10.1-1.

Using Figure 10.1 as a model, illustrate the result of each operation in the sequence PUSH$(S, 4)$, PUSH$(S, 1)$, PUSH$(S, 3)$, POP(S), PUSH$(S, 8)$, and POP(S) on an initially empty stack S stored in array $S[1..6]$.

Answer.

Figure 1 shows the result of each operation in the sequence PUSH$(S, 4)$, PUSH$(S, 1)$, PUSH$(S, 3)$, POP(S), PUSH$(S, 8)$, and POP(S) on an initially empty stack S stored in array $S[1..6]$.
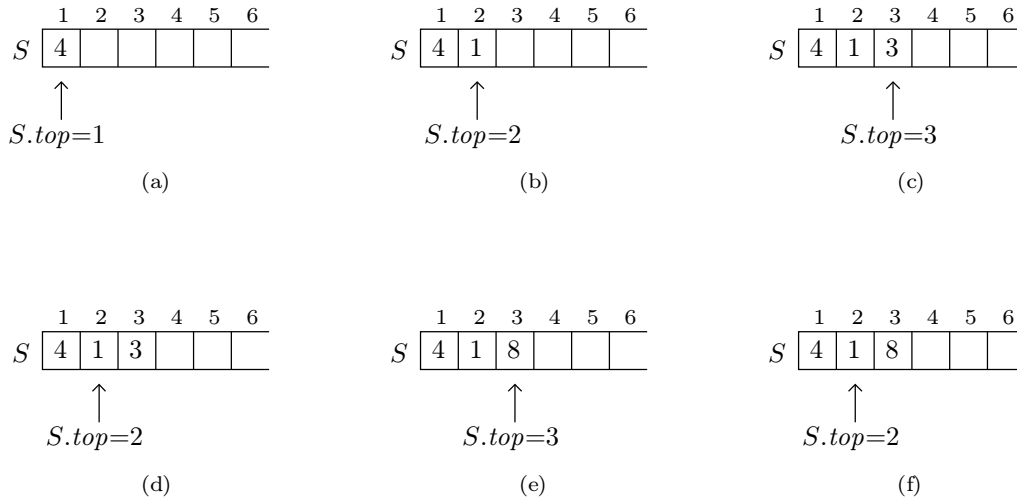

Figure 1. An array implementation of a stack S. **(a)** Stack S has 1 element, after a PUSH$(S, 4)$ operation on an empty stack. **(b)** Stack S after the call PUSH$(S, 1)$. **(c)** Stack S after the call PUSH$(S, 3)$. **(d)** Stack S after the call POP(S) has returned the element 3. **(e)** Stack S after the call PUSH$(S, 8)$. **(f)** Stack S after the call POP(S) has returned the element 8, which is the one most recently pushed. Although element 8 still appears in the array, it is no longer in the stack; the top is element 1.