06-23069 *Introduction to AI*
Autumn Semester 2015
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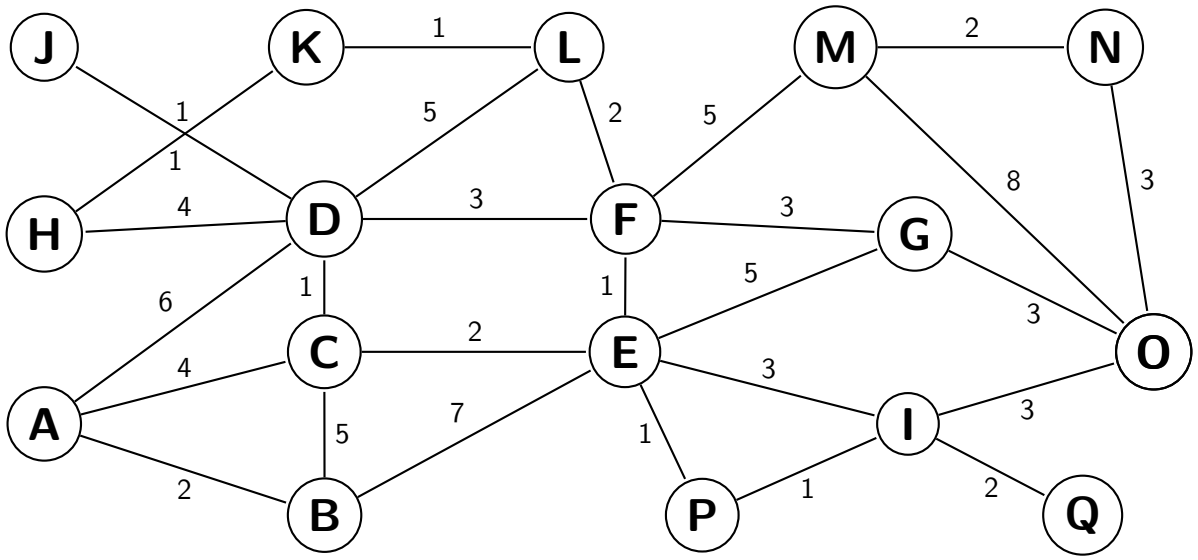
Exercise 1

This exercise consists of four questions, which make up 5% of the overall mark module mark, i.e., a quarter of the continuous assessment mark.

Submission The assignment is due 19^{th} **October 2015, 3pm**. The usual late submission penalties apply.

Please submit your solution electronically in Canvas by uploading a single PDF file. Handwritten are fine; please scan or photograph them and collate them into a single PDF file. Please also your ID number on the front page.

Consider the following search graph, where the numbers next to the edges indicate the cost of an edge in the path. Let the goal state $s_0 = A$ and the set of goal states $\mathcal{F} = \{O\}$



1. For this exercise ignore the path costs. Perform Depth-First-Search to find a path from A to O. Assume that nodes are expanded in alphabetic order. Write down carefully the values in your data structures `Explored` and `Frontier` as well as the search tree. [30%]

2. Perform Uniform Cost Search to find a path from A to O. Again assume that nodes are expanded in alphabetic order. Write down carefully the values in your data structures `Explored` and `Frontier` as well as the search tree. [30%]

3. Ignore again the path costs and perform bi-directional search to solve the problem. [30%]

4. Design an algorithm for bi-directional search that would allow you to search for an optimal solution with respect to path costs. [10%]