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

For a more detailed output (including queue/cache status) please look at the `cache_solver_extra_verbose.pdf` file.

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

## L=16 N=8 K=1

**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 |
|---|
| X |
| X |
| X |
| X |
| X |
| X |
| X |
| X |

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

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

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

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

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

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

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

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

```
HIT - tag 34 found in set 3, updating LRU...
```

```
HIT - tag 68 found in set 0, updating LRU...
```

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

```
HIT - tag 1 found in set 5, updating LRU...
```

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

```
HIT - tag 103 found in set 1, updating LRU...
```

**Hits: 9**
**Misses: 23**

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

## 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
```

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

```
HIT - tag 206 found in set 1, updating LRU...
```

**Hits: 13**
**Misses: 19**

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

## 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
```

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

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

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

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

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

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

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

```
HIT - tag 137 found in set 1, updating LRU...
```

```
HIT - tag 272 found in set 0, updating LRU...
```

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

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

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

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

```
HIT - tag 272 found in set 0, updating LRU...
```

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

```
HIT - tag 412 found in set 1, updating LRU...
```

**Hits: 15**
**Misses: 17**

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

## 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
```

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

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

```
MISS - tag 544 not found in set 0, tag 544 -> set 0
```

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

```
MISS - tag 14 not found in set 0, tag 14 -> set 0
```

```
MISS - tag 275 not found in set 0, tag 275 -> set 0
```

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

```
HIT - tag 275 found in set 0, updating LRU...
```

```
HIT - tag 544 found in set 0, updating LRU...
```

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

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

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

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

```
HIT - tag 544 found in set 0, updating LRU...
```

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

```
MISS - tag 10 not found in set 0, tag 10 -> set 0
```

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

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

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

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

```
MISS - tag 8 not found in set 0, tag 8 -> set 0
```

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

```
MISS - tag 825 not found in set 0, tag 825 -> set 0
```

```
MISS - tag 11 not found in set 0, tag 11 -> set 0
```

```
HIT - tag 272 found in set 0, updating LRU...
```

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

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

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

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

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

```
HIT - tag 825 found in set 0, updating LRU...
```

**Hits: 16**
**Misses: 16**