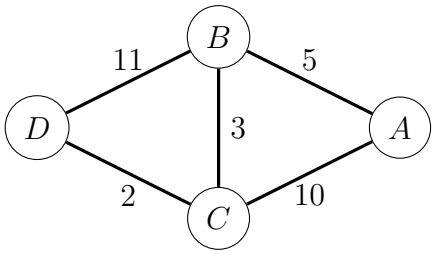
Indian Institute of Technology Bombay

Department of Electrical Engineering

Handout 30 EE 706 Communication Networks

Solutions to Quiz 10 April 14, 2010

For the network shown below, assume that link state routing is used to build the routing tables. Suppose that node A has received the link state packets from all the other nodes. Detail the steps of Dijkstra's algorithm for calculating the shortest paths at node A by adding the rows to the table given below.



Step	M	$N-M$	Cost to B, Next hop to B	Ct to C, NH to C	Ct to D, NH to D
1	$\{A\}$	$\{B,C,D\}$	5,B	10,C	∞,-

Psuedocode for Dijkstra's algorithm is given below for your convenience. It calculates the shortest paths at a source node S. N is the set of all nodes, $C_S(X)$ is the cost of reaching node X from node S and $l(S,X)$ is the cost of the edge from node S to node X.

$M = \{S\}$
for each X in $N - \{S\}$
  $C_S(X) = l(S,X)$
  if $C_S(X) < \infty$, next hop for X is X itself
while $(N \neq M)$
  $M = M \cup \{Y\}$ such that $C_S(Y)$ is the minimum among all Y in $(N - M)$
  for each X in $(N - M)$
    $C_S(X) = \min\{C_S(X), C_S(Y) + l(Y,X)\}$
    if $C_S(X)$ has changed, next hop for X is the next hop to reach Y from S

Answer.

Step	M	$N-M$	Cost to B, Next hop to B	Ct to C, NH to C	Ct to D, NH to D
1	$\{A\}$	$\{B,C,D\}$	5,B	10,C	∞,-
2	$\{A,B\}$	$\{C,D\}$	5,B	8,B	16,B
3	$\{A,B,C\}$	$\{D\}$	5,B	8,B	10,B
4	$\{A,B,C,D\}$	$\{\}$	5,B	8,B	10,B