

CREATE returns stack

Preconditions - None

Postcondition - Stack is empty

EMPTY (stack) returns boolean

Preconditions - None

Postconditions - The result is true iff the
stack is empty.

PUSH (item, stack) modifies the stack

Preconditions - None (assuming an implementation with unlimited size) - else the stack is not full

Postcondition - Item is added to the stack

POP (stack) modifies the stack

Precondition - Stack is not empty

Postcondition - Top item is removed from
the stack

TOP (stack) returns item

Precondition - Stack is not empty

Postconditions - The top item of the stack is returned,
but the stack is not altered.

Note: POP and TOP are often combined into a single POP operation that combines both operations, as in the text. In this case, we have an operation I'll call TOPnPOP

SIZE (stack) returns int

Preconditions - None

Postconditions - The current number of items on the stack is returned, but the stack is not altered.

AXIOMS

Let S be any stack and I be any item. Then:

$\text{EMPTY}(\text{CREATE}) ::= \text{True}$

$\text{EMPTY}(\text{PUSH}(I,S)) ::= \text{False}$

$\text{TOP}(\text{CREATE}) ::= \text{Error}$

$\text{TOP}(\text{PUSH}(I,S)) ::= I$

$\text{POP}(\text{CREATE}) ::= \text{error}$

$\text{POP}(\text{PUSH}(I,S)) ::= S$

$\text{SIZE}(\text{CREATE}) ::= 0$

$\text{SIZE}(\text{PUSH}(I,S)) ::= \text{SIZE}(S) + 1;$

$\text{SIZE}(\text{POP}(S)) ::= \text{SIZE}(S) - 1;$