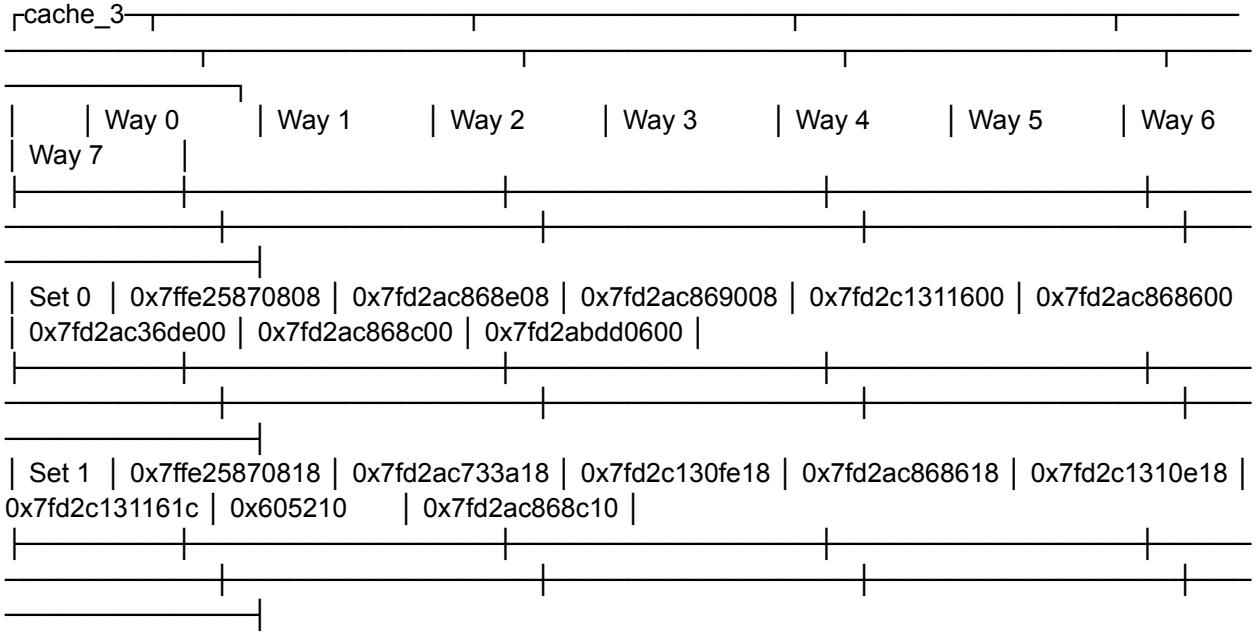
Convolution Operation:

Varying Block Size :

Matrix Size 20x20:

Block Size 16

Number of instructions: 186697
Total cycles taken: 1629177
cache_3
    Number of accesses: 1571
    Number of hits: 1009
    Number of misses: 562
cache_2
    Number of accesses: 16765
    Number of hits: 15063
    Number of misses: 1702
cache_1
    Number of accesses: 186697
    Number of hits: 167123
    Number of misses: 19574
AMATs:
{'cache_1': 7.549544455680323,
 'cache_2': 62.46961792388624,
 'cache_3': 457.7339274347549,
 'mem': 1000}



| Set 2 | 0x7ffe25870828 | 0x7fd2c1310028 | 0x7fd2ac868628 | 0x7fd2c1310e20 | 0x7fd2ac868220 | 0x7fd2abfec020 | 0x7fd2ac868428 | 0x7fd2abdcfa28 |

| Set 3 | 0x7fd2c1310a38 | 0x7ffe2587083c | 0x7ffe2586fe30 | 0x7fd2ac734430 | 0x7ffe2586fc38 | 0x604e38 | 0x7fd2ac868230 | 0x7fd2c1310e3c |

| Set 4 | 0x7ffe2586fe40 | 0x7fd2ac735840 | 0x7ffe2586fc48 | 0x7fd2c1311248 | 0x7fd2ac733040 | 0x7fd2ac732a48 | 0x7fd2abfebc40 | 0x7fd2abdd1848 |

| . | | | | | | | | |

| . | | | | | | | | |

| . | | | | | | | | |

| Set 31 | 0x7fd2c13117f8 | 0x7fd2ac868ff8 | 0x7ffe258707f8 | 0x7fd2c13115f8 | 0x7fd2ac7297f8 | 0x7fd2ac36ddf0 | 0x7fd2ac36dff0 | 0x7fd2abfebff8 |

cache_2

| | Way 0 | Way 1 | Way 2 | Way 3 |

| Set 0 | 0x7ffe25870800 | 0x7fd2abdd0d0c | 0x7fd2abdd0700 | 0x7fd2abdd0600 |

| Set 1 | 0x7fd2ac86891c | 0x7fd2ac868c10 | 0x7fd2c130fe18 | 0x7ffe25870810 |

| Set 2 | 0x7fd2abdd0d28 | 0x7ffe25870820 | 0x7fd2abdd0620 | 0x7fd2abdcfa28 |

| Set 3 | 0x7fd2abdd0d30 | 0x7fd2ac36e134 | 0x7ffe25870738 | 0x7ffe2587083c |

Set 4	0x7fd2abdd1848	0x7ffe25870748	0x7fd2abdd0748	0x7fd2abdd4740
.				
.				
.				
Set 15	0x7fd2ac8692fc	0x7fd2ac8690f0	0x7fd2c1310af8	0x7ffe258707f8

cache_1

	Way 0	Way 1
Set 0	0x7fd2abdcfa80	0x7ffe25870800
Set 1	0x7ffe25870810	0x7ffe25870798
Set 2	0x7fd2abdcfa28	0x7ffe25870820
Set 3	0x7fd2abdd1830	0x7ffe258707b4
Set 4	0x7fd2abdcf9c0	0x7fd2abdd1844
Set 5	0x7fd2ab9f9f50	0x7fd2abdd4750
Set 6	0x7fd2ab9f9f68	0x7fd2abdcee68
Set 7	0x7ffe258707f8	0x7ffe25870778

real 1m48.760s
user 0m17.443s
sys 0m2.055s

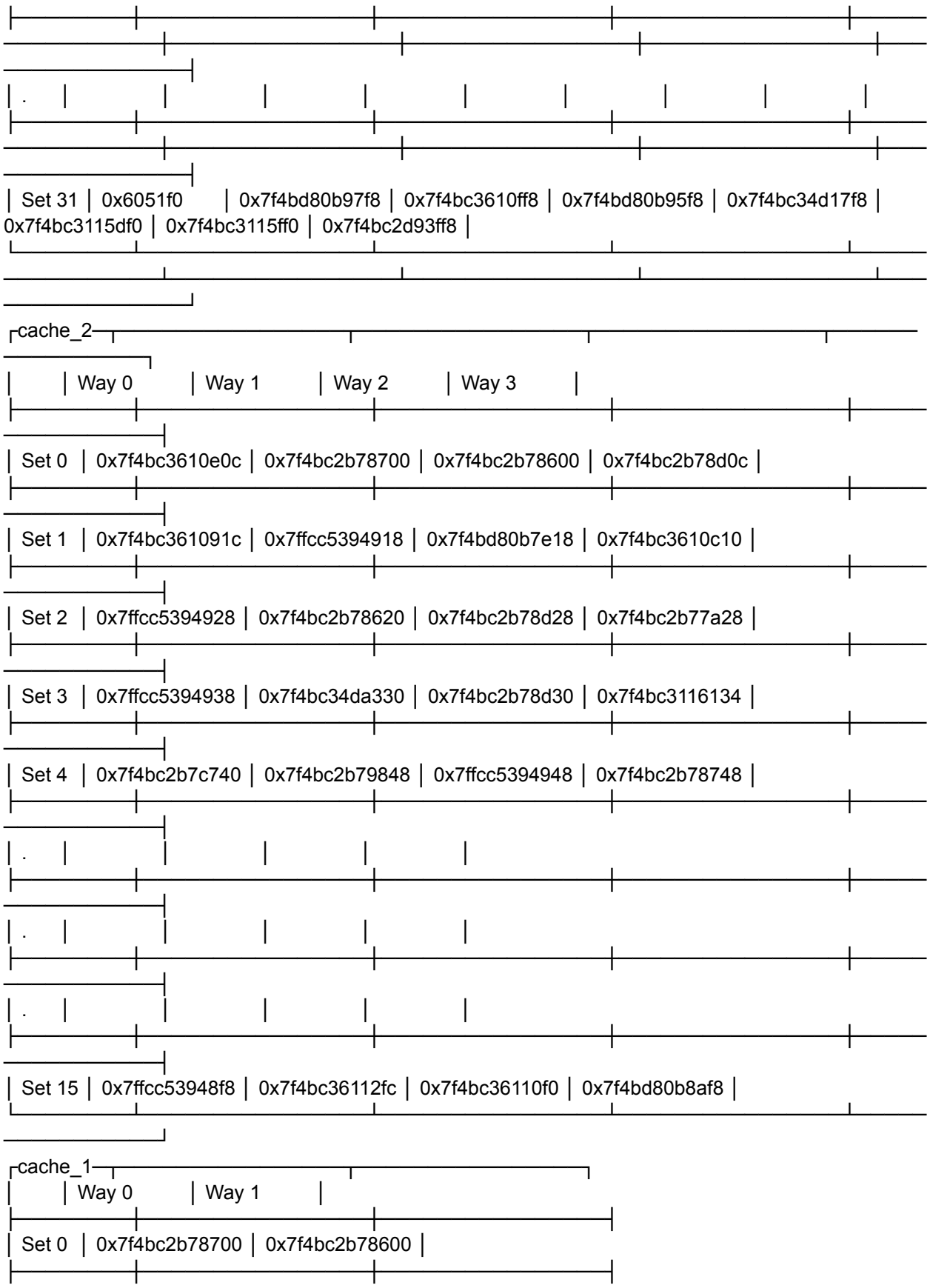
Block Size 32

Number of instructions: 186697
Total cycles taken: 1430181
cache_3
    Number of accesses: 1556
    Number of hits: 985
    Number of misses: 571
cache_2
    Number of accesses: 8298

Number of hits: 6607
Number of misses: 1691
cache_1
Number of accesses: 186697
Number of hits: 177747
Number of misses: 8950
AMATs:
{'cache_1': 6.328875285083403,
'cache_2': 111.16033844683979,
'cache_3': 466.9665809768637,
'mem': 1000}

cache_3

	Way 0	Way 1	Way 2	Way 3	Way 4	Way 5	Way 6	Way 7
Set 0	0x7f4bd80b9808	0x7f4bc3610e08	0x7f4bc3611008	0x7f4bd80b9600	0x7f4bc3610600	0x7f4bc3115e00	0x7f4bc3610c00	0x7f4bc2b78600
Set 1	0x7f4bd80b7e18	0x7ffcc5393e10	0x7f4bc3610618	0x7f4bd80b8e18	0x7f4bd80b961c	0x605210	0x7ffcc5394818	0x7f4bc3610c10
Set 2	0x7f4bc361042e	0x7f4bc3610628	0x7f4bd80b8e20	0x7f4bc3610220	0x7ffcc5394828	0x7f4bc2d94020	0x7f4bc2b78620	0x7f4bc2b77a28
Set 3	0x7f4bd80b8a38	0x7ffcc5394230	0x7f4bc34dc430	0x7ffcc5393e38	0x604e38	0x7f4bd80b8e3c	0x7f4bc3610230	0x7ffcc5394838
Set 4	0x7ffcc5394848	0x7f4bc34dd840	0x7ffcc5393e48	0x7f4bd80b9248	0x7f4bc34db040	0x7f4bc34daa48	0x7f4bc2d93c40	0x7f4bc2b79848
.								
.								

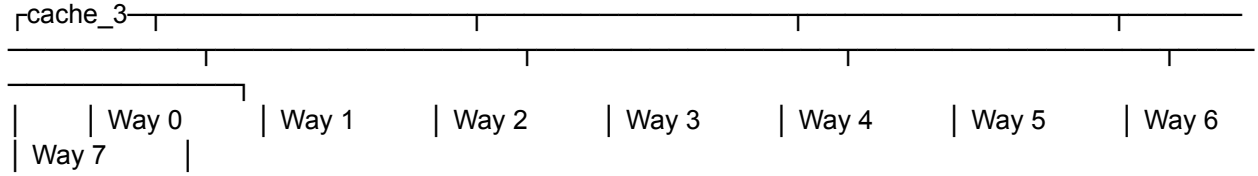

.
Set 31 0x6051f0 0x7f4bd80b97f8 0x7f4bc3610ff8 0x7f4bd80b95f8 0x7f4bc34d17f8 0x7f4bc3115df0 0x7f4bc3115ff0 0x7f4bc2d93ff8
cache_2
Way 0 Way 1 Way 2 Way 3
Set 0 0x7f4bc3610e0c 0x7f4bc2b78700 0x7f4bc2b78600 0x7f4bc2b78d0c
Set 1 0x7f4bc361091c 0x7ffcc5394918 0x7f4bd80b7e18 0x7f4bc3610c10
Set 2 0x7ffcc5394928 0x7f4bc2b78620 0x7f4bc2b78d28 0x7f4bc2b77a28
Set 3 0x7ffcc5394938 0x7f4bc34da330 0x7f4bc2b78d30 0x7f4bc3116134
Set 4 0x7f4bc2b7c740 0x7f4bc2b79848 0x7ffcc5394948 0x7f4bc2b78748
.
.
.
Set 15 0x7ffcc53948f8 0x7f4bc36112fc 0x7f4bc36110f0 0x7f4bd80b8af8
cache_1
Way 0 Way 1
Set 0 0x7f4bc2b78700 0x7f4bc2b78600

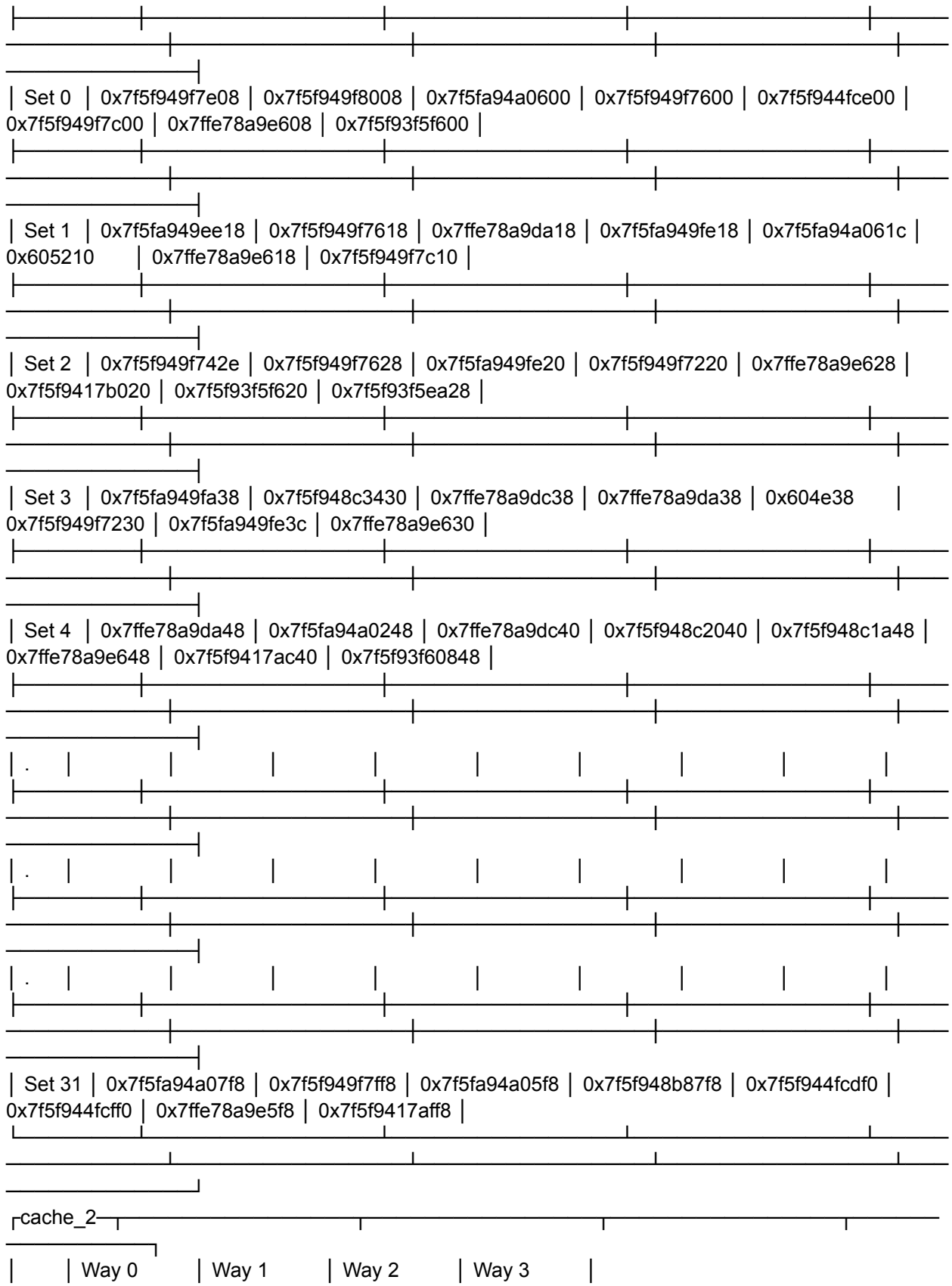
Set 1	0x7ffcc5394918	0x7f4bd80b7e18
Set 2	0x7f4bc2b77a28	0x7ffcc5394928
Set 3	0x7ffcc5394938	0x7f4bc2b79830
Set 4	0x7f4bc2b79848	0x7f4bc2b78748
.		
.		
.		
Set 15	0x7f4bd80b8af8	0x7ffcc53948f8

