Internetworking (2G1305) Examination
Tuesday 31-May-05 9:00-13:00

Instructor: G. Q. Maguire Jr.

- *No help material is allowed.*
- You may answer the questions in English or Swedish.
- The questions for *section A* should be answered *on the exam itself*, for the other sections the questions should *each* be answered on a *separate* page.
- **For multiple-choice questions, selecting a wrong alternative will reduce the number of points** (with a lower limit of 0 points for the problem)**.**
- The *entire* exam must be turned in along with your answers.

The exam is divided into three sections:

- *Section A* consists of multiple-choice questions. Each question is worth two points - if all correct alternatives (*regardless of how many there are*) are selected. Each missed correct alternative will reduce the score by one point. Each selected alternative that is wrong will also reduce the score by one point. The total score for each question will not be lower than zero.
- *Section B* consists of short questions. Each correctly answered questions is worth 2 points.
- *Section C* consists of essay questions where a more elaborative answer is required. A correct answer is worth four points.

The exam grades will be:

- Grade 3: at least 26 points in section A alone.
- Grade 4:
  - ♦ at least 28 points in section A and
  - ♦ at least 4 points in section B and
  - ♦ at least 4 points in section C
- Grade 5:
  - ♦ at least 30 points in section A and
  - ♦ at least 6 points in section B and
  - ♦ at least 8 points in section C

Results will be announced on the institution's announcement board - before 2005-06-21.

Name/Your name:

Personnummer/student number:

Utbildningslinje/Your major

If you are a student from 2G1507 or another version of the course please indicate the course number:

Initials/Initials:		Section A:
Inlämnat/Handed in: :		Section B:
Antal sidor/Number of pages:		Section C:
		Betyg/Grade:

Please check off which questions you have answered:

Fråga/Questions	Besvarad/Answered	Fråga är värd/ Question worth	Rättning/ Grading	Subtotals
1	❏	2		
2	❏	2		
3	❏	2		
4	❏	2		
5	❏	2		
6	❏	2		
7	❏	2		
8	❏	2		
9	❏	2		
10	❏	2		
11	❏	2		
12	❏	2		
13	❏	2		
14	❏	2		
15	❏	2		
16	❏	2		
Total section A:				
17	❏	2		
18	❏	2		
19	❏	2		
20	❏	2		
Total section B:				
21	❏	4		
22	❏	4		
23	❏	4		
24	❏	4		
Total section C:				
			Total	

Section A: Multiple choice

1. RIP version 1 uses which of the following for its transport protocol?

    ❍ TCP
    ❍ UDP

2. If we use firewalls from two *different* manufacturers in *series*, what basic security principle does this exemplify?

    ❍ flow control
    ❍ virtual circuits
    ❍ least privilege
    ❍ delayed acknowledgments
    ❍ defense in depth
    ❍ weakest links
    ❍ encryption

3. Is there any checksum protection in an ARP request or reply?

    ❍ Yes
    ❍ No

4. In the Resource Reservation Protocol (RSVP) does the source or the destination (receiver) determine the required resources?

    ❍ Source
    ❍ Destination

5. When an node wants to send an IP packet on an ethernet segment it uses ARP to find the destination's link address. When a node wants to send an IP packet on a PPP link does it need to transmit anything to learn the destination's **link** address?

    ❍ Yes
    ❍ No

6. The "Version" field is the same in IPv4 and IPv6, but is this actually used to differentiate between IPv4 and IPv6 packets in the case of an ethernet (IEEE 802.3) physical and an IEEE 802.2 logical link layer.

    ❍ Yes
    ❍ No

7. When a destination host receives only some of the fragments from an IP packet what happens?

 ❍ There will be a IP checksum error and the packet will be discarded
 ❍ There will be a reassembly timeout and the packet will be discarded
 ❍ There will be a IP checksum error and the packet will be sent up the stack
 ❍ There will be a reassembly timeout and the packet will be sent up the stack
 ❍ There will be both an IP checksum error *and* a reassembly timeout, then the packet will be sent up the stack

8. PPP provides the following advantages as compared to SLIP:

 ❍ PPP supports multiple protocols, while SLIP only supports IP
 ❍ PPP uses a fixed IP address, manually configured by the user
 ❍ PPP provides TCP and IP header compression
 ❍ PPP can negotiate many data-link options
 ❍ PPP provides a file transfer checksum

9. DHCP always assigns a client an IP address for an *indefinite* period of time

 ❍ Yes
 ❍ No

10. Explain the purpose of a "hold down" when doing routing updates

 ❍ When a route is removed, no update of this route is accepted for some period of time - to give everyone a chance to remove the route.
 ❍ When a route is removed, all updates of this route are processed immediately - to give everyone a chance to insert the correct route.

11. IPv6 fragments contain which of the following:

 ❍ Fragment offset
 ❍ Do not fragment flag
 ❍ More fragments flag

12. Which of the following are timers used in conjunction with *TCP* :

 ❍ Retransmission timer
 ❍ Persist timer
 ❍ Fragment reassembly timer
 ❍ Keepalive timer
 ❍ 3 MSL timer

13. A host using Mobile IP must tunnel packets to the corresponding host via its home agent when sending packets under which of the following conditions

   ❍ When using IPSEC
   ❍ When there is ingress filtering
   ❍ When the mobile host is in the home network
   ❍ When the mobile host is in the same network as the corresponding host

14. An application layer gateway can be used to forward which of the following kinds of traffic through a NAT/Firewall:

   ❍ RTP
   ❍ IPSEC

15. SCTP provides which of the following:

   ❍ A reliable message oriented service
   ❍ multihoming with load balancing
   ❍ multihoming without load balancing
   ❍ a variable number of streams
   ❍ a fixed number of streams
   ❍ The sender selects its primary own address
   ❍ The receiver selects the primary address for the other endpoint
   ❍ An association is allocated resources when a COOKIE ECHO is received
   ❍ An association is allocated resources when a COOKIE ACK is received
   ❍ An association is allocated resources when an INIT ACK is received

16. The BGP keepalive generates approximately how much traffic:

   ❍ 5 bps
   ❍ 50 bps
   ❍ 50 kbps
   ❍ 50 Mbps

Section B: Short Answers

17. Many sites allow anonymous FTP access, but request that the user enter their e-mail address as the password. Explain how the site can check to see if the domain name of this e-mail address corresponds to the domain from which the user is connecting to this FTP server.

18. How many IPv4 addresses are associated with a single ethernet interface? Describe how this/these address(es) is (are) used.

19. When is the Nagle algorithm disabled? Given an example of this.

20. Describe the purpose of anycast in IPv6.

Section C: Essay Answers

21. If a host is participating in a multicast group, why does it delay responding to an IGMP query?

22. Karn's algorithm is a solution for the TCP retransmission ambiguity problem. Explain what this problem is.

23. Describe the Security Parameter Index (SPI) used in the Authentication and ESP protocols in IPsec and IPv6.

24. Explain the steps in a DNS lookup of the name "www.kth.se" assuming that you are doing this from a host named "fred.it.kth.se". Comment on the performance of DNS. {You should assume that the host "fred" is a UNIX/linux workstation, which is *not* using "yellow pages" or a similar service. In addition, assume that the local machine does *not* know the address corresponding to "www.kth.se".}