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# f628
def f628(a):
    l=len(a)
    r=numpy.zeros((l,l),int)
    k=numpy.zeros((l,l),int)
    for i in range(l):
        for j in range(l):
            r[i][j]==-1
            if a[i][j]==0:
                k[i][j]=999999
            else:
                k[i][j]=a[i][j]
            if i==j:
                k[i][j]=0
    for q in range(l):
        for s in range(l):
            for t in range(l):
                if k[s][q]+k[q][t]<k[s][t]:
                    k[s][t]=k[s][q]+k[q][t]
                    if r[s][q]==-1:
                        r[s][t]=q
                    else:
                        r[s][t]=r[s][q]
    for i in range(l):
        for j in range(l):
            if r[i][j]==-1:
                r[i][j]=j
            r[i][j]=r[i][j]+1
    return(k,r)
import numpy
#
exemplo=numpy.array([[ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,18, 0, 0, 0, 0,24],
[ 0, 0, 0, 0, 0, 0, 0, 0, 0,32, 0, 0, 0, 0, 0, 0],
[ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,17, 0, 0, 0, 0],
[ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,40, 0, 0, 0],
[ 0, 0,40, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,40, 0, 0],
[ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,46, 0, 0],
[22, 0, 0,33, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
[ 0,27,39, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
[ 0, 0, 0, 0, 0, 0, 0,0,27, 0, 0, 0, 0, 0, 0, 0],
[ 0, 0, 0, 0, 0, 0,0,48, 0, 0, 0, 0, 0, 0, 0, 0],
[ 0, 0, 0, 0,38, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
[ 0, 0, 0,22, 0,35, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
[29, 0, 0, 0, 0,50, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
[ 0,35, 0, 0, 0, 0,0,39, 0,23, 0,29, 0, 0, 0, 0],
[ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,47, 0, 0]])

print('-----Dados de entrada-----')
print(exemplo)
k1,r1=f628(exemplo)
print('-----Matriz de custos minimos-----')
print(k1)
print('-----Matriz de rotas-----')
print(r1)
print('-----Impressao do caminho de i para j-----')
i=int(input('Informe a cidade de origem '))-1
j=int(input('Informe a cidade de destino '))-1
ct=1
while i!=j:
    print(i+1)
    i=r1[i][j]-1
    ct=ct+1
print(j+1)
print(' Quantidade de cidades (e de dias) ',ct)

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