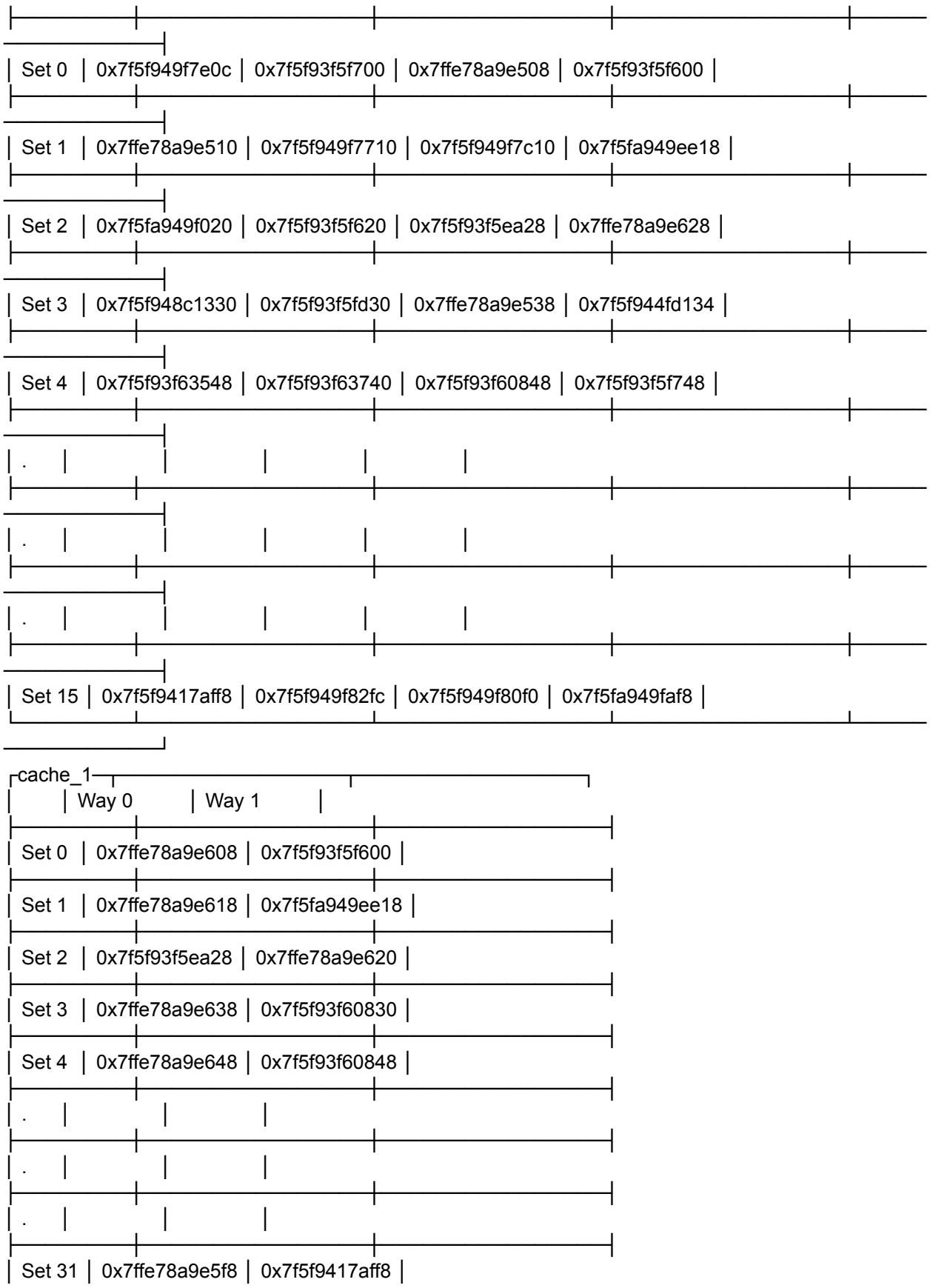
real 1m42.603s
user 0m16.449s
sys 0m2.019s

Block Size 64

Number of instructions: 186697
Total cycles taken: 1249197
cache_3
    Number of accesses: 1015
    Number of hits: 428
    Number of misses: 587
cache_2
    Number of accesses: 2745
    Number of hits: 1643
    Number of misses: 1102
cache_1
    Number of accesses: 186697
    Number of hits: 183495
    Number of misses: 3202
AMATs:
{'cache_1': 5.944888459640029,
 'cache_2': 288.3185011709602,
 'cache_3': 678.3251231527094,
 'mem': 1000}




Set 0	0x7f5f949f7e08	0x7f5f949f8008	0x7f5fa94a0600	0x7f5f949f7600	0x7f5f944fce00	0x7f5f949f7c00	0x7ffe78a9e608	0x7f5f93f5f600
Set 1	0x7f5fa949ee18	0x7f5f949f7618	0x7ffe78a9da18	0x7f5fa949fe18	0x7f5fa94a061c	0x605210	0x7ffe78a9e618	0x7f5f949f7c10
Set 2	0x7f5f949f742e	0x7f5f949f7628	0x7f5fa949fe20	0x7f5f949f7220	0x7ffe78a9e628	0x7f5f9417b020	0x7f5f93f5f620	0x7f5f93f5ea28
Set 3	0x7f5fa949fa38	0x7f5f948c3430	0x7ffe78a9dc38	0x7ffe78a9da38	0x604e38	0x7f5f949f7230	0x7f5fa949fe3c	0x7ffe78a9e630
Set 4	0x7ffe78a9da48	0x7f5fa94a0248	0x7ffe78a9dc40	0x7f5f948c2040	0x7f5f948c1a48	0x7ffe78a9e648	0x7f5f9417ac40	0x7f5f93f60848
.								
.								
.								
Set 31	0x7f5fa94a07f8	0x7f5f949f7ff8	0x7f5fa94a05f8	0x7f5f948b87f8	0x7f5f944fcdf0	0x7f5f944fcff0	0x7ffe78a9e5f8	0x7f5f9417aff8
cache_2
	Way 0	Way 1	Way 2	Way 3

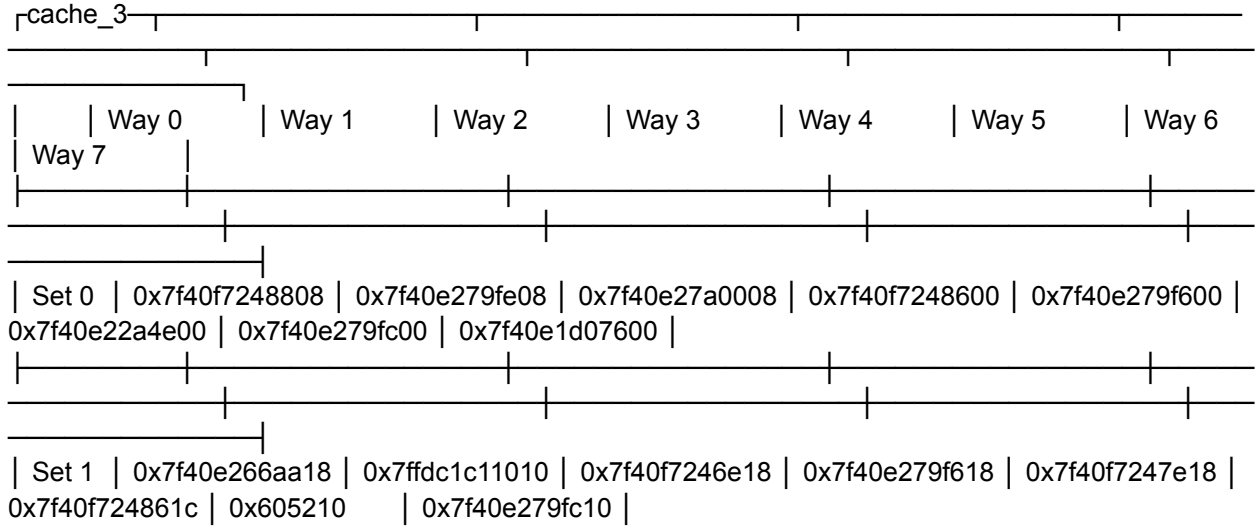

Set 0 | 0x7f5f949f7e0c | 0x7f5f93f5f700 | 0x7ffe78a9e508 | 0x7f5f93f5f600 |
Set 1 | 0x7ffe78a9e510 | 0x7f5f949f7710 | 0x7f5f949f7c10 | 0x7f5fa949ee18 |
Set 2 | 0x7f5fa949f020 | 0x7f5f93f5f620 | 0x7f5f93f5ea28 | 0x7ffe78a9e628 |
Set 3 | 0x7f5f948c1330 | 0x7f5f93f5fd30 | 0x7ffe78a9e538 | 0x7f5f944fd134 |
Set 4 | 0x7f5f93f63548 | 0x7f5f93f63740 | 0x7f5f93f60848 | 0x7f5f93f5f748 |
Set 15 | 0x7f5f9417aff8 | 0x7f5f949f82fc | 0x7f5f949f80f0 | 0x7f5fa949faf8 |
cache_1
Way 0 | Way 1
Set 0 | 0x7ffe78a9e608 | 0x7f5f93f5f600 |
Set 1 | 0x7ffe78a9e618 | 0x7f5fa949ee18 |
Set 2 | 0x7f5f93f5ea28 | 0x7ffe78a9e620 |
Set 3 | 0x7ffe78a9e638 | 0x7f5f93f60830 |
Set 4 | 0x7ffe78a9e648 | 0x7f5f93f60848 |
Set 31 | 0x7ffe78a9e5f8 | 0x7f5f9417aff8 |

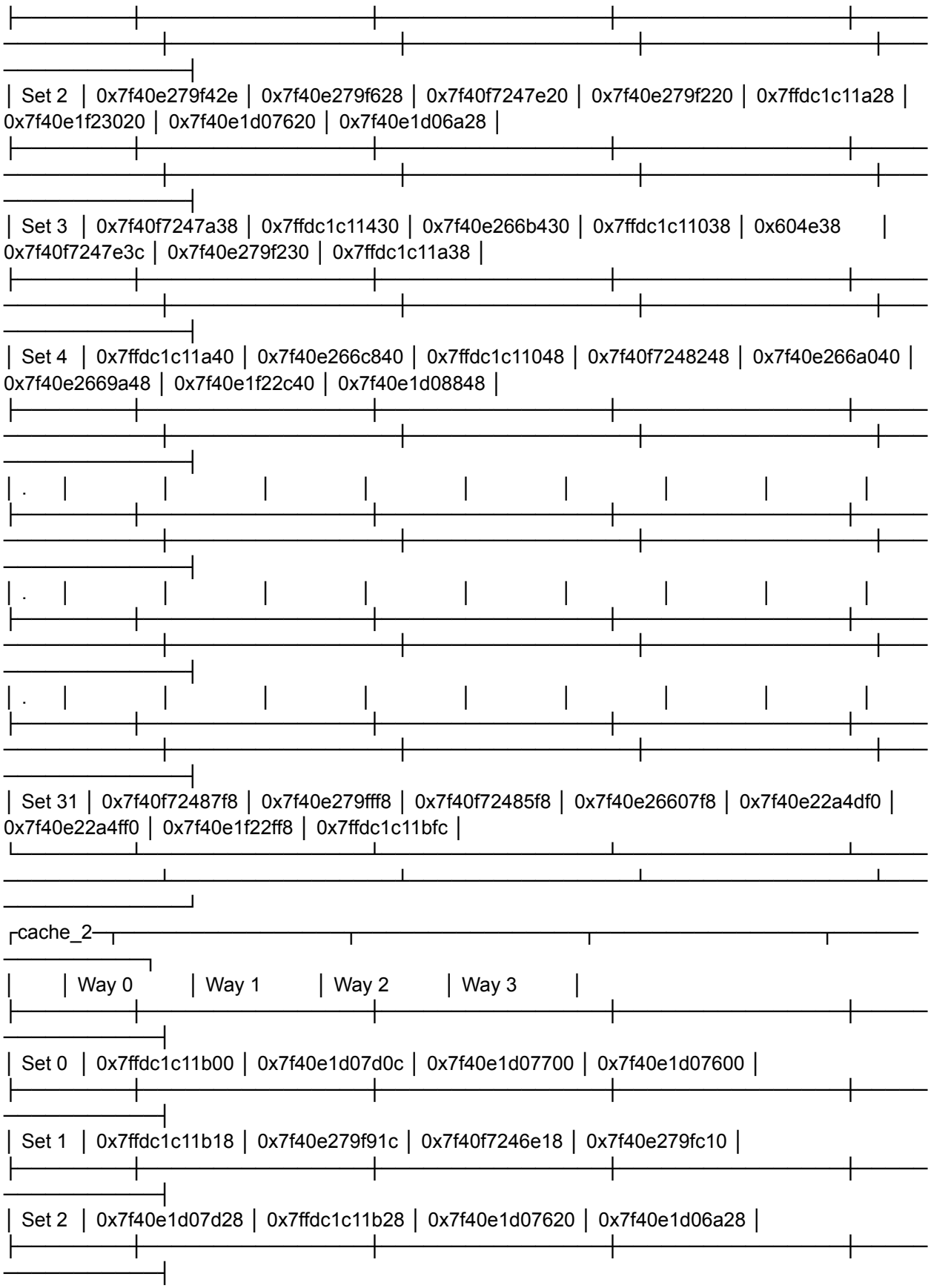
```
real    1m38.976s
user    0m16.035s
sys     0m1.946s
```

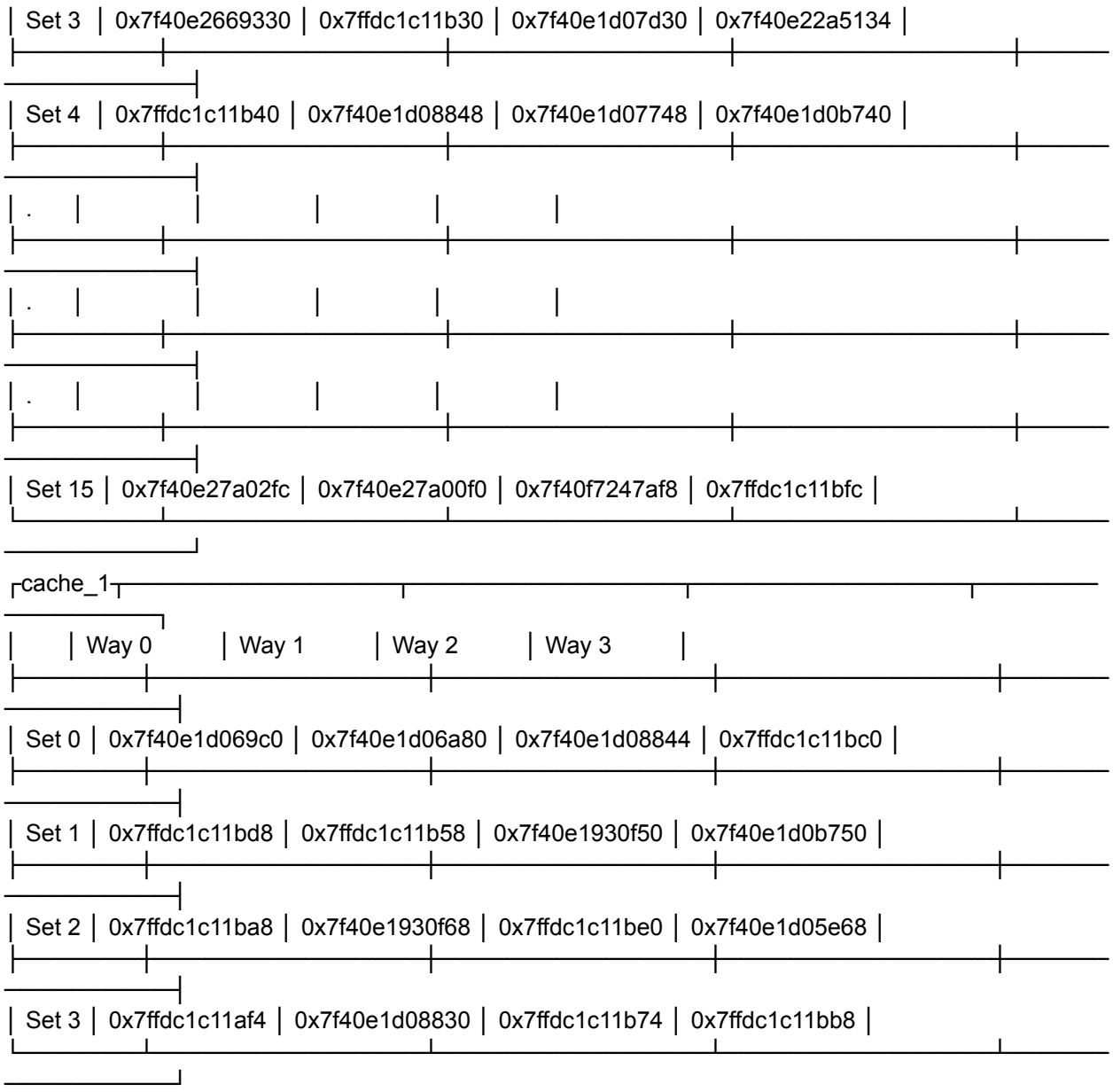
Matrix Size 32x32:

Block Size 16

```
Number of instructions: 186697
Total cycles taken: 1473353
cache_3
        Number of accesses: 1493
        Number of hits: 933
        Number of misses: 560
cache_2
        Number of accesses: 11460
        Number of hits: 9843
        Number of misses: 1617
cache_1
        Number of accesses: 186697
        Number of hits: 174231
        Number of misses: 12466
AMATs:
{'cache_1': 6.54429182524576,
 'cache_2': 83.03406472789247,
 'cache_3': 475.0837240455459,
 'mem': 1000}
```




Set 2	0x7f40e279f42e	0x7f40e279f628	0x7f40f7247e20	0x7f40e279f220	0x7ffdc1c11a28	0x7f40e1f23020	0x7f40e1d07620	0x7f40e1d06a28
Set 3	0x7f40f7247a38	0x7ffdc1c11430	0x7f40e266b430	0x7ffdc1c11038	0x604e38	0x7f40f7247e3c	0x7f40e279f230	0x7ffdc1c11a38
Set 4	0x7ffdc1c11a40	0x7f40e266c840	0x7ffdc1c11048	0x7f40f7248248	0x7f40e266a040	0x7f40e2669a48	0x7f40e1f22c40	0x7f40e1d08848
.								
.								
.								
Set 31	0x7f40f72487f8	0x7f40e279fff8	0x7f40f72485f8	0x7f40e26607f8	0x7f40e22a4df0	0x7f40e22a4ff0	0x7f40e1f22ff8	0x7ffdc1c11bfc
cache_2
	Way 0	Way 1	Way 2	Way 3
Set 0	0x7ffdc1c11b00	0x7f40e1d07d0c	0x7f40e1d07700	0x7f40e1d07600
Set 1	0x7ffdc1c11b18	0x7f40e279f91c	0x7f40f7246e18	0x7f40e279fc10
Set 2	0x7f40e1d07d28	0x7ffdc1c11b28	0x7f40e1d07620	0x7f40e1d06a28

