

The Verbose Version

The tags are displayed in the same grid as the LRU queue.
The value contained in the tag is the same as would be in a real cache.
The LRU tag is the one with the highest tag number eg $K = 2 \rightarrow$ Tag 1 would be LRU, Tag 0 would be MRU.

Command: `python cache_sim.py 16 8 1 addr.txt -v:`

$L=16$ $N=8$ $K=1$

When displaying cache: LRU status is combined with tags, lower tag value \rightarrow more recently used

Set values of 'X' are to be considered empty

tag 0
X
X
X
X
X
X
X
X
X

MISS – tag 0 not found in set 0, tag 0 \rightarrow set 0

tag 0
0
X
X
X
X
X
X
X

HIT – tag 0 found in set 0, updating LRU...

tag 0

0
X
X
X
X
X
X
X
X
X

HIT – tag 0 found in set 0, updating LRU...

tag 0

0
X
X
X
X
X
X
X
X
X

MISS – tag 68 not found in set 0, tag 68 -> set 0

tag 0

68
X
X
X

tag 0

X

X

X

X

MISS – tag 1 not found in set 5, tag 1 -> set 5

tag 0

68

X

X

X

X

1

X

X

MISS – tag 1 not found in set 6, tag 1 -> set 6

tag 0

68

X

X

X

X

1

1

X

MISS – tag 34 not found in set 3, tag 34 -> set 3

tag 0

68
X
X
34
X
1
1
X

MISS – tag 0 not found in set 2, tag 0 → set 2

tag 0

68
X
0
34
X
1
1
X

HIT – tag 34 found in set 3, updating LRU...

tag 0

68
X
0
34
X
1

tag 0

1
X

HIT – tag 68 found in set 0, updating LRU...

tag 0

68
X
0
34
X
1
1
X

MISS – tag 0 not found in set 1, tag 0 → set 1

tag 0

68
0
0
34
X
1
1
X

HIT – tag 0 found in set 2, updating LRU...

tag 0

tag 0

68
0
0
34
X
1
1
X

MISS – tag 0 not found in set 0, tag 0 -> set 0

tag 0

0
0
0
34
X
1
1
X

MISS – tag 0 not found in set 4, tag 0 -> set 4

tag 0

0
0
0
34
0
1

tag 0

1
X

MISS – tag 68 not found in set 0, tag 68 → set 0

tag 0

68
0
0
34
0
1
1
X

MISS – tag 0 not found in set 0, tag 0 → set 0

tag 0

0
0
0
34
0
1
1
X

MISS – tag 1 not found in set 2, tag 1 → set 2

tag 0

--

tag 0

0
0
1
34
0
1
1
X

HIT – tag 0 found in set 0, updating LRU...

tag 0

0
0
1
34
0
1
1
X

MISS – tag 34 not found in set 0, tag 34 -> set 0

tag 0

34
0
1
34
0
1

tag 0

1

X

MISS – tag 0 not found in set 2, tag 0 -> set 2

tag 0

34

0

0

34

0

1

1

X

MISS – tag 0 not found in set 0, tag 0 -> set 0

tag 0

0

0

0

34

0

1

1

X

MISS – tag 1 not found in set 0, tag 1 -> set 0

tag 0

tag 0

1
0
0
34
0
1
1
X

MISS – tag 0 not found in set 0, tag 0 → set 0

tag 0

0
0
0
34
0
1
1
X

MISS – tag 103 not found in set 1, tag 103 → set 1

tag 0

0
103
0
34
0
1

tag 0

1

X

MISS – tag 1 not found in set 3, tag 1 -> set 3

tag 0

0

103

0

1

0

1

1

X

MISS – tag 34 not found in set 0, tag 34 -> set 0

tag 0

34

103

0

1

0

1

1

X

HIT – tag 0 found in set 2, updating LRU...

tag 0

tag 0

34

103

0

1

0

1

1

X

MISS – tag 0 not found in set 6, tag 0 -> set 6

tag 0

34

103

0

1

0

1

0

X

MISS – tag 0 not found in set 7, tag 0 -> set 7

tag 0

34

103

0

1

0

1

tag 0

0

0

HIT – tag 1 found in set 5, updating LRU...

