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5/9/2021

Homework 2 Question 4

Create your own stack functions to do the following:

a. List all the elements in the stack

b. Iterate through the stack and change one of the values based on its position in the stack

Program Description:

The program includes an array-based templated stack class with the following functions: push, pop, top, full, empty, print and replace. The push, pop, top, full and empty functions are part of a basic stack class that allow for the creation and manipulation of stacks, while the print function uses the array holding the stack to iterate through the elements and print them in order. The replace function allows us to change a value at a specific position in the stack by accessing the array holding the stack. Creating the print and replace functions were simple because of the array-based implementation of this stack. By comparison, to print a linked list based stack, we would have to traverse the stack starting from the top node and its successive links and print each data value as we traverse the stack. To replace a node in a linked list based stack, we would have to traverse the linked list holding the stack, and keep track of the index of the node we are looking at.

Here are sample outputs from the program:

```
Stack: 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19
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Replaced all elements with 9
9  9  9  9  9  9  9  9  9  9  9  9  9  9  9  9  9  9  9  9
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Replaced first and last elements with 0
0  9  9  9  9  9  9  9  9  9  9  9  9  9  9  9  9  9  9  0
```