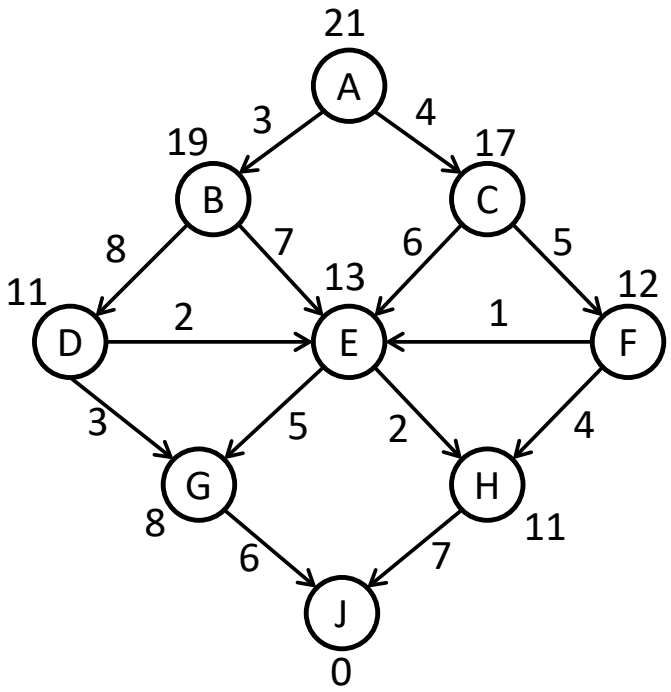
Tutorial 10 A*

Introduction

In this tutorial, you will gain better understanding about A* algorithm for pathfinding. Refer to Lecture 07 (slides 26-42) handout for completing this tutorial.

Task 1. A*

The following directed non-negative weighted graph shows 9 nodes and the connections among them with the corresponding costs. The value next to each node represents the estimated cost to the goal node J.



Apply A* algorithm to find the shortest path from node A to node J.

(a) What is the sequence of nodes that gives you the shortest path from node A to node J after applying A* algorithm? Is the result the same as the one you got from Dijkstra in Tutorial 09?

(b) What is the total cost for the shortest path from node A to node J that you obtained from A*? Is the result the same as the one you got from Dijkstra in Tutorial 09?

(c) Assume that now instead of terminating the A* algorithm in the optimal way to find the shortest path, you terminate the algorithm as soon as your goal node has the smallest estimated total cost in the open list.

(i) Will the algorithm be terminated sooner or later than your result in (a)?

(ii) What is the resulting sequence of nodes from node A to node J?

(iii) Is the path found in (ii) optimal or sub-optimal?

(d) Is the heuristic for the given estimated cost overestimating or underestimating?

Task 2. Complete the Canvas Quiz

Complete the quiz "Tutorial 10" on the Canvas course page (Assignments > Tutorial 10) before the posted deadline.