University of BADJI MOKHTAR - Annaba
Faculty of technology
Computer Science Departement

Class : RSA 01

Tutorial n: 02 "Optimal Spanning Tree problem & applications"

Exercise 01

Given the following network topologies,

1. How many spanning trees are possible for each case ?
2. Which ones are they ? Justify your response.

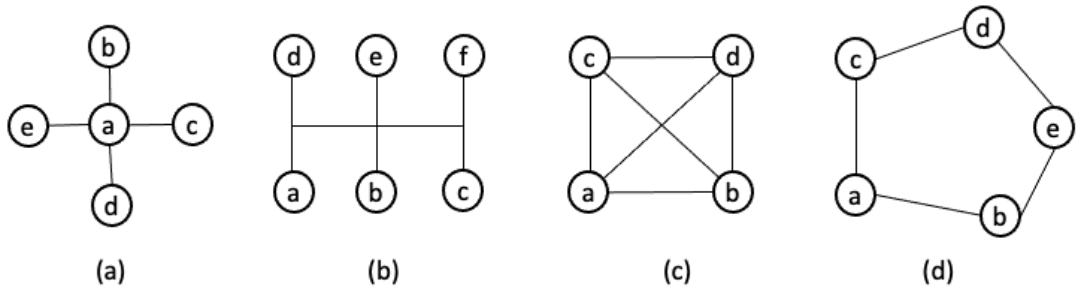

Figure 1 –

Exercise 02

Given the following computer network :

1. Construct the minimum-spanning tree using Kruskal's algorithm.
2. Construct the minimum-spanning tree using Prim's algorithm. What difference do you observe ?
3. Considering that the nodes of the graph represent switches, apply the Spanning Tree Protocol (STP) by unfolding its algorithm on the Figure 2 (a) network and knowing that switch "a" is its root (Root-Bridge). What do you notice ?
4. If we replace switches with sensors and links with wireless connections as shown in Figure 2 (b) and if we consider the energy consumption status given by : a = 90%, b = 30%, c = 95%, d = 60%, e = 50%, what would be the spanning tree of this network ?

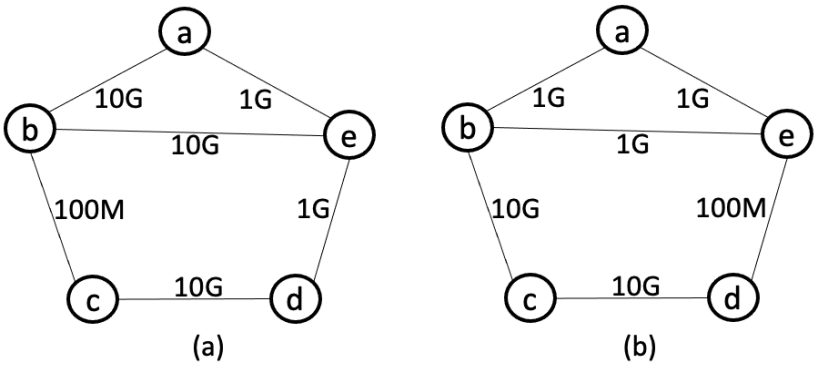

Figure 2 – MST/Wireless network