

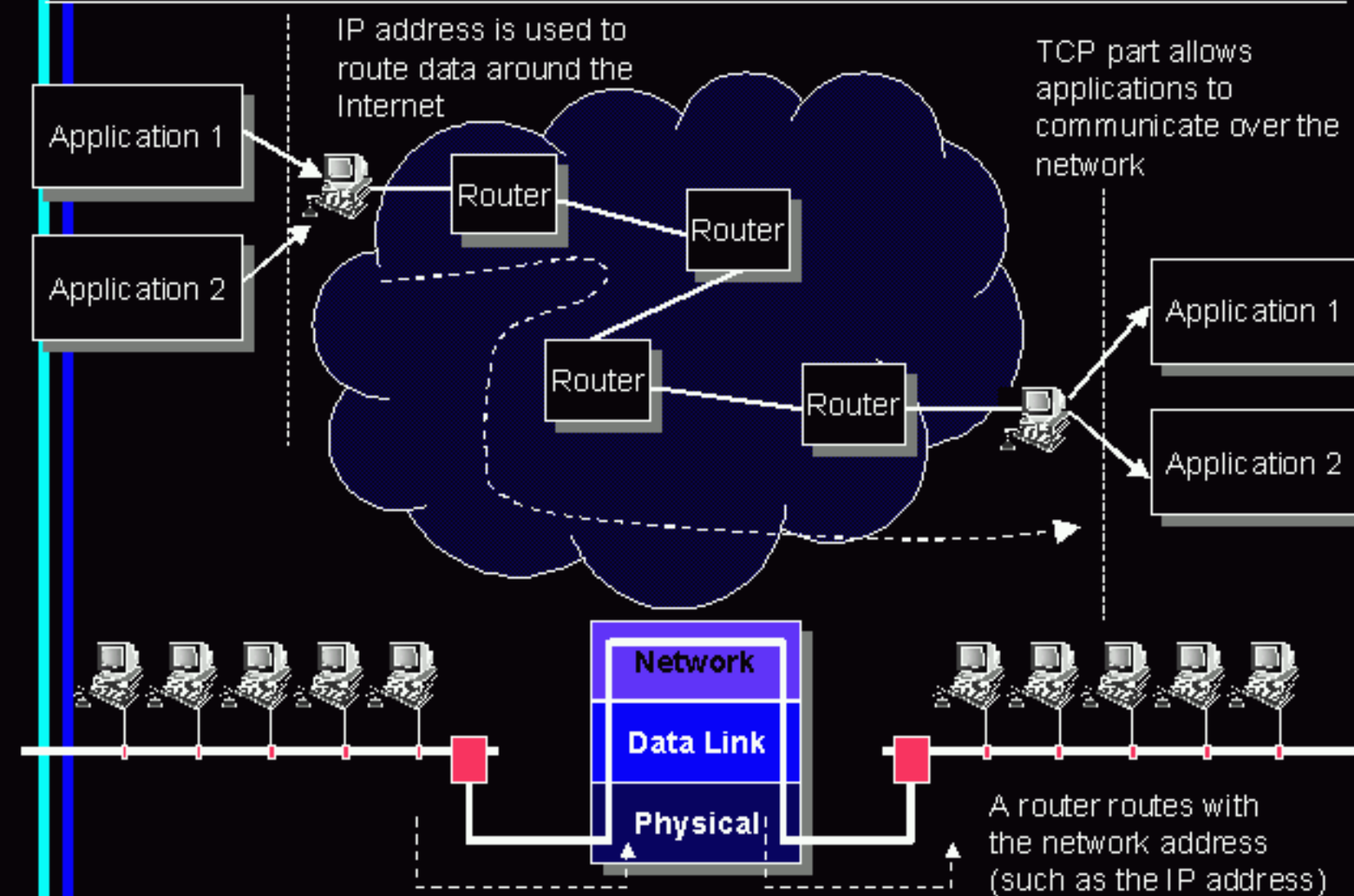
Εισαγωγή στην Υπολογιστική Βιολογία

Διάλεξη 5η :

Εισαγωγή στα δίκτυα : TCP/IP, Ευρέως διαδεδομένα πρωτόκολλα επικοινωνίας : dns, smtp, http, ssh, ftp και σχετικά προγράμματα του Unix : Mail, ssh, sftp, ftp, Εισαγωγή στο πρωτόκολλο http και τη γλώσσα html.

