宿題 2

提出期限: **05 月 23 日 10:30**
提出場所: **room 28**

1. Consider the 5×5 grid in Fig 1. We would like to find the path from A to B, traveling only to the right (either up-right or down-right at each node). The numbers on the edges indicate the cost to travel between nodes.

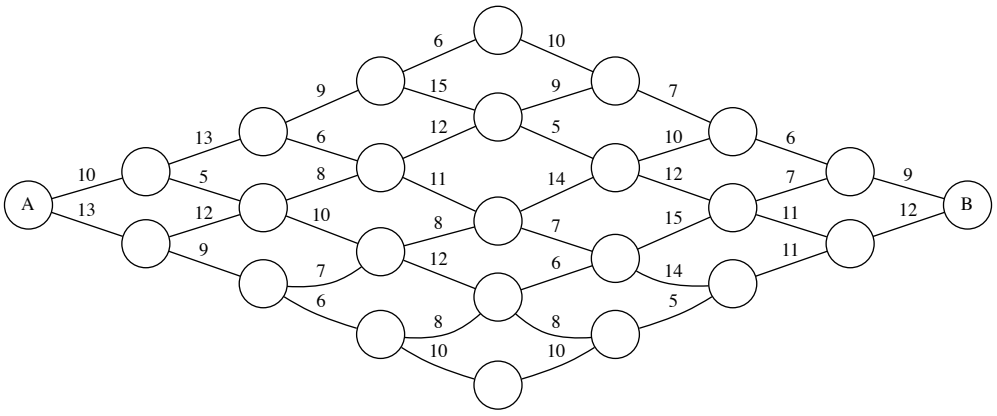

Fig. 1 5×5 grid combinatorial problem.

problem 1. Consider the minimum cost path problem. Derive the cost-to-go and find the optimal path.

problem 2. Consider the maximum cost path problem. Derive the cost-to-go and find the optimal path.

2. The dynamic programming algorithm can also be used on irregular patterns with more than two choices at some node, as shown in Fig. 2. Find the minimum cost path from node 12 to node 1, moving only to the right.
3. Let us consider the grid in Fig. 3 and suppose that node A indicates New York and node M is London. The air lines use the dynamic programming algorithm to find minimum time flight path, taking into account the strong winds that usually occur at cruising altitudes and the restrictions on possible route imposed

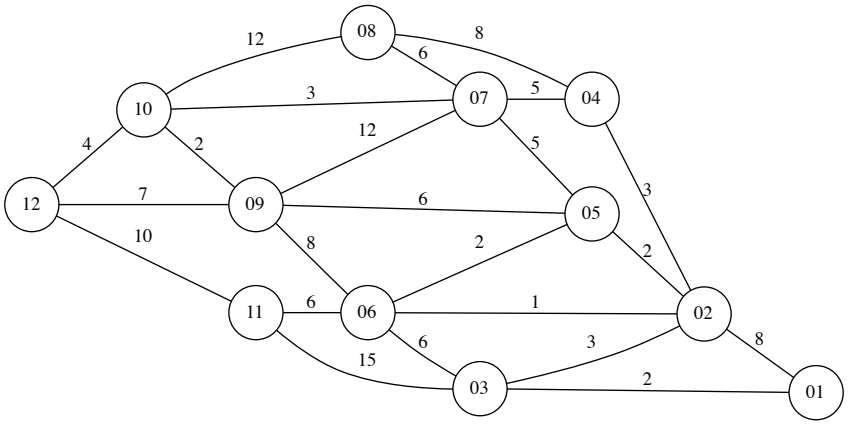

Fig. 2 Combinatorial problem for a irregular patters with more than two choices at some node.

by air traffic control. A grid of nodes is selected and all routes must consists of east to west path segments between nodes. A simplified version of such a grid is shown in Fig. 3. For the flight times given on each edge, find the minimum time flight path from New York to London.

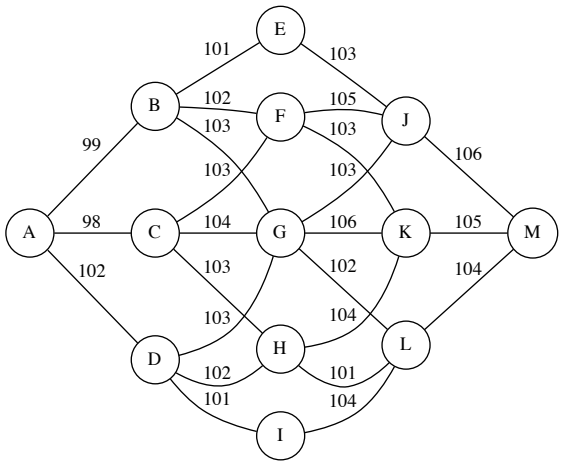

Fig. 3 Airlines flying path problem.

4. Consider the routing problem, as illustrated in Fig. 4. We wish to proceed

along a path from level 0 to successively to level 4, with the cost for each path given by the number associated with that particular edge. The total cost is measured by the sum of the cost of each edge and the terminal cost associated with each position of level 4 (e.g. position c has the terminal cost 2.).

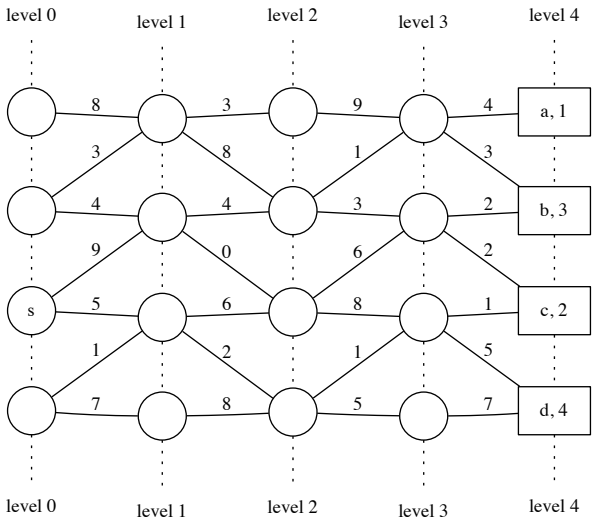

Fig. 4 Grid for problem.

problem 1 Find the minimum cost path from position s to level 4.

problem 2 Find the minimum cost path from position s to position b.

problem 3 Find the minimum cost path from level 0 to to level 4.