Suppose we have a cached system with the following parameters:

\[ t_c = 100 \text{ ns} \quad t_m = 1000 \text{ ns} \]
\[ h = 0.90 \quad \text{block size = 8 words} \]
Main memory to cache connection = 2 words

(a) Calculate the effective memory access time if a read through policy is used.

(b) Calculate the effective memory access time if no read through policy is used. Assume that, upon a cache miss, the replaced cache block is first transferred to main memory, the requested block is then loaded into the cache, and then the selected word is accessed from the cache.

(c) Same as part (b) except that a no write allocate policy is used on a write miss. That is, the word is modified in main memory and the block is not loaded into the cache. Assume 30% of all accesses are writes. Recall that no write allocate does not imply anything about policies on write hits – all it says is what happens upon a cache miss.

(d) In this case a write through policy is also implemented for write hits. That is, the cache implements write through with no write allocate as in part (c). Because of the write-through policy, upon a cache read miss a block does not need to be written to main memory. The requested block is just loaded from main memory into the cache and the addressed word is then accessed by the CPU from the cache (assume no read through).