# Diagnostisc test – DO2003

Suggested solutions

(* = not primarily)

1. Explain the terms "absolute path" and "relative path". Exemplify the two types.
   An absolute path to a file or a folder is a unique identification of where I can find a file or a folder in the file structure. Absolute paths always start with a /, indicating the root of the file system. The absolute path to the apache startup script will be /etc/init.d/apache2 .
   A relative path to a file or a folder explains how to move around in the file structure, starting in the current directory, to find the target. A relative path is dependent on the current directory and different starting positions might lead to different targets, if any. Assuming that the current directory is /etc/rc2.d the relative path to the apache startup-script will be ../init.d/apache2 .

2. In which folder should you look for
   a. configuration files
      i. for the system
         /etc
      ii. for a specific program
         /etc/program
   b. files on a certain users desktop (e.g., user alfa)
      /home/alfa/Desktop
   c. the administrators files
      /root
   d. logs
      /var/log
   e. * kernels and boot manager
      /boot, /boot/grub
   f. * information about processes
      /proc

3. Show schematically in a single diagram how the following distributions are related
   a. CentOS
   b. Debian
   c. Fedora
   d. Knoppix
   e. RedHat

f. Ubuntu
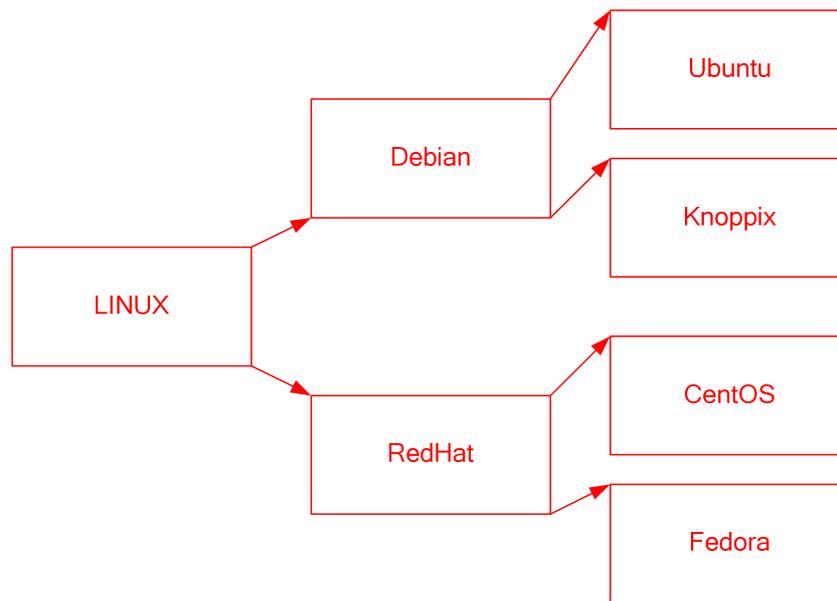
4. Explain and exemplify how the following commands are used
   a. cd
      Change directory – change the current working directory.
      cd [ABSOLUTE PATH]
      cd [RELATIVE PATH]
   b. ls
      Lists folder content. It is also possible to pattern match the file names.
      ls –l
      ls /etc/*.conf
   c. cp
      Copy a file.
      cp [SOURCE] [DESTINATION]
   d. rm
      Remove files or hierarchies.
      rm [FILENAME]
      rm –rf [PATH]
   e. man
      Show manual pages.
      man man
      man tar
   f. mkdir
      Create folder.
      mkdir [FOLDERNAME]
   g. sudo
      Execute command as super user.
      sudo /etc/init.d/networking restart
   h. cat
      Display file content to the screen. Real purpose is to concatenate files.
      cat [FILENAME]
      cat [FILE1] [FILE2] …

i. more
Paginate output data.
cat /var/log/syslog | more
j. nano
Simple text editor.
nano [FILENAME]
k. grep
Pattern matching tool. Prints lines matching the pattern to the terminal.
grep error /var/log/syslog
l. passwd
Change password.
passwd kalle
m. adduser
Adds a user.
adduser kalle
n. lsmod
List installed modules.
lsmod
o. lspci
List pci units in the system.
lspci -v
p. ifconfig
Show network interface configuration.
ifconfig
q. shutdown
Shutdown or reboot the system.
shutdown now
r. * chown
Change ownership of a file or folder.
chown www:www /var/www/index.html

