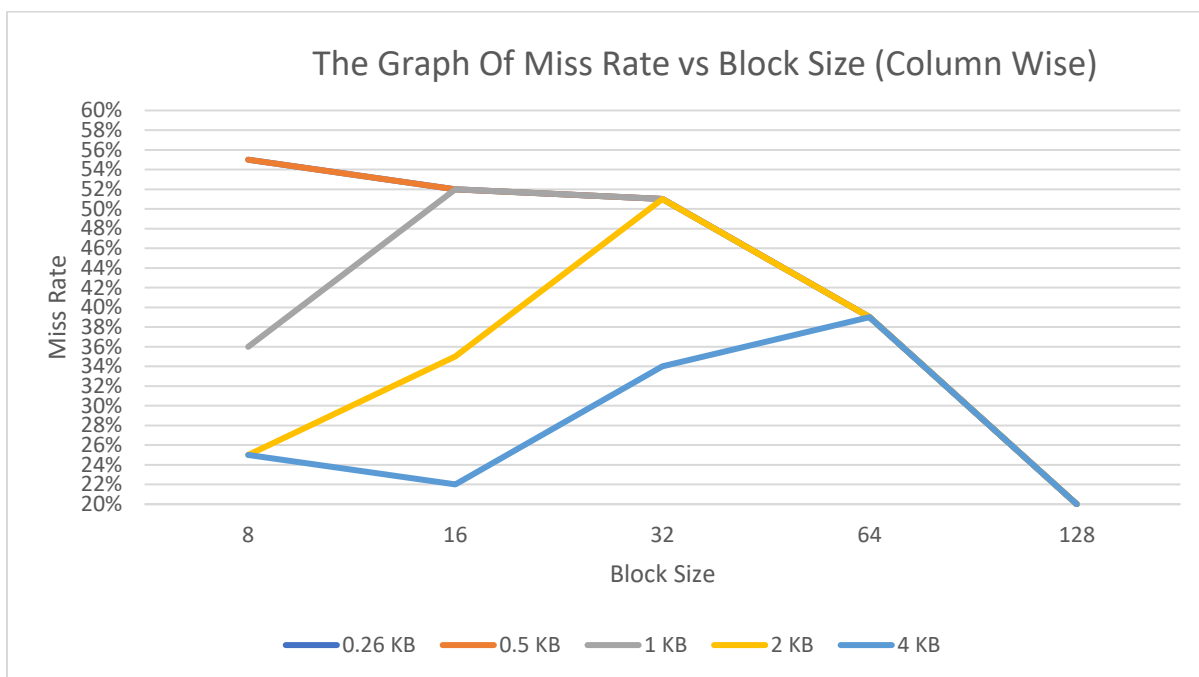
Table 1.1 Miss Rates of Row by Row Average for Direct Mapped Cache (N = 50)

Block Size (words) Cache Size (bytes)	8	16	32	64	128
<b>256 (0.26 KB)</b>	Cache Miss Rate: 55% Number Of Misses: 2821	Cache Miss Rate: 52% Number Of Misses: 2663	Cache Miss Rate: 51% Number Of Misses: 2583	Cache Miss Rate: 39% Number Of Misses: 1998	Cache Miss Rate: - Number Of Misses: -
<b>512 (0.5 KB)</b>	Cache Miss Rate: 55% Number Of Misses: 2821	Cache Miss Rate: 52% Number Of Misses: 2663	Cache Miss Rate: 51% Number Of Misses: 2583	Cache Miss Rate: 39% Number Of Misses: 1998	Cache Miss Rate: 20% Number Of Misses: 1024
<b>1024 (1 KB)</b>	Cache Miss Rate: 36% Number Of Misses: 1845	Cache Miss Rate: 52% Number Of Misses: 2663	Cache Miss Rate: 51% Number Of Misses: 2583	Cache Miss Rate: 39% Number Of Misses: 1998	Cache Miss Rate: 20% Number Of Misses: 1024
<b>2048 (2 KB)</b>	Cache Miss Rate: 26% Number Of Misses: 1326	Cache Miss Rate: 35% Number Of Misses: 1776	Cache Miss Rate: 51% Number Of Misses: 2583	Cache Miss Rate: 39% Number Of Misses: 1998	Cache Miss Rate: 20% Number Of Misses: 1024
<b>4096 (4 KB)</b>	Cache Miss Rate: 25% Number Of Misses: 1280	Cache Miss Rate: 22% Number Of Misses: 1113	Cache Miss Rate: 34% Number Of Misses: 1710	Cache Miss Rate: 39% Number Of Misses: 1998	Cache Miss Rate: 20% Number Of Misses: 1024

