Homework (Week 3)

Write a Python code which implements a function transfer(S, T) that transfers all elements from stack S onto stack T, so that the element that starts at the top of S is the first to be inserted onto T, and the element at the bottom of S ends up at the top of T. Print out all the elements on both stacks before and after the transfer.

Then show how to use the transfer function, described above, and two temporary stacks, to replace the contents of a given stack A with those same elements, but in reversed order. Print out all the elements on the stack A before and after the reverse operation.

You can use either ArrayStack class or LinkedStack class presented in the textbook to do this assignment. In your test runs, each stack should contain at least 10 elements.

Submit your code together with the run results.

Code:

# -\*- coding: utf-8 -\*-

"""

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"""

class ArrayStack:

"""LIFO Stack implementation"""

def \_\_init\_\_(self):

self.\_data = []

def \_\_len\_\_(self):

return len(self,\_data)

def is\_empty(self):

return len(self.\_data)==0

def push(self,e):

self.\_data.append(e)

def top(self):

if self.is\_empty():

raise Empty('Stack is empty')

return self.\_data[-1]

def pop(self):

if self.is\_empty():

raise Empty('Stack is empty')

return self.\_data.pop()

""" Transfer stack T to stack S """

str= " Transfer stack T to stack S "

print(str.center(40, '#'))

T=ArrayStack()

for i in range(10):

x=input("Please input a letter:", )

T.push(x)

print("Top of stack T is:" ,T.top())

S=ArrayStack()

for i in range(10):

y=T.pop()

print(y, end=' ')

S.push(y)

print("Top of stack S is:" ,S.top())

""" Reverse contents in stack A """

str= " Reverse contents in stack A "

print(str.center(40, '#'))

A=ArrayStack()

for i in range(10):

z=A.push(i)

print(A.top(), end=' ')

print("Top of stack A is:" ,A.top())

T=ArrayStack()

for i in range(10):

x=A.pop()

T.push(x)

for i in range(10):

y=T.pop()

S.push(y)

for i in range(10):

z=S.pop()

print(z, end=' ')

A.push(z)

print("Top of stack A is:" ,A.top())

Output:

runfile('C:/Users/rober/Downloads/CSTU/Algorithms/hw3.py', wdir='C:/Users/rober/Downloads/CSTU/Algorithms')

##### Transfer stack T to stack S ######

Please input a letter:a

Please input a letter:b

Please input a letter:c

Please input a letter:d

Please input a letter:e

Please input a letter:f

Please input a letter:g

Please input a letter:h

Please input a letter:i

Please input a letter:j

Top of stack T is: j

j i h g f e d c b a Top of stack S is: a

##### Reverse contents in stack A ######

0 1 2 3 4 5 6 7 8 9 Top of stack A is: 9

9 8 7 6 5 4 3 2 1 0 Top of stack A is: 0