311015040 计算机网络（A 闭） 2012-2013-2

答案仅供参考，可能存在错误或疏漏，如有发现欢迎及时订正，拜谢！

1. Multiple Choice (30 points, 1.5 points for each question)

(1) Which of the following protocols is NOT an application protocol ? ____C_____
A. FTP   B.HTTP
C.ARP   D.DHCP

(2) Among the following applications, which one is not suitable for P2P architecture ? _B__
A. file sharing   B. electronic banking
C. video streaming   D. instant message

(3) The transfer of an Web document from one host to another is: A
A. loss-intolerant and time insensitive   B. loss-tolerant and time sensitive
C. loss-intolerant and time sensitive   D. none of the above

(4) Suppose a browser sends an HTTP request message with the If-modified-since: header. Suppose the object in a server has not changed since the last time a client retrieved the object. Then the server will send a response message with the status code: B
A 404 Not Found   B 304 Not Modified
C 200 OK   D None of the above

(5) In modern packet-switched networks, the source host splits long, application-layer packets (for example, an image or a music file) into smaller packets and sends the packets into the network. This technic is called _____D_____
A. route aggregation   B. IP fragmentation
C. IP reassemblysegment datagram   D. message segmentation

(6) If a segment carries data along with an acknowledgment, this is called ___B_____.
A. backpacking   B. piggybacking
C. out-of-band   D. piggy packing

(7) UDP offers which of the following benefits relative to TCP?   A
A. UDP consumes fewer computer resources by not maintaining connection state
B. UDP supports a self-regulating "throttle" feature that prevents network saturation
C. UDP guarantees that Individual packets of a transmission will arrive "in order"
D. None of the above

(8) In TCP, the timeout interval is a function of ___A___:
A. estimated RTT at the sender   B. MSS and the overhead of a segment
C. the size of buffer at the receiver   D. the size of sending window

(9) How many bits are there in IP v6 ? _____C_____
A. 32   B. 64   C. 128   D. 256

(10) In CIDR notation, which of the following networks contains host 192.168.14.2?   B
A. 192.168.10.0/22   B. 192.168.11.0/21
C. 192.168.12.0/23   D. 192.168.13.0/24

(11) Which of the following protocol belongs to intra-AS routing protocol? _____A_____
A. RIP   B. BGP   C. DV (Distance Vector)   D. LS (Link State)

(12) IP is a _____C_____ protocol.
A. connection-oriented unreliable   B. connection-oriented reliable
C. connectionless unreliable   D. connectionless reliable

(13) In _____A_____ , each station sends a frame whenever it has a frame to send.
A. ALOHA   B. sloted ALOHA   C. CSMA   D. CSMA/CD

(14) _____C_____ layer handles the physical addre ssing of communicating devices
A. Physical   B. Logical   C. Data link   D. Network

(15) Which best describes the Ethernet protocol?   A

A. Talk only if you hear no one else talking, but stop as soon as you hear anybody else.

B. Pass a ticket around and only talk if you are holding the ticket.

C. Raise your hand and wait till a moderator gives you permission to talk.

D. Every person is scheduled a time to talk.

(16) In an Ethernet frame, the preamble is responsible for ___C___

A. collision detection

B. error detection

C. synchronization of the receiver's clock to the sender's clock.

D. multiplexing/ demultiplexing

(17) Which of the following packet delay is the time waiting at the output link for transmission and depends on the congestion level of router? ____C_____

A. transmission delay   B. propagation delay

C. queuing Delay   D.processing delay

(18) The following technologies may be used for residental access, except ____D_____

A. HFC   B. DSL   C.dial-up modem   D. FDDI

(19) The performance of a network can be measured in terms of ____D____.