Table 1.2 Miss Rates of Column by Column Average for Direct Mapped Cache (N = 50)



Graph 1.1 The Graph Of Miss Rate vs Block Size (Row Wise) (N = 50)



Graph 1.2 The Graph Of Miss Rate vs Block Size (Column Wise) (N = 50)

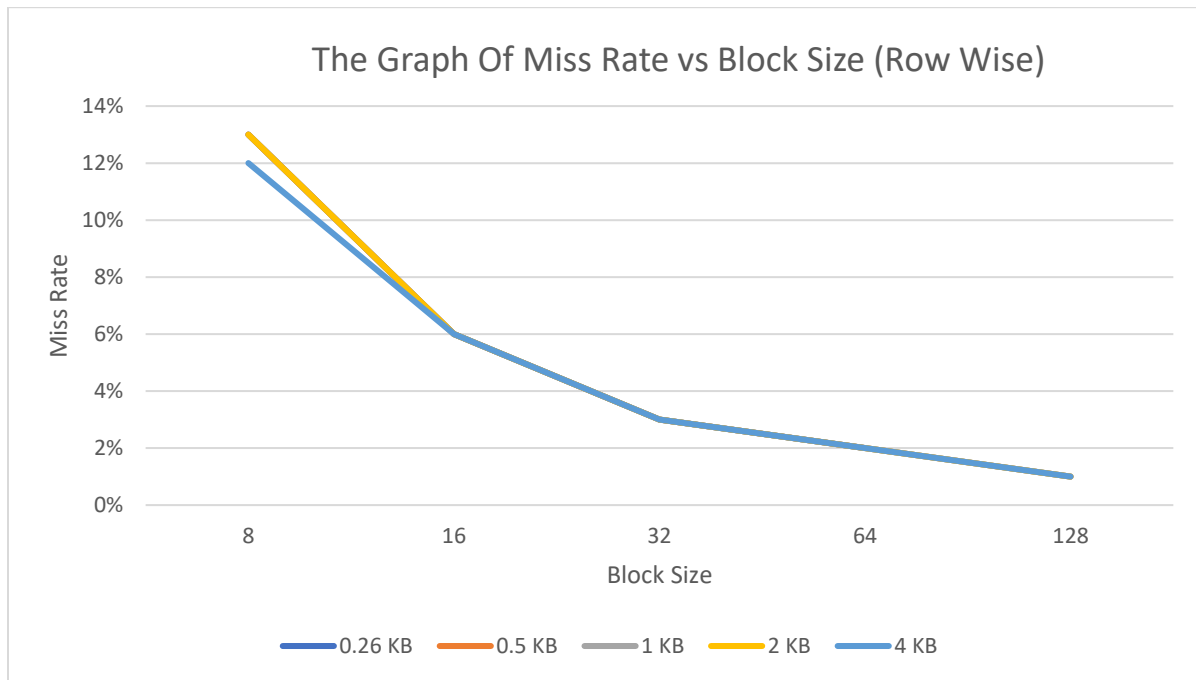
a.2)

