

- The domain of the ADT Stack:  
 $\mathcal{S} = \{s | s \text{ is a stack with elements of type } TElem\}$
- The interface of the ADT Stack contains the following operations:

- **init(s)**
  - **descr:** creates a new empty stack
  - **pre:** True
  - **post:**  $s \in \mathcal{S}$ ,  $s$  is an empty stack

- **destroy(s)**
  - **descr:** destroys a stack
  - **pre:**  $s \in \mathcal{S}$
  - **post:**  $s$  was destroyed

- **push**( $s, e$ )
  - **descr:** pushes (adds) a new element onto the stack
  - **pre:**  $s \in \mathcal{S}$ ,  $e$  is a  $TElem$
  - **post:**  $s' \in \mathcal{S}$ ,  $s' = s \oplus e$ ,  $e$  is the most recent element added to the stack

- **pop(s)**

- **descr:** pops (removes) the most recent element from the stack
- **pre:**  $s \in \mathcal{S}$ ,  $s$  is not empty
- **post:**  $pop \leftarrow e$ ,  $e$  is a  $TElem$ ,  $e$  is the most recent element from  $s$ ,  $s' \in \mathcal{S}$ ,  $s' = s \ominus e$
- **throws:** an *underflow* exception if the stack is empty

- **top(s)**
  - **descr:** returns the most recent element from the stack (but it does not change the stack)
  - **pre:**  $s \in \mathcal{S}$ ,  $s$  is not empty
  - **post:**  $top \leftarrow e$ ,  $e$  is a  $TElem$ ,  $e$  is the most recent element from  $s$
  - **throws:** an *underflow* exception if the stack is empty

- **isEmpty(s)**
  - **descr:** checks if the stack is empty (has no elements)
  - **pre:**  $s \in \mathcal{S}$
  - **post:**

$$isEmpty \leftarrow \begin{cases} \text{true, if } s \text{ has no elements} \\ \text{false, otherwise} \end{cases}$$

- **Note:** stacks cannot be iterated, so they don't have an *iterator* operation!