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# -*- coding: utf-8 -*-
"""
https://www.geeksforgeeks.org/heap-queue-or-heapq-in-python/
"""

# Python code to demonstrate working of
# heapify(), heappush() and heappop()

# importing "heapq" to implement heap queue
import heapq

# initializing list
li = [5, 7, 9, 1, 3]

# using heapify to convert list into heap
heapq.heapify(li)

# printing created heap
print ("The created heap is : ",end="")
print (list(li))

# using heappush() to push elements into heap
# pushes 4
heapq.heappush(li,4)

# printing modified heap
print ("The modified heap after push is : ",end="")
print (list(li))

# using heappop() to pop smallest element
print ("The popped and smallest element is : ",end="")
print (heapq.heappop(li))

# In[]

# Python code to demonstrate working of
# heappushpop() and heapreplce()

# importing "heapq" to implement heap queue
import heapq

# initializing list 1
li1 = [5, 7, 9, 4, 3]

# initializing list 2
li2 = [5, 7, 9, 4, 3]

# using heapify() to convert list into heap
heapq.heapify(li1)
heapq.heapify(li2)

# using heappushpop() to push and pop items simultaneously
# pops 2
print ("The popped item using heappushpop() is : ",end="")
print (heapq.heappushpop(li1, 2))

# using heapreplace() to push and pop items simultaneously
# pops 3
print ("The popped item using heapreplace() is : ",end="")
print (heapq.heapreplace(li2, 2))

# In[]

# Python code to demonstrate working of
# nlargest() and nsmallest()

# importing "heapq" to implement heap queue
import heapq

# initializing list
li1 = [6, 7, 9, 4, 3, 5, 8, 10, 1]

# using heapify() to convert list into heap
heapq.heapify(li1)

# using nlargest to print 3 largest numbers
# prints 10, 9 and 8
print("The 3 largest numbers in list are : ",end="")
print(heapq.nlargest(3, li1))

# using nsmallest to print 3 smallest numbers
# prints 1, 3 and 4
print("The 3 smallest numbers in list are : ",end="")
print(heapq.nsmallest(3, li1))
```