

# MPCA Theory Assignment -4

classmate

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Sec: 4F

- 1) Cache = 4K blocks, 4 word block size, a 32 bit addr  
total no of sets & tag bits for caches that are  
directly mapped, 2 way/4 way set associative &  
fully associative

Soln: no of lines =  $2^{12}$

no of blocks in physical mem =  $\frac{2^{32}}{\text{block size}}$

i) no of lines in cache for direct map =  $\frac{2^{12}}{2^0} = 2^{12}$

20	10	2
tag	block	word

20	10	2

ii) 2 way -  $\frac{2^{12}}{2^2 \cdot 2} = \text{sets} = 2^9$

21	9	2
tag	set	word

iii) 4 way  $\frac{2^{12}}{2^2 \cdot 2} = 2^9$

22	8	2
tag	set	offset

4) Fully associative

30	2
tag	offset

2) during an  $L_1$  write miss check if the block is in  $L_2$  cache if it is present in  $L_2$ , allocate a block in  $L_1$  cache

if there is a dirty block in  $L_1$  cache replace it, write it back to  $L_2$  cache

ii) In a multilevel exclusive cache check if block is in  $L_2$  cache & update it to 4. if there is a dirty bit in  $L_1$  cache, After writing to new data to  $L_1$ , invalidate corresponding block in  $L_2$  cache