A. delay   B. throughput

C. packet loss   D. all of the choices are correct

(20) What is the name of the algorithm used in CSMA/CD networks in order to avoid repeated collisions?   C

A. collision avoidance   B. crash prevent

C. exponential back-off   D. exponential collisions

2. True or False (20 points, 2 point for each statement)。

(1). When a user request a Web page that consists of some text and two images. For this page, the client will send one request message and receive three response messages. ✗

(2). Local DNS name servers cache resource records, but discard them after a period of time that is on the order of a few days. √

(3). A source's retransmission timeout value is always set equal to the measured RTT. ✗

(4). In TCP, the acknowledgement number that a host puts in a segment is the sequence number of the next byte the host is expecting from the sender. √

(5). Suppose that host A wants to send data over TCP to host B, and host B wants to send data to host A over TCP. Two separate TCP connections - one for each direction - are needed. ✗

(6). The stop-and-wait protocol is highly inefficient when there is a large distance between source and destination and the transmission rate is high. √

(7). As a link state algorithm, RIP plays an important role in LAN. ✗

(8). A gateway router can obtain subnet reachability information from another gateway router in neighboring As by iBGP. ✗

(9). Suppose a router has n input ports each with identical line speeds, n output ports each with identical line speeds, and the line speed of an output port is at least n times as that of an input port. Further suppose that the switching fabric speed is at least n times as fast as an input line speed. Then queuing can occur in an output port ✗

P217 书上的情况是输入端口与输出端口速度相同，本题，输出端口的速度为输入端口的n倍

(10). Switches decrement the TTL field in the IP header ✗

3. please answer the following questions briefly (30 points, 10 points for each question)

(1) The fig 1 shows a portion of the internet with four autonomous systems, one of which is shown with four

routers, each with its own /16 subnet. Note that each of the other ASs has a /8 subnet.
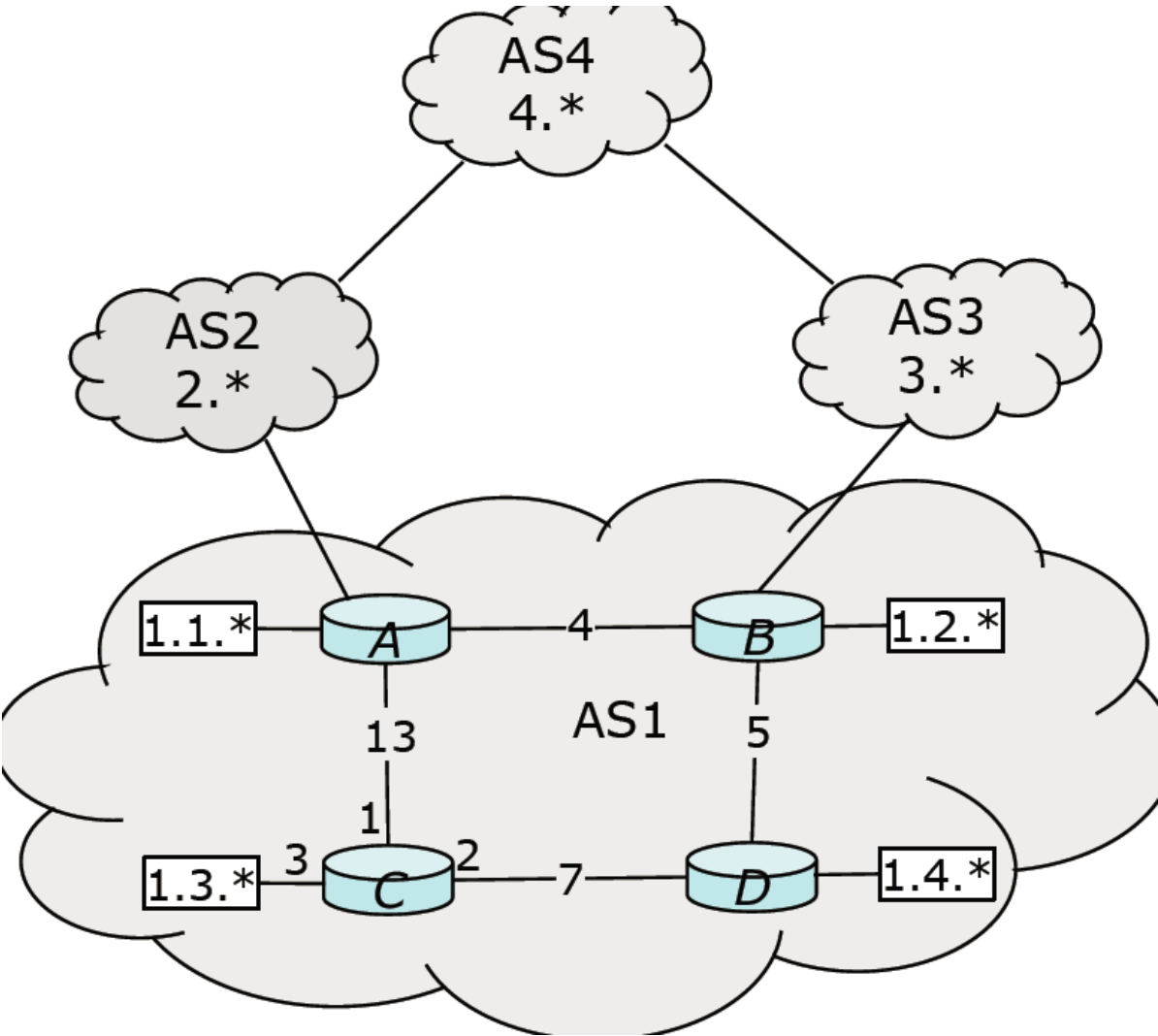
A. Assume that AS1 uses a LS algorithm as its intra-AS routing algorithm and each node initially knows the costs to each of its neighbors. Show how node C compute the shortest path to all the other nodes (5 points)

