

LispCourse #33: Solutions for Homework #32

Note

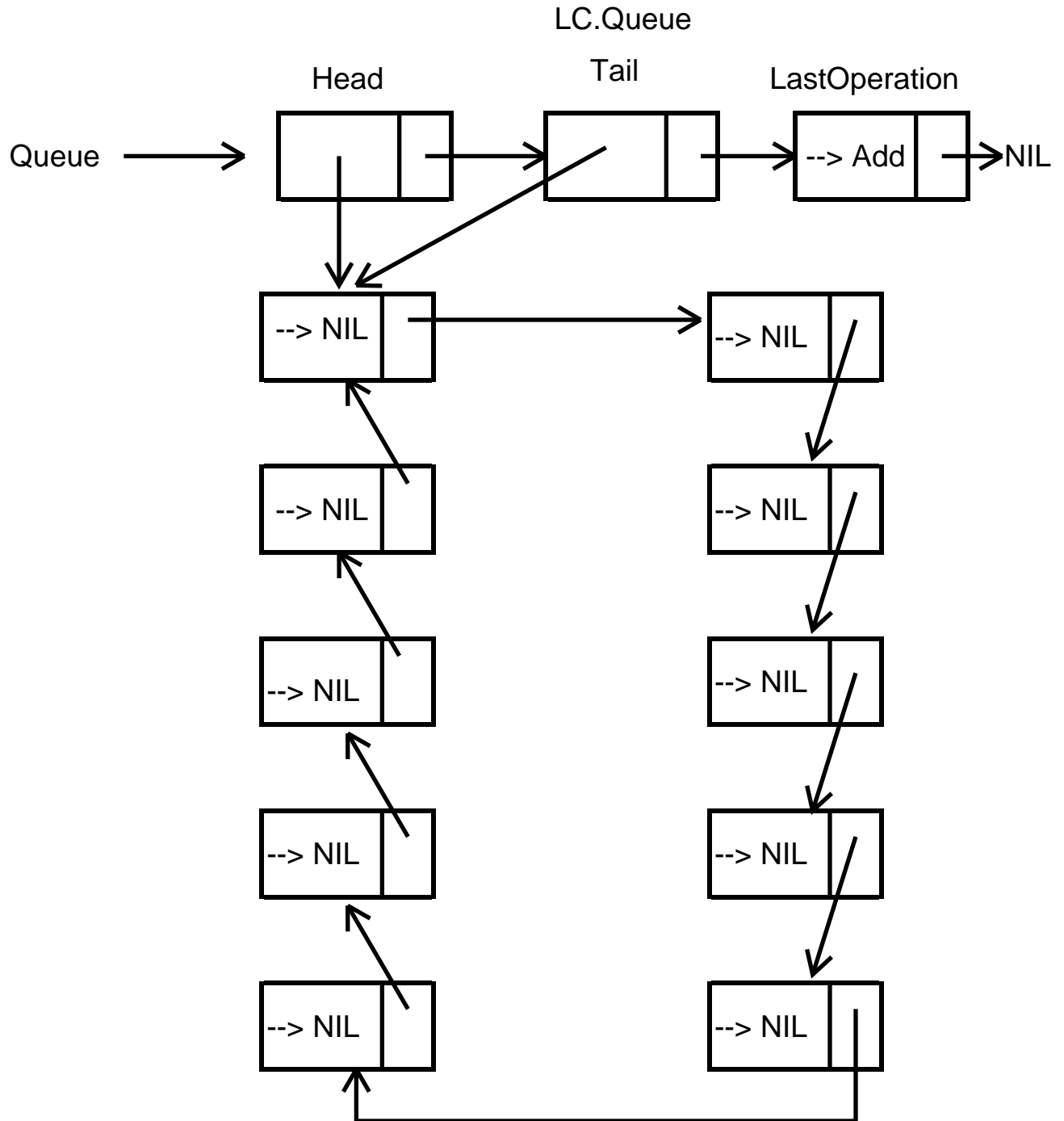
This solution differs slightly from the assignment. Instead of keeping global pointers called LC.Head and LC.Tail, I created a record called LC.Queue with Head and Tail fields (as well as a field to indicate the last operation done on the queue to be used in the empty and full predicates). This scheme allows multiple queues to be created at once, each with its own head and tail pointers.

