

Q2

128 byte 1-way cache with 16 bytes per line (direct mapped)

```
kleong@lg12-24: ~/code/comparc6
File Edit View Search Terminal Help
kleong@lg12-24:~/code/comparc6$ g++ cache.cpp
kleong@lg12-24:~/code/comparc6$ ./a.out
For a cache with L= 16, N= 8, K= 1
Result:
0x0 miss
0x4 hit
0xc hit
0x2200 miss
0xd0 miss
0xe0 miss
0x1130 miss
0x28 miss
0x113c hit
0x2204 hit
0x10 miss
0x20 hit
0x4 miss
0x40 miss
0x2208 miss
0x8 miss
0xa0 miss
0x4 hit
0x1104 miss
0x28 miss
0xc miss
0x84 miss
0xc miss
0x3390 miss
0xb0 miss
0x1100 miss
0x28 hit
0x64 miss
0x70 miss
0xd0 hit
0x8 miss
0x3394 hit
Hit: 9
Miss: 23
kleong@lg12-24:~/code/comparc6$
```

128 byte 2-way set associative cache with 16 bytes per line

```
kleong@lg12-24: ~/code/comparc6
File Edit View Search Terminal Help
kleong@lg12-24:~/code/comparc6$ g++ cache.cpp
^[[A^[[A^[[Akleong@lg12-24:~/code/comparc6$ ./a.out
For a cache with L= 16, N= 4, K= 2
Result:
0x0 miss
0x4 hit
0xc hit
0x2200 miss
0xd0 miss
0xe0 miss
0x1130 miss
0x28 miss
0x113c hit
0x2204 hit
0x10 miss
0x20 hit
0x4 hit
0x40 miss
0x2208 miss
0x8 miss
0xa0 miss
0x4 hit
0x1104 miss
0x28 hit
0xc hit
0x84 miss
0xc hit
0x3390 miss
0xb0 miss
0x1100 miss
0x28 hit
0x64 miss
0x70 miss
0xd0 miss
0x8 hit
0x3394 hit
Hit: 13
Miss: 19
kleong@lg12-24:~/code/comparc6$
```

Q2

128 byte 4-way set associative cache with 16 bytes per line

```
For a cache with L= 16, N= 2, K= 4
Result:
0x0 miss
0x4 hit
0xc hit
0x2200 miss
0xd0 miss
0xe0 miss
0x1130 miss
0x28 miss
0x113c hit
0x2204 hit
0x10 miss
0x20 hit
0x4 hit
0x40 miss
0x2208 hit
0x8 hit
0xa0 miss
0x4 hit
0x1104 miss
0x28 miss
0xc hit
0x84 miss
0xc hit
0x3390 miss
0xb0 miss
0x1100 hit
0x28 hit
0x64 miss
0x70 miss
0xd0 miss
0x8 hit
0x3394 hit
Hit: 15
Miss: 17
```

128 byte 8-way associative cache with 16 bytes per line (fully associative)

kleong@lg12-24: ~/code/comparc6

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kleong@lg12-24:~/code/comparc6\$./a.out

For a cache with L= 16, N= 1, K= 8

Result:

```
0x0 miss
0x4 hit
0xc hit
0x2200 miss
0xd0 miss
0xe0 miss
0x1130 miss
0x28 miss
0x113c hit
0x2204 hit
0x10 miss
0x20 hit
0x4 hit
0x40 miss
0x2208 hit
0x8 hit
0xa0 miss
0x4 hit
0x1104 miss
0x28 hit
0xc hit
0x84 miss
0xc hit
0x3390 miss
0xb0 miss
0x1100 hit
0x28 hit
0x64 miss
0x70 miss
0xd0 miss
0x8 hit
0x3394 hit
Hit: 16
Miss: 16
kleong@lg12-24:~/code/comparc6$
```

```
kleong@lg12-24: ~/code/comparc6
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kleong@lg12-24:~/code/comparc6$ ./matrixMultiply
lg12-24 22-Nov-2018 17:43:21
RELEASE
Linux 4.15.0-39-generic 64 bit exe
Intel64 family 6 model 158 stepping 10 Intel(R) Core(TM) i7-8700 CPU @ 3.20GHz NCPUS=12 RAM=16GB L2 cacheSz=256K
L1 D 32K L 64 K 8 N 64
L1 I 32K L 64 K 8 N 64
L2 U 256K L 64 K 4 N 1024
L3 U 12288K L 64 K 16 N 12288

50x50 matrix multiplication
cnt=329922 32988.90 op/s

50x50 matrix multiplication using matB_transposed
cnt=392427 39238.78 op/s

OK 1.19 time faster
kleong@lg12-24:~/code/comparc6$
```