Quiz 4: Abstract Data Types

Read the code for the function **unravel**.

```
1  def unravel(nested: list) -> None:
2      """Print elements of <L> and its nested sub-lists in "level order".
3      """
4      q = Queue()
5      for e in nested:
6          q.enqueue(e)
7
8      while not q.is_empty():
9          i = q.dequeue()
10         if not isinstance(i, list):
11             print(i)
12         else:
13             for e in i:
14                 q.enqueue(e)
```

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

Consider the following code snippet that uses a queue:

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

1. Draw the state of **q** during the function call `unravel(L)` at line 7 in **unravel**.

   a -> [b, [c, d], e, f] -> [g, h, i] -> j

2. For each iteration of the `while` loop in `unravel`, write/draw two things:

   (i) What, if any, output is printed at line 11.

   (ii) The state of `q` at the *end* of the iteration (right after line 15).

Output (if any)	State of **q**
a	[b, [c, d], e, f] -> [g, h, i] -> j
	[g, h, i] -> j -> b -> [c, d] -> e -> f]
	j -> b -> [c, d] -> e -> f -> g -> h -> i
j	b -> [c, d] -> e -> f -> g -> h -> i
b	[c, d] -> e -> f -> g -> h -> i
	e -> f -> g -> h -> i -> c -> d
e	f -> g -> h -> i -> c -> d
f	g -> h -> i -> c -> d
g	h -> i -> c -> d
h	i -> c -> d
i	c -> d
c	d
d	