



# University of Asia Pacific

**Course Title** - Artificial Intelligence & Expert System

**Course Title** - CSE 404

**Submitted By -**

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Section - A-1

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**Problem Statement** : Create your own map from your home district to University of Asia Pacific and write in any programming language to implement the A\* search to reach the destination from the starting point by using the path costs and straight line distances.

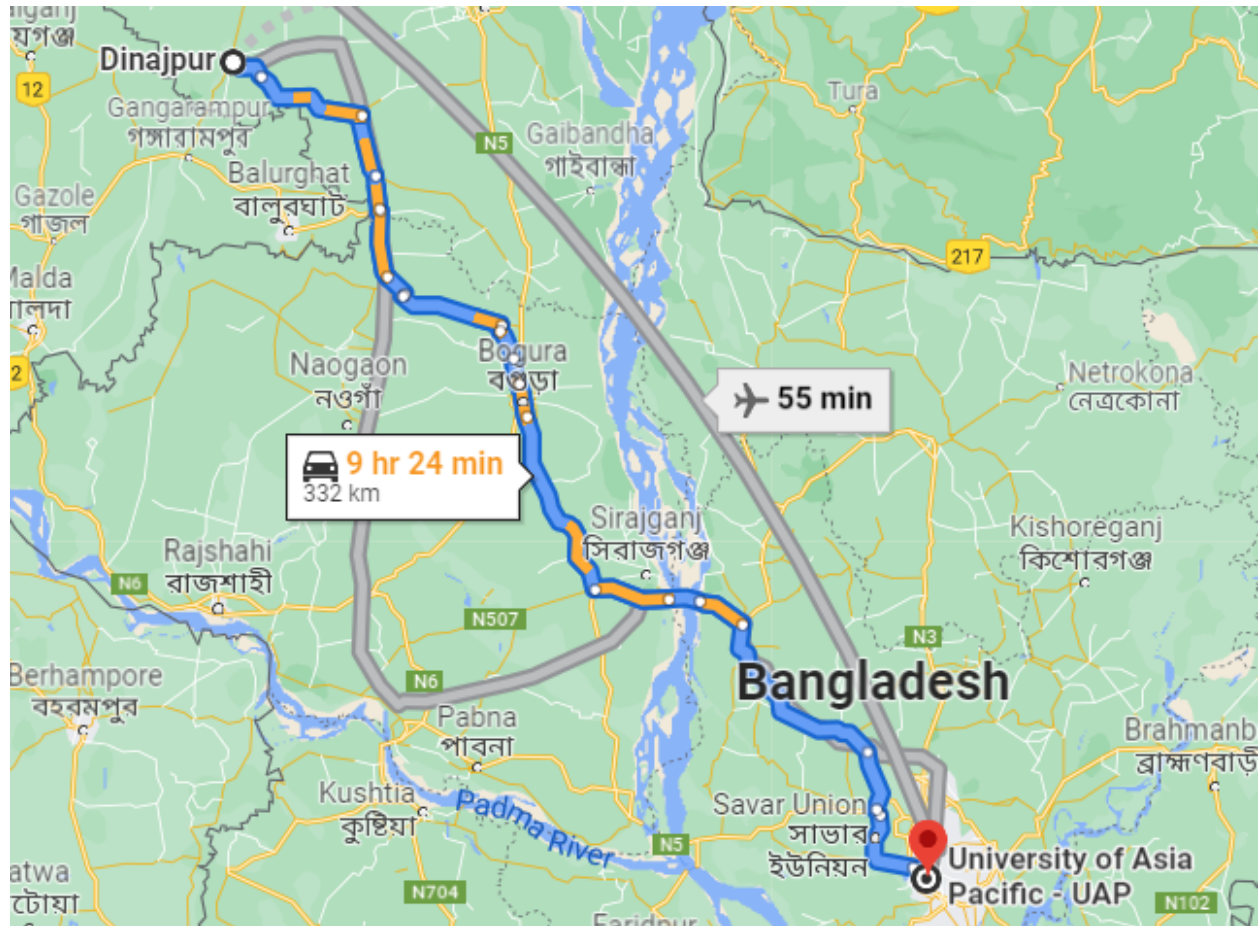
### **A\* Search Algorithm**

A\* Algorithm in Python or in general is basically an artificial intelligence problem used for path-finding (from point A to point B) and the Graph traversals.

This Algorithm is the advanced form of the BFS algorithm (Breadth-first search), which searches for the shorter path first than the longer paths. It is a complete as well as an optimal solution for solving path and grid problems.

