‘’’ Title : A star code

Roll no : 3946

‘’’

# -\*- coding: utf-8 -\*-  
"""  
Created on Wed Jan 22 19:43:03 2020  
   
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"""  
   
Prior={}  
vertices = int(input("Enter number of Vertices:"))  
for i in range(1,vertices+2):  
    k = int(input("Enter the heurestic value:"))  
    Prior[i]=k  
print(Prior)  
   
goal = int(input('Enter the goal value:'))  
mat=[]  
ls=[]  
   
for i in range(0,vertices):  
    for j in range(0,vertices):  
        if(i==j):  
            ls.insert(j,0)  
        else:  
            print("Enter value of edge if there is an edge between",i+1," and ",j+1," else enter 0:")  
        #print(i," ",j)  
            a=int(input())  
            ls.insert(j,a)  
    mat.insert(i, ls)  
    ls=[]  
     
print(mat)  
visited = []  
for i in range (0,vertices):  
    visited.insert(i,0)  
   
open1={}  #priority queue  
close=[]   #normal queue  
open2={}  
start = int(input("Enter the start vertex:"))  
for i in range(0,vertices):  
    if(mat[start][i]!=0):  
        open1.update({i+1:Prior[i+2]+mat[start][i]})  #inserts into open priority queue  
        open2.update({i+1:Prior[i+2]+mat[start][i]})  #to check min of all children nodes  
close.append(start)  
visited[start]=1  
while open1:  
    temp = min(open2.values())  
    res  = [key for key in open2 if open2[key] == temp]  
    open1.pop(res[0])  
    if((res[0]-1)==goal):  
        close.append(res[0]-1)  
        break        
    close.append(res[0]-1)  
    visited[res[0]-1]=1  
    open2={}  
    for i in range(0,vertices):  
        if(mat[res[0]-1][i]!=0 and visited[i]==0):  
            open1.update({i+1:Prior[i+2]+mat[res[0]-1][i]})  #inserts into open priority queue  
            open2.update({i+1:Prior[i+2]+mat[res[0]-1][i]})  
            #visited.insert(res[0]-1,1)  
  
for i in close:  
    i=i+1  
      
print('The path is:',close)    
sum = 0   
for i in range (0,len(close)-1):  
    sum = sum + mat[close[i]][close[i+1]]   
print('The minimum distance to reach goal is:',sum)  
  
  
'''  
Output:  
      
    Enter number of Vertices:7  
  
Enter the heurestic value:14  
  
Enter the heurestic value:12  
  
Enter the heurestic value:11  
  
Enter the heurestic value:6  
  
Enter the heurestic value:4  
  
Enter the heurestic value:11  
  
Enter the heurestic value:0  
{1: 14, 2: 12, 3: 11, 4: 6, 5: 4, 6: 11, 7: 0}  
  
Enter the goal value:6  
Enter value of edge if there is an edge between 1  and  2  else enter 0:  
  