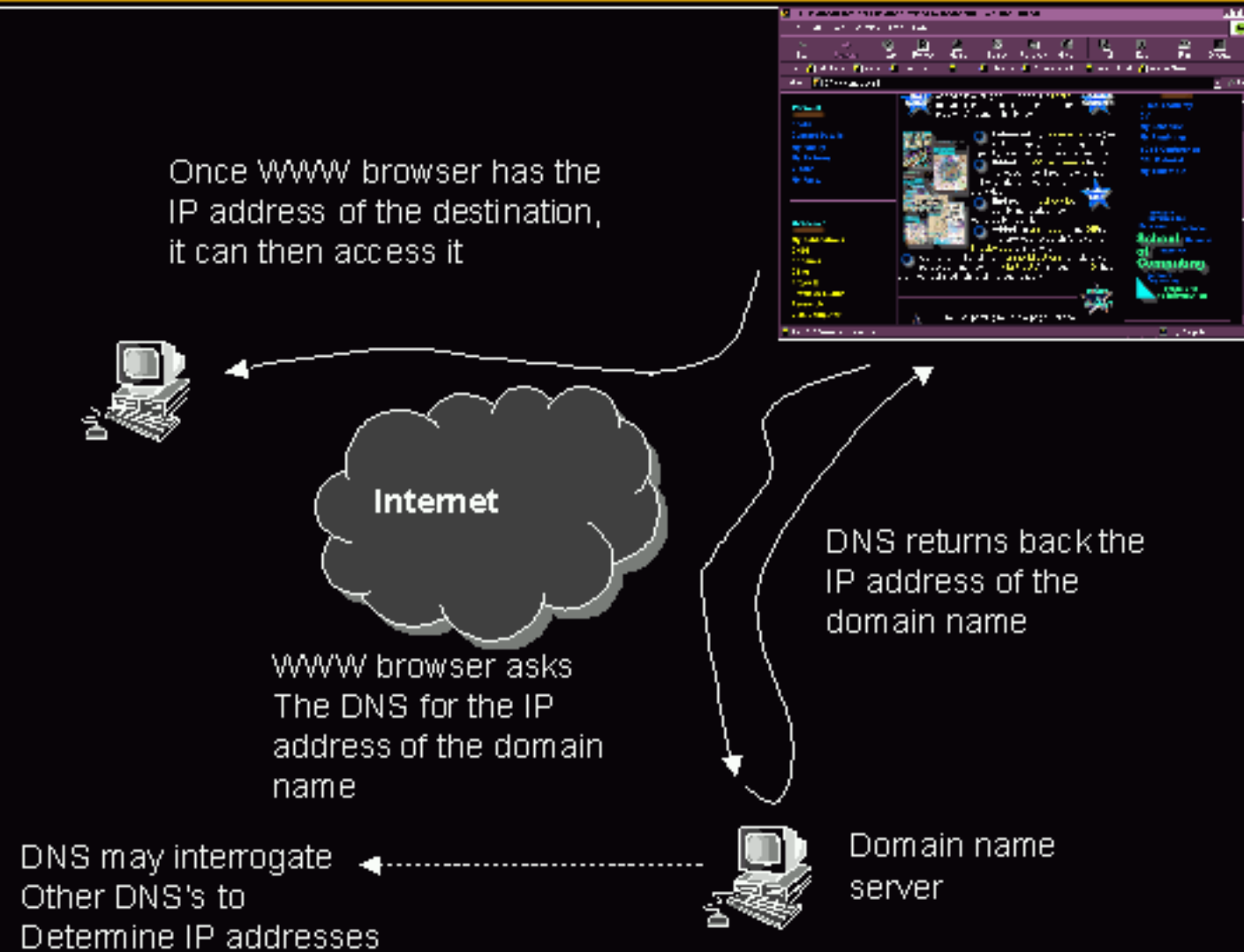
TCP/IP

5.2 IP and TCP



TCP/IP

5.16 Domain name server



Πρωτόκολλα

```
$ cat /etc/services
```

```
.....
```

ftp	21/tcp		
ftp	21/udp	fsp fspd	
ssh	22/tcp		# SSH Remote Login Protocol
ssh	22/udp		# SSH Remote Login Protocol
telnet	23/tcp		
telnet	23/udp		
smtp	25/tcp	mail	
smtp	25/udp	mail	
.....			
domain	53/tcp		# name-domain server
domain	53/udp		
.....			
http	80/tcp	www www-http	# WorldWideWeb HTTP
http	80/udp	www www-http	# HyperText Transfer Protocol
.....			
sftp	115/tcp		
sftp	115/udp		
.....			
imap	143/tcp	imap2	# Interim Mail Access Proto
.....			
https	443/tcp		
.....			

DNS

Παράδειγμα χρήσης DNS

```
$ nslookup webmail.duth.gr
```

```
Server:          127.0.0.1
```

```
Address:         127.0.0.1#53
```

```
Non-authoritative answer:
```

```
webmail.duth.gr canonical name = mail.duth.gr.
```

```
Name:   mail.duth.gr
```

```
Address: 192.108.114.110
```

```
$
```

```
$ nslookup www.google.com
```

```
Server:          193.92.110.1
```

```
Address:         193.92.110.1#53
```

```
Non-authoritative answer:
```

```
www.google.com canonical name = www.google.akadns.net.
```

```
Name:   www.google.akadns.net
```

```
Address: 216.239.59.99
```

```
Name:   www.google.akadns.net
```

```
Address: 216.239.59.104
```

smtp

Το πρωτόκολλο smtp

```
$ telnet crystal2.imbb.forth.gr 25
```

```
Trying 147.52.170.102...
```

```
Connected to crystal2.imbb.forth.gr (147.52.170.102).
```

```
Escape character is '^]'.
```

```
220 crystal2.imbb.forth.gr ESMTP Sendmail ; Tue, 16 Nov 2004 13:10:21 +0200 (EET)
```

```
ehlo ppp1-62.axd.forthnet.gr
```

```
250-crystal2.imbb.forth.gr Hello ppp1-62.axd.forthnet.gr [213.16.225.62],  
pleased to meet you
```

```
250-ENHANCEDSTATUSCODES
```

```
250-8BITMIME
```

```
250-SIZE 20000000
```

```
250-DSN
```

```
250-ONEX
```

```
250-ETRN
```

```
250-XUSR
```

```
250 HELP
```

```
help
```

```
214-2.0.0 This is sendmail
```

```
214-2.0.0 Topics:
```

```
214-2.0.0          HELO      EHLO      MAIL      RCPT      DATA
```