tag 0

34

103

0

1

0

1

0

0

MISS – tag 0 not found in set 0, tag 0 → set 0

tag 0

0

103

0

1

0

1

0

0

HIT – tag 103 found in set 1, updating LRU...

tag 0

tag 0

0
103
0
1
0
1
0
0

Hits: 9**Misses: 23**Command: `python cache_sim.py 16 4 2 addr.txt -v:`

L=16 N=4 K=2

When displaying cache: LRU status is combined with tags, lower tag value -> more recently used

Set values of 'X' are to be considered empty

tag 0 tag 1

X	X
X	X
X	X
X	X

MISS – tag 0 not found in set 0, tag 0 -> set 0

tag 0 tag 1

0	X
X	X
X	X
X	X

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1
0	X
X	X
X	X
X	X

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1
0	X
X	X
X	X
X	X

MISS – tag 136 not found in set 0, tag 136 → set 0

tag 0	tag 1
136	0
X	X
X	X
X	X

MISS – tag 3 not found in set 1, tag 3 → set 1

tag 0	tag 1
136	0
3	X
X	X
X	X

MISS – tag 3 not found in set 2, tag 3 → set 2

tag 0	tag 1
136	0
3	X
3	X
X	X

MISS – tag 68 not found in set 3, tag 68 → set 3

tag 0	tag 1
136	0
3	X
3	X
68	X

MISS – tag 0 not found in set 2, tag 0 → set 2

tag 0	tag 1
136	0
3	X
0	3
68	X

HIT – tag 68 found in set 3, updating LRU...

tag 0	tag 1
136	0
3	X
0	3
68	X

HIT – tag 136 found in set 0, updating LRU...

tag 0	tag 1
136	0
3	X
0	3
68	X

MISS – tag 0 not found in set 1, tag 0 → set 1

tag 0	tag 1
136	0
0	3
0	3
68	X

HIT – tag 0 found in set 2, updating LRU...

tag 0	tag 1
136	0
0	3
0	3
68	X

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1
0	136
0	3
0	3
68	X

MISS – tag 1 not found in set 0, tag 1 -> set 0

tag 0	tag 1
1	0
0	3
0	3
68	X

MISS – tag 136 not found in set 0, tag 136 -> set 0

tag 0	tag 1
136	1
0	3
0	3
68	X

MISS – tag 0 not found in set 0, tag 0 -> set 0

tag 0	tag 1
0	136
0	3
0	3
68	X

MISS – tag 2 not found in set 2, tag 2 -> set 2

tag 0	tag 1
0	136
0	3
2	0
68	X

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1
0	136
0	3
2	0
68	X

MISS – tag 68 not found in set 0, tag 68 -> set 0

tag 0	tag 1
68	0
0	3
2	0
68	X

HIT – tag 0 found in set 2, updating LRU...

tag 0	tag 1
68	0
0	3
0	2
68	X

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1
0	68
0	3
0	2
68	X

MISS – tag 2 not found in set 0, tag 2 -> set 0

tag 0	tag 1
2	0
0	3
0	2
68	X

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1
0	2
0	3
0	2
68	X

MISS – tag 206 not found in set 1, tag 206 -> set 1

tag 0	tag 1
0	2
206	0
0	2
68	X

MISS – tag 2 not found in set 3, tag 2 -> set 3

tag 0	tag 1
0	2
206	0
0	2
2	68

MISS – tag 68 not found in set 0, tag 68 → set 0

tag 0	tag 1
68	0
206	0
0	2
2	68

HIT – tag 0 found in set 2, updating LRU...

