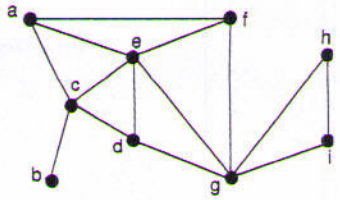
Practice Problems

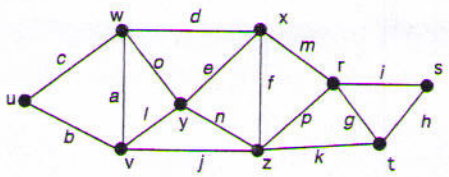
In Exercises 4.4.1 through 4.4.7, (a) give the dfnumber and low values for each vertex that result from a depth-first search on the graph shown, starting at the specified vertex. Use the alphabetical order of the vertex names as the default priority; (b) verify the characterization given by Corollary 4.4.12 for the calculations of part (a).

4.4.1[S] Vertex a.
4.4.2 Vertex b.
4.4.3 Vertex c.
4.4.4 Vertex e.
4.4.5[S] Vertex g.
4.4.6 Vertex i.
4.4.7 Vertex f.



In Exercises 4.2.1 through 4.2.7, draw the depth-first tree that results when Algorithm 4.2.1 is applied to the graph shown below, starting at the specified vertex. Include the dfnumbers and use: (a) lexicographic order as the default priority; (b) reverse lexicographic order as the default priority.

4.2.1[S] Vertex w.
4.2.2 Vertex u.
4.2.3 Vertex x.
4.2.4 Vertex y.
4.2.5[S] Vertex t.
4.2.6 Vertex z.
4.2.7 Vertex s.



Ignore the comments about orders & pick edges at random when you have more than one candidate.

Algorithm 4.2.1 : Depth-First-Search Algorithm

Corollary 4.4.12 : Let T be the result of applying DFS to a connected graph G. Then a non-root v of T is cut-vertex if and only if v has a child w such that

$$low(w) \geq dfnumber(v)$$