

Q1. ~~Pop~~  
 Stack = []  
 Push(5) # [5]  
 Push(3) # [5, 3]      # 3 return 3  
~~Pop~~  
 Pop() # [5]  
 Push(2) # [5, 2]  
 Push(8) # [5, 2, 8]  
 Pop() # [5, 2]      # return 8  
 Pop() # [5]      # return 2  
 Push(9) # [5, 9]  
 Push(1) # [5, 9, 1]  
 Pop() # [5, 9]      # return 1  
 Push(7) # [5, 9, 7]  
 Push(6) # [5, 9, 7, 6]  
 Pop() # [5, 9, 7]      # return 6  
 Pop() # [5, 9]      # return 7  
 Push(4) # [5, 9, 4]  
 Pop() # [5, 9]      # return 4  
 Pop() # [5]      # return 9

Return values = 3, 8, 2, 1, 6, 7, 4, 9

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## 2. Given: initial\_empty\_queue

Enqueue(5) # [5]  
Enqueue(3) # [5,3]  
dequeue() # [3] # Removed 5  
Enqueue(2) # [3,2] (Returned 5)  
Enqueue(8) # [3,2,8]  
dequeue() # [2,8] # Removed 3  
dequeue() # [8] # Removed 2  
Enqueue(9) # [8,9]  
Enqueue(1) # [8,9,1]  
dequeue() # [9,1] # Removed 8  
Enqueue(7) # [9,1,7]  
Enqueue(6) # [9,1,7,6]  
dequeue() # [9,1,7,6] # Removed 9  
dequeue() # [7,6] # Removed 1  
Enqueue(4) # [7,6,4]  
dequeue() # [6,4] # Removed 7  
dequeue() # [4] # Removed 6  
Return values = 5, 3, 2, 1, 9, 8, 7, 6

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Since a total of 32 enqueue operations  
has been executed,

$$\text{added items} = 32$$

Since 5 operations among 15 are  
error,

$$15 - 5 = 10$$

Therefore, current size of queue =  $32 - 10$   
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