**20186039**

Suppose that a client performs an intermixed sequence of (stack) push and pop operations. The push operations put the integers 0 through 9 in order onto the stack; the pop operations print out the return values. Which of the following sequence(s) could not occur? 

a. 4 3 2 1 0 9 8 7 6 5   
b. 4 6 8 7 5 3 2 9 0 1   
c. 2 5 6 7 4 8 9 3 1 0   
d. 4 3 2 1 0 5 6 7 8 9   
e. 1 2 3 4 5 6 9 8 7 0   
f. 0 4 6 5 3 8 1 7 2 9   
g. 1 4 7 9 8 6 5 3 0 2   
h. 2 1 4 3 6 5 8 7 9 0

A ) 4 3 2 1 0 9 8 7 6 5

|  |  |  |
| --- | --- | --- |
| PUSH | POP | Output |
| Push 4 | - | - |
| Push 3 | - | - |
| Push 2 | - | - |
| Push 1 | - | - |
| Push 0 | - | - |
| - | Pop 4 | 4 |
| - | Pop 3 | 4 3 |
| - | Pop 2 | 4 3 2 |
| - | Pop 1 | 4 3 2 1 |
| - | Pop 0 | 4 3 2 1 0 |
| Push 9 | - | 4 3 2 1 0 |
| Push 8 | - | 4 3 2 1 0 |
| Push 7 | - | 4 3 2 1 0 |
| Push 6 | - | 4 3 2 1 0 |
| Push 5 | - | 4 3 2 1 0 |
| - | Pop 9 | 4 3 2 1 0 9 |
| - | Pop 8 | 4 3 2 1 0 9 8 |
| - | Pop 7 | 4 3 2 1 0 9 8 7 |
| - | Pop 6 | 4 3 2 1 0 9 8 7 6 |
| - | Pop 5 | 4 3 2 1 0 9 8 7 6 5 |
| **-** | **Final output(possible)** | 4 3 2 1 0 9 8 7 6 5 |

**Answer : Could Occur**

b. 4 6 8 7 5 3 2 9 0 1

|  |  |  |
| --- | --- | --- |
| PUSH | POP | Output |
| Push 0 | - | - |
| Push 1 | - | - |
| Push 2 | - | - |
| Push 3 | - | - |
| Push 4 | - | - |
| - | Pop 4 | 4 |
| Push 5 | - | 4 |
| Push 6 | - | 4 |
| - | Pop 6 | 4 6 |
| Push 7 | - | 4 6 |
| Push 8 | - | 4 6 |
| - | Pop 8 | 4 6 8 |
| - | Pop 7 | 4 6 8 7 |
| - | Pop 5 | 4 6 8 7 5 |
| - | Pop 3 | 4 6 8 7 5 3 |
| - | Pop 2 | 4 6 8 7 5 3 2 |
| Push 9 | - | 4 6 8 7 5 3 2 |
| - | Pop 9 | 4 6 8 7 5 3 2 |
| Push 1 | **ERROR OCCUR** | 4 6 8 7 5 3 2 9 |
|  |  |  |
| - | **Final output(Not possible**) | 4 6 8 7 5 3 2 9 |

**Answer : Could Not Occur**

C. 2 5 6 7 4 8 9 3 1 0

|  |  |  |
| --- | --- | --- |
| PUSH | POP | Output |
| Push 0 | - | - |
| Push 1 | - | - |
| Push 2 | - | - |
|  | Pop 2 | 2 |
| Push 3 |  | 2 |
| Push 4 |  | 2 |
| Push 5 |  | 2 |
|  | Pop 5 | 2 5 |
| Push 6 |  | 2 5 |
|  | Pop 6 | 2 5 6 |
| Push 7 |  | 2 5 6 |
|  | Pop 7 | 2 5 6 7 |
|  | Pop 4 | 2 5 6 7 4 |
| Push 8 |  | 2 5 6 7 4 |
|  | Pop 8 | 2 5 6 7 4 8 |
| Push 9 |  | 2 5 6 7 4 8 |
|  | Pop 9 | 2 5 6 7 4 8 9 |
|  | Pop 3 | 2 5 6 7 4 8 9 3 |
|  | Pop 1 | 2 5 6 7 4 8 9 3 1 |
|  | Pop 0 | 2 5 6 7 4 8 9 3 1 0 |
|  |  |  |
| - | **Final output(possible)** | 2 5 6 7 4 8 9 3 1 0 |

**Answer : Could Occur**

**D.** 4 3 2 1 0 5 6 7 8 9

|  |  |  |
| --- | --- | --- |
| PUSH | POP | Output |
| Push 0 | - | - |
| Push 1 | - | - |
| Push 2 | - | - |
| Push 3 | - | - |
| Push 4 | - | - |
| - | Pop 4 | 4 |
| - | Pop 3 | 4 3 |
| - | Pop 2 | 4 3 2 |
| - | Pop 1 | 4 3 2 1 |
| - | Pop 0 | 4 3 2 1 0 |
| Push 5 | - | 4 3 2 1 0 |
| - | Pop 5 | 4 3 2 1 0 5 |
| Push 6 | - | 4 3 2 1 0 5 |
| - | Pop 6 | 4 3 2 1 0 5 6 |
| Push 7 | - | 4 3 2 1 0 5 6 |
| - | Pop 7 | 4 3 2 1 0 5 6 7 |
| Push 8 | - | 4 3 2 1 0 5 6 7 |
| - | Pop 8 | 4 3 2 1 0 5 6 7 8 |
| Push 9 | - | 4 3 2 1 0 5 6 7 8 |
| - | Pop 9 | 4 3 2 1 0 5 6 7 8 9 |
| - | **Final output(possible)** | 4 3 2 1 0 5 6 7 8 9 |

