Stacks/Queues

There is another common and useful linear data structure call **queue**.

As the stack, it is fairly intuitive, since we experience the concept when we are waiting at some place to get some goods or service.

Let us note $\textsc{Empty}$ the empty queue. This is the same name as for the empty stacks, because it is a convenient choice. When the context is clear, there is no need to be more precise, otherwise we can write $\textsc{Stack.Empty}$ for noting empty stacks and $\textsc{Queue.Empty}$ for empty queues.

Let us note $\textsc{Put}(i, q)$ the queue made by adding item i at the end of queue q.

Stacks/Queues (cont)

Let us define an operation on queues, named dequeuing, which consists in returning the next available item in the queue and a new queue without this item.

That is to say, $\textsc{Get}(q)$ is a pair (q', i).

$$\textsc{Get}(\textsc{Put}(i, \textsc{Empty})) \to (\textsc{Empty}, i)$$

$$\frac{\textsc{Get}(q) \to (q_1, i_1)}{\textsc{Get}(\textsc{Put}(i, q)) \to (\textsc{Put}(i, q_1), i_1)}$$