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Assignment -3

1) How many total bits are required for a direct mapped cache with 16Kb of data with 4 word blocks assuming 32 bit address?

cache size = 16 Kb = $2^4 \times 2^{10} = 2^{14}$ bytes
each line = has 4 words

no of lines = $\frac{2^{14}}{2^2}$
= 2^{12} lines

tag	block	word
18	12	2

← 32 →

Cache size = 2^{14} bytes = $2^{14} \times 2^3 = 2^{17}$ bits
$2^7 2^{10} = 2^7$ Kb
128 Kb

Size of tag memory = tag bits x No of lines
= 18×2^{12} = 72 Kbits
total mem needed for cache = 200 Kbits

2) Consider a cache with 64 blocks & a block size of 16 bytes what block number does the byte addr 1200 map? Assume all are decimal no.

no of blocks = 64
block size = 16 bytes

$\frac{1200}{16} = \frac{\text{byte addr}}{\text{block size}}$

= 75

find cache block no
related to mem block no
cache block no = 75 % 64
= 11

$\frac{\text{Cache size}}{\text{block size}} = \text{no of blocks}$

$\frac{x}{16} = 64$

$x = 2^4 2^6 = 2^{10}$

$x = 2^{10}$ 1 Kb

Cache size = 1 Kb