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1a. 0 tag bits, 3 bit byte offset, 1 bit block offset, 28 index bits

cache size
$1M = 2^{20} / (2^3 \cdot 2^1 \cdot 1) = 2^{16}$ ← sets, ← associativity, ← block, ← byte

32-16-3-1 = 12 tag bits

~~1 M~~ 3 bit byte offset, 1 bit block offset, 16 index bits, 12 tag bits

b. 2 bit byte offset, 0 bit block offset, 2 tag bits, 28 index bits

cache size
$1M = 2^{20} / (2^2 \cdot 4) = 2^{16}$ ← offset, ← associativity, ← sets

32-2-16 = 14 tag bits

2 bit byte offset, 0 bit block offset, 16 index bits, 14 tag bits

-1.5

2a. cold miss, cold miss, miss, miss, miss, miss, miss 0 4 0 4 All misses

1 5 1 5

8 misses

b. 4 misses ← cold start

0,1 4,5

-2

↳ set assoc ✗ with 2-word block: 2 miss

miss → 0, 1 ← hit, hit

miss → 4, 5 hit

3a, F

b. T

C. F (have to write to everything for write-through)

6.5