CS 414 – Artificial Intelligence
Assignment No 3

Due Date: 26-December

Problem 1.

Transportation Problem

We have as street with blocks numbered from 1 to n. Walking from s to s+1 takes 1 minute. Running from s to s+3 takes 1.5minutes. Taking a magic tram from s to 2s takes 2 minutes. How to travel from 1 to n in the least time?

Apply Depth first search, breadth first search, dynamic programming and uniform cost search to find a solution. You can assume costs to zero and constants where deemed necessary.

Problem 2.

Use google map to identify the location of Markaz of different sectors in Islamabad. (e.g I-8 Markaz, I-10 Markaz etc.) and draw a graph between these identified Markaz and label the edges with the distances representing the cost from one to another Markaz. Choose source and destination from these Markaz randomly from any sector I as source to any other sector F or E as destination. Assume a suitable heuristic function to estimate value of each Markaz to destination and the apply uniform and A* search algorithms to find minimum cost path from source to destination. Analyze both algorithm and identify which one is more efficient and why? Efficiency can be measured in terms of number of nodes/Markaz explored during the searching process.

Problem 3.

Consider the transportation problem with different number of blocks n. Prepare a labeled data set (at least 20 training examples) having problem instance as input and minimum cost path as target output (you can find the minimum cost path using running any search algorithm by assuming true parameter/action cost). Now assume that the action costs are unknown. Perform learning the cost function using structured perceptron.