smtp

Το πρωτόκολλο smtp

```
MAIL FROM: glykos@mbg.duth.gr
```

```
250 2.1.0 glykos@mbg.duth.gr... Sender ok
```

```
RCPT TO: guest
```

```
250 2.1.5 guest... Recipient ok
```

```
DATA
```

```
354 Enter mail, end with "." on a line by itself
```

```
Hello. This is a test.
```

```
.
```

```
250 2.0.0 iAGBBQq13795 Message accepted for delivery
```

```
quit
```

```
221 2.0.0 crystal2.imbb.forth.gr closing connection
```

```
Connection closed by foreign host.
```

```
$
```

smtp

Unix Mail : αποστολή μηνύματος

\$

\$ Mail glykos@mbg.duth.gr

Subject: Test

Hi! This is a test. Please ignore.

.

Cc: glykos@imbb.forth.gr

\$

\$

smtp

Unix Mail : απλή χρήση για ανάγνωση μηνυμάτων

\$ Mail

Mail version 8.1 6/6/93. Type ? for help.

"/var/mail/glykos": 3 messages 3 new

>N	1	glykos@aspera.cluste	Wed Nov 17 18:23	14/433	"Test 1"	
	N	2	glykos@aspera.cluste	Wed Nov 17 18:23	14/433	"Test 2"
	N	3	glykos@aspera.cluste	Wed Nov 17 18:23	14/433	"Test 3"

&

Message 1:

From glykos Wed Nov 17 18:23:31 2004

Date: Wed, 17 Nov 2004 18:23:31 +0200

From: Nicholas M Glykos <glykos@aspera.cluster.mbg.gr>

To: glykos@aspera.cluster.mbg.gr

Subject: Test 1

Test 1

&

Message 2:

From glykos Wed Nov 17 18:23:39 2004

.....

smtp

Unix Mail : απλή χρήση για ανάγνωση μηνυμάτων

&

Message 3:

From glykos Wed Nov 17 18:23:49 2004

Date: Wed, 17 Nov 2004 18:23:49 +0200

From: Nicholas M Glykos <glykos@aspera.cluster.mbg.gr>

To: glykos@aspera.cluster.mbg.gr

Subject: Test 3

Test 3

&

At EOF

& h

1	glykos@aspera.cluste	Wed Nov 17 18:23	14/433	"Test 1"
2	glykos@aspera.cluste	Wed Nov 17 18:23	14/433	"Test 2"
> 3	glykos@aspera.cluste	Wed Nov 17 18:23	14/433	"Test 3"

& s 2 test2.txt

"test2.txt" [New file]

smtp

Unix Mail : απλή χρήση για ανάγνωση μηνυμάτων

& d 2

& h

```
1 glykos@aspera.cluste Wed Nov 17 18:23 14/433 "Test 1"
> 3 glykos@aspera.cluste Wed Nov 17 18:23 14/433 "Test 3"
```

& 1

Message 1:

From glykos Wed Nov 17 18:23:31 2004

Date: Wed, 17 Nov 2004 18:23:31 +0200

From: Nicholas M Glykos <glykos@aspera.cluster.mbg.gr>

To: glykos@aspera.cluster.mbg.gr

Subject: Test 1

Test 1

&

Message 3:

From glykos Wed Nov 17 18:23:49 2004

.....

smtp

Unix Mail : απλή χρήση για ανάγνωση μηνυμάτων

& h

```
1 glykos@aspera.cluste Wed Nov 17 18:23 14/433 "Test 1"
> 3 glykos@aspera.cluste Wed Nov 17 18:23 14/433 "Test 3"
```

& r 3

```
To: glykos@aspera.cluster.mbg.gr glykos@aspera.cluster.mbg.gr
Subject: Re: Test 3
```

~m

```
Interpolating: 3
(continue)
```

Thank you for your message.

.

Cc:

smtp

Unix Mail : απλή χρήση για ανάγνωση μηνυμάτων

```
& h
      1 glykos@aspera.cluste Wed Nov 17 18:23 14/433 "Test 1"
>    3 glykos@aspera.cluste Wed Nov 17 18:23 14/433 "Test 3"
& d 1-3
& h
No applicable messages
& q
New mail has arrived.
$
$ Mail
Mail version 8.1 6/6/93.  Type ? for help.
"/var/mail/glykos": 1 message 1 new
>N  1 glykos@aspera.cluste Wed Nov 17 18:26 23/676 "Re: Test 3"
```

smtp

Unix Mail : απλή χρήση για ανάγνωση μηνυμάτων

& 1

Message 1:

From glykos Wed Nov 17 18:26:36 2004

Date: Wed, 17 Nov 2004 18:26:36 +0200

From: Nicholas M Glykos <glykos@aspera.cluster.mbg.gr>

To: glykos@aspera.cluster.mbg.gr

Subject: Re: Test 3

From glykos Wed Nov 17 18:23:49 2004

Date: Wed, 17 Nov 2004 18:23:49 +0200

From: Nicholas M Glykos <glykos@aspera.cluster.mbg.gr>

To: glykos@aspera.cluster.mbg.gr

Subject: Test 3

Test 3

Thank you for your message.

