

Results produced by program cache_sim.py (all match results on website)

The program is invoked through:

`python cache_sim.py L N K FILE`

Where:

- L is the number of bytes per line
- N is the number of sets
- K is the number of tags per set

Optional `-v` flag at the end of the call will result in a detailed trace of the program being written to `output.md` in a markdown-friendly way (for best results: view in a markdown-friendly environment).

The program was tested using the `addr.txt` file containing the same addresses used in the tutorial.

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

`L=16 N=8 K=1`

LRU status is combined with tags, lower tag value -> more recently used

Set values of 'X' are to be considered empty

tag 0

| |
|---|
| X |
| X |
| X |
| X |
| X |
| X |
| X |
| X |
| X |

```
tag 0 not found in set 0  MISS
tag 0 -> set 0
```

tag 0

| tag 0 |
|-------|
| 0 |
| X |
| X |
| X |
| X |
| X |
| X |
| X |

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

| tag 0 |
|-------|
| 0 |
| X |
| X |
| X |
| X |
| X |
| X |
| X |

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

| tag 0 |
|-------|
| 0 |

tag 0

| |
|---|
| X |
| X |
| X |
| X |
| X |
| X |
| X |

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

tag 0

| |
|----|
| 68 |
| X |
| X |
| X |
| X |
| X |
| X |
| X |

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

tag 0

| |
|----|
| 68 |
| X |

tag 0

| |
|---|
| X |
| X |
| X |
| 1 |
| X |
| X |

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

tag 0

| |
|----|
| 68 |
| X |
| X |
| X |
| X |
| 1 |
| 1 |
| X |

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

tag 0

| |
|----|
| 68 |
| X |
| X |

tag 0

34

X

1

1

X

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

tag 0

68

X

0

34

X

1

1

X

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

tag 0

68

X

0

34

tag 0

| |
|---|
| X |
| 1 |
| 1 |
| X |

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

tag 0

| |
|----|
| 68 |
| X |
| 0 |
| 34 |
| X |
| 1 |
| 1 |
| X |

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

tag 0

| |
|----|
| 68 |
| 0 |
| 0 |
| 34 |
| X |

tag 0

| |
|---|
| 1 |
| 1 |
| X |

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

tag 0

| |
|----|
| 68 |
| 0 |
| 0 |
| 34 |
| X |
| 1 |
| 1 |
| X |

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

tag 0

| |
|----|
| 0 |
| 0 |
| 0 |
| 34 |
| X |
| 1 |

tag 0

| |
|---|
| 1 |
| X |

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

tag 0

| |
|----|
| 0 |
| 0 |
| 0 |
| 34 |
| 0 |
| 1 |
| 1 |
| X |

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

tag 0

| |
|----|
| 68 |
| 0 |
| 0 |
| 34 |
| 0 |
| 1 |
| 1 |

tag 0

X

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

tag 0

0

0

0

34

0

1

1

X

tag 1 not found in set 2 MISS
tag 1 -> set 2

tag 0

0

0

1

34

0

1

1

X

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

tag 0

| |
|----|
| 0 |
| 0 |
| 1 |
| 34 |
| 0 |
| 1 |
| 1 |
| X |

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

tag 0

| |
|----|
| 34 |
| 0 |
| 1 |
| 34 |
| 0 |
| 1 |
| 1 |
| X |

```
tag 0 not found in set 2  MISS
tag 0 -> set 2
```

tag 0

| |
|----|
| 34 |
| 0 |
| 0 |
| 34 |
| 0 |
| 1 |
| 1 |
| X |

```
tag 0 not found in set 0  MISS
tag 0 -> set 0
```

tag 0

| |
|----|
| 0 |
| 0 |
| 0 |
| 34 |
| 0 |
| 1 |
| 1 |
| X |

```
tag 1 not found in set 0  MISS
tag 1 -> set 0
```

tag 0

| |
|----|
| 1 |
| 0 |
| 0 |
| 34 |
| 0 |
| 1 |
| 1 |
| X |

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

tag 0

| |
|----|
| 0 |
| 0 |
| 0 |
| 34 |
| 0 |
| 1 |
| 1 |
| X |

tag 103 not found in set 1 MISS
tag 103 -> set 1

tag 0

| |
|---|
| 0 |
|---|

tag 0

103

0

34

0

1

1

X

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

tag 0

0

103

0

1

0

1

1

X

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

tag 0

34

103

tag 0

0

1

0

1

1

X

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

tag 0

34

103

0

1

0

1

1

X

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

tag 0

34

103

0

tag 0

1

0

1

0

X

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

tag 0

34

103

0

1

0

1

0

0

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

tag 0

34

103

0

1

tag 0

0

1

0

0

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

tag 0

0

103

0

1

0

1

0

0

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

tag 0

0

103

0

1

0

tag 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

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 |

```
tag 0 not found in set 0  MISS
tag 0 -> set 0
```

