- **Domain** of an Iterator

$\mathcal{I} = \{\textbf{it} | \text{it is an iterator over a container with elements of type TElem } \}$

- init(it, c)
  - **description:** creates a new iterator for a container
  - **pre:** c is a container
  - **post:** $it \in \mathcal{I}$ and it points to the first element in c if c is not empty or it is not valid
- getCurrent(it)
  - **description:** returns the current element from the iterator
  - **pre:** $it \in \mathcal{I}$, it is valid
  - **post:** getCurrent $\leftarrow$ e, $e \in TElem$, e is the current element from it
  - **throws:** an exception if the iterator is not valid
- next(it)
  - **description:** moves the current element from the container to the next element or makes the iterator invalid if no elements are left
  - **pre:** $it \in \mathcal{I}$, it is valid
  - **post:** $it' \in \mathcal{I}$, the current element from it' points to the next element from the container or it' is invalid if no more elements are left
  - **throws:** an exception if the iterator is not valid

- valid(it)
  - **description:** verifies if the iterator is valid
  - **pre:** $it \in \mathcal{I}$
  - **post:**

$$valid \leftarrow \begin{cases} True, & \text{if it points to a valid element from the container} \\ False & \text{otherwise} \end{cases}$$

- first(it)
  - **description:** sets the current element from the iterator to the first element of the container
  - **pre:** $it \in \mathcal{I}$
  - **post:** $it' \in \mathcal{I}$, the current element from it' points to the first element of the container if it is not empty, or it' is invalid