import heapq

input\_file = *open*("23341065\_Istiaque\_CSE422\_08\_Lab\_Assignment01\_InputFile\_Summer2024.txt")

output\_file = *open*("23341065\_Istiaque\_CSE422\_08\_Lab\_Assignment01\_OutputFile\_Summer2024.txt", "w")

adj = {}

h = {}

for i in input\_file:

lst = i.split()

now = lst[0]

h[now] = *int*(lst[1])

adj[now] = []

for k in *range*(2, *len*(lst), 2):

adj[now].append((lst[k], *int*(lst[k + 1])))

s = *input*("Start node: ")

d = *input*("Destination: ")

vis = {key: *float*('inf') for key in adj.keys()}

par = {key: None for key in adj.keys()}

vis[s] = h[s]

pq = []

heapq.heappush(pq, (h[s], s))

while *len*(pq):

val, now = heapq.heappop(pq)

if vis[now] != val: continue

if now == d: break

val -= h[now]

for i in adj[now]:

if val + i[1] + h[i[0]] < vis[i[0]]:

vis[i[0]] = val + i[1] + h[i[0]]

par[i[0]] = (now, i[1])

heapq.heappush(pq, (vis[i[0]], i[0]))

if vis[d] == *float*('inf'):

output\_file.write("NO PATH FOUND\n")

else:

path = [d]

dist = 0

now = d

while par[now]:

path.append(par[now][0])

dist += par[now][1]

now = par[now][0]

output\_file.write("Path: ")

for i in *range*(*len*(path) - 1, -1, -1):

output\_file.write(f"{path[i]}{" -> " if i else "\n"}")

output\_file.write(f"Total distance: {dist} km")

input\_file.close()

output\_file.close()