& d 1

& q

smtp

Άλλα Unix MUAs : pine

```
PINE 4.58      MAIN MENU      Folder: INBOX  74 Messages

?      HELP      -  Get help using Pine
C      COMPOSE MESSAGE  -  Compose and send a message
I      MESSAGE INDEX  -  View messages in current folder
L      FOLDER LIST  -  Select a folder to view
A      ADDRESS BOOK  -  Update address book
S      SETUP      -  Configure Pine Options
Q      QUIT      -  Leave the Pine program

Copyright 1989-2003.  PINE is a trademark of the University of Washington.
[Sorting "INBOX" | 100% |]
? Help      P PrevCmd      R ReINotes
O OTHER CMDS [ListFldrs] N NextCmd      K KBlock
```

smtp

Άλλα Unix MUAs : pine

PINE 4.58 MESSAGE INDEX Folder: INBOX Message 50 of 74

50	Oct	22	ealert@iucr.org	(21K)	Contents of Journal of Synchrotron Rad
51	Oct	22	ScienceDirect Mess	(39K)	ScienceDirect Alert: Journal of Molecu
52	Oct	26	ealert@iucr.org	(36K)	Contents of Acta Crystallographica Sec
53	Oct	26	pnas-mailer@lionta	(20K)	PNAS Table of Contents for 26 October
54	Oct	26	biophysj-mailer@li	(22K)	Biophys. J. Table of Contents for 1 No
55	Oct	28	Cell	(45K)	Cell Volume 119 Issue 3 Annotated Tabl
56	Oct	28	science-mailer@lio	(15K)	Science Table of Contents: 306 (5697)
57	Nov	2	ScienceDirect Mess	(42K)	ScienceDirect Alert: Journal of Molecu
58	Nov	2	ScienceDirect Mess	(34K)	ScienceDirect Alert: Journal of Struct
59	Nov	2	pnas-mailer@lionta	(21K)	PNAS Table of Contents for 2 November
60	Nov	2	Nature Structural	(8976)	Nature Structural & Molecular Biology
61	Nov	3	oupjournals-mailer	(6134)	Protein Engineering, Design and Select
62	Nov	4	science-mailer@lio	(15K)	Science Table of Contents: 306 (5698)
63	Nov	9	ScienceDirect Mess	(42K)	ScienceDirect Alert: Journal of Molecu
64	Nov	9	pnas-mailer@lionta	(20K)	PNAS Table of Contents for 9 November
65	Nov	10	ScienceDirect Mess	(37K)	ScienceDirect Alert: Structure, Vol. 1
66	Nov	11	Jawahar Swaminatha	(4842)	[ccp4bb]: Announcing biobar - A toolba
67	Nov	11	science-mailer@lio	(15K)	Science Table of Contents: 306 (5699)
68	Nov	11	Cell	(60K)	Cell Volume 119 Issue 4 Annotated Tabl

Help FldrList P PrevMsg - PrevPage D Delete R Reply
OTHER CMDS [ViewMsg] N NextMsg Spc NextPage U Undelete F Forward

Σύνδεση με άλλους υπολογιστές

telnet ... και (αν)ασφάλεια δικτύων

```
$ telnet server.cluster.mbg.gr
```

```
Trying 190.100.100.100...
```

```
Connected to server.cluster.mbg.gr (190.100.100.100).
```

```
Escape character is '^]'.
```

```
Red Hat Linux release 7.3 (Valhalla)
```

```
Kernel 2.4.22-openmosix3 on an i686
```

```
login: glykos
```

```
Password:
```

```
Last login: Thu Nov 18 11:41:05 from aspera
```

```
Programs installed :
```

```
– CCP4 4.2.1
```

```
.....
```

```
$ hostname
```

```
server.cluster.mbg.gr
```

Σύνδεση με άλλους υπολογιστές

Secure shell : ssh

```
$ ssh crystal3.imbb.forth.gr
```

```
glykos@crystal3.imbb.forth.gr's password:
```

```
Last login: Wed Nov 17 18:19:45 2004 from  
ppp1-86.axd.forthnet.gr
```

```
Programs installed :
```

```
  - CCP4 4.2.1  
  .....
```

```
$
```

```
$ exit
```

```
logout
```

```
Connection to crystal3.imbb.forth.gr closed.
```

```
$
```

```
$
```

Σύνδεση με άλλους υπολογιστές

File transfer protocol (ftp) ... και (αν)ασφάλεια δικτύων

```
$ ftp server
```

```
Connected to server.cluster.mbg.gr.
```

```
220 server.cluster.mbg.gr FTP server (Version wu-2.6.2-5) ready.
```

```
504 AUTH GSSAPI not supported.
```

```
504 AUTH KERBEROS_V4 not supported.
```

```
KERBEROS_V4 rejected as an authentication type
```

```
Name (server:glykos): glykos
```

```
331 Password required for glykos.
```

```
Password:
```

```
230 User glykos logged in. Access restrictions apply.
```

```
Remote system type is UNIX.
```

```
Using binary mode to transfer files.
```

```
ftp> pwd
```

```
257 "/" is current directory.
```

