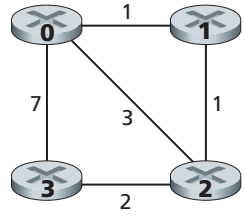
In this lab, you will write your own Ping application in Python. Your application will use ICMP. But in order to keep your program simple, you will not exactly follow the official specification in RFC 1739. Note that you will only need to write the client side of the program, as the functionality needed on the server side is built into almost all operating systems. You can find full details of this assignment, as well as important snippets of the Python code, at the Web site http://www.awl.com/kurose-ross.

Programming Assignment

In this programming assignment, you will be writing a "distributed" set of procedures that implements a distributed asynchronous distance-vector routing for the network shown below.

You are to write the following routines that will "execute" asynchronously within the emulated environment provided for this assignment. For node 0, you will write the routines:



- *rtinit0()*. This routine will be called once at the beginning of the emulation. *rtinit0()* has no arguments. It should initialize your distance table in node 0 to reflect the direct costs of 1, 3, and 7 to nodes 1, 2, and 3, respectively. In the figure above, all links are bidirectional and the costs in both directions are identical. After initializing the distance table and any other data structures needed by your node 0 routines, it should then send its directly connected neighbors (in this case, 1, 2, and 3) the cost of its minimum-cost paths to all other network nodes. This minimum-cost information is sent to neighboring nodes in a routing update packet by calling the routine *tolayer2(),* as described in the full assignment. The format of the routing update packet is also described in the full assignment.
- *rtupdate0(struct rtpkt *rcvdpkt)*. This routine will be called when node 0 receives a routing packet that was sent to it by one of its directly connected neighbors. The parameter **rcvdpkt* is a pointer to the packet that was received. *rtupdate0()* is the "heart" of the distance-vector algorithm. The values it receives in a routing update packet from some other node *i* contain *i*'s current shortest-path costs to all other network nodes. *rtupdate0()* uses these received