# Computer Networks and Distributed Systems

## Solutions to Questionnaire about IP routing

Parts of this document are based on textbook "*Conceptual Computer Networks*" (WIP)

## Context

- IP routing (Summary presentation: http://paloalto.unileon.es/cn/lect/CN-IP-Routing.pdf)

1. Can proliferation happen in an interconnection of IP routers? Explain you response.

   *Typically, routers will not forward any 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 might have slipped 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 the textbook by Peterson & Davie (Computer Networks), 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 Thursday (31st/June) for **partitioning an IP block space**. You have **examples** of subnetwork partitioning in Spanish and English in the following document. Test yourselves by solving exercise 3.2:*

      `http://paloalto.unileon.es/cn/notes/CN-NotesOnVLSMandCIDR.pdf`

   b. From the following document, which contains <u>solved exercises</u>:

      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