tag 0 tag 1

| | |
|---|---|
| 0 | X |
| X | X |
| X | X |
| X | X |

```
tag 0 found in set 0  HIT
updating LRU...
```

| tag 0 | tag 1 |
|-------|-------|
| 0 | X |
| X | X |
| X | X |
| X | X |

```
tag 0 found in set 0  HIT
updating LRU...
```

| tag 0 | tag 1 |
|-------|-------|
| 0 | X |
| X | X |
| X | X |
| X | X |

```
tag 136 not found in set 0  MISS
tag 136 -> set 0
```

| tag 0 | tag 1 |
|-------|-------|
| 136 | 0 |
| X | X |
| X | X |
| X | X |

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

| tag 0 | tag 1 |
|-------|-------|
| 136 | 0 |
| 3 | X |
| X | X |
| X | X |

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

| tag 0 | tag 1 |
|-------|-------|
| 136 | 0 |
| 3 | X |
| 3 | X |
| X | X |

tag 68 not found in set 3 MISS
tag 68 -> set 3

| tag 0 | tag 1 |
|-------|-------|
| 136 | 0 |
| 3 | X |
| 3 | X |
| 68 | X |

```
tag 0 not found in set 2  MISS  
tag 0 -> set 2
```

| tag 0 | tag 1 |
|-------|-------|
| 136 | 0 |
| 3 | X |
| 0 | 3 |
| 68 | X |

```
tag 68 found in set 3  HIT  
updating LRU...
```

| tag 0 | tag 1 |
|-------|-------|
| 136 | 0 |
| 3 | X |
| 0 | 3 |
| 68 | X |

```
tag 136 found in set 0  HIT  
updating LRU...
```

| tag 0 | tag 1 |
|-------|-------|
| 136 | 0 |
| 3 | X |
| 0 | 3 |
| 68 | X |

```
tag 0 not found in set 1  MISS
tag 0 -> set 1
```

| tag 0 | tag 1 |
|-------|-------|
| 136 | 0 |
| 0 | 3 |
| 0 | 3 |
| 68 | X |

```
tag 0 found in set 2  HIT
updating LRU...
```

| tag 0 | tag 1 |
|-------|-------|
| 136 | 0 |
| 0 | 3 |
| 0 | 3 |
| 68 | X |

```
tag 0 found in set 0  HIT
updating LRU...
```

| tag 0 | tag 1 |
|-------|-------|
| 0 | 136 |
| 0 | 3 |
| 0 | 3 |
| 68 | X |

```
tag 1 not found in set 0  MISS
tag 1 -> set 0
```

| tag 0 | tag 1 |
|-------|-------|
| 1 | 0 |
| 0 | 3 |
| 0 | 3 |
| 68 | X |

```
tag 136 not found in set 0  MISS
tag 136 -> set 0
```

| tag 0 | tag 1 |
|-------|-------|
| 136 | 1 |
| 0 | 3 |
| 0 | 3 |
| 68 | X |

```
tag 0 not found in set 0  MISS
tag 0 -> set 0
```

| tag 0 | tag 1 |
|-------|-------|
| 0 | 136 |
| 0 | 3 |
| 0 | 3 |
| 68 | X |

```
tag 2 not found in set 2  MISS
tag 2 -> set 2
```

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

```
tag 0 found in set 0  HIT
updating LRU...
```

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

```
tag 68 not found in set 0  MISS
tag 68 -> set 0
```

| tag 0 | tag 1 |
|-------|-------|
| 68 | 0 |
| 0 | 3 |
| 2 | 0 |
| 68 | X |

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

| tag 0 | tag 1 |
|-------|-------|
| 68 | 0 |
| 0 | 3 |
| 0 | 2 |
| 68 | X |

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

| tag 0 | tag 1 |
|-------|-------|
| 0 | 68 |
| 0 | 3 |
| 0 | 2 |
| 68 | X |

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

| tag 0 | tag 1 |
|-------|-------|
| 2 | 0 |
| 0 | 3 |
| 0 | 2 |
| 68 | X |


```
tag 0 found in set 0  HIT
updating LRU...
```

| tag 0 | tag 1 |
|-------|-------|
| 0 | 2 |
| 0 | 3 |
| 0 | 2 |
| 68 | X |

```
tag 206 not found in set 1  MISS
tag 206 -> set 1
```

| tag 0 | tag 1 |
|-------|-------|
| 0 | 2 |
| 206 | 0 |
| 0 | 2 |
| 68 | X |

```
tag 2 not found in set 3  MISS
tag 2 -> set 3
```

| tag 0 | tag 1 |
|-------|-------|
| 0 | 2 |
| 206 | 0 |
| 0 | 2 |
| 2 | 68 |

```
tag 68 not found in set 0  MISS  
tag 68 -> set 0
```