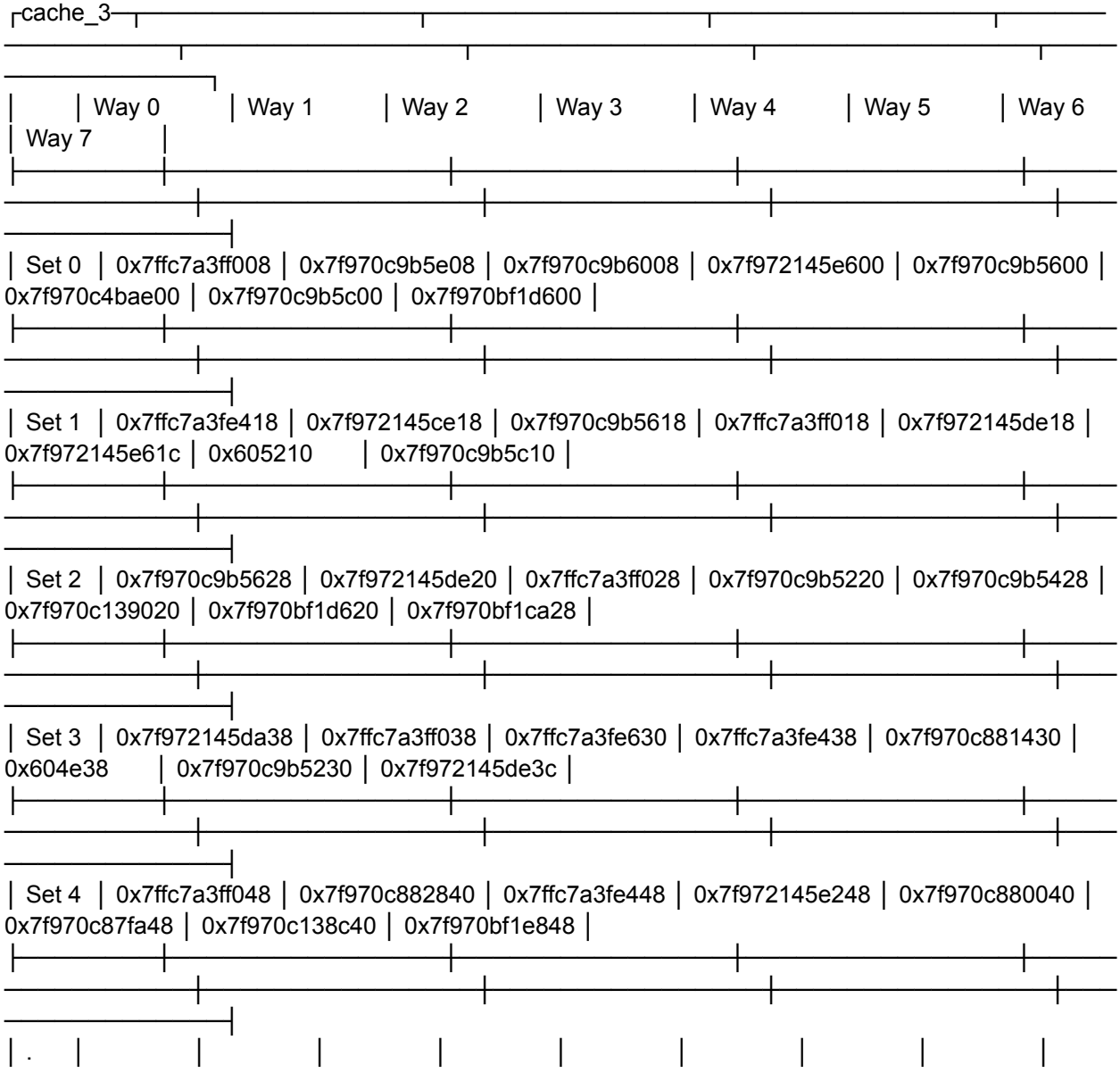


real 1m42.676s
user 0m16.786s
sys 0m2.015s

Block Size 32

Number of instructions: 496741
Total cycles taken: 2790121
cache_3
    Number of accesses: 2500
    Number of hits: 1487
    Number of misses: 1013

cache_2
Number of accesses: 14507
Number of hits: 11824
Number of misses: 2683
cache_1
Number of accesses: 496741
Number of hits: 480800
Number of misses: 15941
AMATs:
{'cache_1': 4.511875216558266,
'cache_2': 109.43431446887709,
'cache_3': 505.2,
'mem': 1000}



| . | | | | | | | | |

| . | | | | | | | | |

| Set 31 | 0x7f972145e7f8 | 0x7f970c9b5ff8 | 0x7ffc7a3feff8 | 0x7f972145e5f8 | 0x7f970c8767f8 | 0x7f970c4badf0 | 0x7f970c4baff0 | 0x7f970c138ff8 |

cache_2

	Way 0	Way 1	Way 2	Way 3
Set 0	0x7f970bf1d700	0x7f970bf1dd0c	0x7f970bf1d600	0x7ffc7a3ff008
Set 1	0x7f970c9b591c	0x7f970c9b5c10	0x7f972145ce18	0x7ffc7a3ff018
Set 2	0x7ffc7a3ff020	0x7f970bf1dd28	0x7f970bf1d620	0x7f970bf1ca28
Set 3	0x7f970c87f330	0x7f970bf1dd30	0x7f970c4bb134	0x7ffc7a3ff030
Set 4	0x7ffc7a3ff040	0x7f970bf21740	0x7f970bf1e848	0x7f970bf1d748
.				
.				
.				
Set 15	0x7f970c9b62fc	0x7f970c9b60f0	0x7ffc7a3feff8	0x7f972145daf8

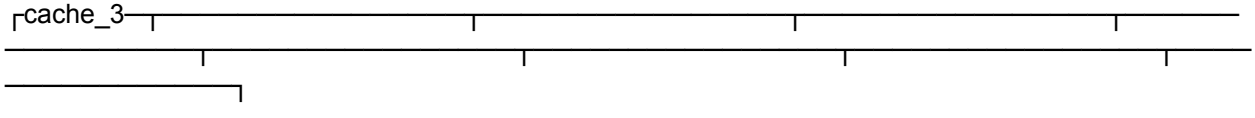
cache_1

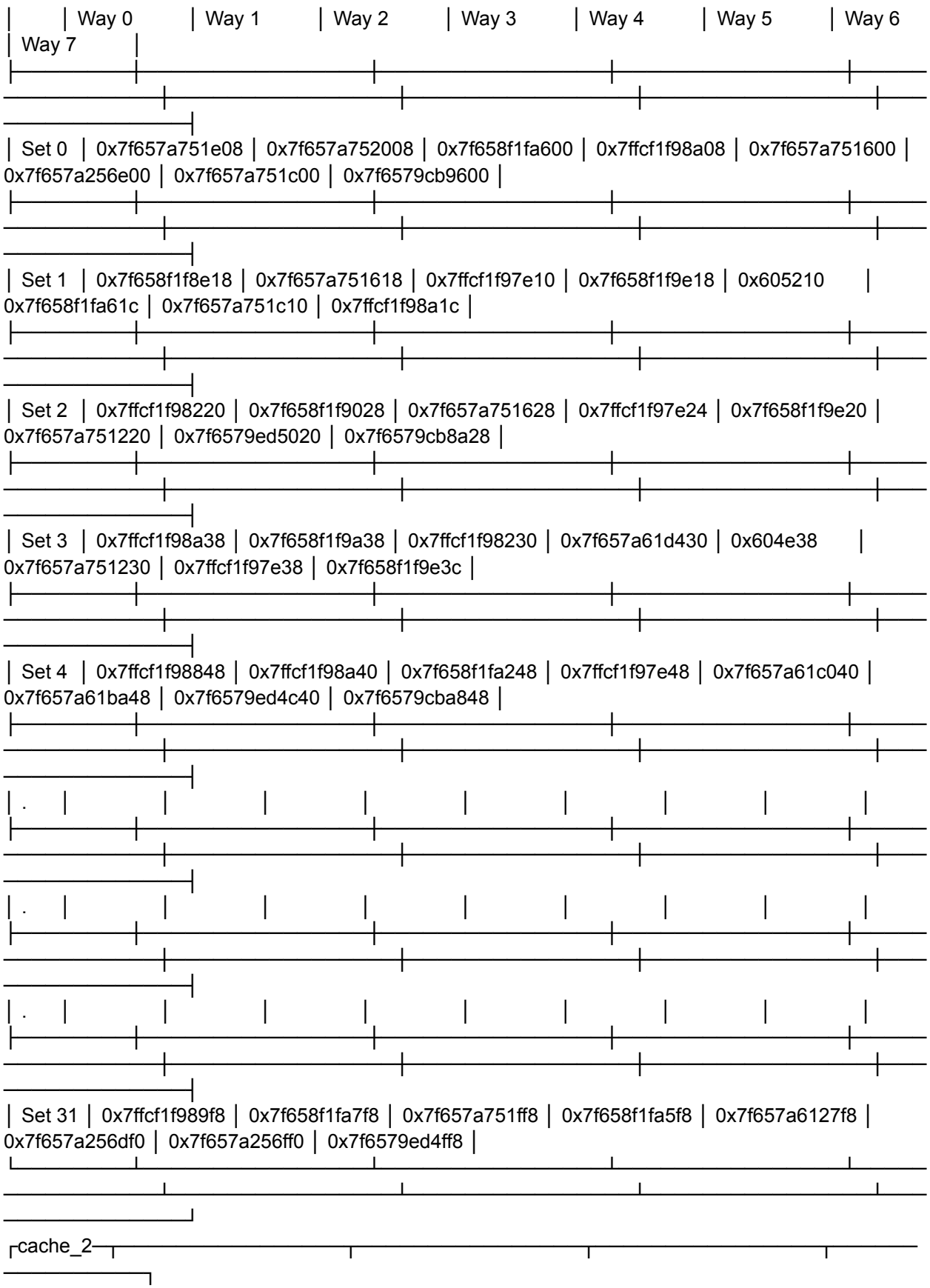
	Way 0	Way 1
Set 0	0x7f970bf1d600	0x7ffc7a3ff008
Set 1	0x7f972145ce18	0x7ffc7a3ff018
Set 2	0x7f970bf1ca28	0x7ffc7a3ff020
Set 3	0x7ffc7a3ff030	0x7f970bf1e830
Set 4	0x7f970bf1e848	0x7ffc7a3ff040
.		
.		
.		
Set 15	0x7ffc7a3feff8	0x7f972145daf8

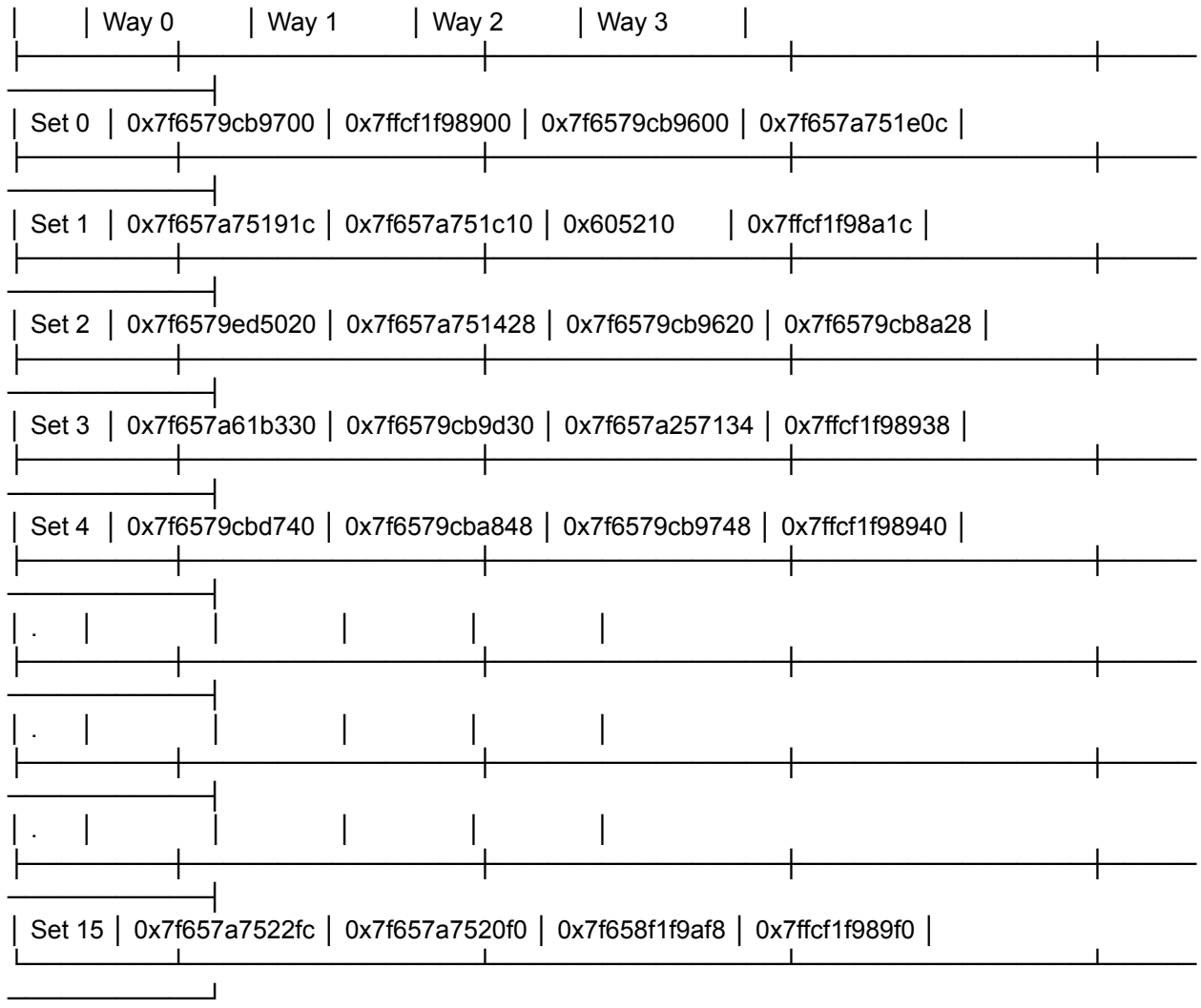
real 4m45.368s
user 0m45.527s
sys 0m5.569s

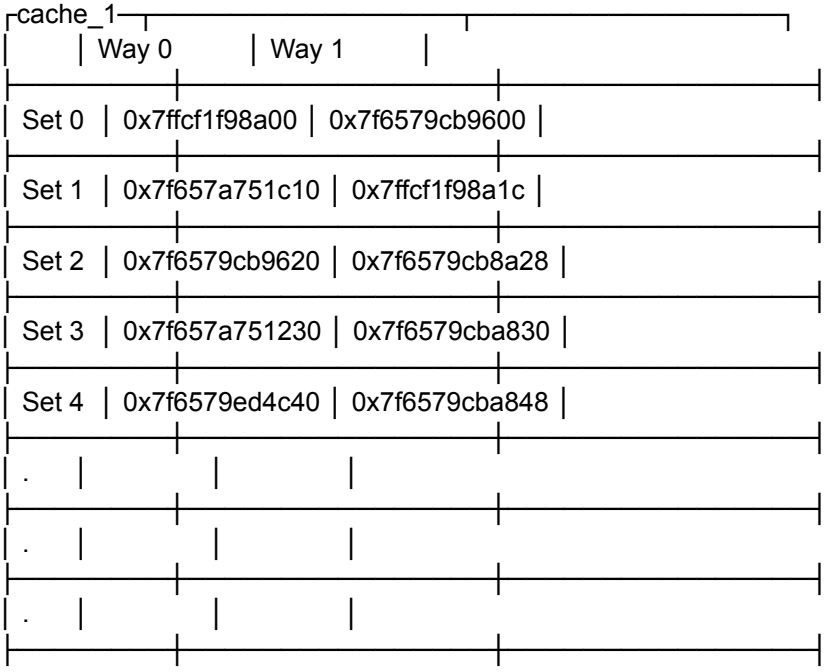
Block Size 64

Number of instructions: 496741
Total cycles taken: 2504085
cache_3
    Number of accesses: 1978
    Number of hits: 923
    Number of misses: 1055
cache_2
    Number of accesses: 4181
    Number of hits: 2046
    Number of misses: 2135
cache_1
    Number of accesses: 496741
    Number of hits: 491917
    Number of misses: 4824
AMATs:
{'cache_1': 4.296254385939403,
 'cache_2': 339.4246890393709,
 'cache_3': 633.3670374115268,
 'mem': 1000}




	Way 0	Way 1	Way 2	Way 3	Way 4	Way 5	Way 6	Way 7
Set 0	0x7f657a751e08	0x7f657a752008	0x7f658f1fa600	0x7ffcf1f98a08	0x7f657a751600	0x7f657a256e00	0x7f657a751c00	0x7f6579cb9600
Set 1	0x7f658f1f8e18	0x7f657a751618	0x7ffcf1f97e10	0x7f658f1f9e18	0x605210	0x7f658f1fa61c	0x7f657a751c10	0x7ffcf1f98a1c
Set 2	0x7ffcf1f98220	0x7f658f1f9028	0x7f657a751628	0x7ffcf1f97e24	0x7f658f1f9e20	0x7f657a751220	0x7f6579ed5020	0x7f6579cb8a28
Set 3	0x7ffcf1f98a38	0x7f658f1f9a38	0x7ffcf1f98230	0x7f657a61d430	0x604e38	0x7f657a751230	0x7ffcf1f97e38	0x7f658f1f9e3c
Set 4	0x7ffcf1f98848	0x7ffcf1f98a40	0x7f658f1fa248	0x7ffcf1f97e48	0x7f657a61c040	0x7f657a61ba48	0x7f6579ed4c40	0x7f6579cba848
.								
.								
.								
Set 31	0x7ffcf1f989f8	0x7f658f1fa7f8	0x7f657a751ff8	0x7f658f1fa5f8	0x7f657a6127f8	0x7f657a256df0	0x7f657a256ff0	0x7f6579ed4ff8
cache_2


Way 0
Way 1
Way 2
Way 3
Set 0
0x7f6579cb9700
0x7ffcf1f98900
0x7f6579cb9600
0x7f657a751e0c
Set 1
0x7f657a75191c
0x7f657a751c10
0x605210
0x7ffcf1f98a1c
Set 2
0x7f6579ed5020
0x7f657a751428
0x7f6579cb9620
0x7f6579cb8a28
Set 3
0x7f657a61b330
0x7f6579cb9d30
0x7f657a257134
0x7ffcf1f98938
Set 4
0x7f6579cbd740
0x7f6579cba848
0x7f6579cb9748
0x7ffcf1f98940
Set 15
0x7f657a7522fc
0x7f657a7520f0
0x7f658f1f9af8
0x7ffcf1f989f0


cache_1
Way 0
Way 1
Set 0
0x7ffcf1f98a00
0x7f6579cb9600
Set 1
0x7f657a751c10
0x7ffcf1f98a1c
Set 2
0x7f6579cb9620
0x7f6579cb8a28
Set 3
0x7f657a751230
0x7f6579cba830
Set 4
0x7f6579ed4c40
0x7f6579cba848

| Set 31 | 0x7f6579ed4ff8 | 0x7ffcf1f989f0 |

real 4m19.116s
user 0m41.833s
sys 0m5.320s

Varying Associativity :

Matrix Size 20x20:

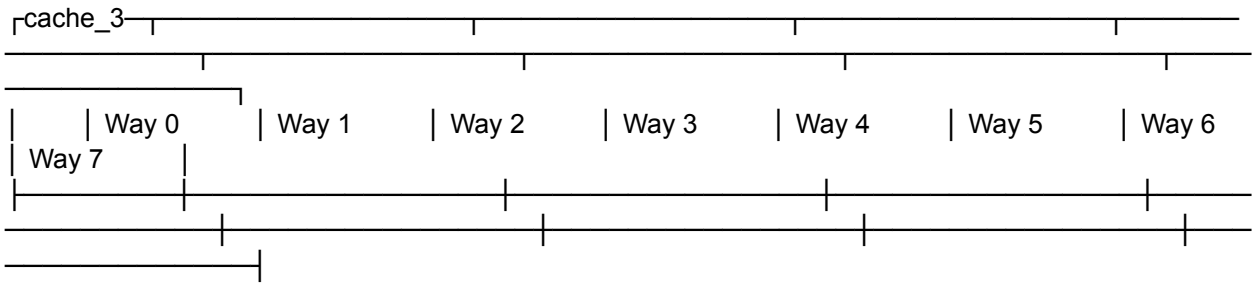
Associativity : 2

Number of instructions: 186697

Total cycles taken: 1629177

cache_3
Number of accesses: 1571
Number of hits: 1009
Number of misses: 562
cache_2
Number of accesses: 16765
Number of hits: 15063
Number of misses: 1702
cache_1
Number of accesses: 186697
Number of hits: 167123
Number of misses: 19574