Σύνδεση με άλλους υπολογιστές

File transfer protocol (ftp) ... και (αν)ασφάλεια δικτύων

```
ftp> ls
```

```
227 Entering Passive Mode (190,100,100,100,26,21)
```

```
150 Opening ASCII mode data connection for directory listing.
```

```
total 22512
```

drwxrwxr-x	5	500	500	4096	Feb	20	2004	GNUstep
drwxrwxr-x	2	500	500	4096	Nov	13	03:22	download
-rw-rw-r--	1	500	500	243	Jun	1	2004	eln.ini
drwx-----	2	500	500	4096	Mar	15	2004	mail
-rw-----	1	500	500	11478549	Oct	1	19:58	namd-tutorial.pdf
drwxr-xr-x	17	500	500	4096	Sep	18	13:21	server
drwxrwxr-x	3	500	500	4096	Oct	31	12:26	tmp

```
226 Transfer complete.
```

```
ftp> cd server
```

```
250 CWD command successful.
```

```
ftp> pwd
```

```
257 "/server" is current directory.
```

```
ftp> cd ..
```

```
250 CWD command successful.
```

Σύνδεση με άλλους υπολογιστές

File transfer protocol (ftp) ... και (αν)ασφάλεια δικτύων

```
ftp> binary
```

```
200 Type set to I.
```

```
ftp> get namd-tutorial.pdf
```

```
local: namd-tutorial.pdf remote: namd-tutorial.pdf
```

```
227 Entering Passive Mode (190,100,100,100,216,150)
```

```
150 Opening BINARY mode data connection for namd-tutorial.pdf (11478549  
bytes) .
```

```
226 Transfer complete.
```

```
11478549 bytes received in 1.3 seconds (8.5e+03 Kbytes/s)
```

Σύνδεση με άλλους υπολογιστές

File transfer protocol (ftp) ... και (αν)ασφάλεια δικτύων

```
ftp> put 5.mgp
```

```
local: 5.mgp remote: 5.mgp
```

```
227 Entering Passive Mode (190,100,100,100,98,14)
```

```
150 Opening BINARY mode data connection for 5.mgp.
```

```
226 Transfer complete.
```

```
11014 bytes sent in 0.00011 seconds (1e+05 Kbytes/s)
```

```
ftp> ls
```

```
227 Entering Passive Mode (190,100,100,100,207,30)
```

```
150 Opening ASCII mode data connection for directory listing.
```

```
total 22536
```

-rw-r--r--	1	500	500	11014	Nov	18	12:33	5.mgp
drwxrwxr-x	5	500	500	4096	Feb	20	2004	GNUstep
drwxrwxr-x	2	500	500	4096	Nov	13	03:22	download
-rw-rw-r--	1	500	500	243	Jun	1	2004	eln.ini
drwx-----	2	500	500	4096	Mar	15	2004	mail
-rw-----	1	500	500	11478549	Oct	1	19:58	namd-tutorial.pdf
drwxr-xr-x	17	500	500	4096	Sep	18	13:21	server
drwxrwxr-x	3	500	500	4096	Oct	31	12:26	tmp

```
226 Transfer complete.
```


Σύνδεση με άλλους υπολογιστές

File transfer protocol (ftp) ... και (αν)ασφάλεια δικτύων

```
ftp> del 5.mgp
```

```
250 DELE command successful.
```

```
ftp> ls
```

```
227 Entering Passive Mode (190,100,100,100,123,181)
```

```
150 Opening ASCII mode data connection for directory listing.
```

```
total 22512
```

drwxrwxr-x	5	500	500	4096	Feb 20	2004	GNUstep
drwxrwxr-x	2	500	500	4096	Nov 13	03:22	download
-rw-rw-r--	1	500	500	243	Jun 1	2004	eln.ini
drwx-----	2	500	500	4096	Mar 15	2004	mail
-rw-----	1	500	500	11478549	Oct 1	19:58	namd-tutorial.pdf
drwxr-xr-x	17	500	500	4096	Sep 18	13:21	server
drwxrwxr-x	3	500	500	4096	Oct 31	12:26	tmp
drwxrwxr-x	2	500	500	4096	Mar 19	2004	viky

```
226 Transfer complete.
```

```
ftp> bye
```

```
221-You have transferred 11489563 bytes in 2 files.
```

```
221-Total traffic for this session was 11490951 bytes in 2 transfers.
```

```
221-Thank you for using the FTP service on server.cluster.mbg.gr.
```

```
221 Goodbye.
```

Σύνδεση με άλλους υπολογιστές

Secure ftp : sftp

```
$ sftp glykos@origin.imbb.forth.gr
```

```
Connecting to origin.imbb.forth.gr...
```

```
The authenticity of host 'origin.imbb.forth.gr (147.52.170.139)' can't be established.
```

```
DSA key fingerprint is 0a:17:31:c4:7c:58:56:e9:00:c5:88:12:5b:0d:53:b9.
```

```
Are you sure you want to continue connecting (yes/no)? yes
```

```
Warning: Permanently added 'origin.imbb.forth.gr' (DSA) to the list of known hosts.
```

```
glykos@origin.imbb.forth.gr's password:
```

```
sftp>
```

```
sftp> cd tmp
```


