Computer Networks and Distributed Systems

Reference solution to Questionnaire no. 10

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Context

- Lecture of May 26th (Friday): IP routing, DV and Dijkstra's algorithms
- Exercise resolution session (In Lab B6): IP fragmentation and Longest Prefix Matching
- Based on the following lecture presentation:
    - (All slides) http://paloalto.unileon.es/cn/ch3-part3-2016.pdf

1. Can proliferation happen in an interconnection of IP routers? Explain you response.
   Typically, routers will not forward broadcast traffic, thereby preventing packet proliferation as understood in Ethernet switching

2. Reproduce the DV and Dijkstra examples contained in the presentation above and verify that the results are correct
   Overall, I checked the results appearing on the slides, however, some isolated error did slip in

3. Review the basic concepts about RIP and OSPF protocols:
   Consult your textbook for solving the following questions

    a. Their protocol data units
       Lookup Reliable Flooding in the textbook and list the relevant PDUs

    b. In what sense do we understand that Distance Vector algorithm is distributed?
       DV is a distributed algorithm, however, there's a non-distributed version of it, which is also based on the Bellman-Ford formula. We don't consider the latter in this course on CN.

    c. Is Dijkstra distributed, also?
       Like in the preceding case, Dijkstra has a distributed algorithm and a non-distributed one

    d. How can DV's count-to-infinity problem be avoided?
       In the development of the DV algorithm, two mechanisms were introduced in the DV algorithm for dealing with count-to-infinity

    e. Why is it necessary that LSPs be flooded *reliably*?
       Consult Reliable Flooding in the textbook

4. Solve the following exercises:
    a. From textbook chapter no. 3:
       46: *Carefully solve this exercise step-by-step, since it has* <u>*valuable hints*</u> *about DV and Bellman-Ford*

48: *Apply Dijkstra's algorithm assuming root node D*

49: *Consult Lab Practical no. 1 from year 2016; in your LabBook you must have already solved exercises similar to this*

62: *Use the notation explained in this chapter's presentation. <u>Forward Search Algorithm</u> is Dijkstra's algorithm. Assume root is node A (Fig. 3.59)*

63: *Assume root is node A of fig. 3.60*

68: *Proceed per the algorithm explained in the B1 classes of last Monday for partitioning an IP block space. You have examples of subnetwork partitioning in Spanish and English in the following document:* `http://paloalto.unileon.es/cn/CN-NotesOnVLSMandCIDR.pdf`

b. From the following document, which contains **solved exercises**:

http://paloalto.unileon.es/cn/CN-ExRefSol2013.pdf:

Page 10 and on: 1, 5, 7, 8, 9, 10 and 11 (Some of these were already recommended) 12, 13, 14 and 15