| tag 0 | tag 1 |
|-------|-------|
| 68 | 0 |
| 206 | 0 |
| 0 | 2 |
| 2 | 68 |

```
tag 0 found in set 2  HIT  
updating LRU...
```

| tag 0 | tag 1 |
|-------|-------|
| 68 | 0 |
| 206 | 0 |
| 0 | 2 |
| 2 | 68 |

```
tag 1 not found in set 2  MISS  
tag 1 -> set 2
```

| tag 0 | tag 1 |
|-------|-------|
| 68 | 0 |
| 206 | 0 |
| 1 | 0 |
| 2 | 68 |

```
tag 1 not found in set 3  MISS
tag 1 -> set 3
```

| tag 0 | tag 1 |
|-------|-------|
| 68 | 0 |
| 206 | 0 |
| 1 | 0 |
| 1 | 2 |

```
tag 3 not found in set 1  MISS
tag 3 -> set 1
```

| tag 0 | tag 1 |
|-------|-------|
| 68 | 0 |
| 3 | 206 |
| 1 | 0 |
| 1 | 2 |

```
tag 0 found in set 0  HIT
updating LRU...
```

| tag 0 | tag 1 |
|-------|-------|
| 0 | 68 |
| 3 | 206 |
| 1 | 0 |
| 1 | 2 |

```
tag 206 found in set 1  HIT
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:`

$L=16$ $N=2$ $K=4$

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 |

```
tag 0 not found in set 0  MISS
tag 0 -> set 0
```

| tag 0 | tag 1 | tag 2 | tag 3 |
|-------|-------|-------|-------|
| 0 | X | X | X |
| X | X | X | X |

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

| tag 0 | tag 1 | tag 2 | tag 3 |
|-------|-------|-------|-------|
| 0 | X | X | X |
| X | X | X | X |

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

| tag 0 | tag 1 | tag 2 | tag 3 |
|-------|-------|-------|-------|
| 0 | X | X | X |
| X | X | X | X |

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

| tag 0 | tag 1 | tag 2 | tag 3 |
|-------|-------|-------|-------|
| 272 | 0 | X | X |
| X | X | X | X |

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

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

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

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

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

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

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

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

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

| tag 0 | tag 1 | tag 2 | tag 3 |
|-------|-------|-------|-------|
|-------|-------|-------|-------|

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

| tag 0 | tag 1 | tag 2 | tag 3 |
|-------|-------|-------|-------|
|-------|-------|-------|-------|

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

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

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

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

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

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

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

```
tag 412 not found in set 1  MISS
tag 412 -> set 1
```

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

```
tag 5 not found in set 1  MISS
tag 5 -> set 1
```

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

```
tag 136 found in set 0  HIT
updating LRU...
```

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

```
tag 1 found in set 0  HIT
updating LRU...
```

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

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

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

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

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

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

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

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

| tag 0 | tag 1 | tag 2 | tag 3 |
|-------|-------|-------|-------|
|-------|-------|-------|-------|

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

```
tag 412 found in set 1 HIT
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:`

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

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 |

```
tag 0 not found in set 0 MISS
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 |

tag 0 found in set 0 HIT
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 |

tag 0 found in set 0 HIT
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 |

tag 544 not found in set 0 MISS
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 |

tag 13 not found in set 0 MISS
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 |

tag 14 not found in set 0 MISS
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 |

tag 275 not found in set 0 MISS
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 |

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

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

tag 275 found in set 0 HIT
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 |

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

| tag 0 | tag 1 | tag 2 | tag 3 | tag 4 | tag 5 | tag 6 | tag 7 |
|-------|-------|-------|-------|-------|-------|-------|-------|
|-------|-------|-------|-------|-------|-------|-------|-------|

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

tag 1 not found in set 0 MISS
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 |

tag 2 found in set 0 HIT
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 |

tag 0 found in set 0 HIT
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 |

tag 4 not found in set 0 MISS
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 |

tag 544 found in set 0 HIT
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 |

tag 0 found in set 0 HIT
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 |

tag 10 not found in set 0 MISS
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 |

tag 0 found in set 0 HIT
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 |

```
tag 272 not found in set 0  MISS
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 |

```
tag 2 found in set 0  HIT
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 |

```
tag 0 found in set 0  HIT
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 |

```
tag 8 not found in set 0  MISS
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 |

```
tag 0 found in set 0  HIT
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 |

```
tag 825 not found in set 0  MISS
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 |

```
tag 11 not found in set 0  MISS
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 |

```
tag 272 found in set 0  HIT
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 |

```
tag 2 found in set 0  HIT
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 |

tag 6 not found in set 0 MISS
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 |

tag 7 not found in set 0 MISS
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 |

tag 13 not found in set 0 MISS
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 |

tag 0 found in set 0 HIT
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 |

```
tag 825 found in set 0  HIT
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