

Department of Computer Science & Engineering

**Course Title :** Artificial Intelligence and Expert Systems Lab

**Course Code :** CSE 404

# Lab Report : 02

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# Submitted To: Submitted By:

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**Problem Title:**

Finding the Optimal Path from Mogbazar Mor Noyatola to UAP Using A\* Search Algorithm

**Problem Description:**

The objective of this problem is to determine the optimal path from Azimpur Bus Stand(home) to UAP(University of Asia Pacific) using the A\* search algorithm.

***A Search Algorithm*\***

f(n) = g(n) + h(n)

Where:  
f(n) = Evaluation function  
g(n) = Actual cost from the start node to the current node  
h(n) = Heuristic estimated cost from the current node to the goal node

**Tools and Languages Used:**

* Programming Language: Python
* Tools: Colab Notebook

**Diagram:**

**Designed Graph:**

* Edge labels represent g(n) values (actual distances in km from Google Maps)
* Node labels include h(n) values (heuristic cost using Manhattan Distance)

**Diagram:**

**Designed Graph**

**A diagram of a flowchart

AI-generated content may be incorrect.**

Here,

Start Node : Mogbazar Noyatola (Home) Goal Node : UAP(University of Asia Pacific)

g(n) : Calculated in Kilo meter(km) from Google Maps

h(n) : Calculated from Google Maps(Longitude,Latitude),using Manhattan Distance(Longitude - Latitude).

**Designed Search Tree**

**A diagram of a road

AI-generated content may be incorrect.**

**Sample Input/Output:**

**A screenshot of a computer program

AI-generated content may be incorrect.**

A screenshot of a computer program

AI-generated content may be incorrect.

**Output:**

Optimal Path: Mogbazar Mor Noyatola -> Mogbazar Mor -> Banglamotor -> Bashundhara Signal -> Panthapath Signal -> UAP

Total Cost (km): 4.1

**Conclusion:**

By implementing the A\* search algorithm, we successfully determined the most optimal path from Mogbazar Mor Noyatola to UAP while minimizing travel distance. The algorithm efficiently balances actual travel cost (g(n)) and estimated distance (h(n)), ensuring the shortest possible route.