Solutions to #1 thru 4, and 6 thru 9

Attached

Solution to #5

Result of (SETQ Queue (LC.MakeCircularQueue 10))



Test Run of Exerciser

```
83_(LC.ExerciseQueue 100 (LC.MakeCircularQueue 30))

ITERATION # 1
Queue is empty!
Adding Item: 17
ITERATION # 2
Head of Queue: 17 :Tail of Queue
Adding Item: 71
ITERATION # 3
Head of Queue: 17 71 :Tail of Queue
Adding Item: 9
ITERATION # 4
Head of Queue: 17 71 9 :Tail of Queue
Adding Item: 13
ITERATION # 5
Head of Queue: 17 71 9 13 :Tail of Queue
Adding Item: 5
ITERATION # 6
Head of Queue: 17 71 9 13 5 :Tail of Queue
Removing Item: 17
ITERATION # 7
Head of Queue: 71 9 13 5 :Tail of Queue
Removing Item: 71
ITERATION # 8
Head of Queue: 9 13 5 :Tail of Queue
Removing Item: 9
ITERATION # 9
Head of Queue: 13 5 :Tail of Queue
Adding Item: 46
ITERATION # 10
Head of Queue: 13 5 46 :Tail of Queue
Adding Item: 89
ITERATION # 11
Head of Queue: 13 5 46 89 :Tail of Queue
Adding Item: 63
ITERATION # 12
Head of Queue: 13 5 46 89 63 :Tail of Queue
Adding Item: 43
ITERATION # 13
Head of Queue: 13 5 46 89 63 43 :Tail of Queue
Adding Item: 84
ITERATION # 14
Head of Queue: 13 5 46 89 63 43 84 :Tail of Queue
Removing Item: 13
ITERATION # 15
Head of Queue: 5 46 89 63 43 84 :Tail of Queue
Adding Item: 51
ITERATION # 16
Head of Queue: 5 46 89 63 43 84 51 :Tail of Queue
Adding Item: 43
ITERATION # 17
Head of Queue: 5 46 89 63 43 84 51 43 :Tail of Queue
```

```
Removing Item: 5
ITERATION # 18
Head of Queue: 46 89 63 43 84 51 43 :Tail of Queue
Adding Item: 68
ITERATION # 19
Head of Queue: 46 89 63 43 84 51 43 68 :Tail of Queue
Adding Item: 8
ITERATION # 20
Head of Queue: 46 89 63 43 84 51 43 68 8 :Tail of Queue
Removing Item: 46
ITERATION # 21
Head of Queue: 89 63 43 84 51 43 68 8 :Tail of Queue
Removing Item: 89
ITERATION # 22
Head of Queue: 63 43 84 51 43 68 8 :Tail of Queue
Adding Item: 71
ITERATION # 23
Head of Queue: 63 43 84 51 43 68 8 71 :Tail of Queue
Adding Item: 19
ITERATION # 24
Head of Queue: 63 43 84 51 43 68 8 71 19 :Tail of Queue
Adding Item: 30
ITERATION # 25
Head of Queue: 63 43 84 51 43 68 8 71 19 30 :Tail of Queue
Adding Item: 3
ITERATION # 26
Head of Queue: 63 43 84 51 43 68 8 71 19 30 3 :Tail of Queue
Removing Item: 63
ITERATION # 27
Head of Queue: 43 84 51 43 68 8 71 19 30 3 :Tail of Queue
Adding Item: 97
ITERATION # 28
Head of Queue: 43 84 51 43 68 8 71 19 30 3 97 :Tail of Queue
Adding Item: 69
ITERATION # 29
Head of Queue: 43 84 51 43 68 8 71 19 30 3 97 69 :Tail of Queue