Block Size (words) Cache Size (bytes)	8	16	32	64	128
<b>256 (0.26 KB)</b>	Cache Miss Rate: 12% Number Of Misses: 2507	Cache Miss Rate: 6% Number Of Misses: 1256	Cache Miss Rate: 3% Number Of Misses: 630	Cache Miss Rate: 2% Number Of Misses: 318	Cache Miss Rate: - Number Of Misses: -
<b>512 (0.5 KB)</b>	Cache Miss Rate: 12% Number Of Misses: 2507	Cache Miss Rate: 6% Number Of Misses: 1256	Cache Miss Rate: 3% Number Of Misses: 630	Cache Miss Rate: 2% Number Of Misses: 318	Cache Miss Rate: 1% Number Of Misses: 162
<b>1024 (1 KB)</b>	Cache Miss Rate: 12% Number Of Misses: 2507	Cache Miss Rate: 6% Number Of Misses: 1256	Cache Miss Rate: 3% Number Of Misses: 630	Cache Miss Rate: 2% Number Of Misses: 318	Cache Miss Rate: 1% Number Of Misses: 162
<b>2048 (2 KB)</b>	Cache Miss Rate: 12% Number Of Misses: 2507	Cache Miss Rate: 6% Number Of Misses: 1256	Cache Miss Rate: 3% Number Of Misses: 630	Cache Miss Rate: 2% Number Of Misses: 318	Cache Miss Rate: 1% Number Of Misses: 162
<b>4096 (4 KB)</b>	Cache Miss Rate: 12% Number Of Misses: 2507	Cache Miss Rate: 6% Number Of Misses: 1256	Cache Miss Rate: 3% Number Of Misses: 630	Cache Miss Rate: 2% Number Of Misses: 318	Cache Miss Rate: 1% Number Of Misses: 162

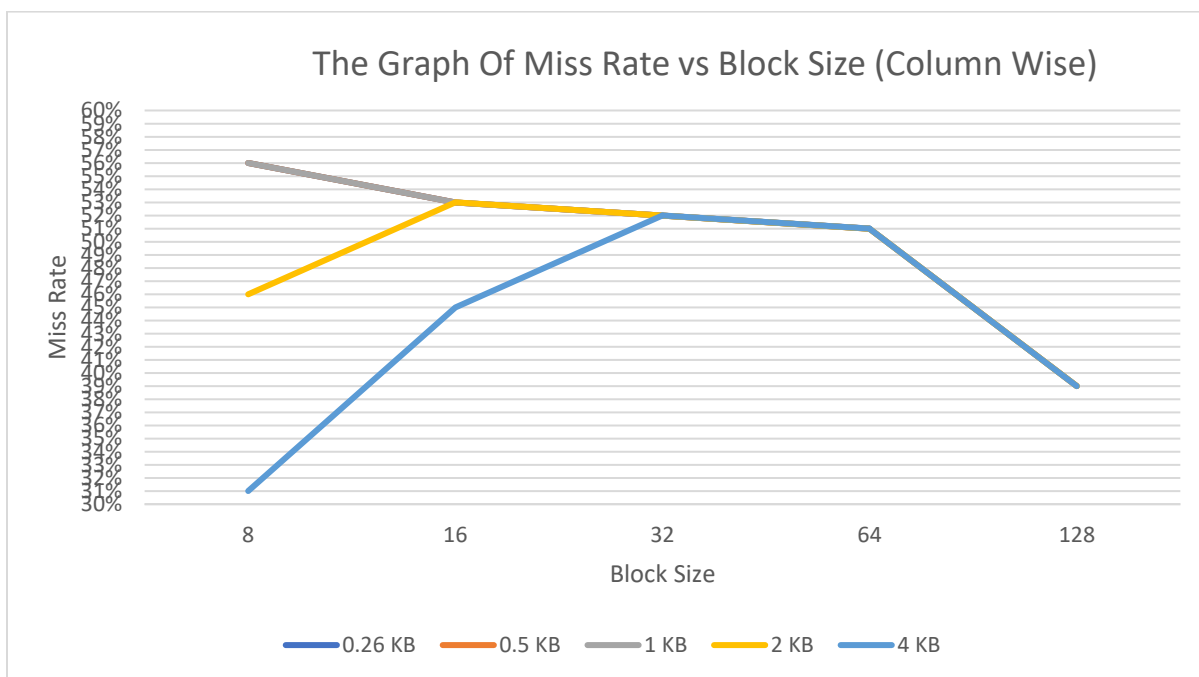
Table 2.1 Miss Rates of Row by Row Average for Direct Mapped Cache (N = 100)

