**Assignment 1 part 2: Shortest path from A to B**

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1. Give the representation of a solution (answer) of the problem, as explained during the course.

A possible representation of a solution of the problem is as follows:

X = {X1, X2, X3, …, Xn}

Where n is a number of cities, Xi is one single node and its domain is Xi = {0,1} which means it can be in chosen or not.

1. Give the equation of **f(n)** used in **Greedy Best-first Search** (or explain how to calculate f(n)).

The equation is as follows:

f(n) = h(n)

It is also called the evaluation function and is based only on the heuristic function h(n). In this case h(n) is the distance from current city to end city (Malaga to Valladolid).

1. Give the equation of **f(n)** used in **A\*** (or explain how to calculate f(n)).

The equation is as follows:

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

This algorithm combines the actual cost to reach a node and the estimated cost to that goal. g(n) is the actual cost from start node to node n, h(n) is heuristic function that estimates the cost from n to the goal.

1. Explain both algorithms and the differences between them.

Main difference between these two algorithms is how they calculate their evaluation function. A\* balances actual cost and heuristics while GBF does not care about previous distance covered. This makes A\* guarantee to find the optimal solution while GBF does not.

GBF is faster than A\*. A\* avoids unnecessary paths while GBF can get stuck in loops or suboptimal paths.