AMATs:
{'cache_1': 7.549544455680323,
'cache_2': 62.46961792388624,
'cache_3': 457.7339274347549,
'mem': 1000}



| Set 0 | 0x7ffe25870808 | 0x7fd2ac868e08 | 0x7fd2ac869008 | 0x7fd2c1311600 | 0x7fd2ac868600 | 0x7fd2ac36de00 | 0x7fd2ac868c00 | 0x7fd2abdd0600 |

| Set 1 | 0x7ffe25870818 | 0x7fd2ac733a18 | 0x7fd2c130fe18 | 0x7fd2ac868618 | 0x7fd2c1310e18 | 0x7fd2c131161c | 0x605210 | 0x7fd2ac868c10 |

| Set 2 | 0x7ffe25870828 | 0x7fd2c1310028 | 0x7fd2ac868628 | 0x7fd2c1310e20 | 0x7fd2ac868220 | 0x7fd2abfec020 | 0x7fd2ac868428 | 0x7fd2abdcfa28 |

| Set 3 | 0x7fd2c1310a38 | 0x7ffe2587083c | 0x7ffe2586fe30 | 0x7fd2ac734430 | 0x7ffe2586fc38 | 0x604e38 | 0x7fd2ac868230 | 0x7fd2c1310e3c |

| Set 4 | 0x7ffe2586fe40 | 0x7fd2ac735840 | 0x7ffe2586fc48 | 0x7fd2c1311248 | 0x7fd2ac733040 | 0x7fd2ac732a48 | 0x7fd2abfebc40 | 0x7fd2abdd1848 |

| . | | | | | | | | |

| . | | | | | | | | |

| . | | | | | | | | |

| Set 31 | 0x7fd2c13117f8 | 0x7fd2ac868ff8 | 0x7ffe258707f8 | 0x7fd2c13115f8 | 0x7fd2ac7297f8 | 0x7fd2ac36ddf0 | 0x7fd2ac36dff0 | 0x7fd2abfebff8 |

cache_2

| | Way 0 | Way 1 | Way 2 | Way 3 |

Set 0	0x7ffe25870800	0x7fd2abdd0d0c	0x7fd2abdd0700	0x7fd2abdd0600
Set 1	0x7fd2ac86891c	0x7fd2ac868c10	0x7fd2c130fe18	0x7ffe25870810
Set 2	0x7fd2abdd0d28	0x7ffe25870820	0x7fd2abdd0620	0x7fd2abdcfa28
Set 3	0x7fd2abdd0d30	0x7fd2ac36e134	0x7ffe25870738	0x7ffe2587083c
Set 4	0x7fd2abdd1848	0x7ffe25870748	0x7fd2abdd0748	0x7fd2abdd4740
.				
.				
.				
Set 15	0x7fd2ac8692fc	0x7fd2ac8690f0	0x7fd2c1310af8	0x7ffe258707f8

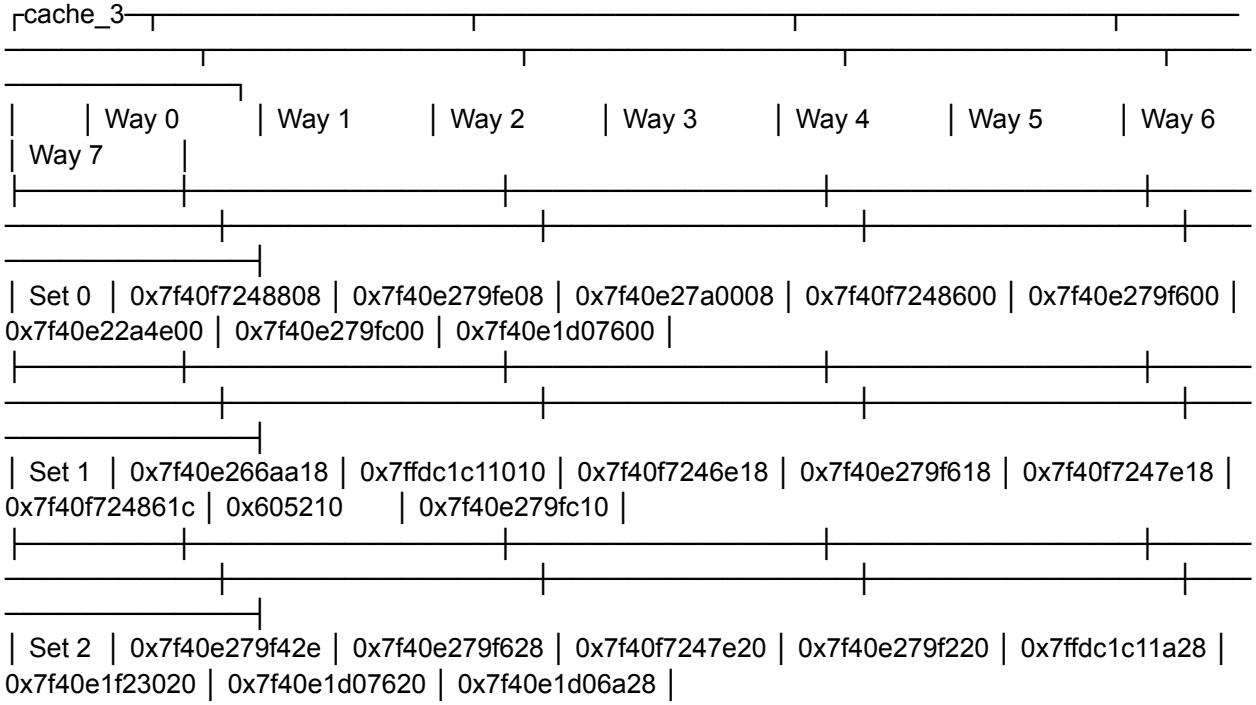
cache_1

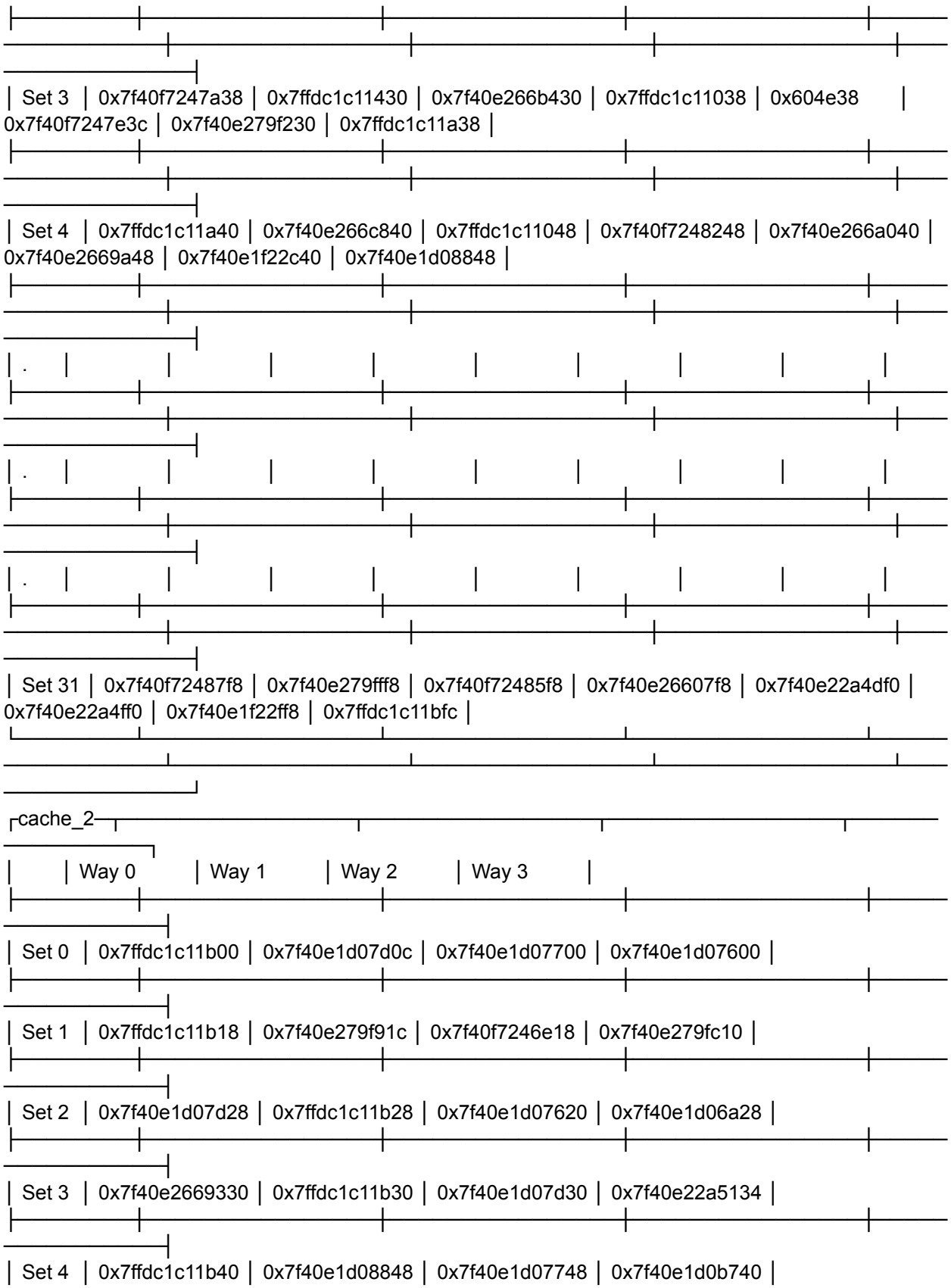
	Way 0	Way 1
Set 0	0x7fd2abdcfa80	0x7ffe25870800
Set 1	0x7ffe25870810	0x7ffe25870798
Set 2	0x7fd2abdcfa28	0x7ffe25870820
Set 3	0x7fd2abdd1830	0x7ffe258707b4
Set 4	0x7fd2abdcf9c0	0x7fd2abdd1844
Set 5	0x7fd2ab9f9f50	0x7fd2abdd4750
Set 6	0x7fd2ab9f9f68	0x7fd2abdcee68
Set 7	0x7ffe258707f8	0x7ffe25870778

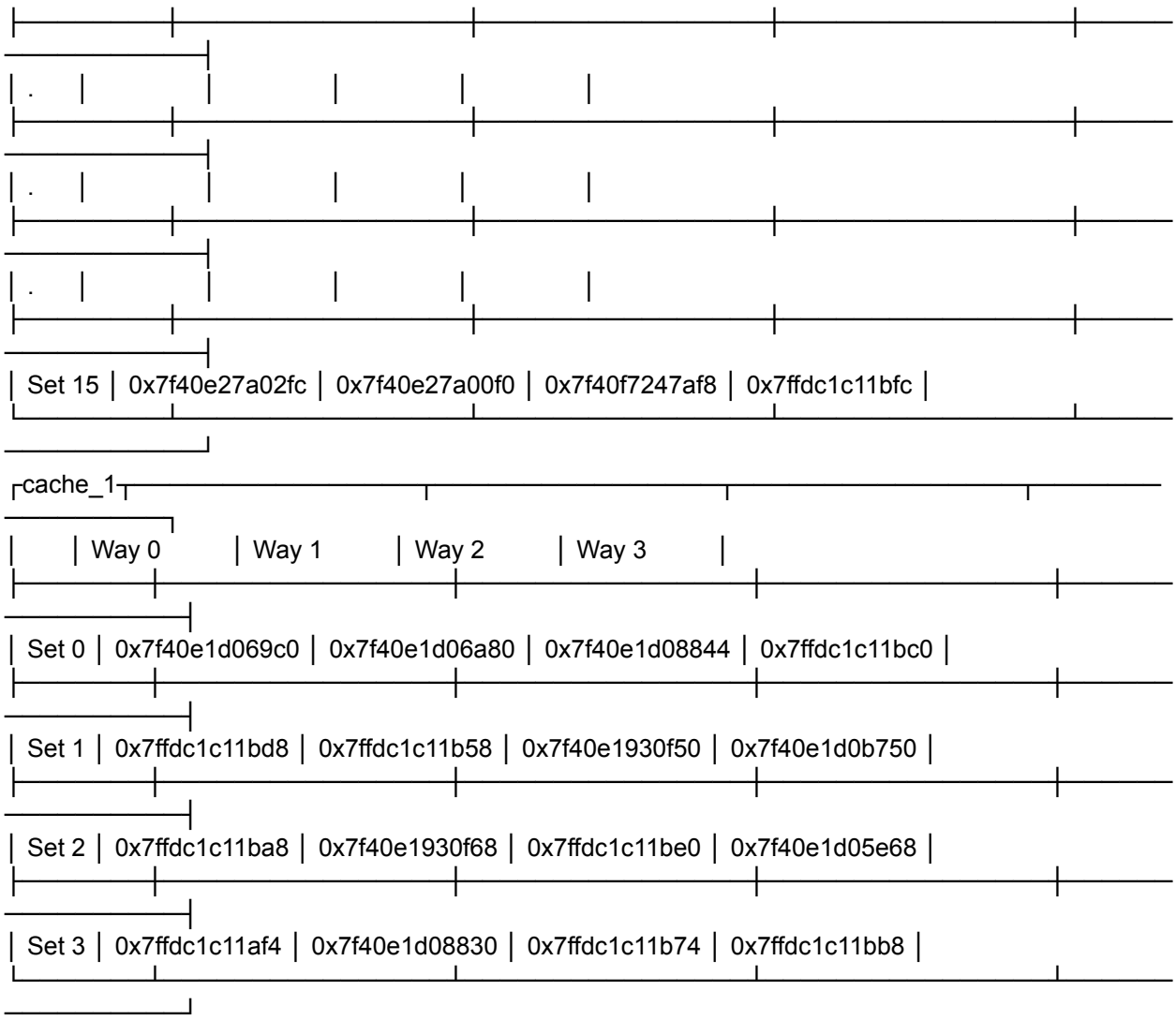
real 1m48.760s
user 0m17.443s
sys 0m2.055s

Associativity : 4

Number of instructions: 186697
Total cycles taken: 1473353
cache_3
Number of accesses: 1493
Number of hits: 933
Number of misses: 560
cache_2
Number of accesses: 11460
Number of hits: 9843
Number of misses: 1617
cache_1
Number of accesses: 186697
Number of hits: 174231
Number of misses: 12466
AMATs:
{'cache_1': 6.54429182524576,
'cache_2': 83.03406472789247,
'cache_3': 475.0837240455459,
'mem': 1000}




| Set 3 | 0x7f40f7247a38 | 0x7ffdc1c11430 | 0x7f40e266b430 | 0x7ffdc1c11038 | 0x604e38 | 0x7f40f7247e3c | 0x7f40e279f230 | 0x7ffdc1c11a38 |
| Set 4 | 0x7ffdc1c11a40 | 0x7f40e266c840 | 0x7ffdc1c11048 | 0x7f40f7248248 | 0x7f40e266a040 | 0x7f40e2669a48 | 0x7f40e1f22c40 | 0x7f40e1d08848 |
| . |
| . |
| . |
| Set 31 | 0x7f40f72487f8 | 0x7f40e279fff8 | 0x7f40f72485f8 | 0x7f40e26607f8 | 0x7f40e22a4df0 | 0x7f40e22a4ff0 | 0x7f40e1f22ff8 | 0x7ffdc1c11bfc |
cache_2
	Way 0	Way 1	Way 2	Way 3
Set 0	0x7ffdc1c11b00	0x7f40e1d07d0c	0x7f40e1d07700	0x7f40e1d07600
Set 1	0x7ffdc1c11b18	0x7f40e279f91c	0x7f40f7246e18	0x7f40e279fc10
Set 2	0x7f40e1d07d28	0x7ffdc1c11b28	0x7f40e1d07620	0x7f40e1d06a28
Set 3	0x7f40e2669330	0x7ffdc1c11b30	0x7f40e1d07d30	0x7f40e22a5134
Set 4	0x7ffdc1c11b40	0x7f40e1d08848	0x7f40e1d07748	0x7f40e1d0b740

