

CODE:

```
1 from LinkedQueue import LinkedQueue
2 from LinkedStack import LinkedStack
3 from LinkedDeque import LinkedDeque
4
5
6 class DequeReorder:
7     def __init__(self):
8         self.D = LinkedDeque()
9         self.Q = LinkedQueue()
10        self.S = LinkedStack()
11
12    1 usage
13    def populate_deque(self):
14        for i in range(1, 9):
15            self.D.insert_last(i)
16
17    4 usages
18    def print_deque(self, label):
19        print(f"{label}: ", end="")
20        current = self.D._header._next
21        while current != self.D._trailer:
22            print(current._element, end=" ")
23            current = current._next
24        print()
25
26    1 usage
27    def reorder_using_queue(self):
28        self.populate_deque()
29        self.print_deque("Deque D before reordering using Queue Q")
30
31        for _ in range(8):
32            self.Q.enqueue(self.D.delete_first())
33
34        self.D.insert_last(self.Q.dequeue())
35        self.D.insert_last(self.Q.dequeue())
36        self.D.insert_last(self.Q.dequeue())
37        self.D.insert_first(self.Q.dequeue())
38        self.D.insert_last(self.Q.dequeue())
```

```

36     self.D.insert_first(self.Q.dequeue())
37     self.D.insert_last(self.Q.dequeue())
38     self.D.insert_last(self.D.delete_first())
39     self.D.insert_last(self.Q.dequeue())
40     self.D.insert_last(self.Q.dequeue())
41     self.D.insert_last(self.Q.dequeue())
42
43
44
45     self.print_deque("Deque D after reordering using Queue Q")
46
47     1 usage
48     def reorder_using_stack(self):
49         self.print_deque("Deque D before reordering using Stack S")
50
51         for _ in range(8):
52             self.S.push(self.D.delete_last())
53
54             self.D.insert_last(self.S.pop())
55             self.D.insert_last(self.S.pop())
56             self.D.insert_last(self.S.pop())
57             self.D.insert_last(self.S.pop())
58             self.D.insert_first(self.S.pop())
59             self.D.insert_last(self.D.delete_first())
60             self.D.insert_last(self.S.pop())
61             self.D.insert_last(self.S.pop())
62             self.D.insert_last(self.S.pop())
63
64
65     self.print_deque("Deque D after reordering using Stack S")
66
67
68 reorder = DequeReorder()
69 reorder.reorder_using_queue()
70 print()
71 reorder.reorder_using_stack()

```

OUTPUT:

```
"C:\Program Files\Python312\python.exe" Z:\FINALS\LinkedLists\actFinals.py
Initial deque D = [1, 2, 3, 4, 5, 6, 7, 8]
Final deque D = [1, 2, 3, 5, 7, 8, 4]
[1, 2, 3, 5, 4, 6, 7, 8]
Deque D before reordering using Queue Q: 1 2 3 4 5 6 7 8
Deque D after reordering using Queue Q: 1 2 3 5 4 6 7 8

Deque D before reordering using Stack S: 1 2 3 5 4 6 7 8
Traceback (most recent call last):
  File "Z:\FINALS\LinkedLists\actFinals.py", line 71, in <module>
    reorder.reorder_using_stack()
  File "Z:\FINALS\LinkedLists\actFinals.py", line 51, in reorder_using_stack
    self.S.push(self.D.delete_last())
    ^^^^^^^^^^^
AttributeError: 'LinkedList' object has no attribute 'push'

Process finished with exit code 1
```