

464√ A limited queue is a queue with a limited number of places for items. Let the limit be  $n: \text{nat}+1$ , and let  $Q: [n*X]$  and  $p: \text{nat}$  be implementer's variables. Here is an implementation.

$mkemptyq = p:= 0$

$isemptyq = p=0$

$isfullq = p=n$

$join\ x = Q\ p:= x. p:= p+1$

$leave = \mathbf{for}\ i:= 1;..p\ \mathbf{do}\ Q(i-1):= Q\ i\ \mathbf{od.}\ p:= p-1$

$front = Q\ 0$

Removing the front item from the queue takes time  $p-1$  to shift all remaining items down one index. Transform the queue so that all operations are instant.

§ see book Subsection 7.2.3