4  
Enter value of edge if there is an edge between 1  and  3  else enter 0:  
  
3  
Enter value of edge if there is an edge between 1  and  4  else enter 0:  
  
0  
Enter value of edge if there is an edge between 1  and  5  else enter 0:  
  
0  
Enter value of edge if there is an edge between 1  and  6  else enter 0:  
  
0  
Enter value of edge if there is an edge between 1  and  7  else enter 0:  
  
0  
Enter value of edge if there is an edge between 2  and  1  else enter 0:  
  
4  
Enter value of edge if there is an edge between 2  and  3  else enter 0:  
  
0  
Enter value of edge if there is an edge between 2  and  4  else enter 0:  
  
0  
Enter value of edge if there is an edge between 2  and  5  else enter 0:  
  
12  
Enter value of edge if there is an edge between 2  and  6  else enter 0:  
  
11  
Enter value of edge if there is an edge between 2  and  7  else enter 0:  
  
0  
Enter value of edge if there is an edge between 3  and  1  else enter 0:  
  
3  
Enter value of edge if there is an edge between 3  and  2  else enter 0:  
  
0  
Enter value of edge if there is an edge between 3  and  4  else enter 0:  
  
7  
Enter value of edge if there is an edge between 3  and  5  else enter 0:  
  
10  
Enter value of edge if there is an edge between 3  and  6  else enter 0:  
  
0  
Enter value of edge if there is an edge between 3  and  7  else enter 0:  
  
0  
Enter value of edge if there is an edge between 4  and  1  else enter 0:  
  
0  
Enter value of edge if there is an edge between 4  and  2  else enter 0:  
  
0  
Enter value of edge if there is an edge between 4  and  3  else enter 0:  
  
10  
Enter value of edge if there is an edge between 4  and  5  else enter 0:  
  
2  
Enter value of edge if there is an edge between 4  and  6  else enter 0:  
  
0  
Enter value of edge if there is an edge between 4  and  7  else enter 0:  
  
0  
Enter value of edge if there is an edge between 5  and  1  else enter 0:  
  
0  
Enter value of edge if there is an edge between 5  and  2  else enter 0:  
  
12  
Enter value of edge if there is an edge between 5  and  3  else enter 0:  
  
10  
Enter value of edge if there is an edge between 5  and  4  else enter 0:  
  
2  
Enter value of edge if there is an edge between 5  and  6  else enter 0:  
  
0  
Enter value of edge if there is an edge between 5  and  7  else enter 0:  
  
5  
Enter value of edge if there is an edge between 6  and  1  else enter 0:  
  
0  
Enter value of edge if there is an edge between 6  and  2  else enter 0:  
  
5  
Enter value of edge if there is an edge between 6  and  3  else enter 0:  
  
0  
Enter value of edge if there is an edge between 6  and  4  else enter 0:  
  
0  
Enter value of edge if there is an edge between 6  and  5  else enter 0:  
  
0  
Enter value of edge if there is an edge between 6  and  7  else enter 0:  
  
16  
Enter value of edge if there is an edge between 7  and  1  else enter 0:  
  
0  
Enter value of edge if there is an edge between 7  and  2  else enter 0:  
  
0  
Enter value of edge if there is an edge between 7  and  3  else enter 0:  
  
0  
Enter value of edge if there is an edge between 7  and  4  else enter 0:  
  
0  
Enter value of edge if there is an edge between 7  and  5  else enter 0:  
  
5  
Enter value of edge if there is an edge between 7  and  6  else enter 0:  
  
16  
[[0, 4, 3, 0, 0, 0, 0], [4, 0, 0, 0, 12, 11, 0], [3, 0, 0, 7, 10, 0, 0], [0, 0, 10, 0, 2, 0, 0], [0, 12, 10, 2, 0, 0, 5], [0, 5, 0, 0, 0, 0, 16], [0, 0, 0, 0, 5, 16, 0]]  
  
Enter the start vertex:0  
The path is: [0, 2, 3, 4, 6]  
The minimum distance to reach goal is: 17  
  
Output 2 :  
      
      
    Enter number of Vertices:5  
  
Enter the heurestic value:7  
  
Enter the heurestic value:6  
  
Enter the heurestic value:2  
  
Enter the heurestic value:1  
  
Enter the heurestic value:0  
{1: 7, 2: 6, 3: 2, 4: 1, 5: 0}  
  
Enter the goal value:4  
Enter value of edge if there is an edge between 1  and  2  else enter 0:  
  
