

ITS323 – Quiz 6

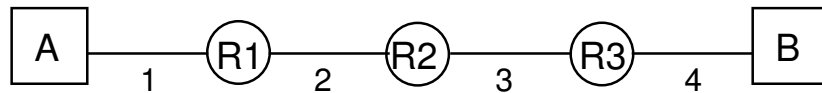
Introduction to Data Communications, Semester 1, 2010

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ITS323Y10S1Q06, Steve/Courses/ITS323/Assessment/Quiz6.tex, r1411

Question 1 [4 marks]

Consider the internet below where source A is sending 12KB of data to destination B. The 4 subnets are numbered. The maximum packet size that is allowed by each subnet link layer is: 2000B (subnet 1); 4000B (subnet 2); 4000B (subnet 3); 1000B (subnet 4). There are 3 possible fragmentation schemes: fragmentation and re-assembly at any node; fragmentation only at the source, re-assembly only at the destination; or fragmentation at any node, re-assembly only at the destination. Assume the [1st | 2nd | 3rd] scheme is being used. You can ignore the size of headers in the following questions.



- (a) What is the maximum size of each packet sent across the 2nd subnet? [2 marks]

Answer. *With the 1st scheme (fragment and reassemble at any node), node A fragments into 2000B packets and sends to R1. R1 reassembles all the packets to get the original data, then fragments into 4000B packets. Hence the answer is 4000B. With the 2nd scheme (fragment only at source, reassembly only at destination), node A must know the minimum maximum packet size along the path, which is 1000B. Node A fragments into 1000B packets and sends to R1. R1 sends those packets (without fragmentation/reassembly) to R2. Hence the answer is 1000B. With the 3rd scheme (fragment anywhere, reassemble at the destination), node A sends 2000B packets to R1. R1 cannot reassembly and hence sends those 2000B packets to R2. Hence the answer is 2000B.*

- (b) What is an advantage of this fragmentation/re-assembly scheme (compared to the [2nd | 1st | 2nd] scheme)? [1 mark]

Answer. *Comparing the three schemes: 1st scheme has advantage that maximum sized packets will be sent over each subnet (efficient use of subnet) and disadvantage of many complex fragment/reassemble operations. 2nd scheme has advantage of only performing fragment/reassembly at source/destination (not at routers) therefore being simple but disadvantages of inefficient use of subnets (sometimes packet sizes are smaller than maximum allowed) and requires the source to learn the minimum maximum packet size across the path (which involves extra overhead). The 3rd scheme is “in-between” the other two: it doesn’t always use maximum packet size and operations at routers are required.*

- (c) What is a disadvantage? [1 mark]