



FIGURE 5.14 The location of a memory block whose address is 12 in a cache with eight blocks varies for direct-mapped, set-associative, and fully associative placement. In direct-mapped placement, there is only one cache block where memory block 12 can be found, and that block is given by $(12 \text{ modulo } 8) = 4$. In a two-way set-associative cache, there would be four sets, and memory block 12 must be in set $(12 \text{ mod } 4) = 0$; the memory block could be in either element of the set. In a fully associative placement, the memory block for block address 12 can appear in any of the eight cache blocks.