

Primer control de Xarxes de Computadors (XC), Grau en Enginyeria Informàtica		20/4/2015	Primavera 2015
Name:	Surname	DNI	

Duration: 1h15m. The quiz will be collected in 25 minutes. Answer in the same questions sheet.

Test. (4 points) More than one answer per question may be correct.

Each question is 4/6 points if all the answers are correct, half of it if there is one mistake, and zero if there are more mistakes.

<p>1. Check the boxes for the correct answers:</p> <p><input type="checkbox"/> If the network MTU (Maximum Transmission Unit) is 1500 bytes, then the maximum length of the IP datagram is 1500 bytes and the maximum length of the data field in the datagram is 1480 bytes.</p> <p><input type="checkbox"/> If the length of the original datagram has a data field of 1500 bytes and the network MTU is 1500 then fragmentation is required and the second fragment will carry 20 bytes of data.</p> <p><input type="checkbox"/> The IP header has a field for error checking (checksum). Routers verify this field but they do not ever modify.</p> <p><input type="checkbox"/> Routers subtract 1 to the value of the TTL field (Time to Live) except if they perform a NAT function.</p> <p><input type="checkbox"/> The MTU Path Discovery algorithm allows discovering the minimum MTU for the path and avoids fragmentation within the path.</p>
<p>2. Check the boxes for the correct answers:</p> <p><input type="checkbox"/> ARP (Address Resolution Protocol) transmits "broadcast" datagrams for learning the MAC address (Level 2) which corresponds to a network interface with a given IP address.</p> <p><input type="checkbox"/> If the destination IP address of the datagram does not belong to the same network where the host is attached to, then the ARP function asks for the MAC address of the default router.</p> <p><input type="checkbox"/> The ARP table contains the binding between the IP address and MAC address that have been used recently.</p> <p><input type="checkbox"/> In an Ethernet network, the ARP protocol always sends a broadcast message before sending each one of the IP datagrams.</p>
<p>3. Check the boxes for the correct answers:</p> <p><input type="checkbox"/> The PAT (Port and Address Translation) function makes possible that all the devices of a private network use a single public IP address.</p> <p><input type="checkbox"/> Entries in the NAT (PAT) table contain the bindings between IP addresses and ports while the connections are active and entries are deleted after an inactivity timeout.</p> <p><input type="checkbox"/> The dynamic entries in the NAT (PAT) table contain the bindings [private IP address / private client port] – [public IP address / public dynamic port] corresponding to all the active connections.</p> <p><input type="checkbox"/> NAT is a protocol that coordinates the NAT devices at both ends of a connection.</p>
<p>4. Check the boxes for the correct answers:</p> <p><input type="checkbox"/> The DNS server knows the root servers' addresses so that they may access all TLD (Top Level Domain) servers.</p> <p><input type="checkbox"/> All IP terminals must have access to the configuration file that contains the list of all the DNS root servers' addresses.</p> <p><input type="checkbox"/> The DNS CNAME registry is used to define aliases.</p> <p><input type="checkbox"/> The DNS protocol provides the IP address for the default router to reach the remote (destination) device.</p>
<p>5. Check the boxes for the correct answers:</p> <p><input type="checkbox"/> The DNS server provides the IP address of the DHCP server using a given DNS registry (RR).</p> <p><input type="checkbox"/> The IP address of the DHCP server may be found using a DHCP DISCOVER message.</p> <p><input type="checkbox"/> DHCP allows automatic configuration of a device and provides it with the IP address, network mask and default router's address.</p> <p><input type="checkbox"/> The DHCP server can configure automatically the devices with the corresponding DNS servers' IP addresses.</p>
<p>6. Check the boxes for the correct answers:</p> <p><input type="checkbox"/> ICMP error messages report the status of the remote device.</p> <p><input type="checkbox"/> ICMP error messages carry a complete copy of the discarded datagram.</p> <p><input type="checkbox"/> ICMP error messages always go back to the IP source address of the datagram that caused the event reported.</p> <p><input type="checkbox"/> The "ping" command uses ICMP Echo Request and Echo Reply messages and computes the round trip time.</p>

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Problem 1 (2 points)

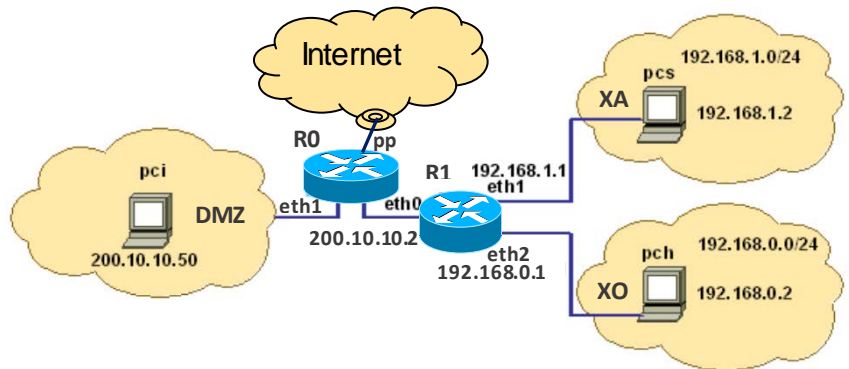
Given the following network topology, on which network 200.10.10.48/30 is a DMZ (Network with servers accessible from Internet), and the other two corresponding to Enterprise administration (network XA: 192.168.1.0/24) and to Enterprise operational department (network XO: 192.168.0.0/24).

Answer the following questions:

1.1 The router connecting to Internet (R0) provides also Firewall functions. You must list the rules that will filter the traffic between DMZ and Internet and vice versa, allowing only the following routes:

- From Internet it is possible to access DNS (53) services in DMZ i vice versa.
- From the DMZ computers, it is possible to access HTTP servers (port 80) on Internet

Use a table with the following columns for each route of R0 (use NAMES of networks and ports):



eth1 Outgoing to DMZ

Protocol	IP-src	IP-dst	Port-src	Port-dst	Action

eth1 Incoming from DMZ

Protocol	IP-src	IP-dst	Port-src	Port-dst	Action

PP Outgoing to Internet

Protocol	IP-src	IP-dst	Port-src	Port-dst	Action

PP Incoming from Internet

Protocol	IP-src	IP-dst	Port-src	Port-dst	Action

The company Candy S.L. wants to isolate computers from different departments, spread in one main office and 2 branches, in the following way:

- We are asking you to:

- b) (1,5 points) Assume that in all routers it is activated RIP version 2 with summarization to the class. Summarization to the class means that upon sending update messages in an interface, subnetworks are aggregated to the class, if the message is sent in a network with address not belonging to the aggregated range. For instance, if there are the destinations 192.168.0.0/26 and 192.168.0.128/26, in the update message it will be sent the destination 192.168.0.0/24 (when the update is sent in an interface not belonging to the range 192.168.0.0/24). Taking into account that there is only 1 public address in each site (in the link connecting the site with the Internet Service Provider), design an address assignment using private addresses for the internal networks and the tunnels that allow s having in the routing table of router R0 the minimum number of entries. Give the addresses in the format a.b.c.d/m (use only the rows you need).

[illegible]

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c) (1,5 points) Fill in the routing table of routers R0 and R1 when RIP has converged (use only the rows you need):

R0

[illegible]

R1

[illegible]