

Saturday

COA Assignment -11

1Ans) Given, cache size = $1024 = 2^{10}$

line size = $64 = 2^6$

No. of lines in cache = $\frac{2^{10}}{2^6} = 2^4$
Offset

0x0001 → 0000 0000 00	000001 → Block 0
0x0002 → 0000 0000 00	000010 → cache hit
0x0003 → 0000 0000 00	000011 → cache hit
0x0041 → 0000 0000 01	000001 → Block 1
0x0081 → 0000 0000 10	000001 → Block 2
0x0041 → 0000 0000 10	100001 → cache hit
0x00c1 → 0000 0000 11	000001 → Block 3
0x0401 → 0000 0100 00	000001 → Block 16
0x0402 → 0000 0100 00	000010 → cache hit
0x0001 → 0000 0000 00	000001 → Block 0
0x0002 → 0000 0000 00	000010 → cache hit
0x0003 → 0000 0000 00	000011 → cache hit

15 SUNDAY - ∴ From the above results

Total 6 cache hits are occurred.

2Ans) If the cache in Q1 was 2-way set associative

No. of set = $\frac{\text{No. of lines}}{K}$

$$= \frac{16}{2} = \boxed{8}$$

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S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
18	19	20	21	22	23	24	25	26	27	28	29	30	31							

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Monday

3AN) Given,

Line size = 16B \Rightarrow offset = 4

$$\text{No. of lines} = \frac{128\text{B}}{16\text{B}} = 8$$

\Rightarrow 4 way set associative -

$$\text{No. of set} = 8/4 = 2$$

- LRU performs better than LFU -

Address	offset	Set index	Tag	LRU	LFU
				Hit (or) Miss	Hit (or) Miss
10000010	2	0	4	Miss	Miss
10000011	3	0	4	Hit	Hit
10000110	6	0	4	Hit	Hit
10100111	7	0	5	Miss	Miss
01001000	8	0	2	Miss	Miss
01000011	3	0	2	Hit	Hit
01100001	1	0	3	Miss	Miss
10100000	0	0	5	Hit	Hit
11000010	2	0	6	Miss	Miss
01100100	4	0	3	Hit	Miss

From the above results clearly we can observe that LRU has 5 cache hits and LFU has only 4 cache hits. So, here LRU performs better than LFU.

Educational Publishers

[illegible]



Tuesday

- LFU performs better than LRU.

Address	Offset	Set Index	Tag	LRU Hit (or) Miss	LFU Hit (or) Miss
10000010	2	0	4	Miss	Miss
10000011	3	0	4	Hit	Hit
10000100	4	0	4	Miss	Hit
11000010	2	0	6	Miss	Miss
10000110	6	0	4	Hit	Hit
10100000	0	0	5	Hit	Hit
01000001	1	0	2	Hit	Hit
01100111	7	0	3	Miss	Miss
10101000	8	0	5	Miss	Miss
01000011	3	0	2	Miss	Miss

From the above results, clearly we can observe that LFU has 5 cache hits and LRU has only 4 cache hits.

So, here LFU performs better than LRU.

Ques) Given a fully associative cache-

20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 22, 30, 21, 23, 31

Cache size = 8 words

Line size = 2

$$\text{No. of lines} = 8/2 = \boxed{4}$$

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				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
18	19	20	21	22	23	24	25	26	27	28	29	30	31							



Thursday

GAM) When cache is 2 way associative
 No. of sets = $4/2 = \boxed{2}$

Sequence	Cache Content	Miss (or) Hit.
20	$[(20, 21)]$	Miss
21	$[(20, 21)]$	Hit
22	$[(20, 21)] [(22, 23)]$	Miss
23	$[(20, 21)] [(22, 23)]$	Hit
24	$[(20, 21)] [(22, 23)] [(24, 25)]$	Miss
25	$[(20, 21)] [(22, 23)] [(24, 25)]$	Hit
26	$[(20, 21)] [(22, 23)] [(24, 25)] [(26, 27)]$	Miss
27	$[(20, 21)] [(22, 23)] [(24, 25)] [(26, 27)]$	Hit
28	$[(28, 29)] [(24, 25)] [(22, 23)] [(30, 31)]$	Miss
29	$[(28, 29)] [(24, 25)] [(22, 23)] [(30, 31)]$	Hit
22	$[(28, 29)] [(24, 25)] [(22, 23)] [(30, 31)]$	Hit
30	$[(28, 29)] [(24, 25)] [(22, 23)] [(30, 31)]$	Miss
21	$[(28, 29)] [(24, 25)] [(22, 23)] [(30, 31)]$	Miss
23	$[(28, 29)] [(24, 25)] [(22, 23)] [(30, 31)]$	Hit
31	$[(28, 29)] [(24, 25)] [(22, 23)] [(30, 31)]$	Hit

Total Hits = 8, Hit Ratio = $\frac{8}{15} = 0.53$

Cache in after all executions are -

$[(28, 29) (20, 21)] [(22, 23) (30, 31)]$

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S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
18	19	20	21	22	23	24	25	26	27	28	29	30	31							