ENGR 476 Lab Assignments

Programming assignment 3

ROUTING ALGORITHMS (Layer 3 protocol)

Routing algorithms can be grouped into two major classes: non-adaptive and adaptive. **Non-adaptive algorithms** do not base their routing decisions on measurements or estimates of the current traffic and topology. Instead, the choice of the route to use to get from i *to j* (for all i and j) is computed in advance, off-line, and downloaded to the IMPS when the network is booted. This procedure is sometimes called **static routing. Adaptive algorithms,** on the other hand, attempt to change their routing decisions to reflect changes in topology and the current traffic. Three different families of adaptive algorithms exist, differing in the information they use. The global algorithms use information collected from the entire subnet in an attempt to make optimal decisions. This approach is called centralized routing. The local algorithms run separately on each IMP and only use information available there, such as queue length. These are known as isolated algorithms. Finally, the third class of algorithms uses a mixture of global and local information. They are called distributed algorithms.

Shortest Path Routing

Dijkstra is an example of this type of algorithms for computing the shortest path between two nodes. Your assignment here is to write a program using C programming language to determine the shortest path between a source node and a destination node specified by user. *Figure 2* shows a sample network in which connectivity costs between nodes are indicated on the links.

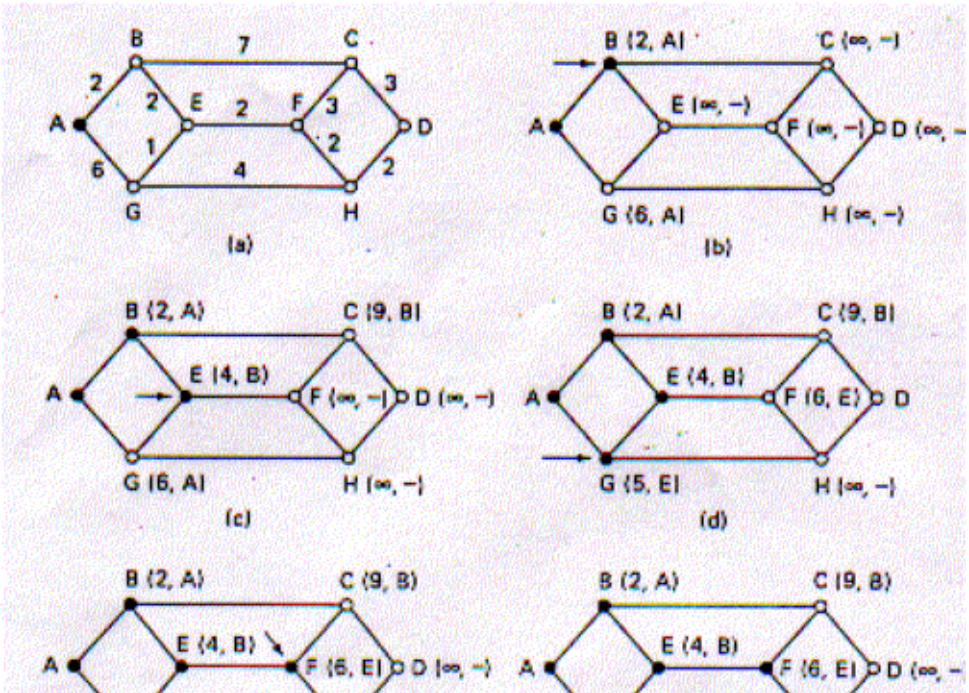

Figure 2: The steps used in computing the shortest path from A to D. The arrows indicate the working node.

Your assignment is to write a C program that reads the connectivity cost matrix from a file that you provide it, and once run it continuously prompts the user for a source and destination node. Then it computes the shortest path as well as its cost and prints the route as well as the cost to screen.
You can use the example shown in figure 2 as your test network.