

Exam in Course 2D1490
IP routing in simple computer networks

NADA/KTH

20030423

No books or notes are allowed.
The questions are not sorted in order of difficulty.
All answers must be well-motivated, and written in a legible style.
Total number of possible points: 50
Preliminary score needed for a passing grade: 30.
Good luck!

1. **General**

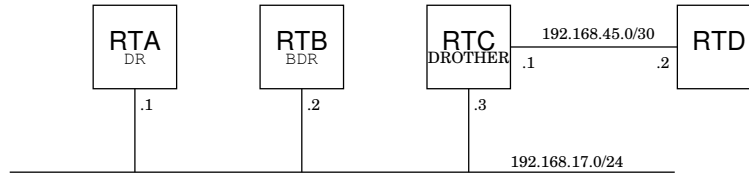
- (a) What is a floating route? (1p)
Give an example of when a floating route could be useful. (2p)
When are they useless? (2p)
- (b) Describe Link State Protocols and Distance Vector Protocols. What are the main differences between the paradigms? (5p)

2. **RIP**

- (a) Describe the Bellman-Ford algorithm for SPF calculations. (4p)
- (b) How is the Bellman-Ford algorithm implemented in RIP? (2p)
- (c) “Count to Infinity” is a fundamental problem in Distance Vector paradigm.
 - i. What is it? (2p)
 - ii. RIP has introduced quite a few enhancements so that it can avoid this problem. List four of them, and explain why they help. (8p)

3. OSPF

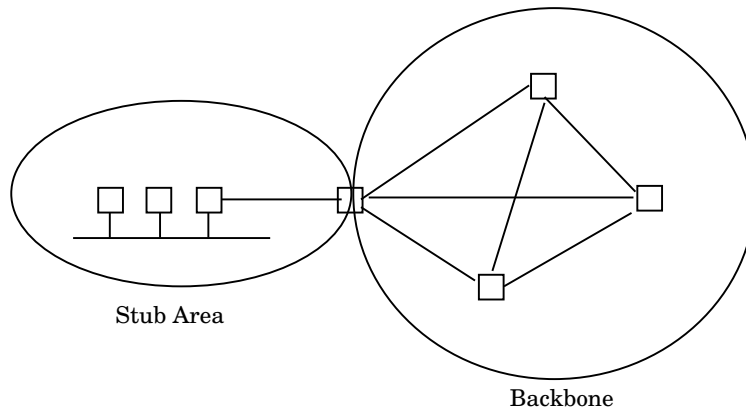
Study the topology below:



Routers RTA, RTB, and RTC are all on the same shared medium. RTC is connected to RTD on a point-to-point link. Assume that the routing domain has converged. All routers belong to a single area.

- How many LSAs does RTD have in its Link State Database? (1p)
- How many LSAs does RTD originate? (1p)
- List the LSAs which RTA has in its Link State Database. Specify the **LS Type**, **Advertising Router**, and payload for each LSA. (10p)
- Assume RTD suddenly goes down. How does OSPF deal with these occurrences in shared mediums? To ask the question in another way: How does RTC inform the other routers in the shared medium that it cannot reach RTD anymore? (4p)

Assume now that RTD never went down. Instead, all the routers in the topology above are now in a Stub Area, with RTD as ABR to Area 0. Area 0 consists of four routers connected by point-to-point links in a full mesh. See the topology below:



- The ABR will originate LSAs into each Area. Describe each LSA which it originates:
 - ... into the Backbone (2p)

ii. ...into the Stub Area (2p)

4. Switching

(a) How does a Switch build its table? (2p)

(b) What is the Spanning Tree Protocol, and why do we need it? (2p)