## My Map

Google map : Dinajpur to University of Asia Pacific(UAP)

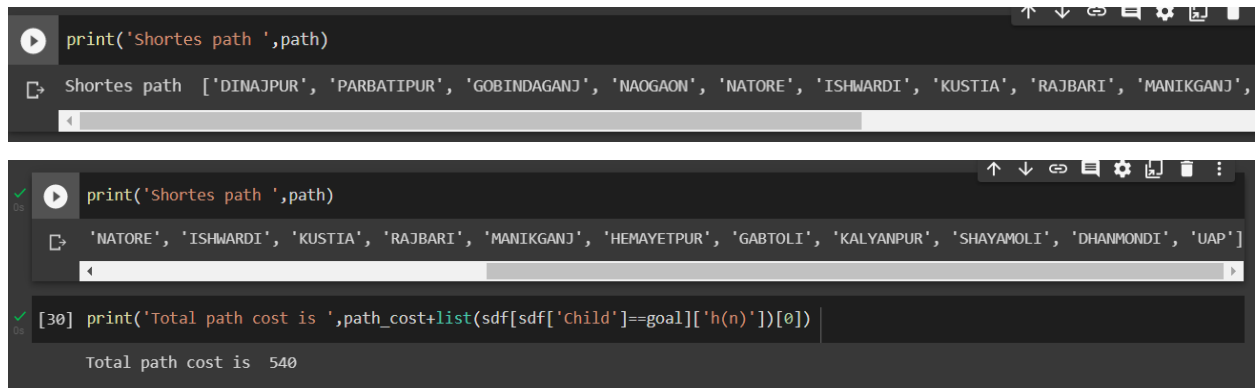


```

graph TD
    Shayamoli[Shayamoli 1] -- 4 --> Bhanmondi[Bhanmondi 3]
    Bhanmondi -- 2 --> UAP[UAP 0]
    Shayamoli -- 2 --> Kalyanpur[Kalyanpur 1]
    Kalyanpur -- 6 --> Gabtoli[Gabtoli 7]
    Gabtoli -- 9 --> Hemayetpur[Hemayetpur 5]
    Hemayetpur -- 44 --> Manikganj[Manikganj 28]
    Hemayetpur -- 6 --> Savar[Savar 57]
    Manikganj -- 66 --> Rajbari[Rajbari 34]
    Rajbari -- 66 --> Kustia[Kustia 24]
    Kustia -- 34 --> Iswardi[Iswardi 31]
    Iswardi -- 44 --> Natore[Natore 43]
    Natore -- 54 --> Naogaon[Naogaon 59]
    Naogaon -- 78 --> Gobindaganj[Gobindaganj 46]
    Gobindaganj -- 101 --> Parsbatipur[Parsbatipur 17]
    Parsbatipur -- 30 --> Dinajpur[Dinajpur 2]
    Dinajpur -- 38 --> Fulbari[Fulbari 34]
    Fulbari -- 14 --> Birampur[Birampur 12]
    Birampur -- 35 --> Joypurhat[Joypurhat 32]
    Joypurhat -- 54 --> Bogura[Bogura 27]
    Bogura -- 62 --> Sirraiganj[Sirraiganj 54]
    Sirraiganj -- 49 --> Tangail[Tangail 32]
    Tangail -- 68 --> Savar
  
```

## Output :

Shortest Path : Dinajpur > Parbatipur > Gobindaganj > Naogaon > Natore > Ishwardi > Kustia > Rajbari > Manikganj > Hemayetpur > Gabtoli > Kalyanpur > Shayamoli > Dhanmondi > UAP



```
print('Shortes path ',path)
Shortes path  ['DINAJPUR', 'PARBATIPUR', 'GOBINDAGANJ', 'NAOGAON', 'NATORE', 'ISHWARDI', 'KUSTIA', 'RAJBARI', 'MANIKGANJ', 'HEMAYETPUR', 'GABTOLI', 'KALYANPUR', 'SHAYAMOLI', 'DHANMONDI', 'UAP']

print('Shortes path ',path)
'NATORE', 'ISHWARDI', 'KUSTIA', 'RAJBARI', 'MANIKGANJ', 'HEMAYETPUR', 'GABTOLI', 'KALYANPUR', 'SHAYAMOLI', 'DHANMONDI', 'UAP']

[30] print('Total path cost is ',path_cost+list(sdf[sdf['Child']==goal]['h(n')])[0])
Total path cost is  540
```