tag 0	tag 1
68	0
206	0
0	2
2	68

MISS – tag 1 not found in set 2, tag 1 → set 2

tag 0	tag 1
68	0
206	0
1	0
2	68

MISS – tag 1 not found in set 3, tag 1 → set 3

tag 0	tag 1
68	0
206	0
1	0
1	2

MISS – tag 3 not found in set 1, tag 3 -> set 1

tag 0	tag 1
68	0
3	206
1	0
1	2

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1
0	68
3	206
1	0
1	2

HIT – tag 206 found in set 1, updating LRU...

tag 0	tag 1
0	68
206	3
1	0
1	2

Hits: 13

Misses: 19

Command: `python cache_sim.py 16 2 4 addr.txt -v:`

L=16 N=2 K=4

When displaying cache: LRU status is combined with tags, lower tag value -> more recently used

Set values of 'X' are to be considered empty

tag 0	tag 1	tag 2	tag 3
X	X	X	X
X	X	X	X

MISS – tag 0 not found in set 0, tag 0 -> set 0

tag 0	tag 1	tag 2	tag 3
0	X	X	X
X	X	X	X

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3
0	X	X	X
X	X	X	X

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3
0	X	X	X
X	X	X	X

MISS – tag 272 not found in set 0, tag 272 -> set 0

tag 0	tag 1	tag 2	tag 3
272	0	X	X
X	X	X	X

MISS – tag 6 not found in set 1, tag 6 -> set 1

tag 0	tag 1	tag 2	tag 3
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tag 0	tag 1	tag 2	tag 3
272	0	X	X
6	X	X	X

MISS – tag 7 not found in set 0, tag 7 -> set 0

tag 0	tag 1	tag 2	tag 3
7	272	0	X
6	X	X	X

MISS – tag 137 not found in set 1, tag 137 -> set 1

tag 0	tag 1	tag 2	tag 3
7	272	0	X
137	6	X	X

MISS – tag 1 not found in set 0, tag 1 -> set 0

tag 0	tag 1	tag 2	tag 3
1	7	272	0
137	6	X	X

HIT – tag 137 found in set 1, updating LRU...

tag 0	tag 1	tag 2	tag 3
1	7	272	0
137	6	X	X

HIT – tag 272 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3
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tag 0	tag 1	tag 2	tag 3
272	1	7	0
137	6	X	X

MISS – tag 0 not found in set 1, tag 0 -> set 1

tag 0	tag 1	tag 2	tag 3
272	1	7	0
0	137	6	X

HIT – tag 1 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3
1	272	7	0
0	137	6	X

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3
0	1	272	7
0	137	6	X

MISS – tag 2 not found in set 0, tag 2 -> set 0

tag 0	tag 1	tag 2	tag 3
2	0	1	272
0	137	6	X

HIT – tag 272 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3
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tag 0	tag 1	tag 2	tag 3
272	2	0	1
0	137	6	X

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3
0	272	2	1
0	137	6	X

MISS – tag 5 not found in set 0, tag 5 -> set 0

tag 0	tag 1	tag 2	tag 3
5	0	272	2
0	137	6	X

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3
0	5	272	2
0	137	6	X

MISS – tag 136 not found in set 0, tag 136 -> set 0

tag 0	tag 1	tag 2	tag 3
136	0	5	272
0	137	6	X

MISS – tag 1 not found in set 0, tag 1 -> set 0

tag 0	tag 1	tag 2	tag 3
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tag 0	tag 1	tag 2	tag 3
1	136	0	5
0	137	6	X

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3
0	1	136	5
0	137	6	X

MISS – tag 4 not found in set 0, tag 4 -> set 0

tag 0	tag 1	tag 2	tag 3
4	0	1	136
0	137	6	X

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3
0	4	1	136
0	137	6	X

MISS – tag 412 not found in set 1, tag 412 -> set 1

tag 0	tag 1	tag 2	tag 3
0	4	1	136
412	0	137	6

MISS – tag 5 not found in set 1, tag 5 -> set 1

tag 0	tag 1	tag 2	tag 3
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tag 0	tag 1	tag 2	tag 3
0	4	1	136
5	412	0	137

HIT – tag 136 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3
136	0	4	1
5	412	0	137

HIT – tag 1 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3
1	136	0	4
5	412	0	137

