

## L1-DRAM Direct Mapping Output

Enter the num of bits address 12

Enter the cache size 8

df:

	index	address	tag	index_memory	data
0	0	000000000000	0000	00000000	1478
1	1	000000000001	0000	00000001	1384
2	2	000000000010	0000	00000010	1177
3	3	000000000011	0000	00000011	811
4	4	000000000100	0000	00000100	1928
...	...	...	...	...	...
4091	4091	111111111011	1111	11111011	205
4092	4092	111111111100	1111	11111100	980
4093	4093	111111111101	1111	11111101	209
4094	4094	111111111110	1111	11111110	400
4095	4095	111111111111	1111	11111111	882

[4096 rows x 5 columns]

cdf:

	tag	index_cache	data	valid_bit
0	0000	00000000	None	0
1	0000	00000001	None	0
2	0000	00000010	None	0
3	0000	00000011	None	0
4	0000	00000100	None	0
..	...	...	...	...
251	0000	11111011	None	0
252	0000	11111100	None	0
253	0000	11111101	None	0

254	0000	11111110	None	0
255	0000	11111111	None	0

[256 rows x 4 columns]

enter the index u want to search0

x: 000000000000

tag: 0000 index: 00000000

condition 1: True condition 2: 0.0

Tag not found retrieving from memory... Cache miss!

Updated cache table:

	tag	index_cache	data	valid_bit
0	0000	00000000	1478	1
1	0000	00000001	None	0
2	0000	00000010	None	0
3	0000	00000011	None	0
4	0000	00000100	None	0
..	...	...	...	...
251	0000	11111011	None	0
252	0000	11111100	None	0
253	0000	11111101	None	0
254	0000	11111110	None	0
255	0000	11111111	None	0

[256 rows x 4 columns]

enter the index u want to search5

x: 000000000101

tag: 0000 index: 00000101

condition 1: True condition 2: 0.0

Tag not found retrieving from memory... Cache miss!

Updated cache table:

	tag	index_cache	data	valid_bit
0	0000	00000000	1478	1
1	0000	00000001	None	0
2	0000	00000010	None	0
3	0000	00000011	None	0
4	0000	00000100	None	0
..	...	...	...	...
251	0000	11111011	None	0
252	0000	11111100	None	0
253	0000	11111101	None	0
254	0000	11111110	None	0
255	0000	11111111	None	0

[256 rows x 4 columns]

enter the index u want to search251

x: 000011111011

tag: 0000 index: 11111011

condition 1: True condition 2: 0.0

Tag not found retrieving from memory... Cache miss!

Updated cache table:

	tag	index_cache	data	valid_bit
0	0000	00000000	1478	1
1	0000	00000001	None	0
2	0000	00000010	None	0
3	0000	00000011	None	0
4	0000	00000100	None	0

.. ... ..

251	0000	11111011	737	1
252	0000	11111100	None	0
253	0000	11111101	None	0
254	0000	11111110	None	0
255	0000	11111111	None	0

[256 rows x 4 columns]

enter the index u want to search0

x: 000000000000

tag: 0000 index: 00000000

condition 1: True condition 2: 0.0

Cache Hit! Data found and retriving from cache: 0 1478

Name: data, dtype: object

enter the index u want to search5

x: 000000000101

tag: 0000 index: 00000101

condition 1: True condition 2: 0.0

Cache Hit! Data found and retriving from cache: 5 1176

Name: data, dtype: object

enter the index u want to search252

x: 000011111100

tag: 0000 index: 11111100

condition 1: True condition 2: 0.0

Tag not found retrieving from memory... Cache miss!

Updated cache table:

	tag	index_cache	data	valid_bit
0	0000	00000000	1478	1

1	0000	00000001	None	0
2	0000	00000010	None	0
3	0000	00000011	None	0
4	0000	00000100	None	0
..	...	...	...	...
251	0000	11111011	737	1
252	0000	11111100	1713	1
253	0000	11111101	None	0
254	0000	11111110	None	0
255	0000	11111111	None	0

[256 rows x 4 columns]

## L2-DRAM Set Associativity Output

### Set Associativity = 2

enter cache length 128

enter associativity type 2

enter membits 12

enter cache bits 7

enter memory location to search 1

corresponding\_tag: 000000 corresponding\_index: 000001

cache miss

	0	1
000000	[,]	[,]
000001	[000000,]	[909,]
000010	[,]	[,]
000011	[,]	[,]
000100	[,]	[,]

```

...      ...      ...
111011   [,] [,]
111100   [,] [,]
111101   [,] [,]
111110   [,] [,]
111111   [,] [,]

```

[64 rows x 2 columns]

enter memory location to search 63

corresponding\_tag: 000000 corresponding\_index: 111111

cache miss

```

          0      1
000000   [,] [,]
000001 [000000,] [909,]
000010   [,] [,]
000011   [,] [,]
000100   [,] [,]
...      ...      ...
111011   [,] [,]
111100   [,] [,]
111101   [,] [,]
111110   [,] [,]
111111 [000000,] [722,]

```

[64 rows x 2 columns]

enter memory location to search 0

corresponding\_tag: 000000 corresponding\_index: 000000

cache miss

```

          0      1

```

000000 [000000,] [1472,]

000001 [000000,] [909,]

000010 [,] [,]

000011 [,] [,]

000100 [,] [,]

... ..