Σύνδεση με άλλους υπολογιστές

Secure ftp : sftp

```
sftp> ls
```

drwxr-xr-x	6	glykos	user	61	Mar	22	2003	./
drwxr-xr-x	18	glykos	user	4096	Nov	5	11:03	../
drwxr-xr-x	2	glykos	user	4096	Mar	22	2003	10-4/
drwxr-xr-x	2	glykos	user	4096	Feb	28	2003	12-4/
drwxr-xr-x	2	glykos	user	4096	Mar	22	2003	12-5/
drwxr-xr-x	2	glykos	user	4096	Feb	13	2003	15-4/

```
sftp> put test.txt
```

Uploading test.txt to /usr/people/glykos/tmp/test.txt

```
sftp> ls
```

drwxr-xr-x	6	glykos	user	78	Nov	18	15:24	./
drwxr-xr-x	18	glykos	user	4096	Nov	5	11:03	../
drwxr-xr-x	2	glykos	user	4096	Mar	22	2003	10-4/
drwxr-xr-x	2	glykos	user	4096	Feb	28	2003	12-4/
drwxr-xr-x	2	glykos	user	4096	Mar	22	2003	12-5/
drwxr-xr-x	2	glykos	user	4096	Feb	13	2003	15-4/
-rw-r--r--	1	glykos	user	40	Nov	18	15:24	test.txt

```
sftp> exit
```

```
$
```

http

[h]yper[t]ext [t]ransfer [p]rotocol : το πρωτόκολλο ...

```
$ telnet www.mbg.duth.gr 80
```

```
Trying 192.108.114.44...
```

```
Connected to utopia.duth.gr (192.108.114.44).
```

```
Escape character is '^]'.
```

```
GET /~glykos/ HTTP/1.0
```

```
HTTP/1.1 200 OK
```

```
Date: Thu, 18 Nov 2004 14:50:54 GMT
```

```
Server: Apache/1.3.26 (Unix) Debian GNU/Linux
```

```
Last-Modified: Wed, 07 Jul 2004 14:16:26 GMT
```

```
ETag: "4e803f-813-40ec05ba"
```

```
Accept-Ranges: bytes
```

```
Content-Length: 2067
```

```
Connection: close
```

```
Content-Type: text/html; charset=iso-8859-1
```

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2//EN">
```

```
<HTML>
```

```
<HEAD>
```

```
.....
```

http & html

[h]yper[t]ext [m]arkup [l]anguage

```
<html>
<head>
<title>Per aspera ad astra</title>
</head>
<body bgcolor="#CC9944" >
<center>
<h1>Chapter 1</h1>
<h2>Section 1</h2>
</center>
```

This is normal text.

The appearance of the text on the web page is the responsibility of the browser.

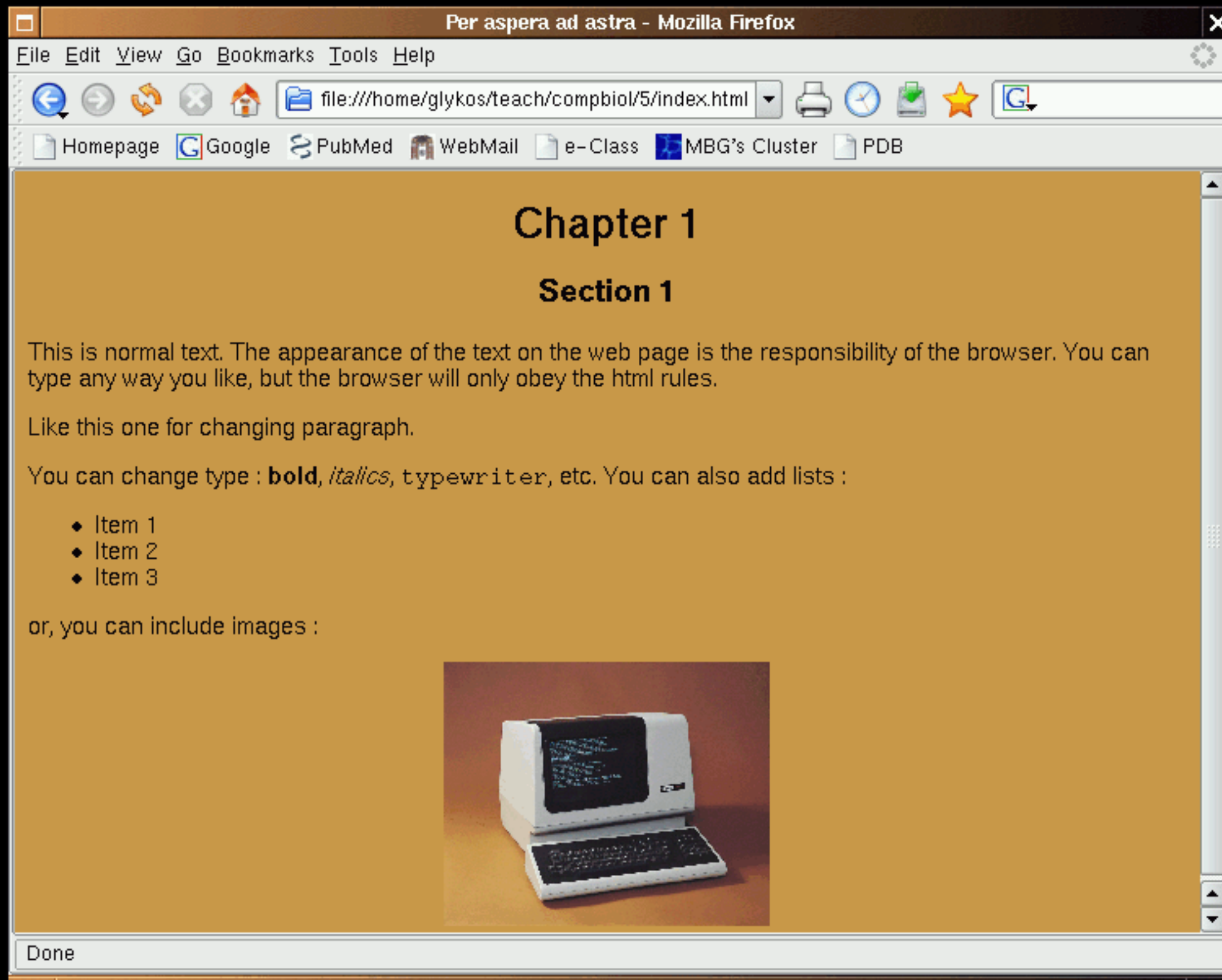
You can

type any way you like, but the browser will only obey the html rules.

