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Name priorityQueue(G)

Sets:

Q : sets of priorityQueue containing items from G

G : sets of item that can be in the Queue

$B = \{ \text{true}, \text{false} \}$

N_0 = set of non-negative integers

Signatures:

$\text{newPriorityQueue}(G)(n) : N_0 \rightarrow Q$

$Q.\text{insert}(g) : G \rightarrow Q$

$Q.\text{isEmpty} : \rightarrow B$

$Q.\text{isFull} : \rightarrow B$

$Q.\text{maxItem} : \rightarrow Q$

$Q.\text{minItem} : \rightarrow Q$

$Q.\text{deleteMax} : \rightarrow Q$

$Q.\text{deleteAllMax} : \rightarrow Q$

$Q.\text{deleteMin} : \rightarrow Q$

$Q.\text{frequency}(q) \rightarrow N_0$

Preconditions: For all $q, g \in Q, g \in G, n \in N_0$

$\text{newPriorityQueue}(G)(n) : n > 0$

$q.\text{insert}(g) : q$ is not full

$q.\text{isEmpty} : \text{none}$

$q.\text{isFull} : \text{none}$

$q.\text{maxItem} : q$ is not Empty

$q.\text{minItem} : q$ is not Empty

$q.\text{deleteMax} : q$ is not Empty

$q.\text{deleteAllMax} : q$ is not Empty

$q.\text{deleteMin} : q$ is not Empty

$q.\text{frequency}(q)$: item q exists in queue q .

Semantics: For $q \in Q, g \in G, n \in N_0$

$\text{newPriorityQueue}(G)(n)$: make a new queue of items from G with capacity of n .

$q.\text{insert}(g)$: Inserts an element with a certain priority

$q.\text{isEmpty}$: return true if the queue is Empty, false otherwise

$q.\text{isFull}$: return false if the queue is full, false otherwise

$q.\text{maxItem}$: return the item with the highest priority

$q.\text{minItem}$: return the item with the lowest priority

$q.\text{deleteMax}$: delete the item with the highest priority

$q.\text{deleteAllMax}$: delete all the items with the highest priority

$q.\text{deleteMin}$: delete the item with the lowest priority

$q.\text{frequency}(q)$: return the number of times q occurs in the queue