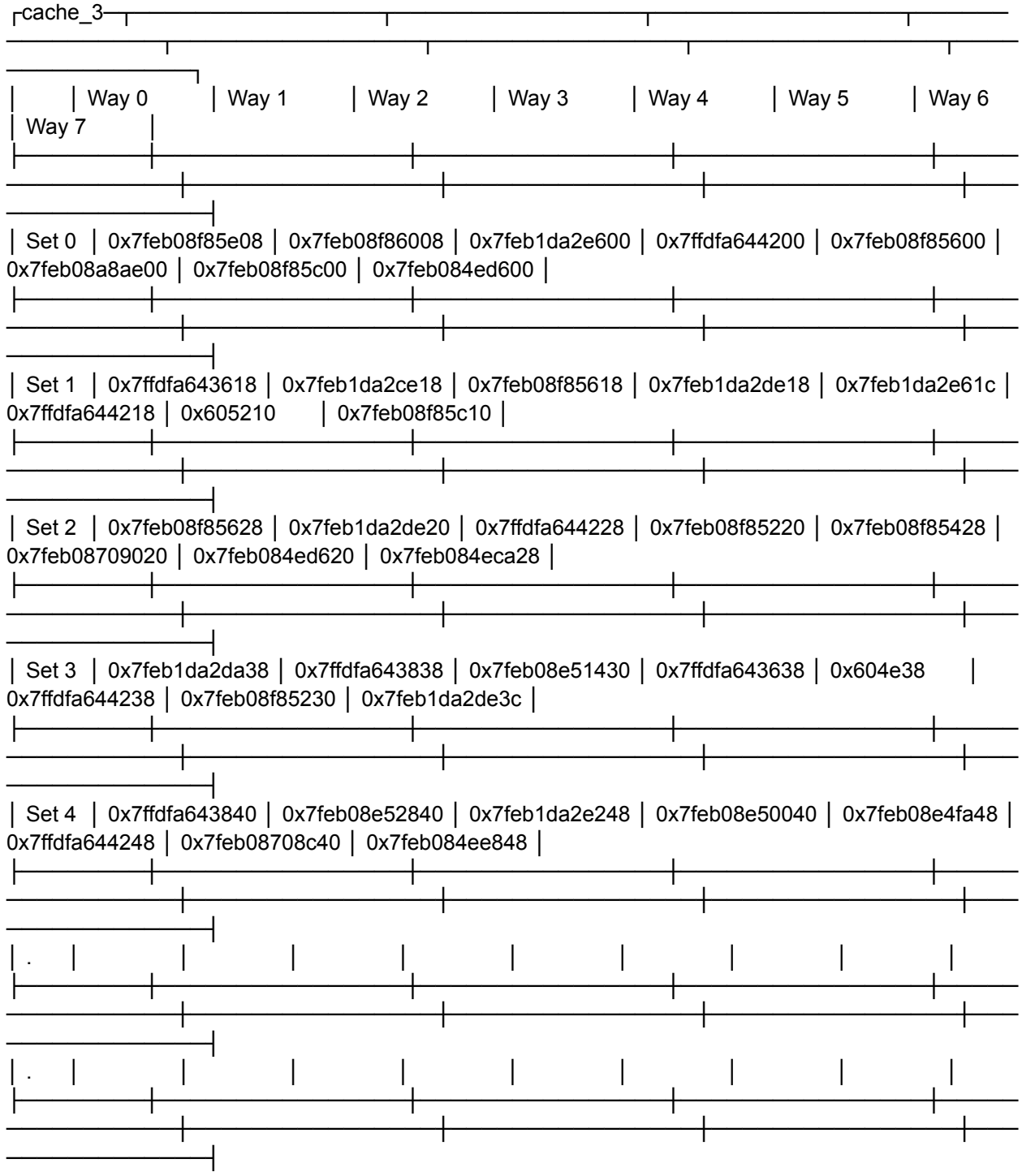


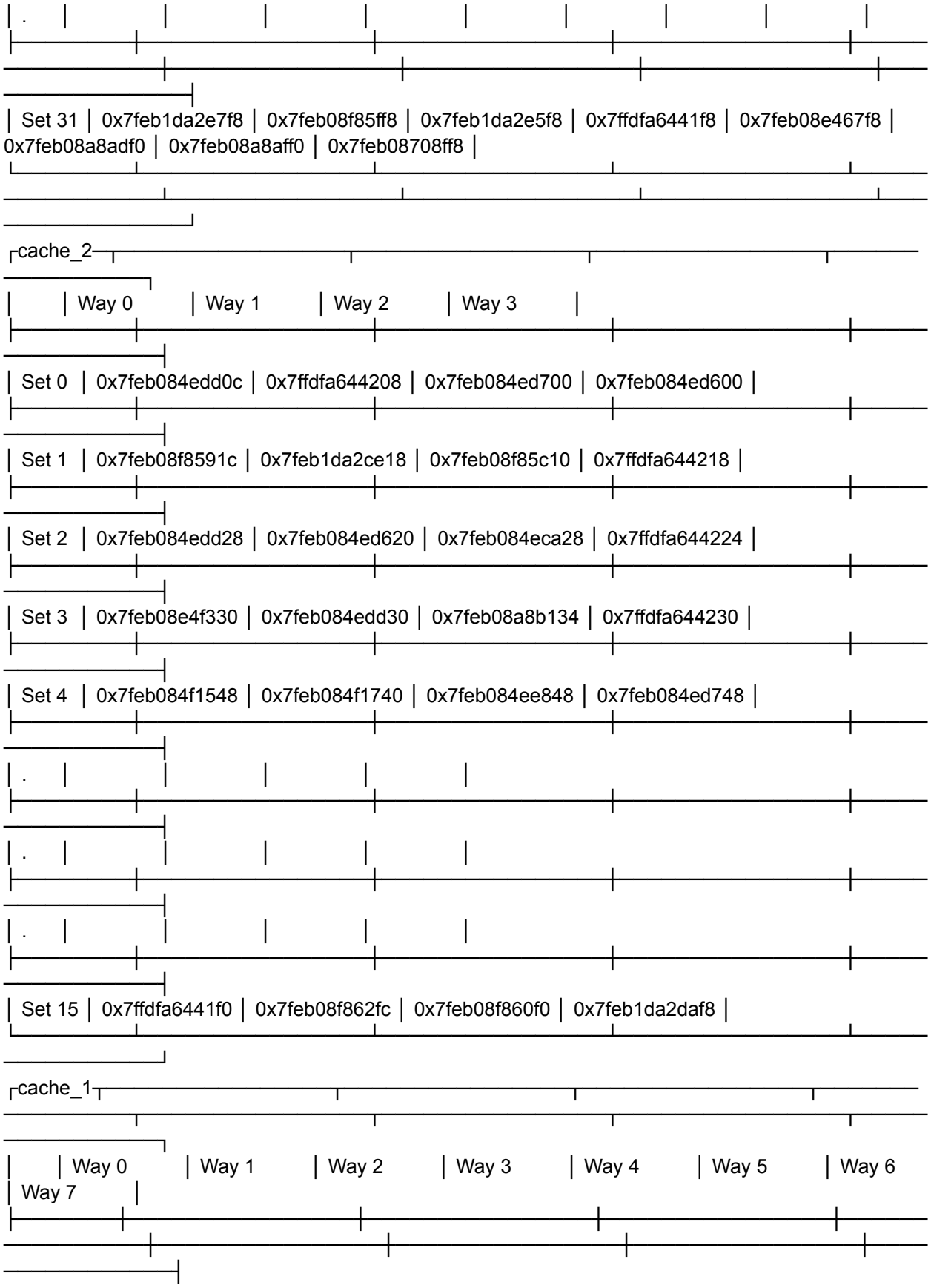
real 1m42.676s
user 0m16.786s
sys 0m2.015s

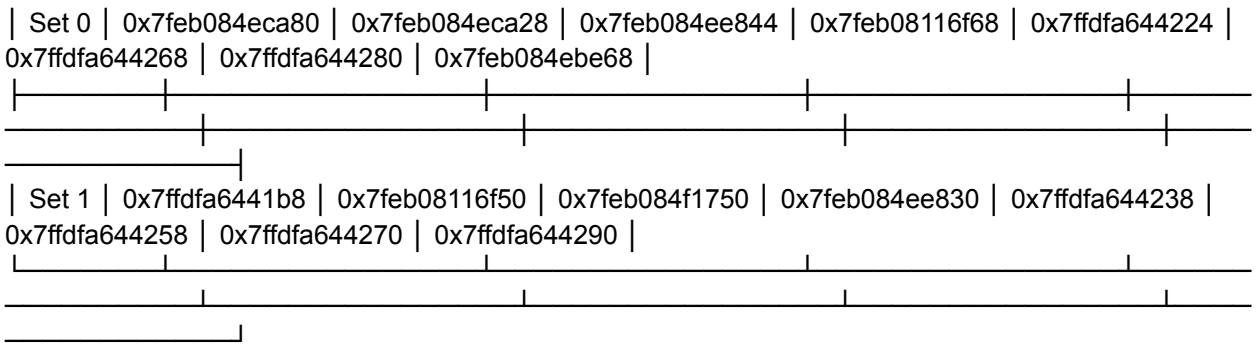
Associativity : 8

Number of instructions: 186697
Total cycles taken: 1491545
cache_3
    Number of accesses: 1540
    Number of hits: 975
    Number of misses: 565
cache_2
    Number of accesses: 12021
    Number of hits: 10357
    Number of misses: 1664
cache_1

Number of accesses: 186697
Number of hits: 173695
Number of misses: 13002
AMATs:
{'cache_1': 6.615117545996271,
 'cache_2': 80.62802649475971,
 'cache_3': 466.8831168831169,
 'mem': 1000}




.
Set 31 | 0x7feb1da2e7f8 | 0x7feb08f85ff8 | 0x7feb1da2e5f8 | 0x7ffdfa6441f8 | 0x7feb08e467f8 | 0x7feb08a8adf0 | 0x7feb08a8aff0 | 0x7feb08708ff8 |
cache_2
Way 0 | Way 1 | Way 2 | Way 3 |
Set 0 | 0x7feb084edd0c | 0x7ffdfa644208 | 0x7feb084ed700 | 0x7feb084ed600 |
Set 1 | 0x7feb08f8591c | 0x7feb1da2ce18 | 0x7feb08f85c10 | 0x7ffdfa644218 |
Set 2 | 0x7feb084edd28 | 0x7feb084ed620 | 0x7feb084eca28 | 0x7ffdfa644224 |
Set 3 | 0x7feb08e4f330 | 0x7feb084edd30 | 0x7feb08a8b134 | 0x7ffdfa644230 |
Set 4 | 0x7feb084f1548 | 0x7feb084f1740 | 0x7feb084ee848 | 0x7feb084ed748 |
.
.
.
Set 15 | 0x7ffdfa6441f0 | 0x7feb08f862fc | 0x7feb08f860f0 | 0x7feb1da2daf8 |
cache_1
Way 0 | Way 1 | Way 2 | Way 3 | Way 4 | Way 5 | Way 6 | Way 7 |

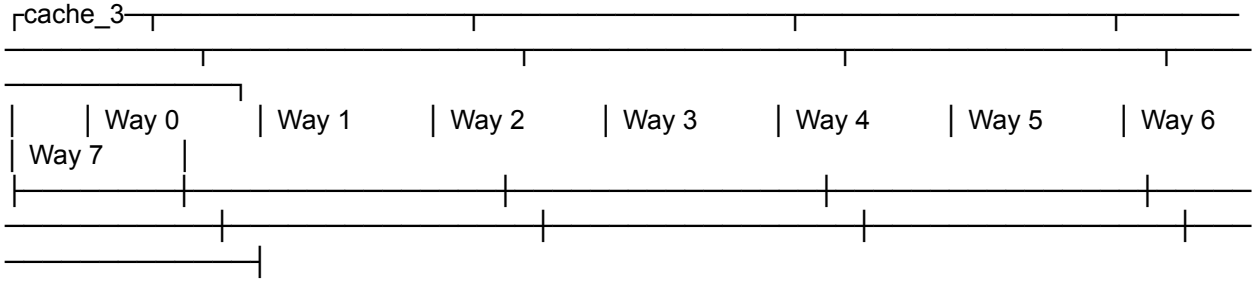


real 1m42.847s
user 0m16.914s
sys 0m1.955s

Matrix Size 32x32:

Associativity : 2

Number of instructions: 496741
Total cycles taken: 3632997
cache_3
    Number of accesses: 3087
    Number of hits: 2097
    Number of misses: 990
cache_2
    Number of accesses: 50683
    Number of hits: 47417
    Number of misses: 3266
cache_1
    Number of accesses: 496741
    Number of hits: 439318
    Number of misses: 57423
AMATs:
{'cache_1': 5.983468649986084,
 'cache_2': 43.10978528921751,
 'cache_3': 420.6997084548105,
 'mem': 1000}



| Set 0 | 0x7fffb0a67e08 | 0x7f306d4c4e08 | 0x7f306d4c5008 | 0x7f3081f6d600 | 0x7f306d4c4600 | 0x7f306cfc9e00 | 0x7f306d4c4c00 | 0x7f306ca2c600 |

| Set 1 | 0x7f306d38fa18 | 0x7f3081f6be18 | 0x7f306d4c4618 | 0x7fffb0a67e18 | 0x7f3081f6ce18 | 0x7f3081f6d61c | 0x605210 | 0x7f306d4c4c10 |

| Set 2 | 0x7fffb0a67e28 | 0x7f3081f6c028 | 0x7f306d4c4628 | 0x7f3081f6ce20 | 0x7f306d4c4220 | 0x7f306d4c4428 | 0x7f306cc48020 | 0x7f306ca2ba28 |

| Set 3 | 0x7f3081f6ca38 | 0x7fffb0a67e38 | 0x7fffb0a67430 | 0x7f306d390430 | 0x7fffb0a67238 | 0x604e38 | 0x7f306d4c4230 | 0x7f3081f6ce3c |

| Set 4 | 0x7f306d391840 | 0x7fffb0a67248 | 0x7f3081f6d248 | 0x7f306d38f040 | 0x7f306d38ea48 | 0x7f306cc47c40 | 0x7fffb0a67e4c | 0x7f306ca2d848 |

| . | | | | | | | | |

| . | | | | | | | | |

| . | | | | | | | | |

| Set 31 | 0x7f3081f6d7f8 | 0x7f306d4c4ff8 | 0x7fffb0a67df8 | 0x7f3081f6d5f8 | 0x7f306d3857f8 | 0x7f306cfc9df0 | 0x7f306cfc9ff0 | 0x7f306cc47ff8 |

cache_2

| | Way 0 | Way 1 | Way 2 | Way 3 |

| Set 0 | 0x7fffb0a67e08 | 0x7f306ca2cd0c | 0x7f306ca2c700 | 0x7f306ca2c600 |

Set 1	0x7f306d4c491c	0x7f306d4c4c10	0x7f3081f6be18	0x7fffb0a67e10
Set 2	0x7f306ca2cd28	0x7fffb0a67e20	0x7f306ca2c620	0x7f306ca2ba28
Set 3	0x7f306d38e330	0x7f306ca2cd30	0x7f306cfca134	0x7fffb0a67e30
Set 4	0x7f306ca2d848	0x7fffb0a67d44	0x7f306ca2c748	0x7f306ca30740
.				
.				
.				
Set 15	0x7fffb0a67df8	0x7f306d4c52fc	0x7f306d4c50f0	0x7f3081f6caf8

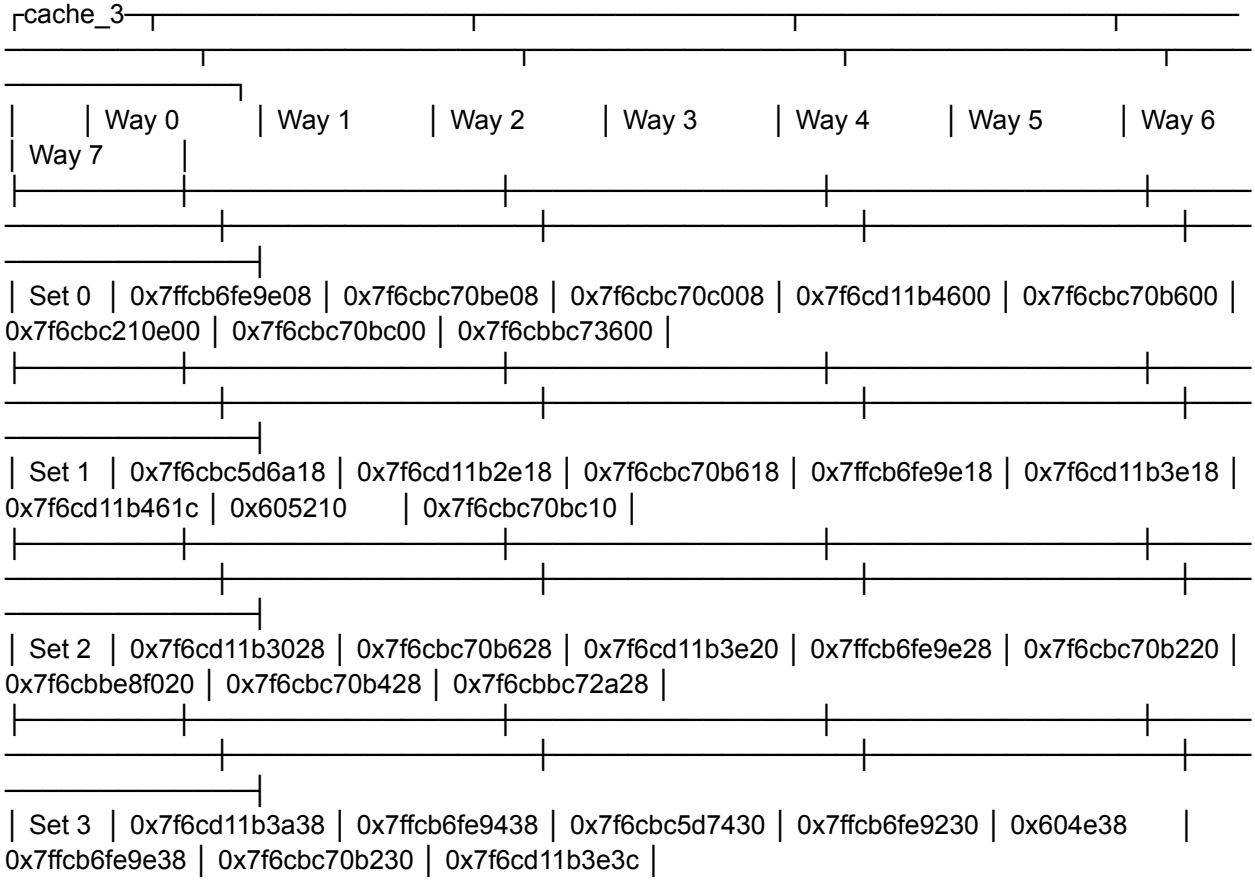
cache_1

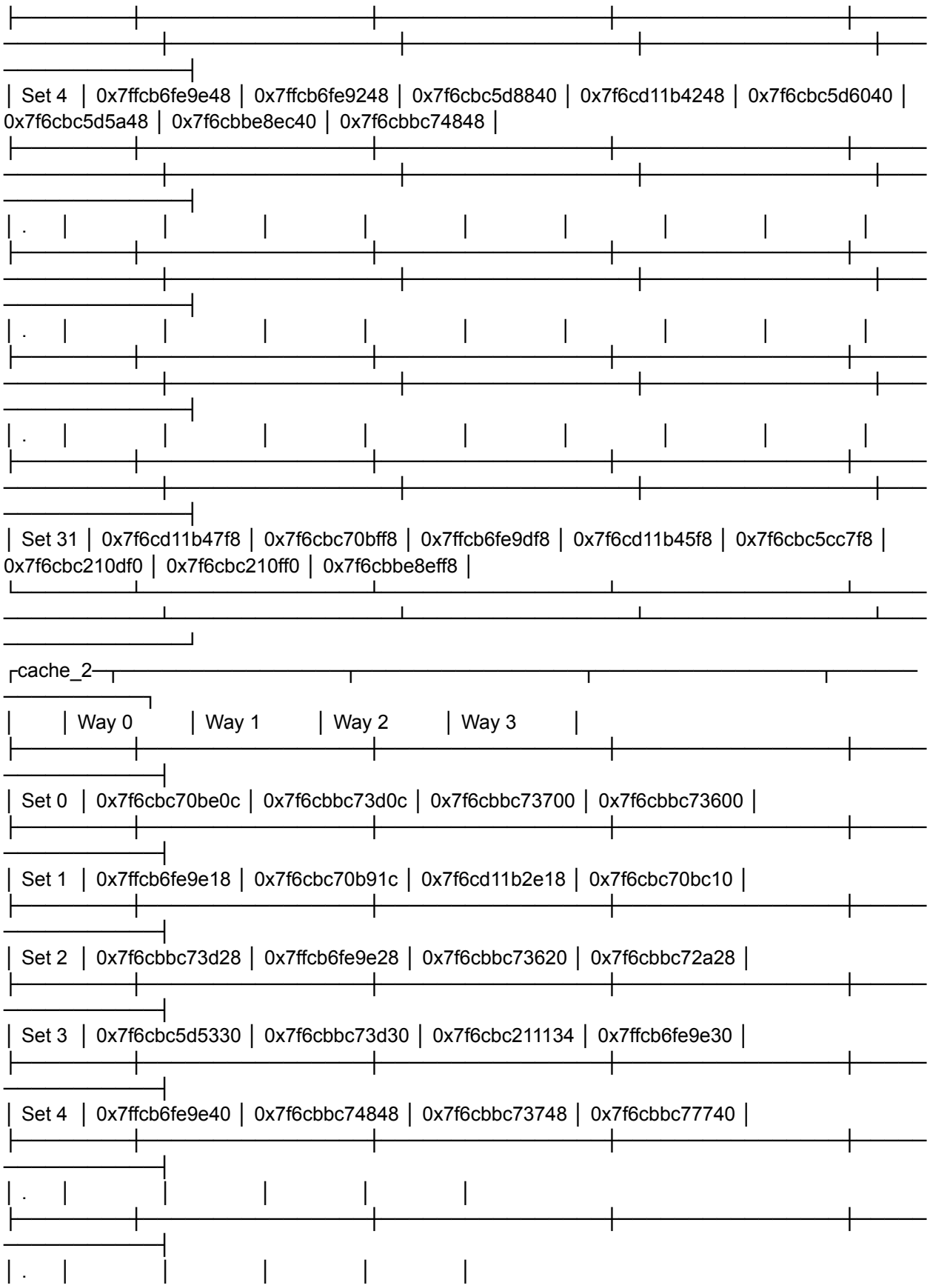
	Way 0	Way 1
Set 0	0x7f306ca2ba80	0x7fffb0a67e08
Set 1	0x7fffb0a67e10	0x7fffb0a67d98
Set 2	0x7f306ca2ba28	0x7fffb0a67e20
Set 3	0x7f306ca2d830	0x7fffb0a67e30
Set 4	0x7f306ca2d844	0x7fffb0a67dc4
Set 5	0x7f306c655f50	0x7f306ca30750
Set 6	0x7f306c655f68	0x7f306ca2ae68
Set 7	0x7fffb0a67df4	0x7fffb0a67d78

