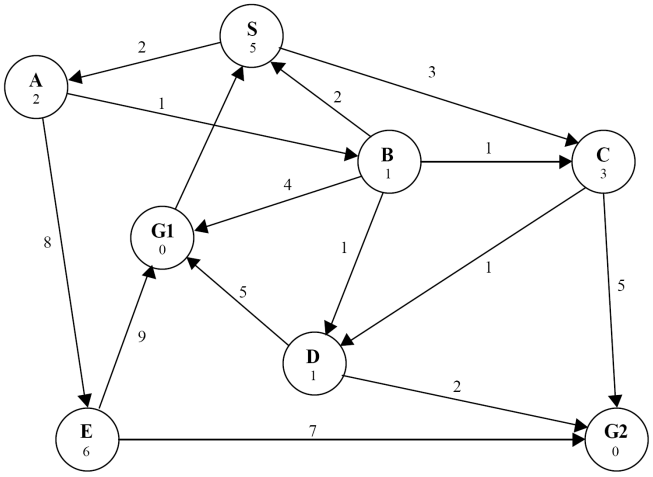
Istanbul Technical University, BLG435E, Sample Questions

Q1. Why do we need heuristic functions?

Q2. Consider the search space below, where *S* is the start node and *G1* and *G2* satisfy the goal test. Arcs are labeled with the cost of traversing them and the estimated cost to a goal is reported inside nodes.



For each of the following search strategies, indicate which goal state is reached (if any) and list the nodes expanded in order. Suppose that if a node has multiple successors, then the successors are expanded in increasing alphabetical order.

Bread-first Search

Goal state reached: _____ Nodes expanded: _____

Uniform Cost Search

Goal state reached: _____ Nodes expanded: _____

Iterative Deepening Search

Goal state reached: _____ Nodes expanded: _____

Best First Search

Goal state reached: _____ Nodes expanded: _____

A* Search

Goal state reached: _____ Nodes expanded: _____

Q3. Consider an environment with a mobile robot trying to navigate from an initial point to a goal position through an environment with many convex obstacles.
(a) Suppose the state space consists of all positions (x, y) in the plane. How many states are there? How many paths are there to the goal?
(b) While reducing the search space, construct an admissible heuristic dominating the straight line distance heuristic.