**Answer : Could Occur**

E . 1 2 3 4 5 6 9 8 7 0

|  |  |  |
| --- | --- | --- |
| PUSH | POP | Output |
| Push 0 | - | - |
| Push 1 | - |  |
| - | Pop 1 | 1 |
| Push 2 | - | 1 |
| - | Pop 2 | 1 2 |
| Push 3 | - | 1 2 |
| - | Pop 3 | 1 2 3 |
| Push 4 | - | 1 2 3 |
| - | Pop 4 | 1 2 3 4 |
| Push 5 | - | 1 2 3 4 |
| - | Pop 5 | 1 2 3 4 5 |
| Push 6 | - | 1 2 3 4 5 |
| - | Pop 6 | 1 2 3 4 5 6 |
| Push 7 |  | 1 2 3 4 5 6 |
| Push 8 |  | 1 2 3 4 5 6 |
| Push 9 |  | 1 2 3 4 5 6 |
| - | Pop 9 | 1 2 3 4 5 6 9 |
| - | Pop 8 | 1 2 3 4 5 6 9 8 |
| - | Pop 7 | 1 2 3 4 5 6 9 8 7 |
|  | Pop 0 | 1 2 3 4 5 6 9 8 7 0 |
|  |  | 1 2 3 4 5 6 9 8 7 0 |
| - | **Final output(possible)** | 1 2 3 4 5 6 9 8 7 0 |

**Answer : Could Occur**

F. 0 4 6 5 3 8 1 7 2 9

|  |  |  |
| --- | --- | --- |
| PUSH | POP | Output |
| Push 0 | - | - |
| - | Pop 0 | 0 |
| Push 1 | - | 0 |
| Push 2 | - | 0 |
| Push 3 | - | 0 |
| Push 4 | - | 0 |
|  | Pop 4 | 0 4 |
| Push 5 |  | 0 4 |
| Push 6 |  | 0 4 |
|  | Pop 6 | 0 4 6 |
|  | Pop 5 | 0 4 6 5 |
|  | Pop 3 | 0 4 6 5 3 |
| Push 7 |  | 0 4 6 5 3 |
| Push 8 |  | 0 4 6 5 3 |
|  | Pop 8 | 0 4 6 5 3 8 |
|  | Pop 7 | **0 4 6 5 3 8 1** |
|  | **ERROR OCCURED** |  |
|  |  |  |
|  |  |  |
|  |  |  |
| - | **Final output(possible)** | 1 2 3 4 5 6 9 8 7 0 |

**Answer : Could Not Occur**

E . 1 4 7 9 8 6 5 3 0 2

|  |  |  |
| --- | --- | --- |
| PUSH | POP | Output |
| Push 0 | - | - |
| Push 1 | - | - |
| - | Pop 1 | 1 |
| Push 2 | - | 1 |
| Push 3 | - | 1 |
| Push 4 | - | 1 |
| - | Pop 4 | 1 4 |
| Push 5 | - | 1 4 |
| Push 6 | - | 1 4 |
| Push 7 | - | 1 4 |
| - | Pop 7 | 1 4 7 |
| Push 8 | - | 1 4 7 |
| Push 9 | - | 1 4 7 |
| - | Pop 9 | 1 4 7 9 |
| - | Pop 8 | 1 4 7 9 8 |
| - | Pop 6 | 1 4 7 9 8 6 |
| - | Pop 5 | 1 4 7 9 8 6 5 |
| - | Pop 3 | 1 4 7 9 8 6 5 3 |
| - | **Pop 0** | 1 4 7 9 8 6 5 3 0 |
| - | **Error Occurred** |  |
|  |  |  |
| - | **Final output(possible)** | 1 4 7 9 8 6 5 3 0 2 |

**Answer : Could Not Occur**

H. 2 1 4 3 6 5 8 7 9 0

|  |  |  |
| --- | --- | --- |
| PUSH | POP | Output |
| Push 0 | - | - |
| Push 1 | - | - |
| Push 2 |  |  |
|  | Pop 2 | 2 |
|  | Pop 1 | 2 1 |
| Push 3 |  | 2 1 |
| Push 4 |  | 2 1 |
|  | Pop 4 | 2 1 4 |
|  | Pop 3 | 2 1 4 3 |
| Push 5 |  |  |
| Push 6 |  |  |
|  | Pop 6 |  |
|  | Pop 5 |  |
| Push 7 |  |  |
| Push 8 |  |  |
|  | Pop 8 |  |
|  | Pop 7 |  |
| Push 9 |  |  |
|  | Pop 9 |  |
|  | Pop 0 |  |
|  |  |  |
| - | **Final output(possible)** | 1 4 7 9 8 6 5 3 0 2 |

**Answer : Could Occur**