In the name of God

Computer Architecture: Assignment #4

Due on Friday, March 4, 2016

Dr. Zarandi 10:45 am

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Contents

Problem 1

Computer A:$T_{access} = t_1 * h_1 + (1 - h_1) * (t_1 + t_2) = 0.98 * 2 + 0.02 * 22 = 2.4ns$
Computer B:$T_{access} = t_1 * h_1 + (1 - h_1) * (t_1 + t_2) = 0.90 * 1.2 + 0.1 * 21.2 = 3.2ns$

Problem 2

(a)

0	1	...	63	64
x	x	x	x	x
x	✓	✓	✓	x
x	✓	✓	✓	x

hit rate = 64.61%

(b)

With LRU replacement policy you the hit rate will be the same as above because with the above policy also the least recently used element will be deleted. hit rate = 64.61%

Problem 3

Memory size = 64*8 word=512 words. Block size = 3 bits. Cache set index = 2 bits. Tag = 9-2-3 = 4 bits. Number of bits for addressing a word = 9 bits. Word size = 5 bits.

Problem 4

(a)

3	3	3	0	0	0	4	4	4	4	4	4
null	2	2	2	3	3	3	3	3	1	1	1
null	null	1	1	1	2	2	2	2	2	0	0
miss	miss	miss	miss	miss	miss	miss	hit	hit	miss	miss	hit

miss rate=9/12=0.75

(b)

3	3	3	3	3	3	4	4	4	4	0	0
null	2	2	2	2	2	2	3	3	3	3	4
null	null	1	1	1	1	1	1	2	2	2	2
null	null	null	0	0	0	0	0	0	1	1	1
miss	miss	miss	miss	hit	hit	miss	miss	miss	miss	miss	miss