111011 [,] [,]

111100 [,] [,]

111101 [,] [,]

111110 [,] [,]

111111 [000000,] [722,]

[64 rows x 2 columns]

enter memory location to search 64

corresponding\_tag: 000001 corresponding\_index: 000000

cache miss

0 1

000000 [000000,000001] [1472, 643]

000001 [000000,] [909,]

000010 [,] [,]

000011 [,] [,]

000100 [,] [,]

... ..

111011 [,] [,]

111100 [,] [,]

111101 [,] [,]

111110 [,] [,]

111111 [000000,] [722,]

[64 rows x 2 columns]

enter memory location to search 0

corresponding\_tag: 000000 corresponding\_index: 000000

cache hit

	0	1
000000	[000000, 000001]	[1472, 643]
000001	[000000, ]	[909, ]
000010	[, ]	[, ]
000011	[, ]	[, ]
000100	[, ]	[, ]
...	...	...
111011	[, ]	[, ]
111100	[, ]	[, ]
111101	[, ]	[, ]
111110	[, ]	[, ]
111111	[000000, ]	[722, ]

[64 rows x 2 columns]

enter memory location to search 63

corresponding\_tag: 000000 corresponding\_index: 111111

cache hit

	0	1
000000	[000000, 000001]	[1472, 643]
000001	[000000, ]	[909, ]
000010	[, ]	[, ]
000011	[, ]	[, ]
000100	[, ]	[, ]
...	...	...
111011	[, ]	[, ]



111100	[,]	[,]
111101	[,]	[,]
111110	[,]	[,]
111111	[000000,]	[722,]

[64 rows x 2 columns]

## Set Associativity = 4

enter cache length 128

enter associativity type 4

enter membits 12

enter cache bits 7

enter memory location to search 0

corresponding\_tag: 0000000 corresponding\_index: 00000

cache miss

	0	1
00000	[0000000,,]	[1510,,]
00001	[,,]	[,,]
00010	[,,]	[,,]
00011	[,,]	[,,]
00100	[,,]	[,,]
00101	[,,]	[,,]
00110	[,,]	[,,]
00111	[,,]	[,,]
01000	[,,]	[,,]
01001	[,,]	[,,]
01010	[,,]	[,,]
01011	[,,]	[,,]
01100	[,,]	[,,]

01101	[,,]	[,,]
01110	[,,]	[,,]
01111	[,,]	[,,]
10000	[,,]	[,,]
10001	[,,]	[,,]
10010	[,,]	[,,]
10011	[,,]	[,,]
10100	[,,]	[,,]
10101	[,,]	[,,]
10110	[,,]	[,,]
10111	[,,]	[,,]
11000	[,,]	[,,]
11001	[,,]	[,,]
11010	[,,]	[,,]
11011	[,,]	[,,]
11100	[,,]	[,,]
11101	[,,]	[,,]
11110	[,,]	[,,]
11111	[,,]	[,,]

enter memory location to search 3

corresponding\_tag: 0000000 corresponding\_index: 00011

cache miss

	0	1
00000	[0000000,,]	[1510,,]
00001	[,,]	[,,]
00010	[,,]	[,,]
00011	[0000000,,]	[1962,,]
00100	[,,]	[,,]
00101	[,,]	[,,]

00110	[,,]	[,,]
00111	[,,]	[,,]
01000	[,,]	[,,]
01001	[,,]	[,,]
01010	[,,]	[,,]
01011	[,,]	[,,]
01100	[,,]	[,,]
01101	[,,]	[,,]
01110	[,,]	[,,]
01111	[,,]	[,,]
10000	[,,]	[,,]
10001	[,,]	[,,]
10010	[,,]	[,,]
10011	[,,]	[,,]
10100	[,,]	[,,]
10101	[,,]	[,,]
10110	[,,]	[,,]
10111	[,,]	[,,]
11000	[,,]	[,,]
11001	[,,]	[,,]
11010	[,,]	[,,]
11011	[,,]	[,,]
11100	[,,]	[,,]
11101	[,,]	[,,]
11110	[,,]	[,,]
11111	[,,]	[,,]