Removing Item: 43
ITERATION # 30
Head of Queue: 84 51 43 68 8 71 19 30 3 97 69 :Tail of Queue
Removing Item: 84
ITERATION # 31
Head of Queue: 51 43 68 8 71 19 30 3 97 69 :Tail of Queue
Adding Item: 4
ITERATION # 32
Head of Queue: 51 43 68 8 71 19 30 3 97 69 4 :Tail of Queue
Adding Item: 41
ITERATION # 33
Head of Queue: 51 43 68 8 71 19 30 3 97 69 4 41 :Tail of Queue
Removing Item: 51
ITERATION # 34
Head of Queue: 43 68 8 71 19 30 3 97 69 4 41 :Tail of Queue
Adding Item: 37
ITERATION # 35
Head of Queue: 43 68 8 71 19 30 3 97 69 4 41 37 :Tail of Queue
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Adding Item: 61
ITERATION # 36
Head of Queue: 43 68 8 71 19 30 3 97 69 4 41 37 61 :Tail of Queue
Adding Item: 90
ITERATION # 37
Head of Queue: 43 68 8 71 19 30 3 97 69 4 41 37 61 90 :Tail of Queue
Removing Item: 43
ITERATION # 38
Head of Queue: 68 8 71 19 30 3 97 69 4 41 37 61 90 :Tail of Queue
Removing Item: 68
ITERATION # 39
Head of Queue: 8 71 19 30 3 97 69 4 41 37 61 90 :Tail of Queue
Adding Item: 16
ITERATION # 40
Head of Queue: 8 71 19 30 3 97 69 4 41 37 61 90 16 :Tail of Queue
Removing Item: 8
ITERATION # 41
Head of Queue: 71 19 30 3 97 69 4 41 37 61 90 16 :Tail of Queue
Adding Item: 21
ITERATION # 42
Head of Queue: 71 19 30 3 97 69 4 41 37 61 90 16 21 :Tail of Queue
Adding Item: 52
ITERATION # 43
Head of Queue: 71 19 30 3 97 69 4 41 37 61 90 16 21 52 :Tail of Queue
Adding Item: 89
ITERATION # 44
Head of Queue: 71 19 30 3 97 69 4 41 37 61 90 16 21 52 89 :Tail of Queue
Adding Item: 18
ITERATION # 45
Head of Queue: 71 19 30 3 97 69 4 41 37 61 90 16 21 52 89 18 :Tail of Queue
Adding Item: 43
ITERATION # 46
Head of Queue: 71 19 30 3 97 69 4 41 37 61 90 16 21 52 89 18 43 :Tail of Queue
Adding Item: 91
ITERATION # 47
Head of Queue: 71 19 30 3 97 69 4 41 37 61 90 16 21 52 89 18 43 91
:Tail of Queue
Removing Item: 71
ITERATION # 48
Head of Queue: 19 30 3 97 69 4 41 37 61 90 16 21 52 89 18 43 91 :Tail of Queue
Adding Item: 12
ITERATION # 49
Head of Queue: 19 30 3 97 69 4 41 37 61 90 16 21 52 89 18 43 91 12
:Tail of Queue
Removing Item: 19
ITERATION # 50
Head of Queue: 30 3 97 69 4 41 37 61 90 16 21 52 89 18 43 91 12 :Tail of Queue
Removing Item: 30
ITERATION # 51
Head of Queue: 3 97 69 4 41 37 61 90 16 21 52 89 18 43 91 12 :Tail of Queue
Adding Item: 65
ITERATION # 52
Head of Queue: 3 97 69 4 41 37 61 90 16 21 52 89 18 43 91 12 65 :Tail of Queue
Adding Item: 7
```

