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EECS 361 Computer Architecture

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Quiz 7

1) What do 'temporal locality' and 'spatial locality' mean?

When a processor accesses a memory address, it will most likely access it again soon. This is called temporal locality.

When a processor accesses a memory address, it will most likely access neighboring addresses in the following requests. This is called spatial locality.

2) How many different locations can a block reside in a direct-mapped cache?

One

3) How many tag bits are there for a cache that has 32 entry cache with 16-byte entries. Assume that the address is 32-bits.

Since there are 32 entries, 5 bits are used for the index. Since the blocks are 16 bytes, 4 bits are needed for the byte-offset. Hence, 23 bits are needed for the tag (32 – 5 – 4 = 23).

4) What is the difference between a write-through and write-back cache?

In a write-through cache, all write operations from the CPU are forwarded to the next memory hierarchy. In a write-back cache, the store only updates the cache block. The block is written to the next level when it is evicted.