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1. Direct Mapped :

Block addresses

0
8
6
9
13
25

Cache Block

0 (0%16)
8 (8%16)
6 (6%16)
9 (9%16)
13 (13%16)
9 ~~25~~ (25%16)

Here,

Address of
Memory
Block

Hit
or
Miss

contents of cache blocks after
Reference

		0	6	8	9	13
0	Miss	M[0]				
8	Miss	M[0]		M[8]		
0	Hit	M[0]		M[8]		
6	Miss	M[0]	M[6]	M[8]		
8	Hit	M[0]	M[6]	M[8]		
25	Miss	M[0]	M[6]	M[8]	M[25]	
13	Miss	M[0]	M[6]	M[8]	M[25]	M[13]
9	Miss	M[0]	M[6]	M[8]	M[9]	M[13]
8	Hit	M[0]	M[6]	M[8]	M[9]	M[13]
0	Hit	M[0]	M[6]	M[8]	M[9]	M[13]

Cache contents after reference -

Total No. of Hits = 4

Total No. of Miss = 6

2. Two-way set associative :

No. of set = $16 / 2 = 8$

Block address

Cache block Set

0

0 (0%8)

8

0 (8%8)

6

6 (6%8)

9

1 (9%8)

13

5 (13%8)

25

1 (25%8)

<u>Address of Memory Block</u>	<u>Hit or Miss</u>	<u>Set 0</u>		<u>Set 1</u>		<u>Set 5</u>		<u>Set 6</u>	
		0	1	2	3	10	11	12	13
0	Miss	M[0]							
8	Miss	M[0] M[8]							
0	Hit	M[0] M[8]							
6	Miss	M[0] M[8]						M[6]	
8	Hit	M[0] M[8]						M[6]	
25	Miss	M[0] M[8] M[25]						M[6]	
13	Miss	M[0] M[8] M[25]				M[13]		M[6]	
9	Miss	M[0] M[8] M[25] M[9]				M[13]		M[6]	
8	Hit	M[0] M[8] M[25] M[9]				M[13]		M[6]	
0	Hit	M[0] M[8] M[25] M[9]				M[13]		M[6]	

Cache contents after References

Total No. of Hits = 4

Total No. of Misses = 6

3. 4-way set associative:

No. of Set = $16 \div 4 = 4$

Block addresses

0
8
6
9
13
25

Cache set

0 (0%4)
8 (8%4)
2 (6%4)
1 (9%4)
1 (13%4)
1 (25%4)

<u>Address of Memory Block</u>	<u>Hit or Miss</u>	<u>Set 0</u> 0 1 2 3	<u>Set 1</u> 4 5 6 7	<u>Set 2</u> 9 10 11 12...
0	Miss	M[0] :		
8	Miss	M[0] M[8]		
0	Hit	M[0] M[8]		
6	Miss	M[0] M[8]		M[6]
8	Hit	M[0] M[8]		M[6]
25	Miss	M[0] M[8]	M[25]	M[6]
13	Miss	M[0] M[8]	M[25] M[13]	M[6]
9	Miss	M[0] M[8]	M[25] M[13] M[9]	M[6]
8	Hit	M[0] M[8]	M[25] M[13] M[9]	M[6]
0	Hit	M[0] M[8]	M[25] M[13] M[9]	M[6]

Cache contents after references.

No. of total hits = 4

No. of total misses = 6

4. 8-way set associative:

No. of set = $16 \div 8 = 2$

<u>Block addresses</u>	<u>cache set</u>
0	0 (0%2)
8	0 (8%2)
6	0 (6%2)
9	1 (9%2)
13	1 (13%2)
25	1 (25%2)

<u>Address of Memory Block</u>	<u>Hit or Miss</u>	<u>Set 0</u> 0 1 2 3 4 5 6 7	<u>Set 1</u> 8 9 10 11 12 13 14 15
0	Miss	M[0]	
8	Miss	M[0] M[8]	
0	Hit	M[0] M[8]	
6	Miss	M[0] M[8] M[6]	
8	Hit	M[0] M[8] M[6]	
25	Miss	M[0] M[8] M[6]	M[25]
13	Miss	M[0] M[8] M[6]	M[25] M[13]
9	Miss	M[0] M[8] M[6]	M[25] M[13] M[9]
8	Hit	M[0] M[8] M[6]	M[25] M[13] M[9]
0	Hit	M[0] M[8] M[6]	M[25] M[13] M[9]

Cache contents after references

Total no. of Hits = 4

Total no. of Misses = 6

5. 16-way set associative:

Number of set = $16 \div 16 = 1$

Mod number of all block address will be 0.

Address of Memory Block	Hit or Miss	Set 0															
		0	1	2	3	4	5	6	...	15							
0	Miss	M[0]	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
8	Miss	M[0]	M[8]	:	:	:	:	:	:	:	:	:	:	:	:	:	:
0	Hit	M[0]	M[8]	:	:	:	:	:	:	:	:	:	:	:	:	:	:
6	Miss	M[0]	M[8]	M[6]	:	:	:	:	:	:	:	:	:	:	:	:	:
8	Hit	M[0]	M[8]	M[6]	:	:	:	:	:	:	:	:	:	:	:	:	:
25	Miss	M[0]	M[8]	M[6]	M[25]	:	:	:	:	:	:	:	:	:	:	:	:
13	Miss	M[0]	M[8]	M[6]	M[25]	M[13]	:	:	:	:	:	:	:	:	:	:	:
9	Miss	M[0]	M[8]	M[6]	M[25]	M[13]	M[9]	:	:	:	:	:	:	:	:	:	:
8	Hit	M[0]	M[8]	M[6]	M[25]	M[13]	M[9]	:	:	:	:	:	:	:	:	:	:
0	Hit	M[0]	M[8]	M[6]	M[25]	M[13]	M[9]	:	:	:	:	:	:	:	:	:	:

Cache contents after references

Total number of hits = 4

Total number of misses = 6

6. Fully associative :

Number of cache blocks = 16

Address of Memory Block	Hit or Miss	Cache Blocks										
		0	1	2	3	4	5	...	15			
0	Miss	M[0]										
8	Miss	M[0]	M[8]									
0	Hit	M[0]	M[8]									
6	Miss	M[0]	M[8]	M[6]								
8	Hit	M[0]	M[8]	M[6]								
25	Miss	M[0]	M[8]	M[6]	M[25]							
13	Miss	M[0]	M[8]	M[6]	M[25]	M[13]						
9	Miss	M[0]	M[8]	M[6]	M[25]	M[13]	M[9]					
8	Hit	M[0]	M[8]	M[6]	M[25]	M[13]	M[9]					
0	Hit	M[0]	M[8]	M[6]	M[25]	M[13]	M[9]					

Cache contents after reference

Total number of hits = 4

Total number of Misses = 6.