Block Size (words) Cache Size (bytes)	8	16	32	64	128
<b>256 (0.26 KB)</b>	Cache Miss Rate: 56% Number Of Misses: 11258	Cache Miss Rate: 53% Number Of Misses: 10631	Cache Miss Rate: 51% Number Of Misses: 10317	Cache Miss Rate: 51% Number Of Misses: 10161	Cache Miss Rate: - Number Of Misses: -
<b>512 (0.5 KB)</b>	Cache Miss Rate: 56% Number Of Misses: 11258	Cache Miss Rate: 53% Number Of Misses: 10631	Cache Miss Rate: 51% Number Of Misses: 10317	Cache Miss Rate: 51% Number Of Misses: 10161	Cache Miss Rate: 39% Number Of Misses: 7899
<b>1024 (1 KB)</b>	Cache Miss Rate: 56% Number Of Misses: 11258	Cache Miss Rate: 53% Number Of Misses: 10631	Cache Miss Rate: 51% Number Of Misses: 10317	Cache Miss Rate: 51% Number Of Misses: 10161	Cache Miss Rate: 39% Number Of Misses: 7899
<b>2048 (2 KB)</b>	Cache Miss Rate: 46% Number Of Misses: 9158	Cache Miss Rate: 53% Number Of Misses: 10631	Cache Miss Rate: 51% Number Of Misses: 10317	Cache Miss Rate: 51% Number Of Misses: 10161	Cache Miss Rate: 39% Number Of Misses: 7899
<b>4096 (4 KB)</b>	Cache Miss Rate: 31% Number Of Misses: 8172	Cache Miss Rate: 45% Number Of Misses: 9093	Cache Miss Rate: 51% Number Of Misses: 10317	Cache Miss Rate: 51% Number Of Misses: 10161	Cache Miss Rate: 39% Number Of Misses: 7899

Table 2.2 Miss Rates of Column by Column Average for Direct Mapped Cache (N = 100)



Graph 2.1 The Graph Of Miss Rate vs Block Size (Row Wise) (N = 100)



Graph 2.2 The Graph Of Miss Rate vs Block Size (Column Wise) (N = 100)

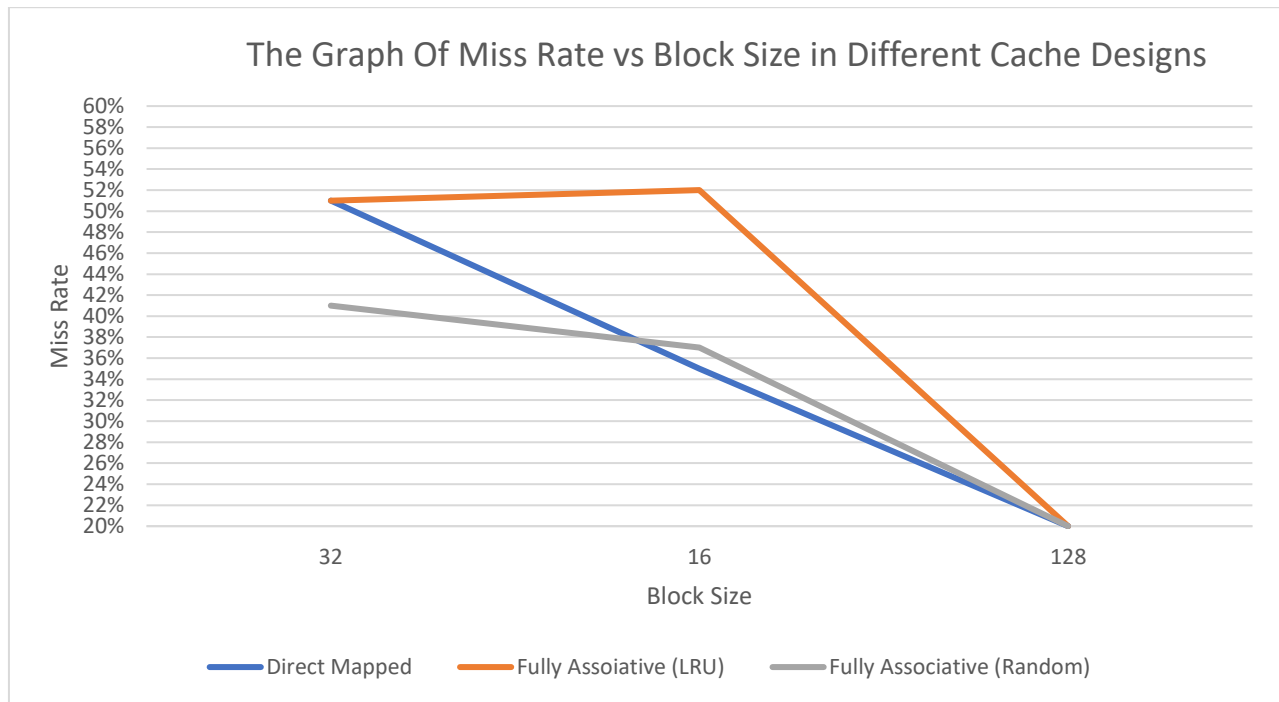
b)

