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**Aim of the Experiment:** Implementation of Informed search algorithm- A\* **Program/ Steps:**

import heapq

def heuristic(a, b):

return ((a[0] - b[0]) \*\* 2 + (a[1] - b[1]) \*\* 2) \*\* 0.5 def astar(graph, start, goal):

open\_set = []

heapq.heappush(open\_set, (0, start))

came\_from = {}

cost\_so\_far = {start: 0}

while open\_set:

current\_cost, current\_node = heapq.heappop(open\_set) if current\_node == goal:

path = []

while current\_node in came\_from:

path.append(current\_node)

current\_node = came\_from[current\_node]

return path[::-1]

for next\_node in graph[current\_node]:

new\_cost = cost\_so\_far[current\_node] +

graph[current\_node][next\_node]

if next\_node not in cost\_so\_far or new\_cost &lt;

cost\_so\_far[next\_node]:

cost\_so\_far[next\_node] = new\_cost

priority = new\_cost + heuristic(goal, next\_node)

heapq.heappush(open\_set, (priority, next\_node))

came\_from[next\_node] = current\_node

return None

graph = {

(0, 0): {(1, 0): 1, (0, 1): 1},

(1, 0): {(2, 0): 1, (1, 1): 1, (0, 0): 1},

(0, 1): {(1, 1): 1, (0, 0): 1},

(1, 1): {(2, 1): 1, (1, 0): 1, (0, 1): 1},

(2, 0): {(1, 0): 1, (2, 1): 1},

(2, 1): {(2, 0): 1, (1, 1): 1}

}

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start\_node = (0, 0)

goal\_node = (2, 1)

path = astar(graph, start\_node, goal\_node)

print(path)

**Output/Result:**

**[(1, 0), (1, 1), (2, 1)]**

**Outcomes:**

**Analyze and formalize the problem and select the appropriate search method and write the algorithm.**

**Conclusion (based on the Results and outcomes achieved):**

**Thus we have successfully implemented informed search algorithm using A\* Algorithm on a predefined graph.**

**References:**

1. Stuart Russell and

Peter Norvig, Artificial Intelligence: A Modern Approach,

Second Edition, Pearson Publication

2. Luger, George F. Artificial Intelligence : Structures and

strategies for complex problem solving , 2009 ,6th Edition,

Pearson Education

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