N'	D(A),p(A)	D(B),p(B)	D(D),p(D)
C	13,C	∞	7,C
CD	13,C	12,D	
CDB	13,C		
CDBA			

目的地	链路	距离
A	(C,A)	13
B	(C,D)	12
D	(C,D)	7

B. Assume that BGP as the inter-AS routing algorithm among these ASes and there are no policy

constraints that must be satisfied. Please complete the forwarding table of node C.(3 points)

Prefix	Output Link
1.1.*	1
1.2.*	2
1.3.*	3
1.4.*	2
2.*	1
3.*	2
4.*	2

B. Suppose the link joining router B with AS3 fails, which entries would change, and how would they change? (2 points)

B到AS3的链路失效，上题中AS3、AS4需要经过该条链路，受到影响

Prefix	Output Link
1.1.*	1
1.2.*	2
1.3.*	3
1.4.*	2
2.*	1
3.*	1
4.*	1

(2) A host using TCP/IP receives the following 10 fragments in the following order. For ease of reference, the fragments are labeled from A-J. Assume an IP header is 20 bytes and a TCP header is 20 bytes.

Fragment	Identifier	Length	Offset	Flag
A	1000	500	60	1
B	1000	500	120	1
C	1003	500	0	1
D	1000	500	0	1
E	1001	500	60	1
F	1003	60	60	0
G	1002	500	0	0
H	1001	500	0	1
I	1001	150	120	0
J	1000	200	180	0

A. In what order are the fragments delivered from the network layer to the transport layer, starting with the first? (3 points)

CF G HEI DABJ

F到达时，ID1003的分片（CF）全部到达，重组并传递给运输层；G到达时ID10002（无分片）传递给运输层；I到达时，ID1001的分片（到达顺序EHI，重组后顺序为HEI）全部到达，重组并传递给运输层；J到达时，ID1000的分片（到达顺序ABDJ，重组后顺序DABJ）全部到达，重组并传递给运输层