	Good Hit Rate Cache Size (bytes): 2048 (2 KB) Block Size(words): 32	Medium Hit Rate Cache Size (bytes): 2048 (2 KB) Block Size(words): 16	Bad Hit Rate Cache Size (bytes): 2048 (2 KB) Block Size(words): 128
Direct Mapped	Cache Miss Rate: 51% Number Of Misses: 2583	Cache Miss Rate: 35% Number Of Misses: 1776	Cache Miss Rate: 20% Number Of Misses: 1024
Fully Associative (LRU)	Cache Miss Rate: 51% Number Of Misses: 2583	Cache Miss Rate: 52% Number Of Misses: 2663	Cache Miss Rate: 20% Number Of Misses: 1024
Fully Associative (Random)	Cache Miss Rate: 48% Number Of Misses: 2468	Cache Miss Rate: 37% Number Of Misses: 1885	Cache Miss Rate: 20% Number Of Misses: 1024

**Table 3.1 Hit Rate Performances For Different Cache Designs in Column Major (N=50)**

	Good Hit Rate Cache Size (bytes): 4096 (4 KB) Block Size(words): 32	Medium Hit Rate Cache Size (bytes): 4096 (4 KB) Block Size(words): 128	Bad Hit Rate Cache Size (bytes): 4096 (4 KB) Block Size(words): 8
Direct Mapped	Cache Miss Rate: 51% Number Of Misses: 10317	Cache Miss Rate: 39% Number Of Misses: 7899	Cache Miss Rate: 31% Number Of Misses: 8172
Fully Associative (LRU)	Cache Miss Rate: 51% Number Of Misses: 10317	Cache Miss Rate: 39% Number Of Misses: 7899	Cache Miss Rate: 13% Number Of Misses: 2170
Fully Associative (Random)	Cache Miss Rate: 49% Number Of Misses: 9841	Cache Miss Rate: 39% Number Of Misses: 7899	Cache Miss Rate: 21% Number Of Misses: 4162

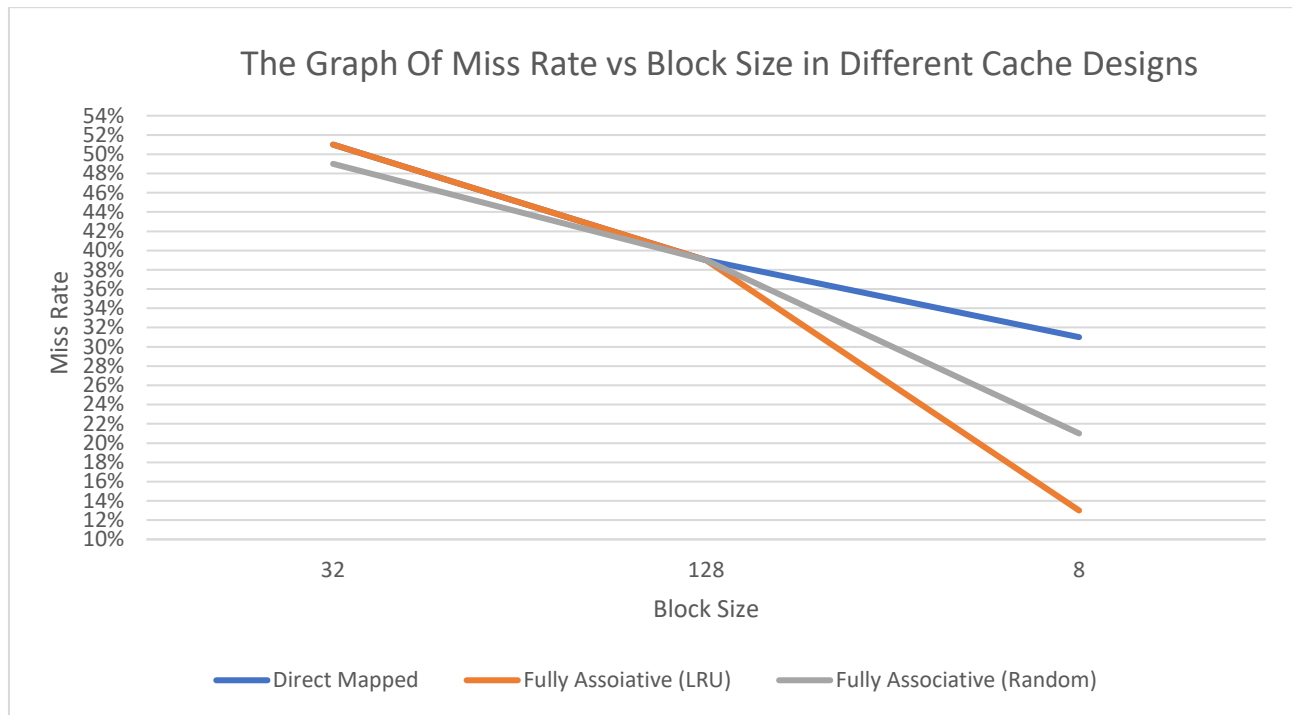
**Table 3.2 Hit Rate Performances For Different Cache Designs in Column Major (N=100)**