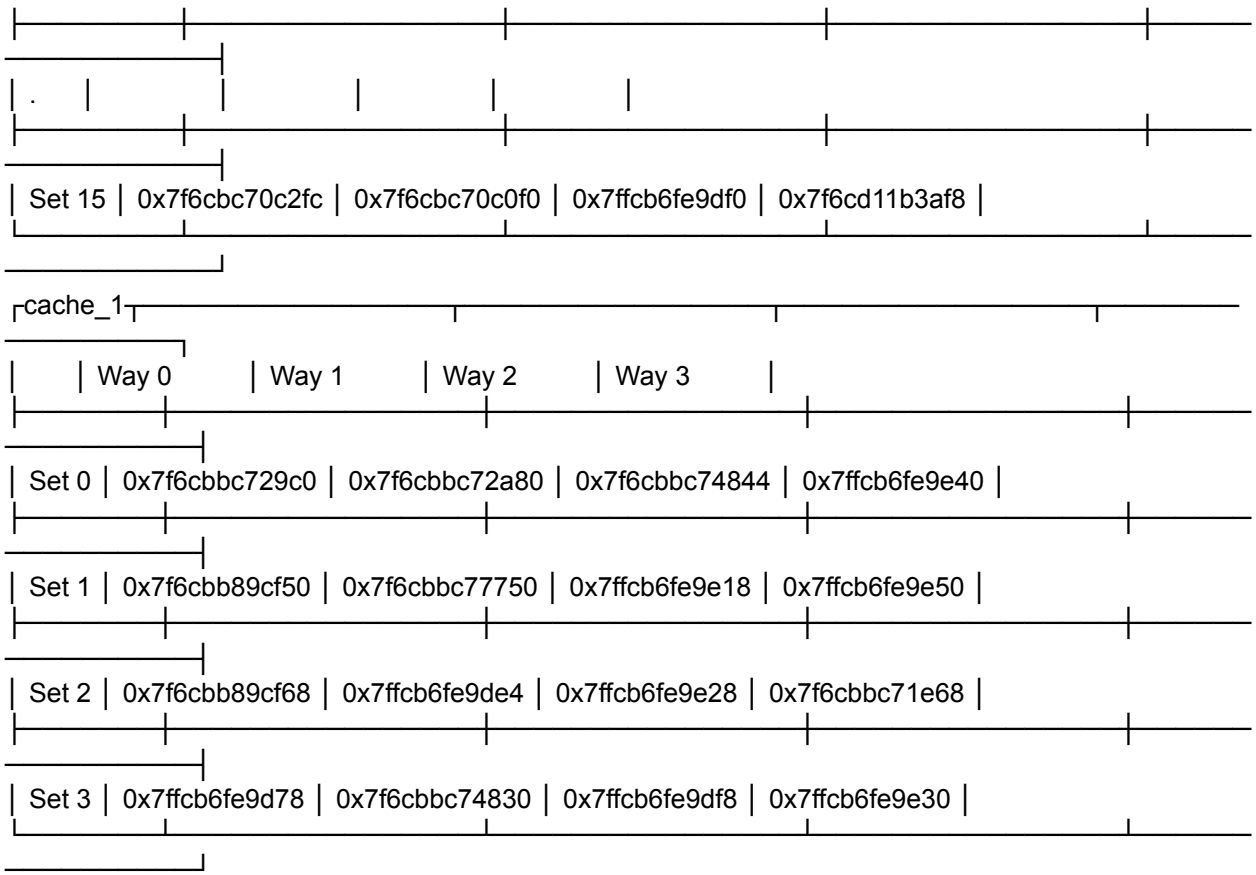
real 3m55.605s
user 0m39.667s
sys 0m4.893s

Associativity : 4

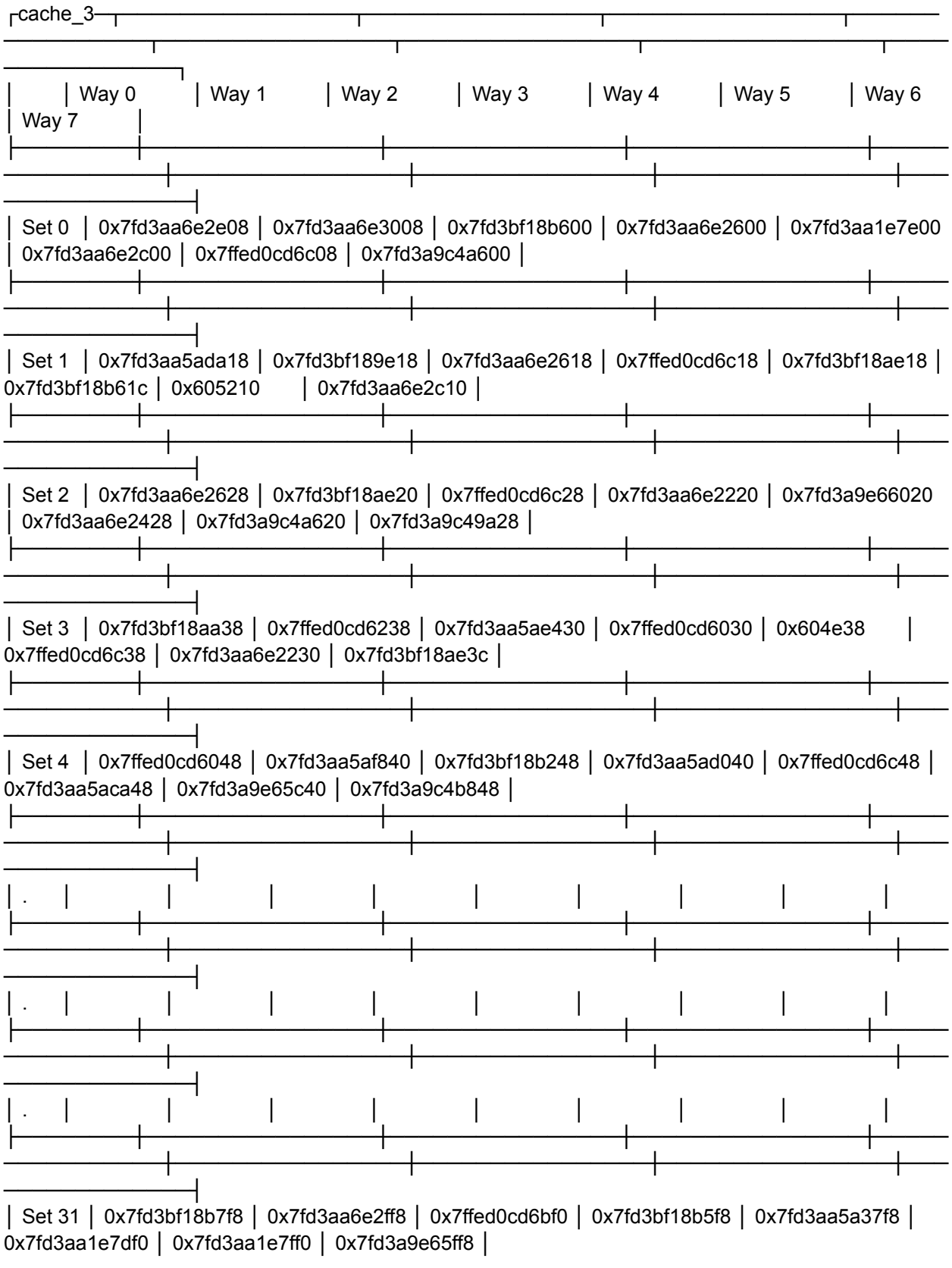
Number of instructions: 496741
Total cycles taken: 3168785
cache_3
    Number of accesses: 2802
    Number of hits: 1826
    Number of misses: 976
cache_2
    Number of accesses: 34339
    Number of hits: 31382
    Number of misses: 2957
cache_1
    Number of accesses: 496741
    Number of hits: 460462
    Number of misses: 36279
AMATs:
{'cache_1': 4.988093526659608,
 'cache_2': 54.60595844776373,
 'cache_3': 448.3226266952177,
 'mem': 1000}

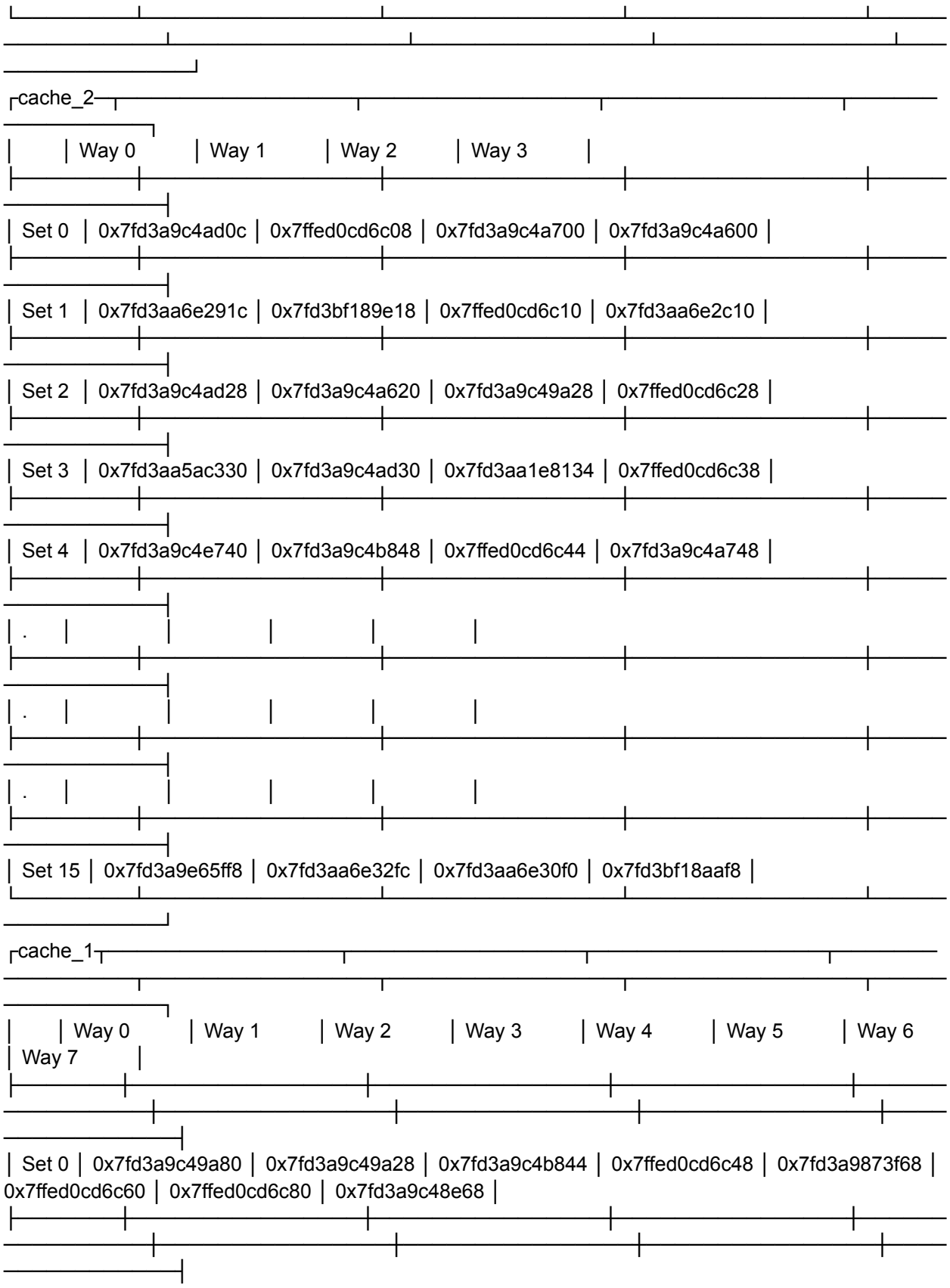



| Set 4 | 0x7ffcb6fe9e48 | 0x7ffcb6fe9248 | 0x7f6cbc5d8840 | 0x7f6cd11b4248 | 0x7f6cbc5d6040 | 0x7f6cbc5d5a48 | 0x7f6cbbe8ec40 | 0x7f6cbbc74848 |
| . |
| . |
| . |
| Set 31 | 0x7f6cd11b47f8 | 0x7f6cbc70bff8 | 0x7ffcb6fe9df8 | 0x7f6cd11b45f8 | 0x7f6cbc5cc7f8 | 0x7f6cbc210df0 | 0x7f6cbc210ff0 | 0x7f6cbbe8eff8 |
cache_2
	Way 0	Way 1	Way 2	Way 3
Set 0	0x7f6cbc70be0c	0x7f6cbbc73d0c	0x7f6cbbc73700	0x7f6cbbc73600
Set 1	0x7ffcb6fe9e18	0x7f6cbc70b91c	0x7f6cd11b2e18	0x7f6cbc70bc10
Set 2	0x7f6cbbc73d28	0x7ffcb6fe9e28	0x7f6cbbc73620	0x7f6cbbc72a28
Set 3	0x7f6cbc5d5330	0x7f6cbbc73d30	0x7f6cbc211134	0x7ffcb6fe9e30
Set 4	0x7ffcb6fe9e40	0x7f6cbbc74848	0x7f6cbbc73748	0x7f6cbbc77740
.
.



real 4m29.913s
user 0m44.151s
sys 0m5.153s
Associativity : 8
Number of instructions: 496741
Total cycles taken: 2976081
cache_3
Number of accesses: 2566
Number of hits: 1605
Number of misses: 961
cache_2
Number of accesses: 25855
Number of hits: 23101
Number of misses: 2754
cache_1
Number of accesses: 496741
Number of hits: 468906
Number of misses: 27835
AMATs:
{'cache_1': 4.728794330461738,
'cache_2': 66.54374077628503,
'cache_3': 474.5128604832424,
'mem': 1000}


cache_3
Way 0
Way 1
Way 2
Way 3
Way 4
Way 5
Way 6
Way 7
Set 0 | 0x7fd3aa6e2e08 | 0x7fd3aa6e3008 | 0x7fd3bf18b600 | 0x7fd3aa6e2600 | 0x7fd3aa1e7e00 | 0x7fd3aa6e2c00 | 0x7ffed0cd6c08 | 0x7fd3a9c4a600 |
Set 1 | 0x7fd3aa5ada18 | 0x7fd3bf189e18 | 0x7fd3aa6e2618 | 0x7ffed0cd6c18 | 0x7fd3bf18ae18 | 0x7fd3bf18b61c | 0x605210 | 0x7fd3aa6e2c10 |
Set 2 | 0x7fd3aa6e2628 | 0x7fd3bf18ae20 | 0x7ffed0cd6c28 | 0x7fd3aa6e2220 | 0x7fd3a9e66020 | 0x7fd3aa6e2428 | 0x7fd3a9c4a620 | 0x7fd3a9c49a28 |
Set 3 | 0x7fd3bf18aa38 | 0x7ffed0cd6238 | 0x7fd3aa5ae430 | 0x7ffed0cd6030 | 0x604e38 | 0x7ffed0cd6c38 | 0x7fd3aa6e2230 | 0x7fd3bf18ae3c |
Set 4 | 0x7ffed0cd6048 | 0x7fd3aa5af840 | 0x7fd3bf18b248 | 0x7fd3aa5ad040 | 0x7ffed0cd6c48 | 0x7fd3aa5aca48 | 0x7fd3a9e65c40 | 0x7fd3a9c4b848 |
.
.
.
Set 31 | 0x7fd3bf18b7f8 | 0x7fd3aa6e2ff8 | 0x7ffed0cd6bf0 | 0x7fd3bf18b5f8 | 0x7fd3aa5a37f8 | 0x7fd3aa1e7df0 | 0x7fd3aa1e7ff0 | 0x7fd3a9e65ff8 |

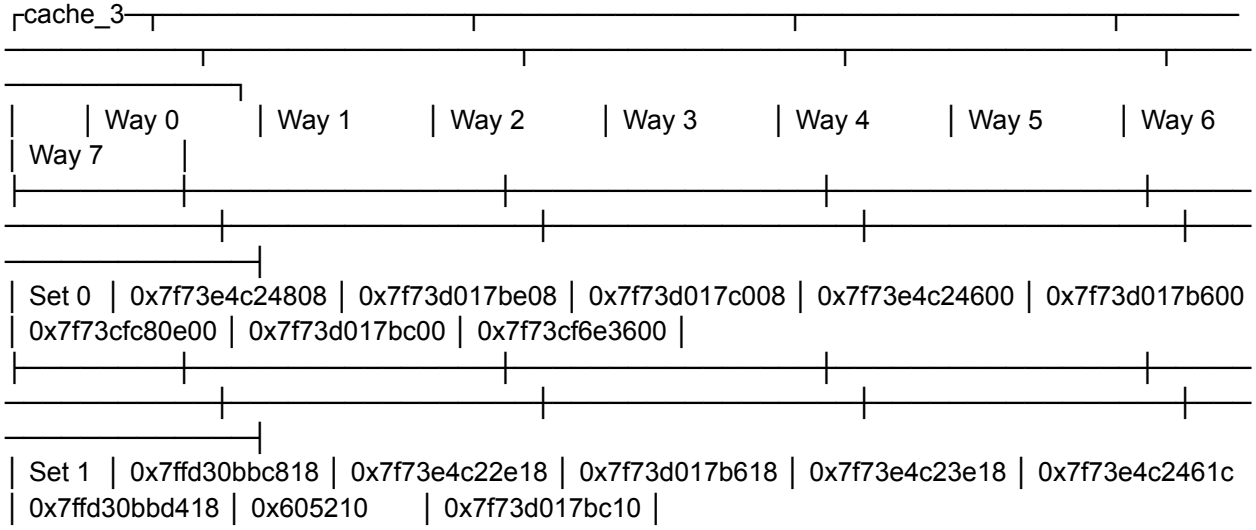

cache_2
	Way 0	Way 1	Way 2	Way 3
Set 0	0x7fd3a9c4ad0c	0x7ffed0cd6c08	0x7fd3a9c4a700	0x7fd3a9c4a600
Set 1	0x7fd3aa6e291c	0x7fd3bf189e18	0x7ffed0cd6c10	0x7fd3aa6e2c10
Set 2	0x7fd3a9c4ad28	0x7fd3a9c4a620	0x7fd3a9c49a28	0x7ffed0cd6c28
Set 3	0x7fd3aa5ac330	0x7fd3a9c4ad30	0x7fd3aa1e8134	0x7ffed0cd6c38
Set 4	0x7fd3a9c4e740	0x7fd3a9c4b848	0x7ffed0cd6c44	0x7fd3a9c4a748
.				
.				
.				
Set 15	0x7fd3a9e65ff8	0x7fd3aa6e32fc	0x7fd3aa6e30f0	0x7fd3bf18aaf8
cache_1
	Way 0	Way 1	Way 2	Way 3	Way 4	Way 5	Way 6	Way 7
Set 0	0x7fd3a9c49a80	0x7fd3a9c49a28	0x7fd3a9c4b844	0x7ffed0cd6c48	0x7fd3a9873f68	0x7ffed0cd6c60	0x7ffed0cd6c80	0x7fd3a9c48e68

