Activity 5

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.For input : 4 3 2 1 0 9 8 7 6 5

|  |  |  |
| --- | --- | --- |
| 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 |  |  |
| Push 6 |  |  |
| Push 7 |  |  |
| Push 8 |  |  |
| Push 9 | 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 |
|  |  | **Output:**4, 3, 2, 1, 0, 9, 8, 7, 6, 5 |

**Output:** The given input sequence occurs the Stack operations.

b. For input : 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 |  |  |
| Push 6 | Pop 6 | 4, 6 |
| Push 7 |  |  |
| Push 8 | Pop 8 | 4, 6, 8 |
|  | Pop 7 | 4, 6, 8 |
|  | Pop 5 | 4, 6, 8, 5 |
|  | Pop 3 | 4, 6, 8, 5, 3 |
| Push 9 | Pop 9 | 4, 6, 8, 5, 3, 9 |
|  | Pop 0 | Could not occur |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  | **Output :**Could not occur |

**Output:** The given input sequence do not occur in the Stack operations.

c.For input :2 5 6 7 4 8 9 3 1 0

|  |  |  |
| --- | --- | --- |
| Push | Pop | Output |
| Push 0 |  |  |
| Push 1 |  |  |
| Push 2 | Pop 2 | 2 |
| Push 3 |  |  |
| Push 4 |  |  |
| Push 5 | Pop 5 | 2, 5 |
| Push 6 | Pop 6 | 2, 5, 6 |
| Push 7 | Pop 7 | 2, 5, 6, 7 |
|  | Pop 4 | 2, 5, 6, 7, 4 |
| Push 8 | Pop 8 | 2, 5, 6, 7, 4, 8 |
| Push 9 | Pop 9 | 2, 5, 6, 7, 4, 8, 9 |
| Push 3 | Pop 3 | 2, 5, 6, 7, 4, 8, 9, 3 |
| Push 1 | Pop 1 | 2, 5, 6, 7, 4, 8, 9, 3,1 |
| Push 0 | Pop 0 | 2, 5, 6, 7, 4, 8, 9, 3,1, 0 |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  | **Output :**2, 5, 6, 7, 4, 8, 9, 3,1, 0 |

**Output:** The given input sequence occurs the Stack operations.

d .For input : 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 | Pop 5 | 4, 3, 2 , 1, 0, 5 |
| Push 6 | Pop 6 | 4, 3, 2 , 1, 0, 5, 6 |
| Push 7 | Pop 7 | 4, 3, 2 , 1, 0, 5, 6, 7 |
| Push 8 | Pop 8 | 4, 3, 2 , 1, 0, 5, 6, 7, 8 |
| Push 9 | Pop 9 | 4, 3, 2 , 1, 0, 5, 6, 7, 8, 9 |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  | **Output :**4, 3, 2 , 1, 0, 5, 6, 7, 8, 9 |

**Output:** The given input sequence occurs the Stack operations.

e . For input : 1 2 3 4 5 6 9 8 7 0

|  |  |  |
| --- | --- | --- |
| Push | Pop | Output |
| Push 0 |  |  |
| Push 1 | Pop 1 | 1 |
| Push 2 | Pop 2 | 1, 2 |
| Push 3 | Pop 3 | 1, 2, 3 |
| Push 4 | Pop 4 | 1, 2, 3, 4 |
| Push 5 | Pop 5 | 1, 2, 3, 4, 5 |
| Push 6 |  |  |
| Push 7 |  |  |
| Push 8 |  |  |
| Push 9 | Pop 9 | 1, 2, 3, 4, 5, 9 |
|  | Pop 8 | 1, 2, 3, 4, 5, 9, 8 |
|  | Pop 7 | 1, 2, 3, 4, 5, 9, 8, 7 |
|  | Pop 0 | 1, 2, 3, 4, 5, 9, 8, 7, 0 |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  | **Output :**1, 2, 3, 4, 5, 9, 8, 7, 0 |

**Output:** The given input sequence occurs the Stack operations.

f .For input : 0 4 6 5 3 8 1 7 2 9

|  |  |  |
| --- | --- | --- |
| Push | Pop | Output |
| Push 0 | Pop 0 | 0 |
| Push 1 |  |  |
| Push 2 |  |  |
| Push 3 |  |  |
| Push 4 | Pop 4 | 0, 4 |
| Push 5 |  |  |
| Push 6 | Pop 6 | 0, 4, 6 |
|  | Pop 5 | 0, 4, 6, 5 |
|  | Pop 3 | 0, 4, 6, 5, 3 |
| Push 7 |  |  |
| Push 8 | Pop 8 | 0, 4, 6, 5, 3, 8 |
|  | Pop 1 | Does not occur |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  | **Output :**Does not occur |

**Output:** The given input sequence do not occur in the Stack operations.

g .For input : 1 4 7 9 8 6 5 3 0 2

|  |  |  |
| --- | --- | --- |
| Push | Pop | Output |
| Push 0 |  |  |
| Push 1 | Pop 1 | 1 |
| Push 2 |  |  |
| Push 3 |  |  |
| Push 4 | Pop 4 | 1, 4 |
| Push 5 |  |  |
| Push 6 |  |  |
| Push 7 | Pop 7 | 1, 4 , 7 |
| Push 8 |  |  |
| Push 9 | 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 | Does Not occur |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  | **Output :** Does not occur |

**Output:** The given input sequence do not occur in the Stack operations.

h .For input : 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 |  |  |
| Push 4 | Pop 4 | 2, 1 ,4 |
|  | Pop 3 | 2, 1 ,4, 3 |
| Push 5 |  |  |
| Push 6 | Pop 6 | 2, 1 ,4, 3, 6 |
|  | Pop 5 | 2, 1 ,4, 3, 6, 5 |
| Push 7 |  |  |
| Push 8 | Pop 8 | 2, 1 ,4, 3, 6, 5, 8 |
|  | Pop 7 | 2, 1 ,4, 3, 6, 5, 8, 7 |
| Push 9 | Pop 9 | 2, 1 ,4, 3, 6, 5, 8, 7, 9 |
|  | Pop 0 | 2, 1 ,4, 3, 6, 5, 8, 7, 9, 0 |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  | **Output :**2, 1 ,4, 3, 6, 5, 8, 7, 9, 0 |

**Output:** The given input sequence occurs the Stack operations.