Graph 3.1 The Graph Of Miss Rate vs Block Size in Different Cache Designs (Row Major)

(N = 50)





Graph 3.2 The Graph Of Miss Rate vs Block Size in Different Cache Designs (Row Major)

(N = 100)

c)

N-Way Set Associative Cache Set Size	Good Hit Rate Cache Size (bytes): 2048 (2 KB) Block Size(words): 32	Medium Hit Rate Cache Size (bytes): 2048 (2 KB) Block Size(words): 16	Bad Hit Rate Cache Size (bytes): 2048 (2 KB) Block Size(words): 128
1	Cache Miss Rate: 51% Number Of Misses: 2583	Cache Miss Rate: 35% Number Of Misses: 1776	Cache Miss Rate: 20% Number Of Misses: 1024
2	Cache Miss Rate: 49% Number Of Misses: 2514	Cache Miss Rate: 35% Number Of Misses: 1776	Cache Miss Rate: 20% Number Of Misses: 1021
4	Cache Miss Rate: 49% Number Of Misses: 2492	Cache Miss Rate: 35% Number Of Misses: 1776	Cache Miss Rate: 20% Number Of Misses: 1020
8	Cache Miss Rate: 49% Number Of Misses: 2475	Cache Miss Rate: 35% Number Of Misses: 1776	Cache Miss Rate: 20% Number Of Misses: 1018

**Table 4.1 Hit Rate Performances For N-Way Cache Designs in Column Major (N=50)**

N-Way Set Associative Cache Set Size	Good Hit Rate Cache Size (bytes): 4096 (4 KB) Block Size(words): 32	Medium Hit Rate Cache Size (bytes): 4096 (4 KB) Block Size(words): 128	Bad Hit Rate Cache Size (bytes): 4096 (4 KB) Block Size(words): 8
1	Cache Miss Rate: 51% Number Of Misses: 10317	Cache Miss Rate: 39% Number Of Misses: 7899	Cache Miss Rate: 41% Number Of Misses: 8172
2	Cache Miss Rate: 49% Number Of Misses: 91008	Cache Miss Rate: 38% Number Of Misses: 7880	Cache Miss Rate: 40% Number Of Misses: 8170
4	Cache Miss Rate: 49% Number Of Misses: 91008	Cache Miss Rate: 38% Number Of Misses: 7756	Cache Miss Rate: 40% Number Of Misses: 8166
8	Cache Miss Rate: 49% Number Of Misses: 91008	Cache Miss Rate: 38% Number Of Misses: 7755	Cache Miss Rate: 40% Number Of Misses: 8165

**Table 4.2 Hit Rate Performances For N-Way Cache Designs in Column Major (N=100)**