P224：在目的地，数据报的有效载荷仅当在IP层已完全重构为初始IP数据报时，才能被传递给目的运输层

B. How many total bytes are sent in these 10 fragments (ignore link layer headers)? (3 points)

7×500+60+150+200=3910

C. How much application layer data (application layer header + message) is sent in these 10

fragments? (4 points)

3910-10×20-4×20=3630
在每个数据报第一个分片中，含有TCP和IP头部，其余分片只有IP头部
P223：一个IP数据报有总长为20字节的首部（假设无选项）。如果数据报承载一个TCP报文段，则每个（无分片的）数据报共承载了总长40字节的首部（20字节的IP首部加上20字节的TCP首部）以及应用层报文

(3) Consider a TCP connection using the slow-start congestion control scheme with an initial THRESHOLD value of 64 kB and a Maximum Segment Size (MSS) of 4 kB. The receiver's advertised window is initially 24 kB. The first transmission attempt is numbered 0, and all transmission attempts are successful except for Timeouts on attempt number 4. In the ACKs for transmission attempt number 9 and subsequently, the receiver's advertised window is reset to 20 kB. Find the size in kB of the sender's sending window for its first 11 transmission attempts (numbers 0 – 10)

Transmission Attempts No.	Size of Sending Window(KB)
0	4
1	8
2	16
3	24
4	24
5	4
6	8
7	16
8	24
9	24
10	20

本题Size of Sending Windows表格中的单位为KB
1MSS=4KB，接收方窗口大小为24KB，到达24KB后，发送方窗口不再增长
Attempts No.4超时，cwnd=1MSS（4KB），并进入慢启动阶段
Attempts No.9的ACK及以后，接收方窗口被重设为20KB，发送方窗口也变为20KB

5. Analysis (20 points,)

(1) As in fig 2. There is new host moves into a network. Thus the new host has to get its IP ddress from the DHCP server running on the router. Please list the sequence of packets sent or received

by the new host until it gets a IP address 192.168.1.4. Please indicate the source and destination MAC address, the source and destination IP address, and the source and destination port number of each packet.*(8 points)*
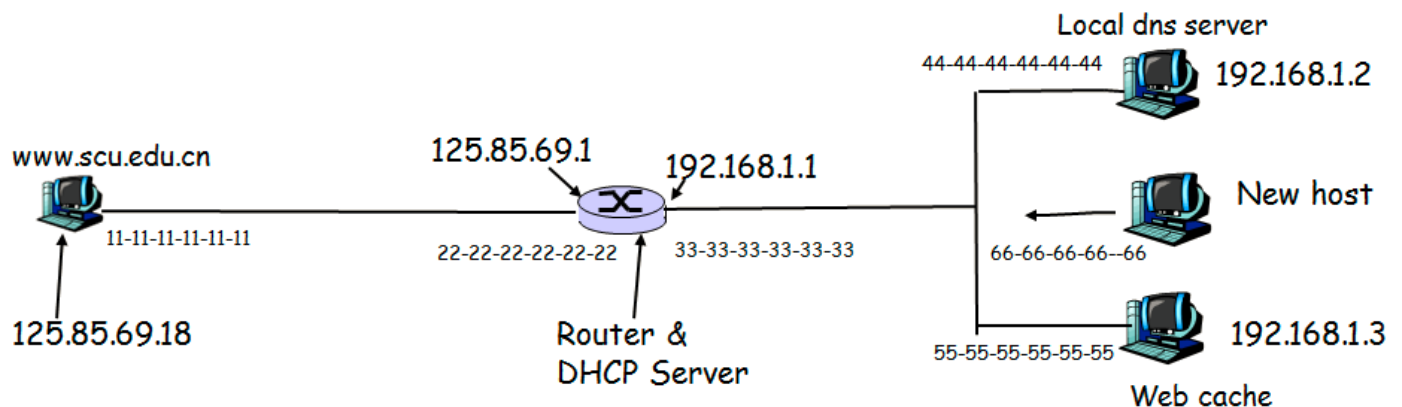

Fig 2.