```
<p>Like this one for changing paragraph.</p>
.....
```

http & html

[h]yper[t]ext [m]arkup [l]anguage



http & html

[h]yper[t]ext [m]arkup [l]anguage

Per aspera ad astra

Chapter 1

Section 1

This is normal text. The appearance of the text on the web page is the responsibility of the browser. You can type any way you like, but the browser will only obey the html rules.

Like this one for changing paragraph.

You can change type : **bold**, italics, typewriter, etc. You can also add lists :

- * Item 1
- * Item 2
- * Item 3

or, you can include images :

[vt100.jpg]

Commands: Use arrow keys to move, '?' for help, 'q' to quit, '<-' to go back.

html

```
<html>
<head>
<title>Per aspera ad astra</title>
</head>
<body bgcolor="#CC9944" >
<center>
<h1>Chapter 1</h1>
<h2>Section 1</h2>
</center>
```

This is normal text.

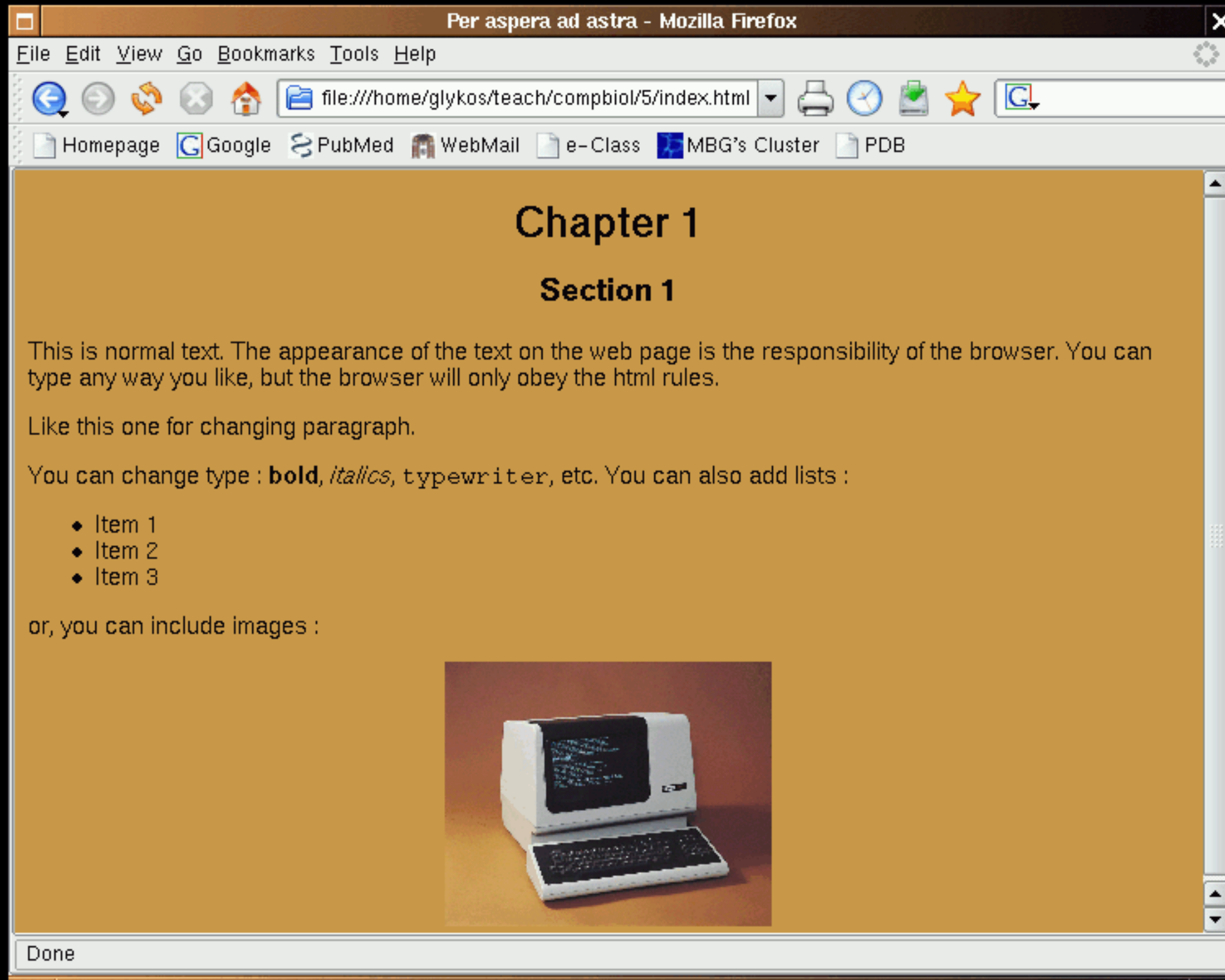
The appearance of the text on the web page is the responsibility of the browser.

You can

type any way you like, but the browser will only obey the html rules.

