

(a) A : contains(18) traversing

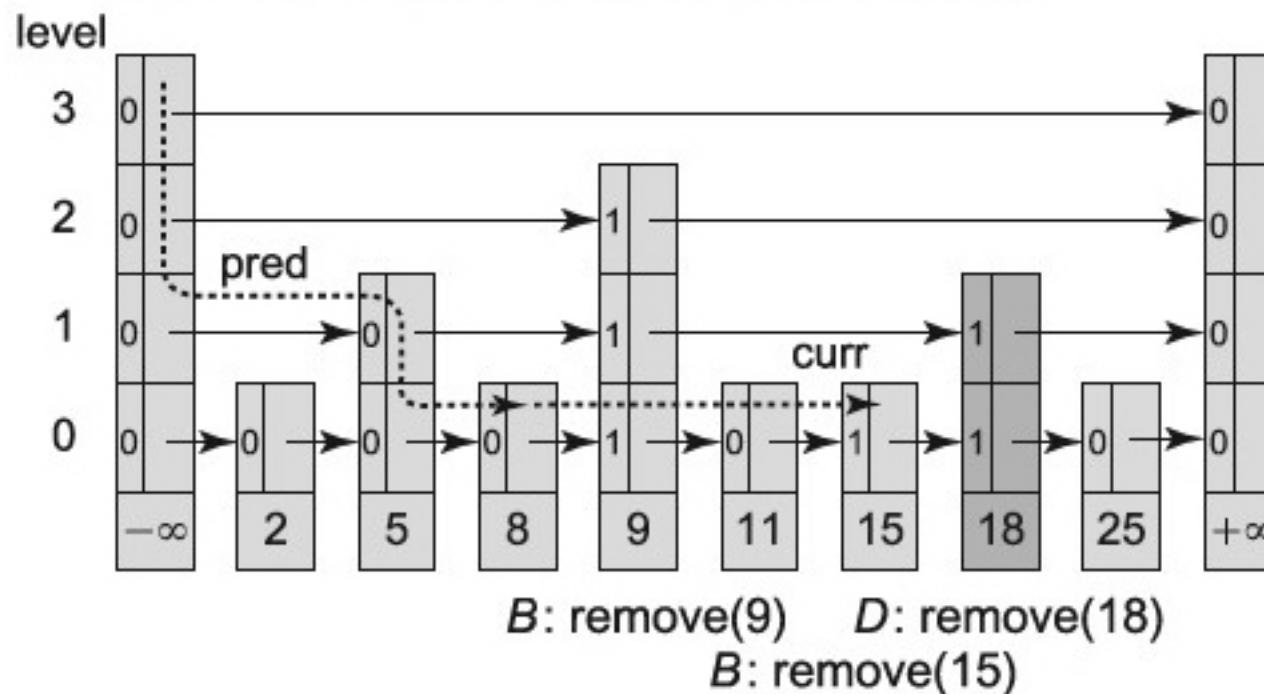


FIGURE 14.16A The LockFreeSkipList class: a contains() call. In part (a), contains(18) traverses the list starting from the top level of the head node. The dotted line marks the traversal by the pred field. The pred field eventually reaches Node 8 at the bottom level and we show the path of curr from that point on using a sparser dotted line. The curr traverses past Node 9 and reaches the marked Node 15. In part (b), a new node with key 18 is added to the list by a thread E . Thread E , as part of its find(18) call, physically removes the old nodes with keys 9, 15, and 18. Now thread A continues its traversal with the curr field from the removed node with key 15 (the nodes with keys 15 and 18 are not recycled since they are reachable by thread A). Thread A reaches the node with key 25, which is greater than 18, returning *false*. Even though at this point there is an unmarked node with key 18 in the LockFreeSkipList, this node was inserted by E concurrently with A 's traversal and is linearized after A 's add(18).