TECHNISCHE UNIVERSITÄT BERLIN
Fakultät IV – Elektrotechnik und Informatik
Fachgebiet Intelligente Netze
Prof. Anja Feldmann
Juhoon Kim, Franziska Lichtblau, Arne Ludwig, Philipp Richter, Florian Streibelt

6th Assignment: Network Protocols and Architectures, WS 13/14

Question 1: $(10 + 15 + 10 + 15 = 50$ points) *Link State Routing*

In this exercise we will always use routers as start and destination points of any communication.

Think of the network as an undirected graph. Routers are modelled as nodes in the graph, links between the routers and their path costs are edges with the respective weight.

Given is a network with the nodes A, B, C, D, E, F, G, H, and I along with the following links with their weights:

(A, B, 4), (A, C, 5), (B, C, 3), (C, D, 8), (B, E, 13),
(C, F, 5), (E, F, 4), (E, G, 6), (F, G, 7), (G, H, 4)

(a) Draw the planar graph in a way such that edges don't overlap.
Hint: Try to find a layout where the length of the edges corresponds to the path costs. This approach helps keeping the overview and understanding routing decisions. **A quick sketch is sufficient!**

(b) Compute the shortest-path-tree of B, F, and I, using Dijkstra's algorithm. Give all the steps for node B. For the other two nodes the end result will suffice.
For your solution use the format of the table on slide 8 slide set "05: Routing" to represent the results of Dijkstra's algorithm. We will not accept other solution formats!

(c) Now derive the forwarding table for each of the nodes B, F, and I from the three shortest path trees. An example for node A could look like this:

Destination	Next Hop
A	self
B	B
C,D,E,F,G,H	C

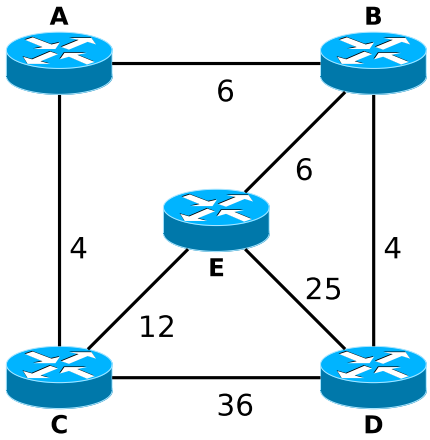
(d) Describe in short terms what will happen if the link B-C fails. Give the shortest-path-trees for the nodes B, F, and I. The end results suffice! How are the forwarding tables changing for these three nodes?

Please turn!

Question 2: (50 points) *Distance Vector Routing*

Consider the network shown below, and assume that each node initially knows the costs (the labels at the links) to each of its neighbors. Assume that all routers start at the same time and send their routing update messages synchronously. Consider the distance vector algorithm and show the distance table entries at node D over time until the routing is stable.

Use tables like in slide 15 of the slide set "05: Routing". We will **not** accept other table formats!



Due Date: Wednesday, December, 4th 2013 only until 09:55 h s. t.

- **As PDF files (no MS Office or OpenOffice files):** Uploaded via ISIS (`https://www.isis.tu-berlin.de/2.0/course/view.php?id=349`)
- **On paper:** Postbox in the Telefunkenhochhaus (basement, behind the doorman right)
- Put your name, StudentID number (Matrikelnummer) **and** the name of your tutor on your solution.