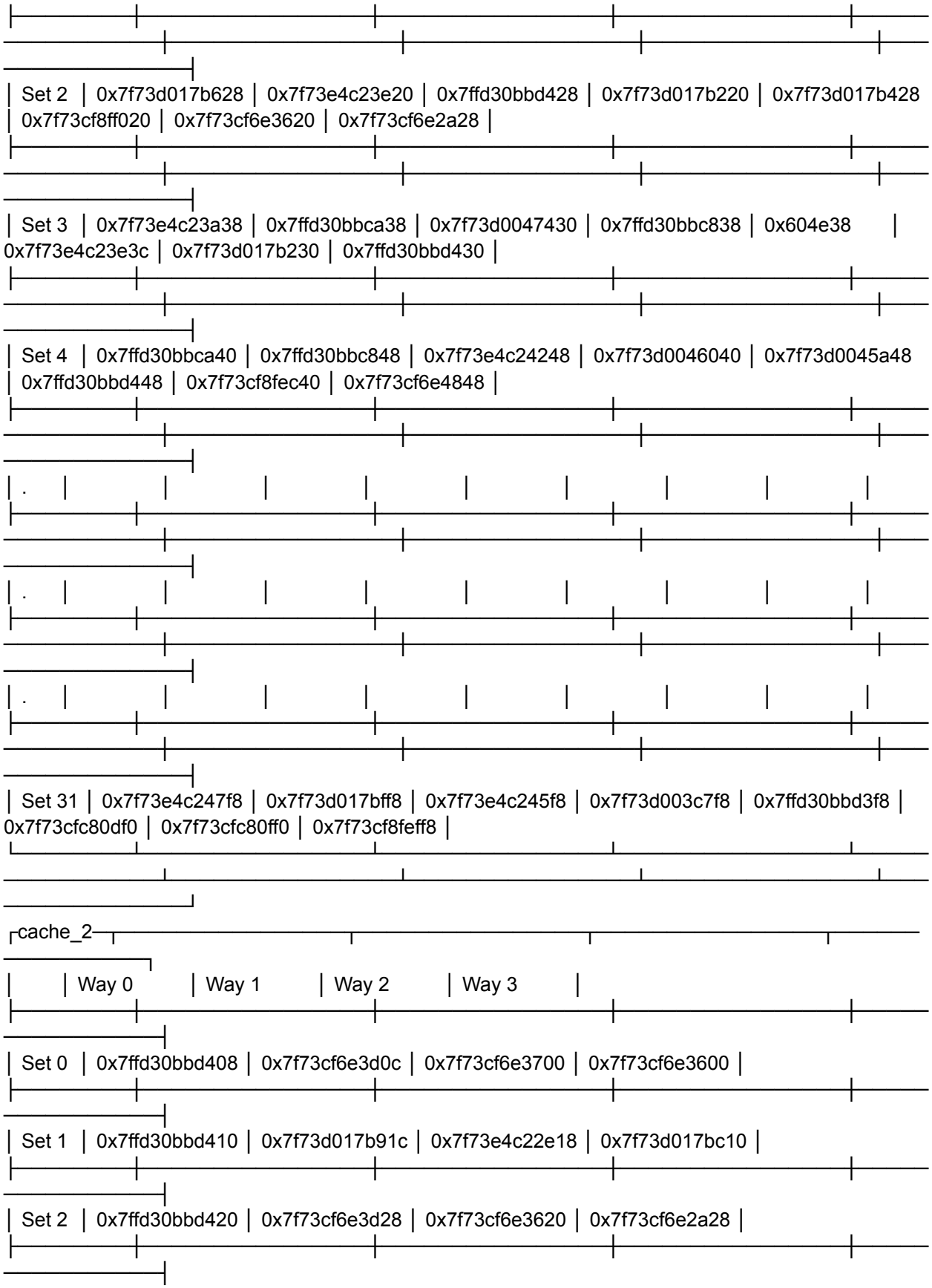
| Set 1 | 0x7ffed0cd6bf8 | 0x7ffed0cd6bd8 | 0x7ffed0cd6b94 | 0x7fd3a9873f50 | 0x7fd3a9c4e750 | 0x7fd3a9c4b830 | 0x7ffed0cd6c14 | 0x7ffed0cd6c70 |

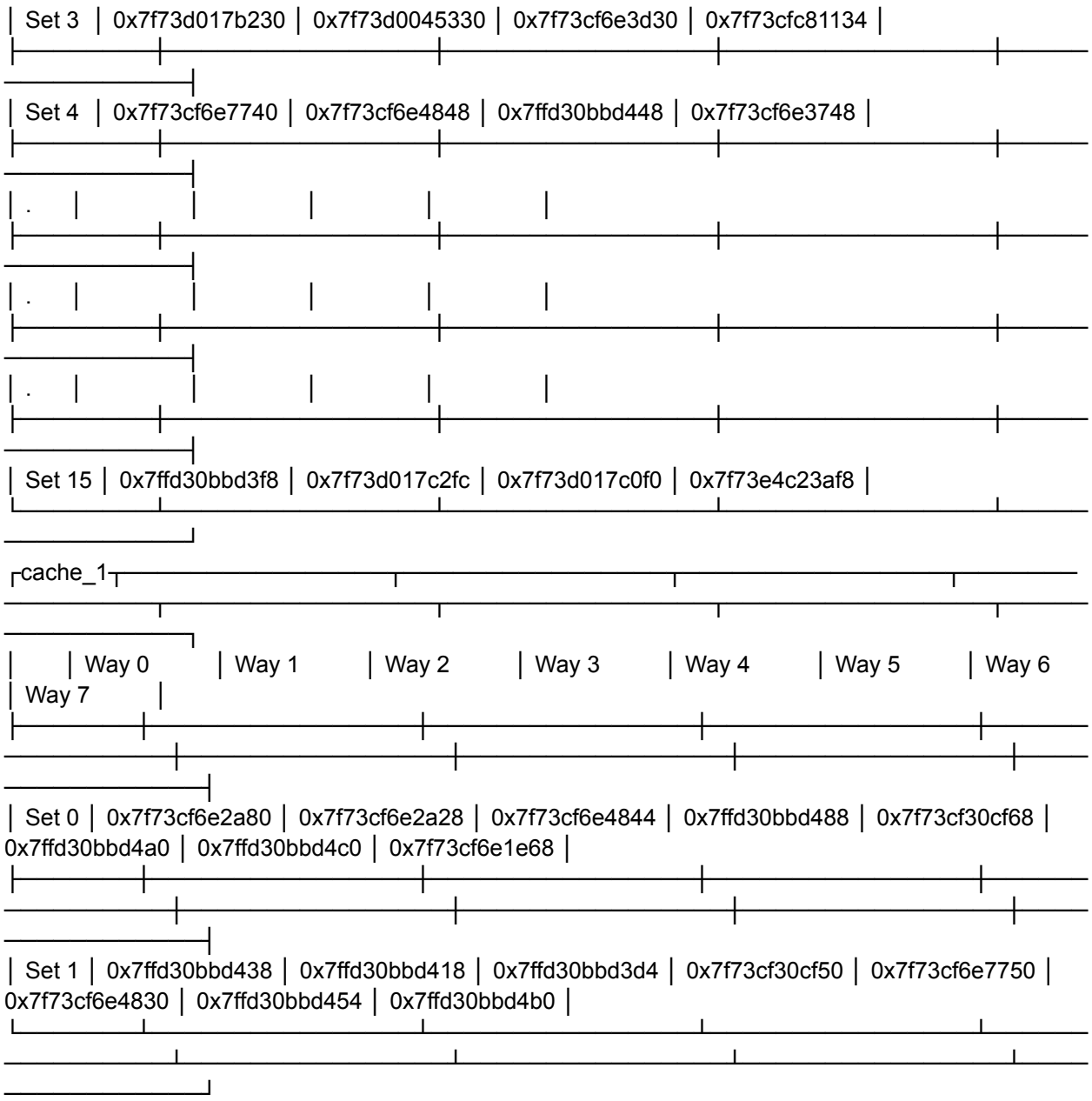
real 4m29.593s
user 0m43.598s
sys 0m5.410s
convolution_traces_stats

Associativity : 8

Number of instructions: 496741
Total cycles taken: 3025181
cache_3
Number of accesses: 2919
Number of hits: 1950
Number of misses: 969
cache_2
Number of accesses: 25855
Number of hits: 22760
Number of misses: 3095
cache_1
Number of accesses: 496741
Number of hits: 468906
Number of misses: 27835
AMATs:
{'cache_1': 4.794066703257222,
'cache_2': 67.70858588980406,
'cache_3': 431.9630010277492,
'mem': 1000}




Set 2	0x7f73d017b628	0x7f73e4c23e20	0x7ffd30bbd428	0x7f73d017b220	0x7f73d017b428	0x7f73cf8ff020	0x7f73cf6e3620	0x7f73cf6e2a28
Set 3	0x7f73e4c23a38	0x7ffd30bbca38	0x7f73d0047430	0x7ffd30bbc838	0x604e38	0x7f73e4c23e3c	0x7f73d017b230	0x7ffd30bbd430
Set 4	0x7ffd30bbca40	0x7ffd30bbc848	0x7f73e4c24248	0x7f73d0046040	0x7f73d0045a48	0x7ffd30bbd448	0x7f73cf8fec40	0x7f73cf6e4848
.								
.								
.								
Set 31	0x7f73e4c247f8	0x7f73d017bff8	0x7f73e4c245f8	0x7f73d003c7f8	0x7ffd30bbd3f8	0x7f73cfc80df0	0x7f73cfc80ff0	0x7f73cf8feff8
cache_2
	Way 0	Way 1	Way 2	Way 3
Set 0	0x7ffd30bbd408	0x7f73cf6e3d0c	0x7f73cf6e3700	0x7f73cf6e3600
Set 1	0x7ffd30bbd410	0x7f73d017b91c	0x7f73e4c22e18	0x7f73d017bc10
Set 2	0x7ffd30bbd420	0x7f73cf6e3d28	0x7f73cf6e3620	0x7f73cf6e2a28



real 3m12.622s
user 0m24.807s
sys 0m2.457s

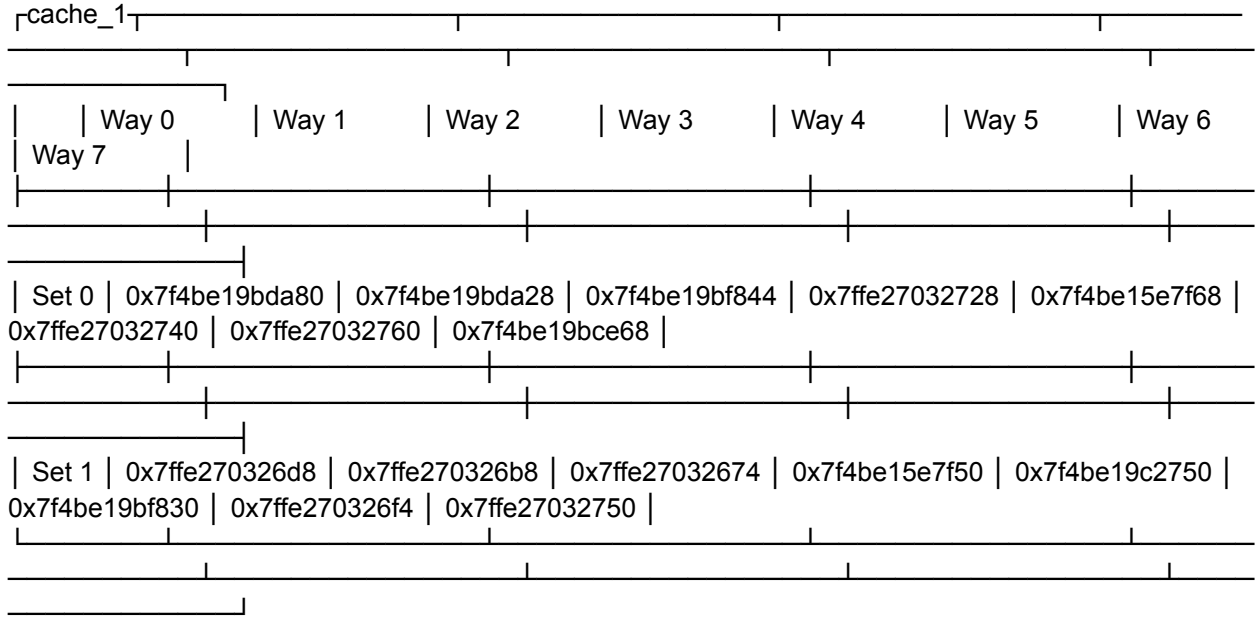
Varying Number of Caches :

Matrix Size 20x20:

Using 1 Cache:

Number of instructions: 186697

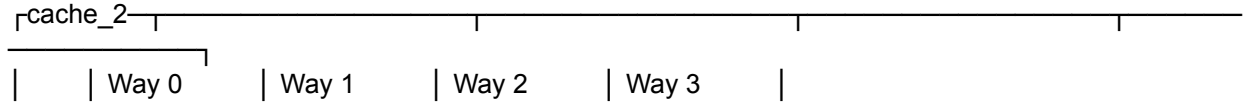
Total cycles taken: 13239697
cache_1
Number of accesses: 186697
Number of hits: 174609
Number of misses: 12088
AMATs:
{'cache_1': 65.74662153114404, 'mem': 1000}

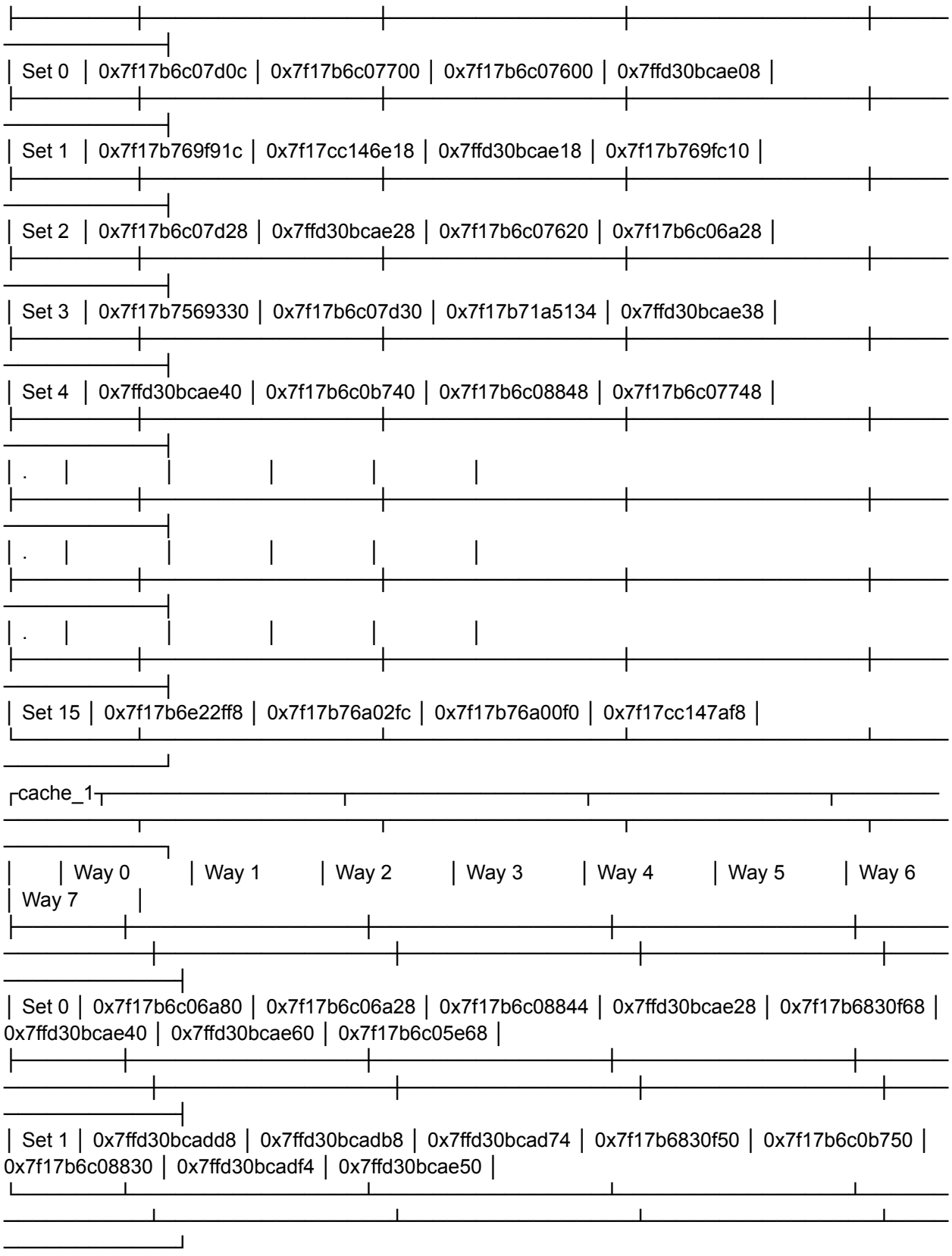


real 1m2.214s
user 0m10.121s
sys 0m1.215s

Using 2 Cache:

Number of instructions: 186697
Total cycles taken: 2553545
cache_2
Number of accesses: 11105
Number of hits: 9613
Number of misses: 1492
cache_1
Number of accesses: 186697
Number of hits: 174609
Number of misses: 12088
AMATs:
{'cache_1': 10.73490671212252, 'cache_2': 150.35389464205312, 'mem': 1000}



