Quiz 6 CSCI 363 Fall 2003 **Solution**
1 December, 2003

Problem 1 (5 points):
Suppose a 10Mbps point-to-point link is set up between Asheville and Knoxville. The length of the link is about 120 km and data travels across the link at about 2×10^8 m/s. What is the delay × bandwidth product for the link?

One way solution

Delay = 120 km / (2×10^8 m/s)
= 12×10^4 m / (2×10^8 m/s)
= 6×10^{-4} s
= .0006 s

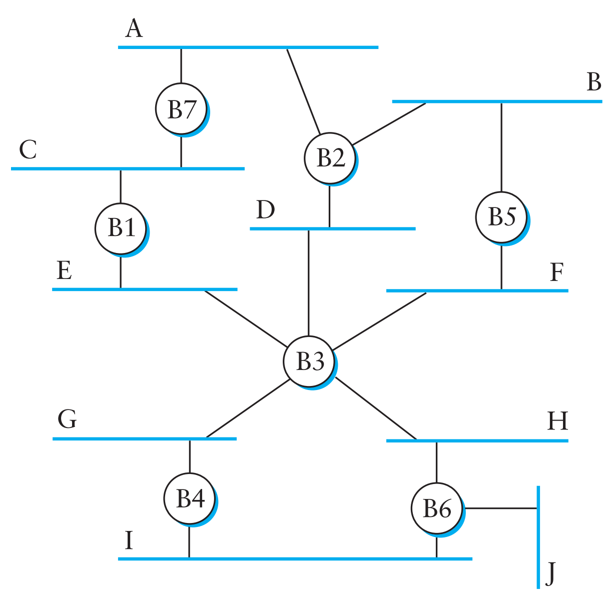
Delay × Bandwidth
= .0006 s * 10Mbps
= 6×10^{-4} s * 10^7 b/s
= 9×10^3 b
= 6000 bits

For round trip solution, double the delay and the delay × bandwidth product

Problem 2 (5 points)
Given the extended LAN shown below, assume that bridge B1 and B5 suffer a near-simultaneous failure. Indicate which ports are **not** selected by the spanning tree algorithm after the recovery process and a new tree has been formed.

Clearly, the ports to B1 and B5 will not be used.

To avoid the cycle between the bridges and LANS, B3→G→ B4→I→B6→H→B3, one of these ports must be disabled. The spanning tree algorithm will disable the port from B6 to I.



Problem 3 (5 points)
Suppose a computer (in this case it's `bulldog.unca.edu`) has the following routing table

Network and mask length	**Interface or next hop**
`152.18.16/20`	*Interface* `tu3`
`152.18.32/20`	*Interface* `tu2`
`152.18.64/24`	*Interface* `tu0`
`152.18.224.16/28`	*Gateway* `152.18.64.33`
Default	*Gateway* `152.18.64.254`

The IP numbers that this computer uses on its three interfaces are `152.18.16.9`, `152.18.32.9`, and `152.18.64.9`. These IP numbers will not be used in the problem.

The leftmost column of the following table, gives an IP address. In the right column, write the routing for these addresses. Two examples are already given in the table.

Destination IP address	**Next routing**
`152.18.16.33`	*Interface* `tu3`
`18.181.0.33`	*Gateway* `152.18.64.254`
`152.18.17.33`	***Interface* `tu3`**
`152.18.64.33`	***Interface* `tu0`**
`152.18.65.33`	***Gateway* `152.18.64.254`**
`152.18.224.11`	***Gateway* `152.18.64.254`**
`152.18.224.21`	***Gateway* `152.18.64.33`**

Problem 4 (5 points)
Suppose TCP's adaptive retransmission mechanism is running with $\delta = 1/8$, $\mu = 1$, and $\phi = 4$. Assume that at the present time, *EstimatedRTT* is 800 and the *Deviation* is 400. The next two packets arrive with a measured RTT of 2000. What is the *TimeOut* value after the second packet arrives?

Difference* = *SampleRTT* – *EstimatedRTT
***EstimatedRTT* = *EstimatedRTT* + (δ × *Difference*)**
***Deviation* = *Deviation* + δ × (|*Difference*| – *Deviation*)**
TimeOut* = μ × *EstimatedRTT* + ϕ × *Deviation

***Difference* = 2000 – 800 = 1200**
***EstimatedRTT* = 800 + (.125× 1200) = 950**
***Deviation* = 400 + .125 × (|1200| – 400) = 500**

***Difference* = 2000 – 950 = 1050**
***EstimatedRTT* = 950 + (.125× 1050) = 1081.25**
***Deviation* = 500 + .125 × (|1050| – 500) = 568.75**

***TimeOut* = 1 × 1081.75 + 4 × 568.75 = 3356.25**