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**Experiment 03 A\* algorithm**

**Aim:**

To write a program to solve any problem using A\* algorithm.

**Code:**

**def a\_star(g, s, t, h):**

**open\_list, p, d = [(h[s], s)], {}, {n: float('inf') for n in g}**

**d[s] = 0**

**while open\_list:**

**open\_list.sort() # Sort by f-score (g + h)**

**\_, c = open\_list.pop(0) # Get the node with the smallest f-score**

**if c == t:**

**path = []**

**while c in p:**

**path.append(c)**

**c = p[c]**

**return [s] + path[::-1]**

**for n, cost in g[c].items():**

**new\_d = d[c] + cost**

**if new\_d < d[n]:**

**p[n], d[n] = c, new\_d**

**open\_list.append((new\_d + h[n], n))**

**return []**

**# Example**

**g = {'S': {'A': 1, 'B': 4}, 'A': {'B': 2, 'C': 5}, 'B': {'C': 1}, 'C': {'G': 3}, 'G': {}}**

**h = {'S': 7, 'A': 6, 'B': 2, 'C': 1, 'G': 0}**

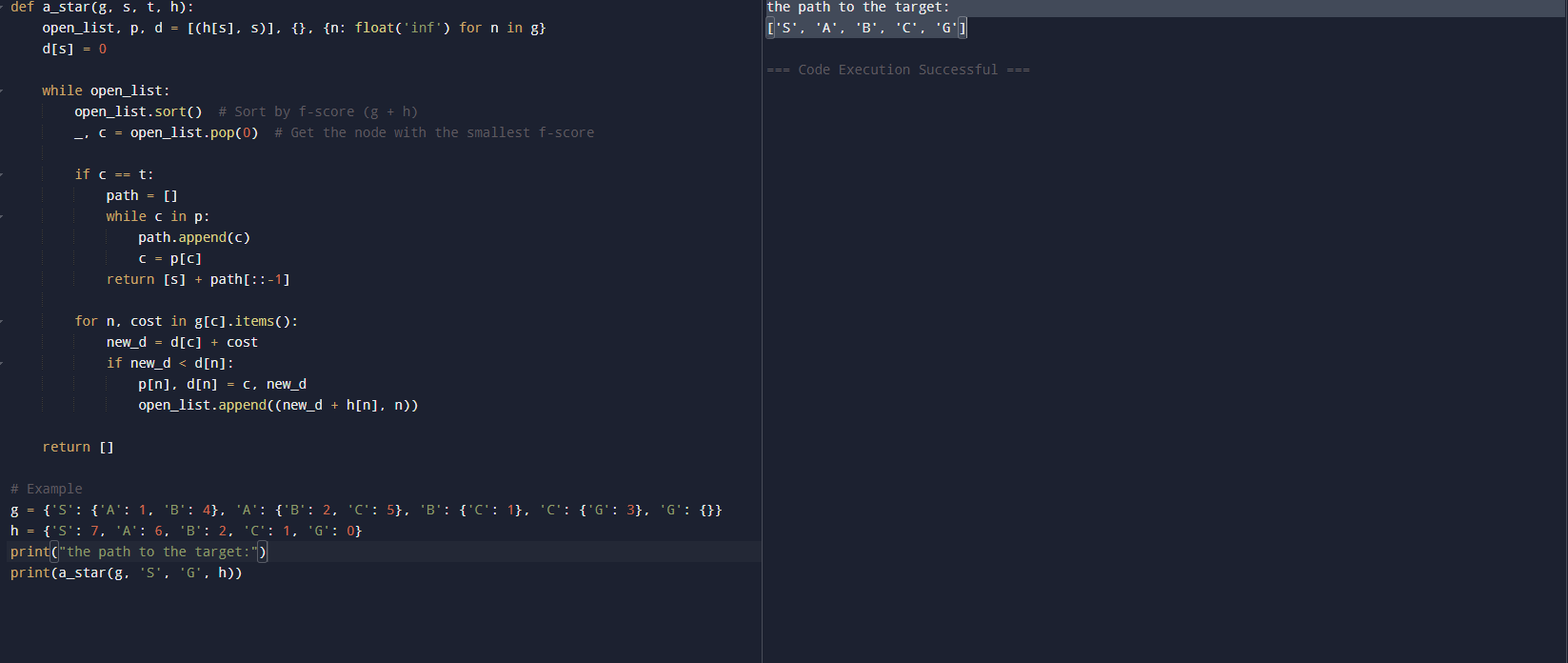
**print("the path to the target:")**

**print(a\_star(g, 'S', 'G', h))**

**output:**

**the path to the target:**

**['S', 'A', 'B', 'C', 'G']**

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