```
<p>Like this one for changing paragraph.</p>
```

html



html

You can change type : `bold`, `<i>italics</i>`,
`<tt>typewriter</tt>`, etc.

You can also add lists :

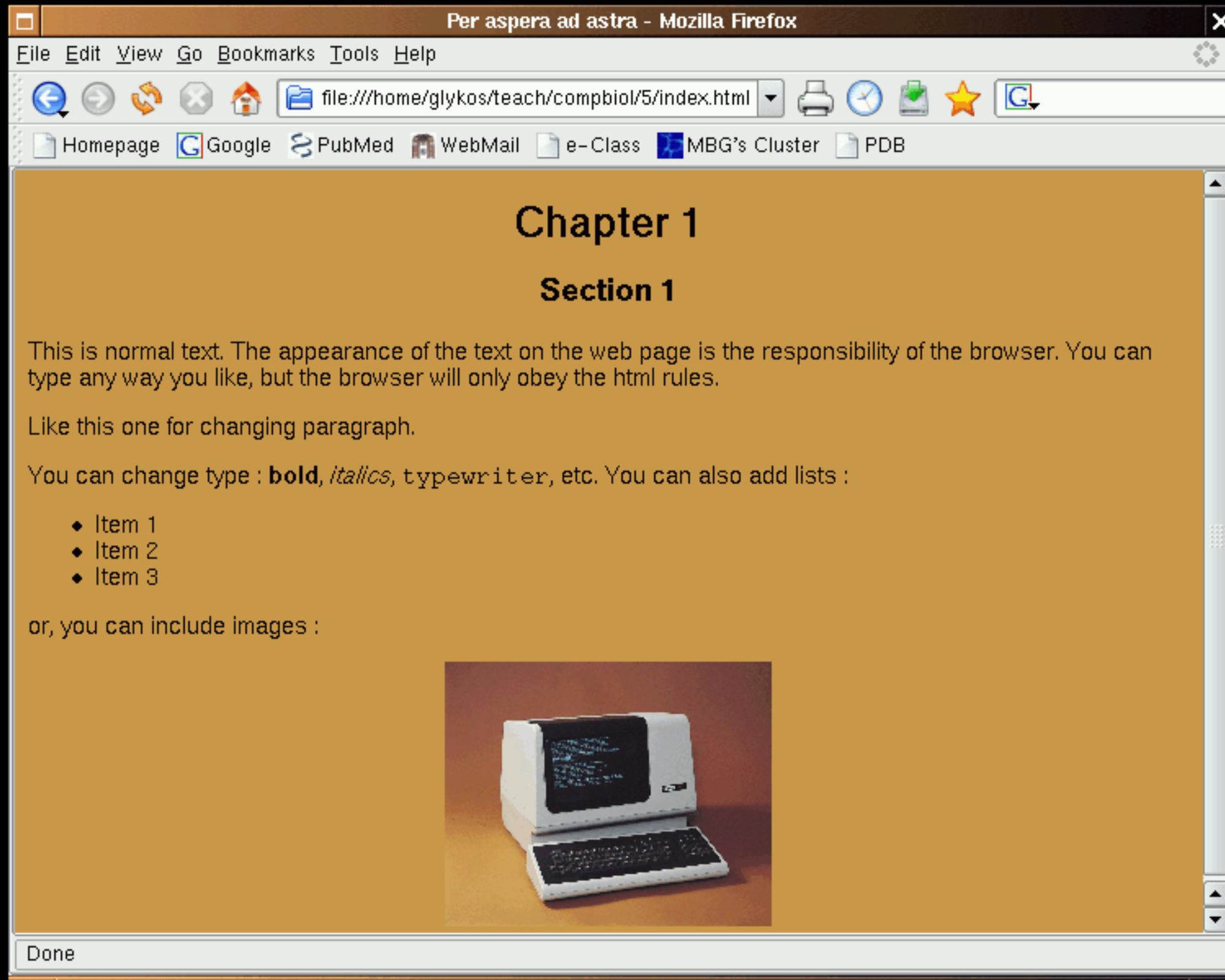
```
<ul>
  <li>Item 1</li>
  <li>Item 2</li>
  <li>Item 3</li>
</ul>
```

`<p>or, you can include images :</p>`

```
<center>

</center>
</html>
```


html



The end

