



Math 297C final exam
Spring 2001
Duration 2 hours

For each wrong answer in the True/False questions 1pt will be deducted from your total score

First Name: Last Name:
ID:

1. (3pts) TCP is a connection oriented protocol
 - (a) True
 - (b) False
2. (3pts) IP is a connection oriented protocol
 - (a) True
 - (b) False
3. (3pts) It is possible that 2 IP packet send from host A to host B to follow different routes
 - (a) True
 - (b) False
4. (3pts) It is possible that 2 TCP segments **belonging to the same connection** send from host A to host B to follow different routes
 - (a) True
 - (b) False
5. (3pts) The port number in TCP(UDP)/IP is used to distinguish between different network interfaces on the same computer
 - (a) True



- (b) False
6. (3pts) Port number 66000 is valid
- (a) True
(b) False
7. (3pts) Port number 67000 is valid
- (a) True
(b) False
8. (3pts) In the 182.61.150.128/25 network, the **default** router should be assigned the address 182.61.150.128
- (a) True
(b) False
9. (3pts) If a router receives a link state packet it forwards it on all its ports **except** the one it received the packet from.
- (a) True
(b) False
10. (3pts) In the link state protocol the age field is used to solve the count to infinity problem
- (a) True
(b) False
11. (3pts) The sequence number field in the link state packet is decremented everytime it is forwarded by a router
- (a) True
(b) False
12. (3pts) The maximum number of routers an IP packet can pass through before reaching its destination is 16
- (a) True

(b) False

13. (4pts) Host A has established a TCP connection with host B. At a certain time A's congestion window is 40kbytes and B has just announced a maximum window size of 10kbytes. The next data that A sends can be no more than

- (a) 10kbytes
- (b) 40kbytes
- (c) 25kbytes
- (d) 50kbytes
- (e) none of the above

14. (4pts) The length of an IP address is

- (a) 32 bits
- (b) 4 bytes
- (c) all of the above
- (d) none of the above

15. (4pts) The network 192.168.216.128/25 can have a maximum of

- (a) 255 hosts
- (b) 256 hosts
- (c) 128 hosts
- (d) 25 hosts
- (e) none of the above

16. (4pts) The maximum length of an IP header is

- (a) 20 bytes
- (b) 40 bytes
- (c) 60 bytes
- (d) 80 bytes
- (e) none of the above

17. (4pts) The minimum length of an IP header is

- (a) 20 bytes
- (b) 40 bytes
- (c) 60 bytes
- (d) 80 bytes
- (e) none of the above

18. (8pts) Assume that the timeout interval for TCP is computed using the formula:

$\text{Timeout} = \text{RTT} + 4 * D$ where $\text{RTT} = 0.5 * \text{RTT} + 0.5 * M$ and

$D = 0.5 * D + 0.5 * |RTT - M|$.

At $t=0$ assume the following: $\text{Timeout} = 10\text{ms}$, $\text{RTT} = 2\text{ms}$ and $D = 2\text{ms}$.

Host A transmits a segment at $t=0$ and receives an ack at $t=5\text{ms}$.

Host A sends a second segment at $t=10\text{ms}$. Host A will retransmit segment 2 only if it does not receive an ack by $t=$

- (a) 20ms
- (b) 23.5ms
- (c) 25.5ms
- (d) 30ms

19. You have been assigned the 200.35.1.0/24 address block. Your goal is to create the maximum number of subnets that can accommodate 45 hosts each.

(a) (2pts) Determine the subnet mask.

(b) (2pts) What is the maximum number of hosts that can be assigned in each subnet?

(c) (2pts) List the subnets in dotted decimal notation

(d) (2pts) List the range of valid host addresses in the second subnet

20. (10pts) The network show in the figure below uses a distance vector algorithm. The segments AB and AC have a delay of 10,10 respectively. Construct the routing table for A (delay,link) given that B,C,D have the following information

From B:	To	Delay	From C:	To	Delay	From D:	To	Delay
	A	10		A	10		A	12
	B	0		B	15		B	14
	C	12		C	0		C	15
	D	8		D	7		D	0

From A:	To	Delay
	A
	B
	C
	D

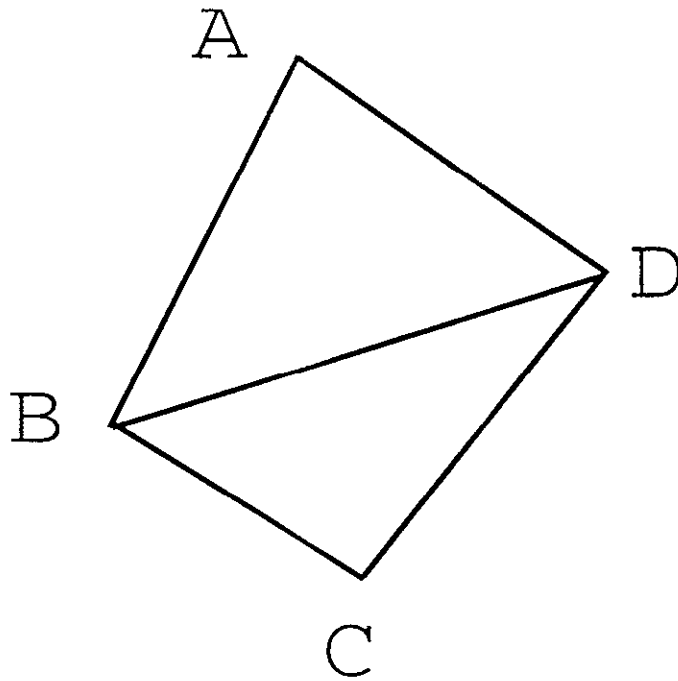


Figure 1:

21. (8pts) Host X has the following routing table

Destination	Mask	Gateway
192.168.216.0	/24	*
192.168.217.0	/24	192.168.216.70
default	*	192.168.216.1

arp(ip) denotes an ARP lookup for the IP address ip. In each of the following cases fill in the ip address.

