# Solutions to CS 401 / MCS 401 Quiz Number #4 — Fall 2007

1. [4 points] Use either Prim's algorithm or Kruskal's algorithm to find a minimal spanning tree (MST) for the weighted graph *G* below. At right, circle the algorithm you are using, and list the edges of the MST *in the order that they are selected*. [*Note:* Each of the integers 1, 2, ..., 22, 23 appears exactly once as an edge weight.]

Algorithm (please circle)   *Prim*   (*Kruskal*)
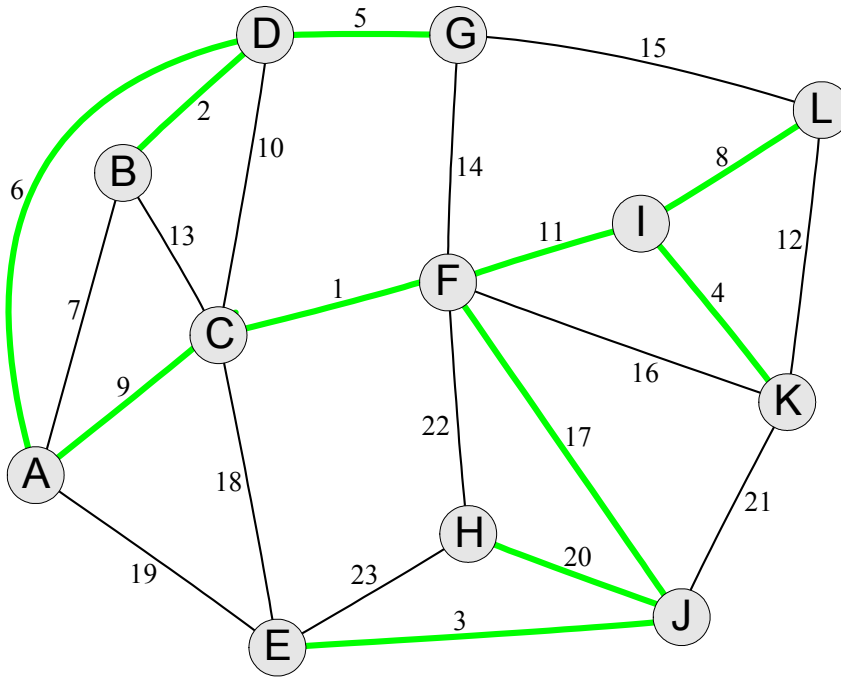
|	**Edges of MST in order chosen**
1st	**CF** (wt 1)
2nd	**BD** (wt 2)
3rd	**EJ** (wt 3)
4th	**IK** (wt 4)
5th	**DG** (wt 5)
6th	**DA** (wt 6)
7th	**IL** (wt 8)
8th	**AC** (wt 9)
9th	**FI** (wt 11)
10th	**FJ** (wt 17)
11th	**JH** (wt 20)

2. [6 points] Perform a depth-first search of the digraph below. *When making an arbitrary choice among vertices, always choose the alphabetically-first vertex.*

i) **[4 points]** Label each vertex with its discover and finish time. (The first time is 1.).

ii) **[1 point]** Highlight the tree edges.

iii) **[1 point]** List the cross edges below.

BA, EG, IJ, HD, HJ
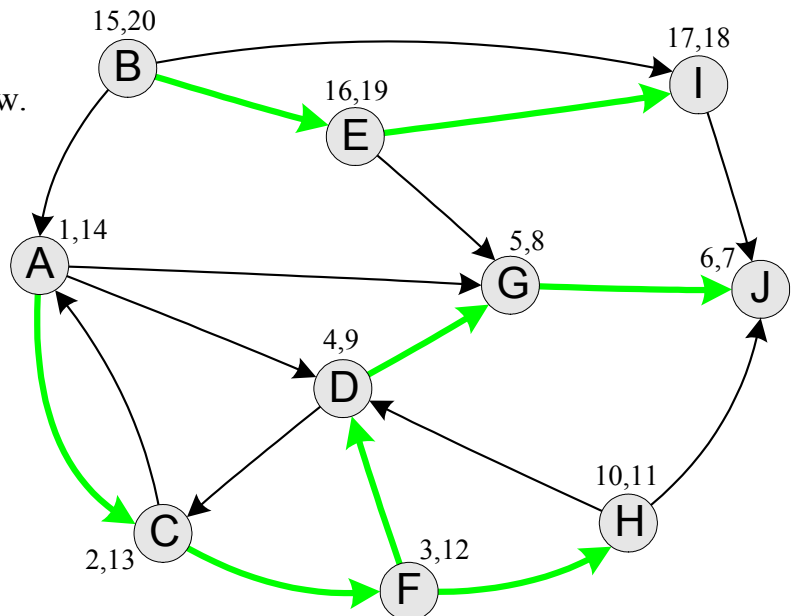
Note: The back edges **CA**, **DC**.

The forward edges are **AD**, **AG**, and **BI**.