

(9.2)

Why do computer use cache memory?

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What is the meaning of temporal locality and spatial locality?

(9.4)

From first principles, derive an expression for the speedup ratio of memory system with cache (assume the hit ratio is h and the ratio of the main storage access time to cache access time is k , where $k \geq 1$). Assume that the system is an ideal system and that you don't have to worry about the effect of clock cycle times.

(9.5)

For the following systems, calculate the speedup ratio S in the cas t_c is the access time of the cache memory, t_m is the access time of the main store, and h is the hit ratio.

a $t_m = 70ns$, $t_c = 7ns$, $h = 0.9$

b $t_m = 60ns$, $t_c = 3ns$, $h = 0.9$

c $t_m = 60ns, t_c = 3ns, h = 0.8$

d $t_m = 60ns, t_c = 3ns, h = 0.97$

(9.6)

For the following ideal systems, calculate the hit ratio h required to achieve the stated speedup ratio S .

a $t_m = 60ns, t_c = 3ns, S = 1.1$

b $t_m = 60ns, t_c = 3ns, S = 2.0$

c $t_m = 60ns, t_c = 3ns, S = 5.0$

d $t_m = 60ns, t_c = 3ns, S = 15.0$

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