enter memory location to search 64

corresponding\_tag: 0000010 corresponding\_index: 00000

cache miss

	0	1
00000	[00000000, , 0000010, ]	[1510, 1372, , ]
00001	[ , , ]	[ , , ]
00010	[ , , ]	[ , , ]
00011	[00000000, , , ]	[1962, , , ]
00100	[ , , ]	[ , , ]
00101	[ , , ]	[ , , ]
00110	[ , , ]	[ , , ]
00111	[ , , ]	[ , , ]
01000	[ , , ]	[ , , ]
01001	[ , , ]	[ , , ]
01010	[ , , ]	[ , , ]
01011	[ , , ]	[ , , ]
01100	[ , , ]	[ , , ]
01101	[ , , ]	[ , , ]
01110	[ , , ]	[ , , ]
01111	[ , , ]	[ , , ]
10000	[ , , ]	[ , , ]
10001	[ , , ]	[ , , ]
10010	[ , , ]	[ , , ]
10011	[ , , ]	[ , , ]
10100	[ , , ]	[ , , ]
10101	[ , , ]	[ , , ]
10110	[ , , ]	[ , , ]
10111	[ , , ]	[ , , ]
11000	[ , , ]	[ , , ]
11001	[ , , ]	[ , , ]
11010	[ , , ]	[ , , ]
11011	[ , , ]	[ , , ]

11100        [,,]        [,,]

11101        [,,]        [,,]

11110        [,,]        [,,]

11111        [,,]        [,,]

enter memory location to search 0

corresponding\_tag: 0000000 corresponding\_index: 00000

cache hit

0            1

00000 [0000000,, 0000010,] [1510, 1372,,]

00001        [,,]        [,,]

00010        [,,]        [,,]

00011        [0000000,,,]        [1962,,,]

00100        [,,]        [,,]

00101        [,,]        [,,]

00110        [,,]        [,,]

00111        [,,]        [,,]

01000        [,,]        [,,]

01001        [,,]        [,,]

01010        [,,]        [,,]

01011        [,,]        [,,]

01100        [,,]        [,,]

01101        [,,]        [,,]

01110        [,,]        [,,]

01111        [,,]        [,,]

10000        [,,]        [,,]

10001        [,,]        [,,]

10010        [,,]        [,,]

10011        [,,]        [,,]

10100        [,,]        [,,]

10101	[,,]	[,,]
10110	[,,]	[,,]
10111	[,,]	[,,]
11000	[,,]	[,,]
11001	[,,]	[,,]
11010	[,,]	[,,]
11011	[,,]	[,,]
11100	[,,]	[,,]
11101	[,,]	[,,]
11110	[,,]	[,,]
11111	[,,]	[,,]

enter memory location to search 96

corresponding\_tag: 0000011 corresponding\_index: 00000

cache miss

	0	1
00000	[00000000,, 0000010, 0000011]	[1510, 1372, 1169,]
00001	[,,]	[,,]
00010	[,,]	[,,]
00011	[00000000,,]	[1962,,]
00100	[,,]	[,,]
00101	[,,]	[,,]
00110	[,,]	[,,]
00111	[,,]	[,,]
01000	[,,]	[,,]
01001	[,,]	[,,]
01010	[,,]	[,,]
01011	[,,]	[,,]
01100	[,,]	[,,]
01101	[,,]	[,,]

01110	[,,]	[,,]
01111	[,,]	[,,]
10000	[,,]	[,,]
10001	[,,]	[,,]
10010	[,,]	[,,]
10011	[,,]	[,,]
10100	[,,]	[,,]
10101	[,,]	[,,]
10110	[,,]	[,,]
10111	[,,]	[,,]
11000	[,,]	[,,]
11001	[,,]	[,,]
11010	[,,]	[,,]
11011	[,,]	[,,]
11100	[,,]	[,,]
11101	[,,]	[,,]
11110	[,,]	[,,]
11111	[,,]	[,,]

enter memory location to search 64

corresponding\_tag: 0000010 corresponding\_index: 00000

cache hit

	0	1
00000	[0000000,, 0000010, 0000011] [1510, 1372, 1169, ]	
00001	[,,]	[,,]
00010	[,,]	[,,]
00011	[0000000,,]	[1962,,]
00100	[,,]	[,,]
00101	[,,]	[,,]
00110	[,,]	[,,]

00111	[,,]	[,,]
01000	[,,]	[,,]
01001	[,,]	[,,]
01010	[,,]	[,,]
01011	[,,]	[,,]
01100	[,,]	[,,]
01101	[,,]	[,,]
01110	[,,]	[,,]
01111	[,,]	[,,]
10000	[,,]	[,,]
10001	[,,]	[,,]
10010	[,,]	[,,]
10011	[,,]	[,,]
10100	[,,]	[,,]
10101	[,,]	[,,]
10110	[,,]	[,,]
10111	[,,]	[,,]
11000	[,,]	[,,]
11001	[,,]	[,,]
11010	[,,]	[,,]
11011	[,,]	[,,]
11100	[,,]	[,,]
11101	[,,]	[,,]
11110	[,,]	[,,]
11111	[,,]	[,,]