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ITERATION # 53
Head of Queue: 3 97 69 4 41 37 61 90 16 21 52 89 18 43 91 12 65 7
:Tail of Queue
Removing Item: 3
ITERATION # 54
Head of Queue: 97 69 4 41 37 61 90 16 21 52 89 18 43 91 12 65 7 :Tail of Queue
Adding Item: 39
ITERATION # 55
Head of Queue: 97 69 4 41 37 61 90 16 21 52 89 18 43 91 12 65 7 39
:Tail of Queue
Adding Item: 1
ITERATION # 56
Head of Queue: 97 69 4 41 37 61 90 16 21 52 89 18 43 91 12 65 7 39 1
:Tail of Queue
Removing Item: 97
ITERATION # 57
Head of Queue: 69 4 41 37 61 90 16 21 52 89 18 43 91 12 65 7 39 1
:Tail of Queue
Adding Item: 36
ITERATION # 58
Head of Queue: 69 4 41 37 61 90 16 21 52 89 18 43 91 12 65 7 39 1 36
:Tail of Queue
Adding Item: 34
ITERATION # 59
Head of Queue: 69 4 41 37 61 90 16 21 52 89 18 43 91 12 65 7 39 1 36 34
:Tail of Queue
Removing Item: 69
ITERATION # 60
Head of Queue: 4 41 37 61 90 16 21 52 89 18 43 91 12 65 7 39 1 36 34
:Tail of Queue
Removing Item: 4
ITERATION # 61
Head of Queue: 41 37 61 90 16 21 52 89 18 43 91 12 65 7 39 1 36 34
:Tail of Queue
Removing Item: 41
ITERATION # 62
Head of Queue: 37 61 90 16 21 52 89 18 43 91 12 65 7 39 1 36 34 :Tail of Queue
Adding Item: 72
ITERATION # 63
Head of Queue: 37 61 90 16 21 52 89 18 43 91 12 65 7 39 1 36 34 72
:Tail of Queue
Removing Item: 37
ITERATION # 64
Head of Queue: 61 90 16 21 52 89 18 43 91 12 65 7 39 1 36 34 72 :Tail of Queue
Removing Item: 61
ITERATION # 65
Head of Queue: 90 16 21 52 89 18 43 91 12 65 7 39 1 36 34 72 :Tail of Queue
Adding Item: 85
ITERATION # 66
Head of Queue: 90 16 21 52 89 18 43 91 12 65 7 39 1 36 34 72 85 :Tail of Queue
Removing Item: 90
ITERATION # 67
Head of Queue: 16 21 52 89 18 43 91 12 65 7 39 1 36 34 72 85 :Tail of Queue
Adding Item: 53
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ITERATION # 68
Head of Queue: 16 21 52 89 18 43 91 12 65 7 39 1 36 34 72 85 53 :Tail of Queue
Removing Item: 16
ITERATION # 69
Head of Queue: 21 52 89 18 43 91 12 65 7 39 1 36 34 72 85 53 :Tail of Queue
Removing Item: 21
ITERATION # 70
Head of Queue: 52 89 18 43 91 12 65 7 39 1 36 34 72 85 53 :Tail of Queue
Removing Item: 52
ITERATION # 71
Head of Queue: 89 18 43 91 12 65 7 39 1 36 34 72 85 53 :Tail of Queue
Adding Item: 80
ITERATION # 72
Head of Queue: 89 18 43 91 12 65 7 39 1 36 34 72 85 53 80 :Tail of Queue
Adding Item: 97
ITERATION # 73
Head of Queue: 89 18 43 91 12 65 7 39 1 36 34 72 85 53 80 97 :Tail of Queue
Removing Item: 89
ITERATION # 74
Head of Queue: 18 43 91 12 65 7 39 1 36 34 72 85 53 80 97 :Tail of Queue
Removing Item: 18
ITERATION # 75
Head of Queue: 43 91 12 65 7 39 1 36 34 72 85 53 80 97 :Tail of Queue
Removing Item: 43
ITERATION # 76
Head of Queue: 91 12 65 7 39 1 36 34 72 85 53 80 97 :Tail of Queue