MISS – tag 3 not found in set 0, tag 3 -> set 0

tag 0	tag 1	tag 2	tag 3
3	1	136	0
5	412	0	137

MISS – tag 3 not found in set 1, tag 3 -> set 1

tag 0	tag 1	tag 2	tag 3
3	1	136	0
3	5	412	0

MISS – tag 6 not found in set 1, tag 6 -> set 1

tag 0	tag 1	tag 2	tag 3
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tag 0	tag 1	tag 2	tag 3
3	1	136	0
6	3	5	412

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3
0	3	1	136
6	3	5	412

HIT – tag 412 found in set 1, updating LRU...

tag 0	tag 1	tag 2	tag 3
0	3	1	136
412	6	3	5

Hits: 15

Misses: 17

Command: `python cache_sim.py 16 8 1 addr.txt -v:`

$L=16$ $N=1$ $K=8$

When displaying cache: LRU status is combined with tags, lower tag value -> more recently used

Set values of 'X' are to be considered empty

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
X	X	X	X	X	X	X	X

MISS – tag 0 not found in set 0, tag 0 -> set 0

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
0	X	X	X	X	X	X	X

HIT – tag 0 found in set 0, updating LRU...

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tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
0	X	X	X	X	X	X	X

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
0	X	X	X	X	X	X	X

MISS – tag 544 not found in set 0, tag 544 → set 0

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
544	0	X	X	X	X	X	X

MISS – tag 13 not found in set 0, tag 13 → set 0

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
13	544	0	X	X	X	X	X

MISS – tag 14 not found in set 0, tag 14 → set 0

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
14	13	544	0	X	X	X	X

MISS – tag 275 not found in set 0, tag 275 → set 0

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
275	14	13	544	0	X	X	X

MISS – tag 2 not found in set 0, tag 2 → set 0

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
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tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
2	275	14	13	544	0	X	X

HIT – tag 275 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
275	2	14	13	544	0	X	X

HIT – tag 544 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
544	275	2	14	13	0	X	X

MISS – tag 1 not found in set 0, tag 1 -> set 0

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
1	544	275	2	14	13	0	X

HIT – tag 2 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
2	1	544	275	14	13	0	X

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
0	2	1	544	275	14	13	X

MISS – tag 4 not found in set 0, tag 4 -> set 0

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
4	0	2	1	544	275	14	13

HIT – tag 544 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
544	4	0	2	1	275	14	13

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
0	544	4	2	1	275	14	13

MISS – tag 10 not found in set 0, tag 10 → set 0

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
10	0	544	4	2	1	275	14

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
0	10	544	4	2	1	275	14

MISS – tag 272 not found in set 0, tag 272 → set 0

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
272	0	10	544	4	2	1	275

HIT – tag 2 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
2	272	0	10	544	4	1	275

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
0	2	272	10	544	4	1	275

MISS – tag 8 not found in set 0, tag 8 → set 0

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
8	0	2	272	10	544	4	1

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
0	8	2	272	10	544	4	1

MISS – tag 825 not found in set 0, tag 825 → set 0

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
825	0	8	2	272	10	544	4

MISS – tag 11 not found in set 0, tag 11 → set 0

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
11	825	0	8	2	272	10	544

HIT – tag 272 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
272	11	825	0	8	2	10	544

HIT – tag 2 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
2	272	11	825	0	8	10	544

MISS – tag 6 not found in set 0, tag 6 -> set 0

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
6	2	272	11	825	0	8	10

MISS – tag 7 not found in set 0, tag 7 -> set 0

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
7	6	2	272	11	825	0	8

MISS – tag 13 not found in set 0, tag 13 -> set 0

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
13	7	6	2	272	11	825	0

HIT – tag 0 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
0	13	7	6	2	272	11	825

HIT – tag 825 found in set 0, updating LRU...

tag 0	tag 1	tag 2	tag 3	tag 4	tag 5	tag 6	tag 7
825	0	13	7	6	2	272	11

Hits: 16

Misses: 16