

<b>Third control Computer Networks (XC), Degree in Informatics Engineering</b>		<b>7/6/2018</b>	<b>Spring 2018</b>
<b>Given name (UPPERCASE):</b>	<b>LAST NAME (UPPERCASE):</b>	<b>GROUP:</b>	<b>ID:</b>

Duration: 1h. The test will be collected in 20 minutes.

### Test (3 points)

Multiple choice questions (any number of correct answers). Counted as half if any error or 0 when more.

1. In the resolution of DNS names:

- ☐ A client can ask for the list of names that contains a domain.
- ☐ A query for an A record must return 0-1 results.
- ☐ To propagate a record change its TTL must be changed.
- ☐ To propagate a change in a record, the serial number of its domain must be changed.

2. About DNS servers:

- ☐ Each domain or zone can not have more than one name server.
- ☐ Resolutions can be made of absolute or partial names, relative to the default domain.
- ☐ A domain server has a reference to the higher level NS records (parent).
- ☐ If a server fails for a period greater than the default TTL of the zone, clients will clear any records they have about this zone.

3. About encodings: The MIME format is used to encode:

- ☐ Binary objects in the HTTP 1.1 protocol.
- ☐ Binary objects in emails.
- ☐ Non-ASCII text in the DNS protocol.
- ☐ Texts in URLs.

4. About the MIME format:

- ☐ The "transfer encoding" Base64 is used to transfer binary objects in HTTP.
- ☐ The "transfer encoding" Base64 is used to transfer binary objects in SMTP.
- ☐ The "transfer encoding" Quoted-Printable is used to transfer text in HTTP.
- ☐ The "transfer encoding" Quoted-Printable is used to transfer text in SMTP.

5. About character sets:

- ☐ The ISO 8859 code family uses one byte per character.
- ☐ The fixed-length encoding in UNICODE uses four bytes per character.
- ☐ The UTF-8 encoding uses from one to four bytes per character.
- ☐ The UTF-8 encoding uses one byte (8 bits) per character.

6. About the SMTP protocol:

- ☐ The sender's email client uses DNS MX to decide where to send a message.
- ☐ An SMTP server uses DNS MX to select the destination of a message.
- ☐ The recipient user's mail client uses DNS MX to decide from where to receive a message.
- ☐ The SMTP protocol allows to send more than one email message during the same connection.

7. An HTTP server 1.1

- ☐ Can transfer one or more binary objects.
- ☐ Can send more than one object consecutively.
- ☐ Can receive more than one request while sending an object.
- ☐ Sends binary objects encoded in base64.

8. About HTTP caches and proxies

- ☐ The Etag header is used to identify the date of an object.
- ☐ The Etag header is used to identify the content of an object.
- ☐ Conditional requests are only used by proxy servers.
- ☐ Conditional requests are used when we have a local copy of an object.



Tercer Control de Xarxes de Computadors (XC), Grau en Enginyeria Informàtica		7/6/2018	Spring 2018
Name:	Surname:	Group	DNI

Duration: 1h30m. The quiz will be collected in 20 minutes. Answer in the same questions sheet.

### Problem 2 (3 points)

A client accesses an Internet web server (with his name) and downloads a 1kB ( $10^3$  bytes) web page with 2 embedded images of 5kB and 2kB respectively, that are on the same server. Suppose it is used a TCP protocol as the one explained in class, and that the minimum number of segments is sent in the least possible time. On the average, a DNS resolution takes 150ms and the RTT with the web server is 100ms. It is requested: (i) a time diagram of all the packets that will be sent over the network since the user clicks the download in the browser until the browser receives all the information to display it; (ii) the approximate time between these instants.

Use the following conventions in the diagram each time the client or server sends a packet (as shown in the example):

D: DNS message

S: segment with the SYN flag set

F: segment with the FIN flag set

A: TCP ack (no payload)

G: HTTP segment with an HTTP GET

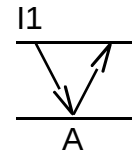
H: segment with the web page

I1, I2, I3, I4: Segments with the data of the first image. Note: To be sent following the TCP algorithms.

J1, J2: Segments with the data of the second image. Note: The same as before with only 2 segments.

Use the lines below, where C is the client and S the server (web or DNS)

1. (1.5 punts) Assume HTTP 1.0 (no persistent)



C

S

Approximate download time:

2. (1.5 punts) Assume HTTP 1.1 (persistent and pipelining)

C

S

Approximate download time:

Reply-To: jordi@ac.upc.edu  
To: albert@gmail.com  
From: Jordi <jordi@ac.upc.edu>  
Subject: Disponibilitat?  
Date: Mon, 4 Jun 2018 13:40:41 +0200  
MIME-Version: 1.0  
Content-Type: multipart/mixed;  
boundary="-----2E3FF031485E8FE8773EF758"  
Content-Language: ca

This is a multi-part message in MIME format.  
-----2E3FF031485E8FE8773EF758  
Content-Type: multipart/alternative;  
boundary="-----DB06E3D6A8FB27C08F22AD50"

-----DB06E3D6A8FB27C08F22AD50  
Content-Type: text/plain; charset=utf-8  
Content-Transfer-Encoding: 8bit

Hola Albert.  
Estàs avui pel DAC?  
Et passo l'horari en el fitxer adjunt.

Gràcies.  
Jordi

-----DB06E3D6A8FB27C08F22AD50  
Content-Type: text/html; charset=utf-8  
Content-Transfer-Encoding: 8bit

```
<html>
<head>

  <meta http-equiv="content-type" content="text/html; charset=utf-8">
</head>
<body text="#000000" bgcolor="#FFFFFF">
  Hola Albert.<br>
  Estàs avui pel DAC?<br>
  Et passo l'horari en el fitxer adjunt.<br>
  <br>
  Gràcies.<br>
  Jordi<br>

</body>
</html>
```

-----DB06E3D6A8FB27C08F22AD50--

-----2E3FF031485E8FE8773EF758  
Content-Type: application/vnd.ms-excel;  
name="horaris.xls"  
Content-Transfer-Encoding: base64  
Content-Disposition: attachment;  
filename="horaris.xls"

0M8R4KGxGuEAAAAAAAAAAAAAAAAAAPgADAP7/CQAGAAAAAAAAAAAAAAAAEAAAAiAEAAAA  
4AAUAAAAAAAAABACIAAHAgAQAgQAAAEkAL4AAUAAAAAAAAABACIAAHQAQAgQAAAEMAg4AAUAAEA  
AAABACIAAHggAQAgQAAABhcg4AAUAAAAAAAAABACIAAHAgAQAgQAAAEMAg4AAUAAAAAAAAABACIA  
AHAgAAAgAAAAEMAg4AAUAAAAAAAAABACIAAHASAUAgQAAABgkg4AAUAAAAAAAAABACIAAHASAEAg  
...  
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAABYABQH////////wIAAAAgCAIAAAAAAAAAAAAAAAAAABG  
AAAAAAAAAAAAAAAAAwKuda3j20wH+////////AAAAAAAAABXAG8AcgBrAGIAbwBvAGsAAAAAAAA  
AAAEgACAf////////  
////////wAAAT5gIAAAAAUA  
AAAAAAAdAEAAAAQAAAAAAAAABQBEAG8AYwB1AG0AZQBwAHQAUwB1AG0AbQBhAHIAeQBJAG4A  
ZgBvAHIAbQBhAHQAaQBvAG4AAAAAAAAAAAAAAAAAADgAAgH////////8AAAAAAAAAAAAA  
AAAB8AQAAABAAAAAAAAAA=  
-----2E3FF031485E8FE8773EF758--