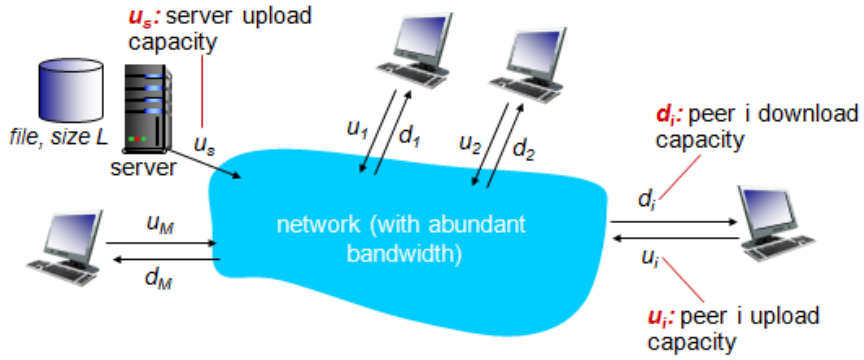
COM332 Midterm
06.05.2020:18:00
Submission Deadline: 06.05.2020 23:59

1. (7 p) Consider a simple quantitative model for distributing a file to a fixed set of peers in client-server architectures and peer-to-peer architectures.



Denote the size of the file to be distributed (in bits) by L and the number of peers that want to obtain a copy of the file by M. The distribution time is the time it takes to get a copy of the file to all M peers. Determine the distribution time for the client-server architecture and peer-to-peer architecture. Explain each component of the distribution time estimation in detail.

2. (7 p) Suppose host A wants to send a large file (the file size is 4 million bytes) to host B. The path from host A to host B has three links, of rates R1=800 kbps, R2=100 kbps, and R3=1 Mbps. Both routers use store-and-forward transmission. Assume no other traffic in the network. Ignore propagation delay. How long will it take transfer the file to host B?

3. (4 p) What are the types of delays a packet suffer from on its travel from one node to the subsequent node? Explain each delay in detail.

4. (4 p) Define the concept of cookies? What is the purpose of using cookies?

5. (4 p) Explain web caching in detail.

6. (5 p) Compare flow control and congestion control. What are their main goals?

7. (5 p) Define Go-Back-N (GBN) and Selective Repeat (SR) protocols. What are their goals?

8. (4 p) Explain how to set TCP timeout value.

9. (5 p) Explain NAT concept in detail. (Why we need it (motivation)? How does it work?)

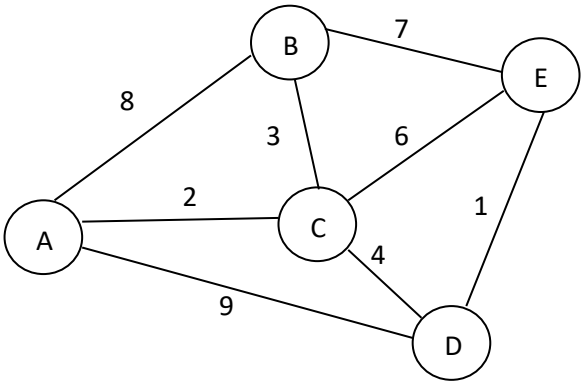
10. (4 p) Explain longest prefix matching concept using an example.

11. (5 p) Compare link-state routing algorithms and distance-vector routing algorithms.

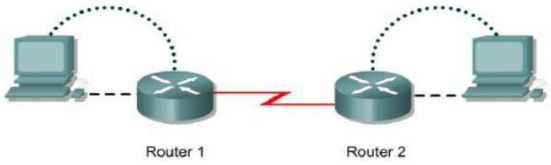
12. (4 p) What is head-of-line (HOL) blocking? Explain the concept in detail.

13. (5 p) Explain IP fragmentation in detail.

14. (7 p) Apply Dijkstra's algorithm to find least cost paths to every other node when the source node is A on the network given below. In each iteration show the values of D(v), p(v) and N'. Construct shortest path tree.
D(v): cost of the least-cost path from the source node to destination v.
p(v): previous node along the current least-cost path from the source to v.
N': subset of nodes; v is in N' if the least-coast path from the source to v is definitively known.



15.



Router Designation	Router Name	Fast Ethernet 0 Address	Interface type	Serial 0 Address	Subnet mask for both interfaces
Router 1	GAD	172.16.0.1	DCE	172.17.0.1	255.255.0.0
Router 2	BHM	172.18.0.1	DTE	172.17.0.2	255.255.0.0

a- (3 p) Assume that you are connected to Router 1.
Write command to enter privileged exec mode.
Router>
Write command to enter global configuration mode.
Router#
Assign name GAD to Router 1.
Router(config)#

b- (3 p) Write all the commands to configure FastEthernet and Serial Interfaces of Router 1.

c- (3 p) Write commands to show interface configurations (check status of interfaces) on Router 1.

d- (3 p) Write all the commands to configure RIP on Router 1 (Use the information given on the table and the figure).

e- (3 p) Write the command to observe the routing activity on Router 1.

f- (3 p) Write the command to cancel RIP on Router 1.

g- (3 p) Write the command to add a static route on Router 1 (Use the information given on the table and the figure).

h- (3 p) Write command to show routes on Router 1.

16. (6 p)

Given:

Host IP Address	192.168.4.227
Network Mask	255.255.0.0
Subnet Mask	255.255.255.192

Find:

Number of Subnet Bits	
Number of Subnets	
Number of Host Bits per Subnet	
Number of Usable Hosts per Subnet	
Subnet Address for this IP Address	
IP Address of First Host on this Subnet	
IP Address of Last Host on this Subnet	
Broadcast Address for this Subnet	