Removing Item: 91
ITERATION # 77
Head of Queue: 12 65 7 39 1 36 34 72 85 53 80 97 :Tail of Queue
Adding Item: 36
ITERATION # 78
Head of Queue: 12 65 7 39 1 36 34 72 85 53 80 97 36 :Tail of Queue
Adding Item: 40
ITERATION # 79
Head of Queue: 12 65 7 39 1 36 34 72 85 53 80 97 36 40 :Tail of Queue
Adding Item: 1
ITERATION # 80
Head of Queue: 12 65 7 39 1 36 34 72 85 53 80 97 36 40 1 :Tail of Queue
Removing Item: 12
ITERATION # 81
Head of Queue: 65 7 39 1 36 34 72 85 53 80 97 36 40 1 :Tail of Queue
Adding Item: 28
ITERATION # 82
Head of Queue: 65 7 39 1 36 34 72 85 53 80 97 36 40 1 28 :Tail of Queue
Removing Item: 65
ITERATION # 83
Head of Queue: 7 39 1 36 34 72 85 53 80 97 36 40 1 28 :Tail of Queue
Removing Item: 7
ITERATION # 84
Head of Queue: 39 1 36 34 72 85 53 80 97 36 40 1 28 :Tail of Queue
Adding Item: 85
ITERATION # 85
Head of Queue: 39 1 36 34 72 85 53 80 97 36 40 1 28 85 :Tail of Queue
Adding Item: 22
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ITERATION # 86
Head of Queue: 39 1 36 34 72 85 53 80 97 36 40 1 28 85 22 :Tail of Queue
Removing Item: 39
ITERATION # 87
Head of Queue: 1 36 34 72 85 53 80 97 36 40 1 28 85 22 :Tail of Queue
Removing Item: 1
ITERATION # 88
Head of Queue: 36 34 72 85 53 80 97 36 40 1 28 85 22 :Tail of Queue
Adding Item: 9
ITERATION # 89
Head of Queue: 36 34 72 85 53 80 97 36 40 1 28 85 22 9 :Tail of Queue
Adding Item: 77
ITERATION # 90
Head of Queue: 36 34 72 85 53 80 97 36 40 1 28 85 22 9 77 :Tail of Queue
Adding Item: 50
ITERATION # 91
Head of Queue: 36 34 72 85 53 80 97 36 40 1 28 85 22 9 77 50 :Tail of Queue
Adding Item: 59
ITERATION # 92
Head of Queue: 36 34 72 85 53 80 97 36 40 1 28 85 22 9 77 50 59 :Tail of Queue
Removing Item: 36
ITERATION # 93
Head of Queue: 34 72 85 53 80 97 36 40 1 28 85 22 9 77 50 59 :Tail of Queue
Removing Item: 34
ITERATION # 94
Head of Queue: 72 85 53 80 97 36 40 1 28 85 22 9 77 50 59 :Tail of Queue
Adding Item: 21
ITERATION # 95
Head of Queue: 72 85 53 80 97 36 40 1 28 85 22 9 77 50 59 21 :Tail of Queue
Adding Item: 73
ITERATION # 96
Head of Queue: 72 85 53 80 97 36 40 1 28 85 22 9 77 50 59 21 73 :Tail of Queue
Adding Item: 49
ITERATION # 97
Head of Queue: 72 85 53 80 97 36 40 1 28 85 22 9 77 50 59 21 73 49
:Tail of Queue
Removing Item: 72
ITERATION # 98
Head of Queue: 85 53 80 97 36 40 1 28 85 22 9 77 50 59 21 73 49 :Tail of Queue
Removing Item: 85
ITERATION # 99
Head of Queue: 53 80 97 36 40 1 28 85 22 9 77 50 59 21 73 49 :Tail of Queue
Adding Item: 64
ITERATION # 100
Head of Queue: 53 80 97 36 40 1 28 85 22 9 77 50 59 21 73 49 64 :Tail of Queue
Adding Item: 83
Head of Queue: 53 80 97 36 40 1 28 85 22 9 77 50 59 21 73 49 64 83
:Tail of Queue
NIL
84_
```