1  
Enter value of edge if there is an edge between 1  and  3  else enter 0:  
  
4  
Enter value of edge if there is an edge between 1  and  4  else enter 0:  
  
0  
Enter value of edge if there is an edge between 1  and  5  else enter 0:  
  
0  
Enter value of edge if there is an edge between 2  and  1  else enter 0:  
  
0  
Enter value of edge if there is an edge between 2  and  3  else enter 0:  
  
2  
Enter value of edge if there is an edge between 2  and  4  else enter 0:  
  
5  
Enter value of edge if there is an edge between 2  and  5  else enter 0:  
  
12  
Enter value of edge if there is an edge between 3  and  1  else enter 0:  
  
0  
Enter value of edge if there is an edge between 3  and  2  else enter 0:  
  
0  
Enter value of edge if there is an edge between 3  and  4  else enter 0:  
  
2  
Enter value of edge if there is an edge between 3  and  5  else enter 0:  
  
0  
Enter value of edge if there is an edge between 4  and  1  else enter 0:  
  
0  
Enter value of edge if there is an edge between 4  and  2  else enter 0:  
  
0  
Enter value of edge if there is an edge between 4  and  3  else enter 0:  
  
0  
Enter value of edge if there is an edge between 4  and  5  else enter 0:  
  
3  
Enter value of edge if there is an edge between 5  and  1  else enter 0:  
  
0  
Enter value of edge if there is an edge between 5  and  2  else enter 0:  
  
0  
Enter value of edge if there is an edge between 5  and  3  else enter 0:  
  
0  
Enter value of edge if there is an edge between 5  and  4  else enter 0:  
  
0  
[[0, 1, 4, 0, 0], [0, 0, 2, 5, 12], [0, 0, 0, 2, 0], [0, 0, 0, 0, 3], [0, 0, 0, 0, 0]]  
  
Enter the start vertex:0  
The path is: [0, 2, 3, 4]  
The minimum distance to reach goal is: 9  
  
runfile('C:/Users/Pooja/Desktop/joc/python/astar.py', wdir='C:/Users/Pooja/Desktop/joc/python')  
  
Enter number of Vertices:5  
  
Enter the heurestic value:7  
  
Enter the heurestic value:6  
  
Enter the heurestic value:2  
  
Enter the heurestic value:1  
  
Enter the heurestic value:0  
  
Enter the heurestic value:0  
{1: 7, 2: 6, 3: 2, 4: 1, 5: 0, 6: 0}  
  
Enter the goal value:4  
Enter value of edge if there is an edge between 1  and  2  else enter 0:  
  
1  
Enter value of edge if there is an edge between 1  and  3  else enter 0:  
  
4  
Enter value of edge if there is an edge between 1  and  4  else enter 0:  
  
0  
Enter value of edge if there is an edge between 1  and  5  else enter 0:  
  
0  
Enter value of edge if there is an edge between 2  and  1  else enter 0:  
  
0  
Enter value of edge if there is an edge between 2  and  3  else enter 0:  
  
2  
Enter value of edge if there is an edge between 2  and  4  else enter 0:  
  
5  
Enter value of edge if there is an edge between 2  and  5  else enter 0:  
  
12  
Enter value of edge if there is an edge between 3  and  1  else enter 0:  
  
0  
Enter value of edge if there is an edge between 3  and  2  else enter 0:  
  
0  
Enter value of edge if there is an edge between 3  and  4  else enter 0:  
  
2  
Enter value of edge if there is an edge between 3  and  5  else enter 0:  
  
0  
Enter value of edge if there is an edge between 4  and  1  else enter 0:  
  
0  
Enter value of edge if there is an edge between 4  and  2  else enter 0:  
  
0  
Enter value of edge if there is an edge between 4  and  3  else enter 0:  
  
0  
Enter value of edge if there is an edge between 4  and  5  else enter 0:  
  
3  
Enter value of edge if there is an edge between 5  and  1  else enter 0:  
  
0  
Enter value of edge if there is an edge between 5  and  2  else enter 0:  
  
0  
Enter value of edge if there is an edge between 5  and  3  else enter 0:  
  
0  
Enter value of edge if there is an edge between 5  and  4  else enter 0:  
  
0  
[[0, 1, 4, 0, 0], [0, 0, 2, 5, 12], [0, 0, 0, 2, 0], [0, 0, 0, 0, 3], [0, 0, 0, 0, 0]]  
  
Enter the start vertex:0  
The path is: [0, 1, 2, 3, 4]  
The minimum distance to reach a goal is: 8  
'''