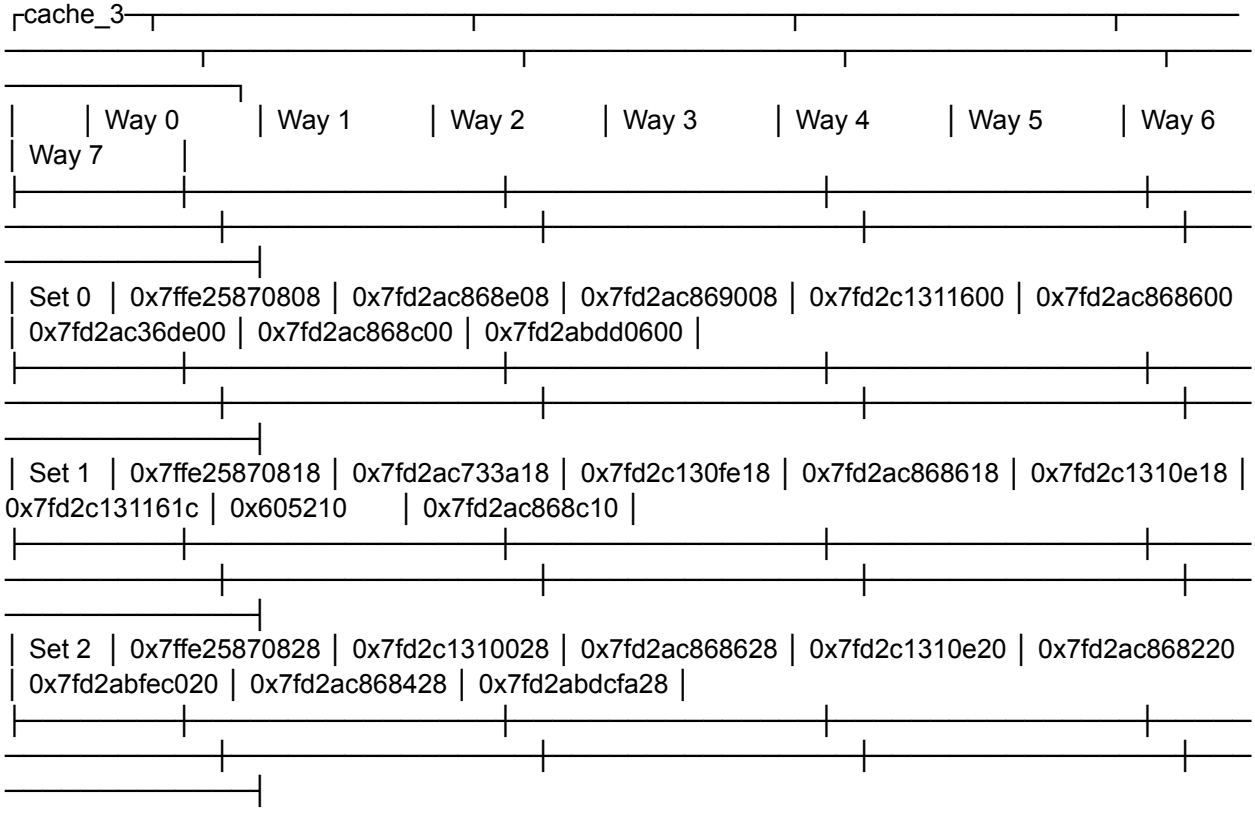


real 1m4.615s
user 0m10.142s

sys 0m1.231s

Using 3 Cache:

Number of instructions: 186697
Total cycles taken: 1629177
cache_3
Number of accesses: 1571
Number of hits: 1009
Number of misses: 562
cache_2
Number of accesses: 16765
Number of hits: 15063
Number of misses: 1702
cache_1
Number of accesses: 186697
Number of hits: 167123
Number of misses: 19574
AMATs:
{'cache_1': 7.549544455680323,
'cache_2': 62.46961792388624,
'cache_3': 457.7339274347549,
'mem': 1000}



| Set 3 | 0x7fd2c1310a38 | 0x7ffe2587083c | 0x7ffe2586fe30 | 0x7fd2ac734430 | 0x7ffe2586fc38 | 0x604e38 | 0x7fd2ac868230 | 0x7fd2c1310e3c |

| Set 4 | 0x7ffe2586fe40 | 0x7fd2ac735840 | 0x7ffe2586fc48 | 0x7fd2c1311248 | 0x7fd2ac733040 | 0x7fd2ac732a48 | 0x7fd2abfebc40 | 0x7fd2abdd1848 |

| . |

| . |

| . |

| Set 31 | 0x7fd2c13117f8 | 0x7fd2ac868ff8 | 0x7ffe258707f8 | 0x7fd2c13115f8 | 0x7fd2ac7297f8 | 0x7fd2ac36ddf0 | 0x7fd2ac36dff0 | 0x7fd2abfebff8 |

cache_2

| | Way 0 | Way 1 | Way 2 | Way 3 |

| Set 0 | 0x7ffe25870800 | 0x7fd2abdd0d0c | 0x7fd2abdd0700 | 0x7fd2abdd0600 |

| Set 1 | 0x7fd2ac86891c | 0x7fd2ac868c10 | 0x7fd2c130fe18 | 0x7ffe25870810 |

| Set 2 | 0x7fd2abdd0d28 | 0x7ffe25870820 | 0x7fd2abdd0620 | 0x7fd2abdcfa28 |

| Set 3 | 0x7fd2abdd0d30 | 0x7fd2ac36e134 | 0x7ffe25870738 | 0x7ffe2587083c |

| Set 4 | 0x7fd2abdd1848 | 0x7ffe25870748 | 0x7fd2abdd0748 | 0x7fd2abdd4740 |

| . |

.				
.				
Set 15	0x7fd2ac8692fc	0x7fd2ac8690f0	0x7fd2c1310af8	0x7ffe258707f8

cache_1

	Way 0	Way 1
Set 0	0x7fd2abdcfa80	0x7ffe25870800
Set 1	0x7ffe25870810	0x7ffe25870798
Set 2	0x7fd2abdcfa28	0x7ffe25870820
Set 3	0x7fd2abdd1830	0x7ffe258707b4
Set 4	0x7fd2abdcf9c0	0x7fd2abdd1844
Set 5	0x7fd2ab9f9f50	0x7fd2abdd4750
Set 6	0x7fd2ab9f9f68	0x7fd2abdcee68
Set 7	0x7ffe258707f8	0x7ffe25870778

real 1m48.760s
user 0m17.443s
sys 0m2.055s

Matrix Size 32x32:

Using 1 Cache:

Number of instructions: 496741
Total cycles taken: 53426741
cache_1
    Number of accesses: 496741
    Number of hits: 451282
    Number of misses: 45459
AMATs:

{'cache_1': 92.51449145530569, 'mem': 1000}

cache_1

	Way 0	Way 1
Set 0	0x7f3506b6aa80	0x7ffda0822080
Set 1	0x7ffda0821f94	0x7ffda0822014
Set 2	0x7f3506b6b7a0	0x7f3506b6aa28
Set 3	0x7f3506b6bd30	0x7f3506b6c830
Set 4	0x7f3506b6c844	0x7ffda0822048
Set 5	0x7f3506b6f750	0x7ffda0822058
Set 6	0x7ffda0822060	0x7f3506b69e68
Set 7	0x7ffda0822070	0x7ffda0821ff8

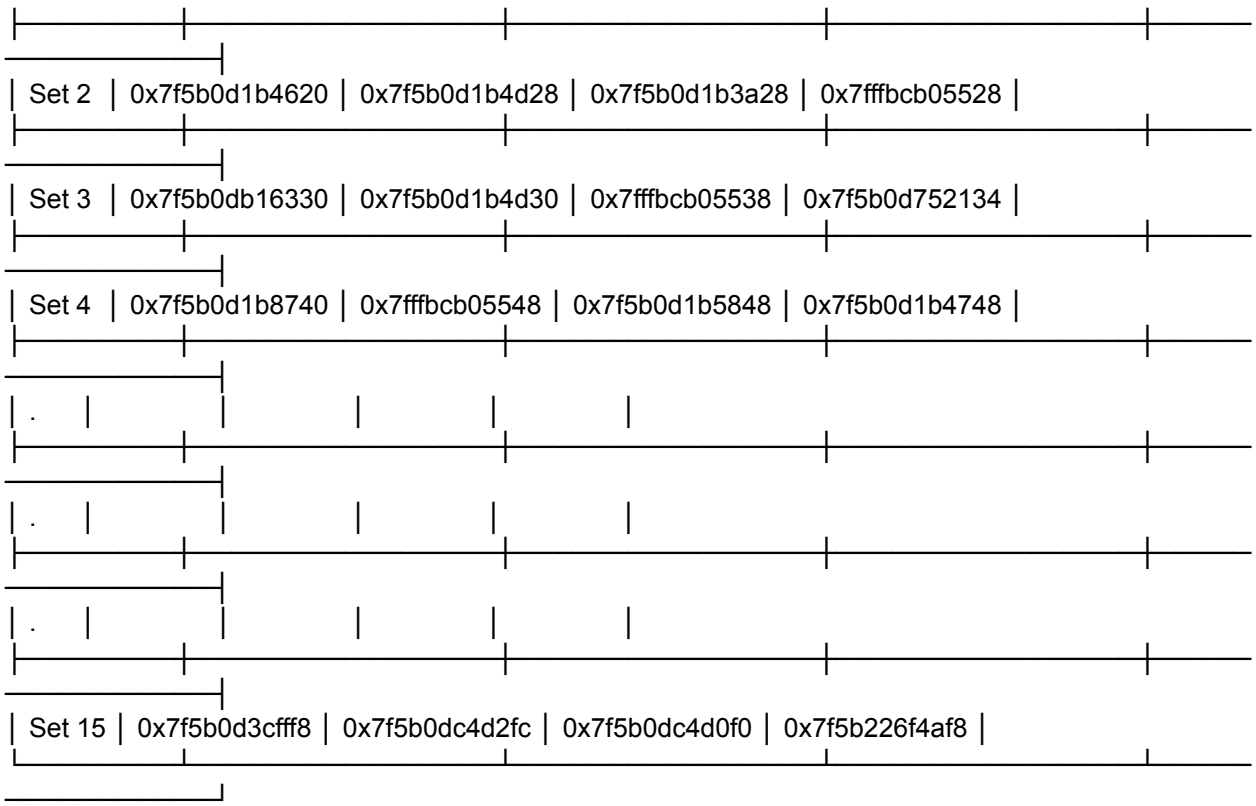
real 1m37.067s
user 0m25.125s
sys 0m2.881s
/home/grads/vmn5118/CachePerformanceOnMatMul

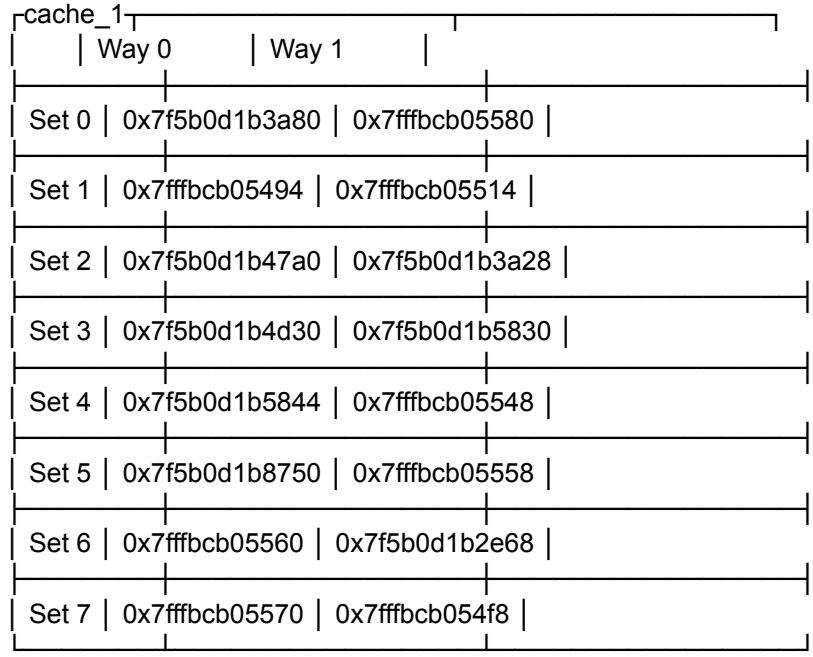
Using 2 Cache:

Number of instructions: 496741
Total cycles taken: 5419621
cache_2
Number of accesses: 38782
Number of hits: 35931
Number of misses: 2851
cache_1
Number of accesses: 496741
Number of hits: 451282
Number of misses: 45459
AMATs:
{'cache_1': 9.1917811165229, 'cache_2': 89.51348563766696, 'mem': 1000}

cache_2

	Way 0	Way 1	Way 2	Way 3
Set 0	0x7f5b0d1b4d0c	0x7f5b0d1b4700	0x7fffbcb05508	0x7f5b0d1b4600
Set 1	0x7f5b0dc4c91c	0x7f5b226f3e18	0x7fffbcb05510	0x7f5b0dc4cc10

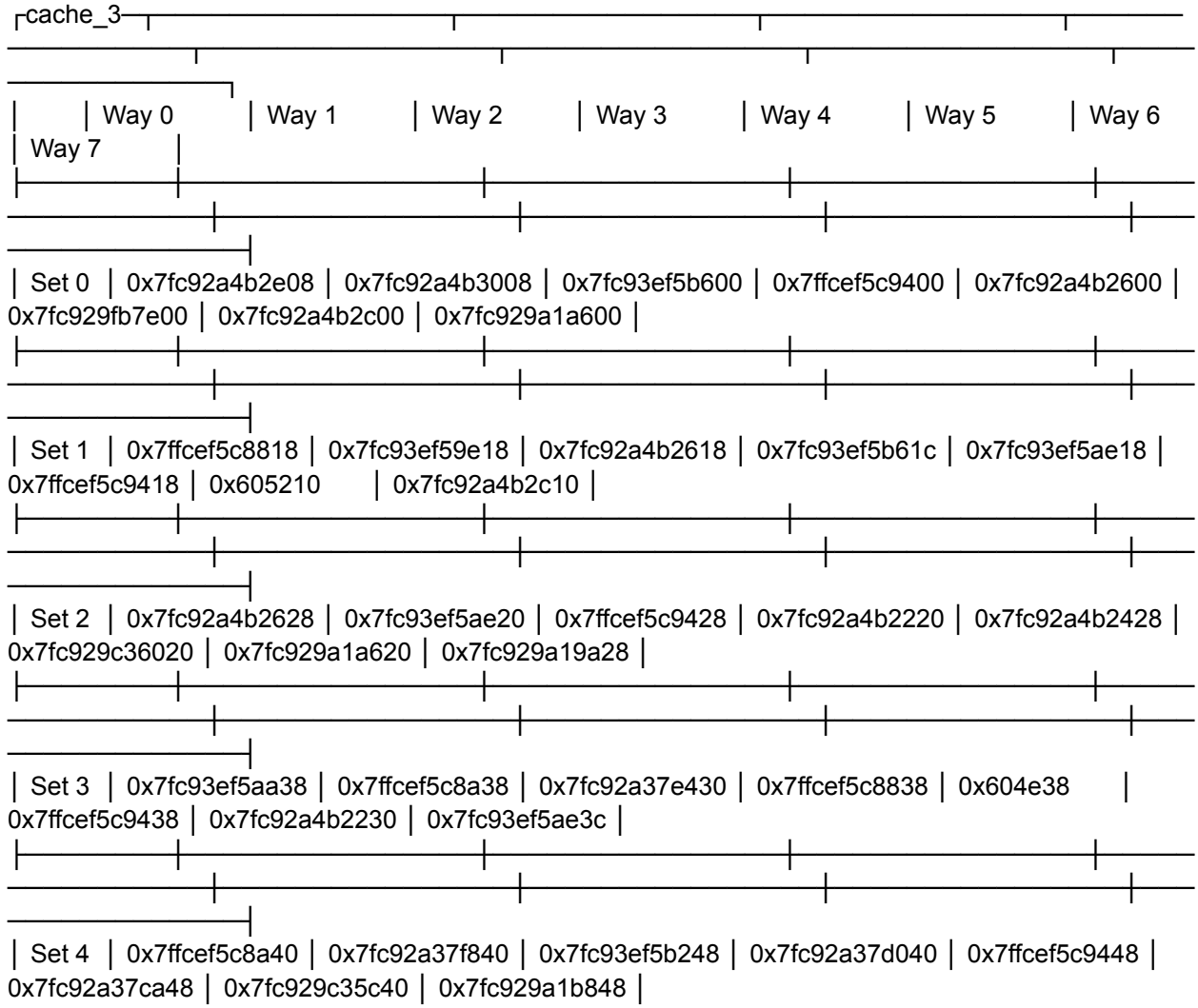




real 1m39.283s
user 0m25.663s
sys 0m2.904s

Using 3 Cache:

Number of instructions: 496741
Total cycles taken: 3466785
cache_3
    Number of accesses: 2886
    Number of hits: 1905
    Number of misses: 981
cache_2
    Number of accesses: 46244
    Number of hits: 43198
    Number of misses: 3046
cache_1
    Number of accesses: 496741
    Number of hits: 446477
    Number of misses: 50264
AMATs:
{'cache_1': 5.5510557832670235,
 'cache_2': 44.97644439033592,
 'cache_3': 439.91683991683993,
 'mem': 1000}



.
.
.
Set 31	0x7fc93ef5b7f8	0x7fc92a4b2ff8	0x7fc93ef5b5f8	0x7ffcef5c93f8	0x7fc92a3737f8	0x7fc929fb7df0	0x7fc929fb7ff0	0x7fc929c35ff8

cache_2

	Way 0	Way 1	Way 2	Way 3
Set 0	0x7fc929a1ad0c	0x7fc929a1a700	0x7ffcef5c9408	0x7fc929a1a600
Set 1	0x7fc92a4b291c	0x7fc92a4b2710	0x7fc93ef59e18	0x7fc92a4b2c10
Set 2	0x7fc929a1ad28	0x7fc929a1a620	0x7fc929a19a28	0x7ffcef5c9424
Set 3	0x7fc92a37c330	0x7fc929a1ad30	0x7fc929fb8134	0x7ffcef5c9430
Set 4	0x7fc929a1e548	0x7fc929a1e740	0x7fc929a1b848	0x7fc929a1a748

.
.
.

Set 15	0x7ffcef5c93f0	0x7fc92a4b32fc	0x7fc92a4b30f0	0x7fc93ef5aaf8

cache_1

	Way 0	Way 1
Set 0	0x7fc929a19a80	0x7ffcef5c9480
Set 1	0x7ffcef5c9490	0x7ffcef5c9418
Set 2	0x7fc929a19a28	0x7ffcef5c9424
Set 3	0x7fc929a1b830	0x7ffcef5c9438
Set 4	0x7fc929a199c0	0x7fc929a1b844
Set 5	0x7fc929a1e750	0x7ffcef5c9458
Set 6	0x7ffcef5c9468	0x7fc929a18e68
Set 7	0x7ffcef5c9470	0x7ffcef5c93f8

real 4m17.298s
user 0m40.936s
sys 0m5.006s