|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **1,1** | **1,2** | **1,3** | **1,4** | **1,5** |
| 100 | 99 | 120 | 30 | 70 |
| **2,1** | **2,2** | **2,3** | **2,4** | **2,5** |
| 3 | 1 | 110 | 97 | 68 |
| **3,1** | **3,2** | **3,3** | **3,4** | **3,5** |
| 103 | 2 | 105 | 89 | 92 |
| **4,1** | **4,2** | **4,3** | **4,4** | **4,5** |
| 87 | 4 | 2 | 201 | 73 |
| **5,1** | **5,2** | **5,3** | **5,4** | **5,5** |
| 110 | 90 | 5 | 80 | 81 |

from queue import PriorityQueue

def path\_find(size, start, goal, values):

frontiers = PriorityQueue()

cell\_visited = []

sum\_cost = 0

frontiers.put((sum\_cost, [start]))

print(start)

while not frontiers.empty():

frontier\_expand = tuple(frontiers.get(-1))

sum\_cost = frontier\_expand[0]

path = list(frontier\_expand[1])

frontier\_loc = path[-1]

cell\_visited.append(frontier\_loc)

if frontier\_loc == goal:

print("Least Cost Path is : ", frontier\_expand[0])

return path

else:

row\_index = frontier\_loc[0]

col\_index = frontier\_loc[1]

# if cell is not on bottom edge

if row\_index != 1 and (row\_index - 1, col\_index) not in cell\_visited:

cost = sum\_cost + values[row\_index - 2][col\_index - 1] + 1

frontier\_path = list(path)

frontier\_path.append((row\_index - 1, col\_index))

frontier = (cost, frontier\_path)

frontiers.put(frontier)

# if cell is not on left edge

if row\_index != 1 and (row\_index, col\_index - 1) not in cell\_visited:

cost = sum\_cost + values[row\_index - 1][col\_index - 2] + 1

frontier\_path = list(path)

frontier\_path.append((row\_index, col\_index - 1))

frontier = (cost, frontier\_path)

frontiers.put(frontier)

# if cell is not on top edge

if row\_index != size and (row\_index + 1, col\_index) not in cell\_visited:

cost = sum\_cost + values[row\_index][col\_index - 1] + 1

frontier\_path = list(path)

frontier\_path.append((row\_index + 1, col\_index))

frontier = (cost, frontier\_path)

frontiers.put(frontier)

# if cell is not on right edge

if row\_index != size and (row\_index, col\_index + 1) not in cell\_visited:

cost = sum\_cost + values[row\_index - 1][col\_index] + 1

frontier\_path = list(path)

frontier\_path.append((row\_index, col\_index + 1))

frontier = (cost, frontier\_path)

frontiers.put(frontier)

leastCostPath = path\_find(5, (1, 1), (5, 3), [[100, 99, 120, 30, 70], [3, 1, 110, 97, 68], [103, 2, 105, 89, 92], [87, 4, 2, 201, 73], [110, 90, 5, 80, 81]])

print("The least cost path is : ", leastCostPath)