	Source IP	Dest IP	Source Port	Dest Port	Source MAC	Dest MAC	Protocol
1	0.0.0.0	255.255.255.255	68	67	66-66-66-66-66	FF-FF-FF-FF-FF	DHCP discover
2	192.168.1.1	255.255.255.255	67	68	33-33-33-33-33	66-66-66-66-66	DHCP offer
3	0.0.0.0	255.255.255.255	68	67	66-66-66-66-66	FF-FF-FF-FF-FF	DHCP request
4	192.168.1.1	255.255.255.255	67	68	33-33-33-33-33	66-66-66-66-66	DHCP ACK
5							
6							
7							
8							

(2) After getting the IP address 192.168.1.4, as in fig 4, the local dns server and the web proxy of the new host is set as 192.168.1.2 and 192.168.1.3, respectively. Now, the user of the new host wants to access an url on the web server www.scu.edu.cn. Luckily the dns cache of local dns server has cached the RR of www.scu.edu.cn. On the other hand, ARP table of all the nodes in fig 3 are empty. Please list the sequence of all the packets sent/received by the new host as well as any other packets sent/received by as other nodes. Please idicate the source and destination MAC address as well as the source and destination IP address of each packets *(12 points)*

因为没有fig3、fig4,就按照fig2的图来做了
P329 5.7 回顾：Web页面请求历程

	Source IP	Dest IP	Source MAC	Dest MAC
1	192.168.1.4	192.168.1.2	66-66-66-66-66-66	FF-FF-FF-FF-FF-FF
2	192.168.1.2	192.168.1.4	44-44-44-44-44-44	66-66-66-66-66-66
3	192.168.1.3	192.168.1.2	66-66-66-66-66-66	44-44-44-44-44-44
4	192.168.1.2	192.168.1.3	44-44-44-44-44-44	66-66-66-66-66-66
5	192.168.1.4	192.168.1.3	66-66-66-66-66-66	FF-FF-FF-FF-FF-FF
6	192.168.1.3	192.168.1.4	55-55-55-55-55-55	66-66-66-66-66-66
7	192.168.1.4	192.168.1.3	66-66-66-66-66-66	55-55-55-55-55-55
8	192.168.1.3	192.168.1.4	55-55-55-55-55-55	66-66-66-66-66-66
9	192.168.1.4	125.85.69.18	66-66-66-66-66-66	55-55-55-55-55-55
10	192.168.1.3	192.168.1.1	55-55-55-55-55-55	FF-FF-FF-FF-FF-FF
11	192.168.1.1	192.168.1.3	33-33-33-33-33-33	55-55-55-55-55-55
12	192.168.1.3	125.85.69.18	55-55-55-55-55-55	33-33-33-33-33-33

13	125.85.69.1	125.85.69.18	22-22-22-22-22-22	FF-FF-FF-FF-FF-FF
14	125.85.69.18	125.85.69.1	11-11-11-11-11-11	22-22-22-22-22-22
15	125.85.69.1	125.85.69.18	22-22-22-22-22-22	11-11-11-11-11-11
16	125.85.69.18	192.168.1.3	11-11-11-11-11-11	22-22-22-22-22-22
17	125.85.69.18	192.168.1.3	33-33-33-33-33-33	55-55-55-55-55-55
18	192.168.1.3	125.85.69.18	55-55-55-55-55-55	33-33-33-33-33-33
19	125.85.69.1	125.85.69.18	22-22-22-22-22-22	11-11-11-11-11-11
20	125.85.69.18	192.168.1.3	11-11-11-11-11-11	22-22-22-22-22-22
21	125.85.69.18	192.168.1.3	33-33-33-33-33-33	55-55-55-55-55-55
22	192.168.1.3	192.168.1.4	55-55-55-55-55-55	66-66-66-66-66-66

整理人：黄纯纯
QQ：1150790988
电话：13568984634

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