Homework 4 for CSE/EE 461 (Winter 2001)

Due: Friday, Feb 16, 2001, at the beginning of class. (Out: Fri, Feb 9, 2001.)

Note: be sure to show how you derived answers so that you are eligible for partial credit.

1. ARP. Peterson 4.11

2. BGP. Peterson 4.24, parts a) and b) only.

3. BGP. Peterson 4.25

4. Subnets. Peterson 4.33

5. CIDR. Peterson 4.39

6. Routing Tables. This question focuses on the size of the routing tables for the Internet under different addressing schemes.

a) Assume that flat addressing is used, where each node gets a unique, unstructured address of 32 bits (the same size as IPv4). How large can the backbone routing tables become?
b) Assume that hierarchical addressing is used, with the same class A, B and C allocations as IPv4. How large can the backbone routing tables become?
c) Assume that route aggregation is used, just for class C networks (for simplicity). How large can the backbone routing tables become now? Give your answer in terms of the aggregation factor F that is achieved in practice (that is, F routes are aggregated into 1 route). Also, how large can the backbone routing tables become if the class C networks are assigned perfectly for aggregation?

7. Sliding Windows. Consider a standard sliding window protocol.

a) If only one packet can be outstanding at a time (stop and wait) give the throughput of the protocol in terms of other system parameters (such as, for example, link bandwidth B Mbps, round trip time RTT seconds, and so forth).
b) Now give the throughput as a function of W, the size of the sliding window.
c) TCP's maximum receive buffer size without the use of extensions is 64K. (Defaults are typically 16 or 32K too.) At what level of throughput will flow control become the limiting factor for cross-country (100ms round trip time) connections?
d) What window size would be needed to obtain the full link bandwidth for a cross-country (100ms round trip time) 1Gbps link?

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