- (a) Destination: 192.168.216.1 arp(.....)
- (b) Destination: 192.168.216.8 arp(.....)
- (c) Destination: 192.168.217.154 arp(.....)
- (d) Destination: 192.168.193.175 arp(.....)

22. (10pts) Consider the network depicted below. Suppose that there is a TCP connection between A and B, with data flowing from A to B, and

ack's from B to A. B announces a maximum window size of 64kbytes and a maximum segment size of 1kbytes. Assume that host A will send as much data as allowed by TCP flow control. All data segments sent from A to B are 1kbytes. The RTT between A and B is 100ms, and B acks the receipt of every data packet(i.e there is no lost or out of order packets)

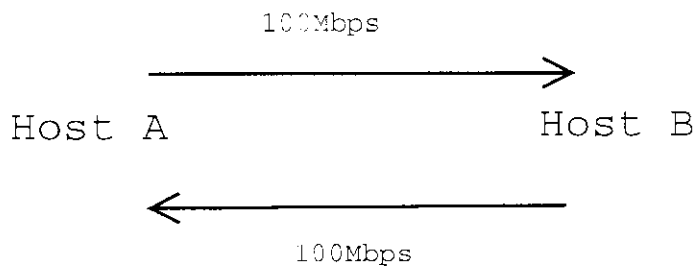


Figure 2:

- (a) How long does it take a packet to reach B
- 50ms
 - 100ms
 - 0.01ms
 - 0.08 ms
- (b) What is the maximum bandwidth that can be achieved(Mbps=Mega bits/second)
- 100Mbps
 - 10.24Mbps
 - 5.12Mbps
 - 50Mbps
- (c) How long does it take for A to transmit the first 15kbytes
- 300ms
 - 600ms
 - 900ms
 - 1500ms

- (d) Suppose that the links between A and B have been upgraded to 1Gbps. How long does it take A to transmit the first 15kbytes
- i. 10 times less
 - ii. 10 times more
 - iii. 5 times less
 - iv. 5 times more
 - v. none of the above

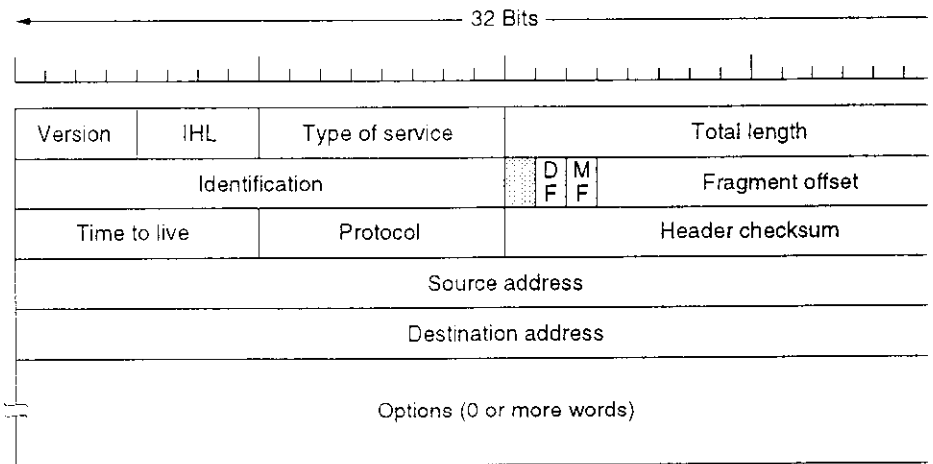


Fig. 5-45. The IP (Internet Protocol) header.

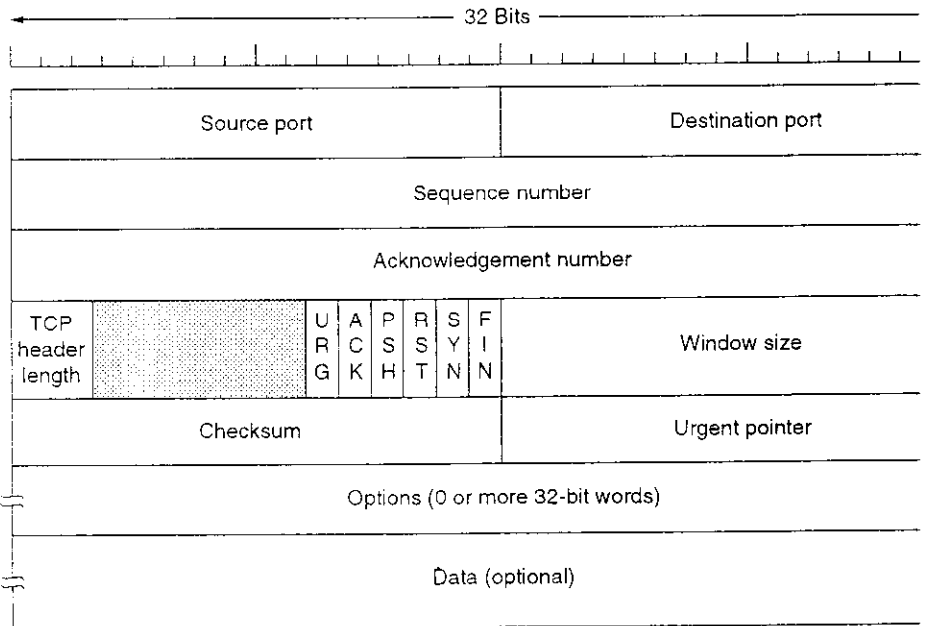


Fig. 6-24. The TCP header.