Quiz 4: Abstract Data Types

Read the code for the function `unravel`.

```python
def unravel(L):
    # """Print elements of <L> and its nested sub-lists in level order.
    @type L: list
    @type q: Queue
    @rtype: None
    """
    q = Queue()
    for e in L:
        q.enqueue(e)

    while not q.is_empty():
        i = q.dequeue()
        # isinstance(i, list) returns True iff i is a list.
        if not isinstance(i, list):
            print(i)
        else:
            for e in i:
                q.enqueue(e)
```

For this quiz, when asked to draw the state of a queue, draw it with the front labelled, and queue elements separated by vertical lines. For example, if we enqueue 10, then 20, then 30, draw the queue like this: `front → 10 | 20 | 30`

Consider the following code snippet that uses a queue:

```python
>>> L = ['a', ['b', ['c', 'd'], 'e'], ['f', ['g', 'h', 'i'], 'j']]
>>> unravel(L)
```

1. Draw the state of `q` during the function call `unravel(L)` at line 12 in `unravel`.

2. For each iteration of the `while` loop in `unravel`, write/draw two things:
   (i) What, if any, output is printed at line 16.
   (ii) The state of `q` at the end of the iteration (right after line 19).

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<th>Output (if any)</th>
<th>State of q</th>
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continue on reverse if needed