5. Give one example of redirection to a file and explain what happens.
lspci –v > configuration
This will list all pci-units in the system and instead of displaying the information to the terminal it will be sent to a file named configuration.

6. Give one example of pipes and explain what happens
ls –l | more
This will list all content in the current folder and instead of displaying it to the terminal it will be sent to the command more. The command more will paginate the data (display it page by page) to the terminal.

7. Explain how to do the following in vi
a. open a file
vi [FILENAME]
b. close a file without saving it
[ESC]q![RETURN]
c. close a file and saving it
[ESC]:wq[RETURN]
d. remove a character
[ESC]x
e. insert a character (e.g, c)
[ESC]ic

8. Explain the difference between command mode and edit mode in vi
   In command mode all keystrokes are considered to be commands to the editor. In edit mode all keystrokes except [ESC] are considered to be data input (symbols).
9. For the command chmod, explain
   a. how to use the command
      chmod [MODE] [FILENAME]
      Sets the access rights of the file FILENAME to MODE.
   b. the difference between access rights for folders and files
   c. access rights 755
      rwx r-x r-x
      Owner: Read-Write-Execute
      Group: Read-Execute
      Other: Read-Execute
   d. access rights 644
      rw- r-- r--
      Owner: Read-Write
      Group: Read
      Other: Read
   e. access rights 700
      rwx --- ---
      Owner: Read-Write-Execute
      Group:
      Other:
   f. * access rights 000
      --- --- ---
      Owner:
      Group:
      Other:
10. Show and explain how you could use mount to mount
    a. a hard drive partition (e.g, /dev/hda3)
       To add the partition /dev/hda3 to the file structure in the existing folder /mnt/external you give the command:
       mount –t auto /dev/hda3 /mnt/external
    b. a cd-player (e.g., /dev/sdc)
       To add the cd-player to the existing folder /media/cdrom you give the command:
       mount –t auto /dev/sdc /media/cdrom
    c. a net disk
       i. of the type nfs
          To add the folder /linux_sw from the server repo.hh.se to the existing folder /mnt/linux you give the command:
          mount –t nfs repo.hh.se:/linux_sw /mnt/linux
       ii. * of the type smbfs
           Assuming the same situation as in 10 c (i):
           mount –t cifs //repo.hh.se/linux_sw –o username=[USER],password=[PASSWORD] /mnt/linux
11. Explain, for apt-get, how to
    a. upgrade all installed packets
       apt-get update
       apt-get upgrade

     b. install a specific packet
To install the packet traceroute you give the command:
apt-get update
apt-get install traceroute

12. Explain how to start a program (e.g., firefox) in the background
firefox &

13. Explain how to terminate a program that executes in the background
Find the process PID, e.g. using the command ps. Then give the command:
kill [PID]

14. * Explain how to start a program in the background that will not be affected by the signal HUP and explain what this means
nohup [COMMAND] &
The hangup signal (HUP) is sent when the system asks a program to shut down. By blocking this signal the program will continue to run in the background although the user who started the command logs out.

15. Explain how to generally restart a server or service, e.g., after a reconfiguration or a crash
Assuming we want to restart the apache2 server you instruct the server controller to restart the server by giving the command:
/etc/init.d/apache2 restart

16. Show how to archive and compress all files and folders in a certain folder (e.g., /tmp/collection) and explain where it ends up
tar cvzf [FILENAME.TGZ] *
This creates an archive in the current working directory.

17. Show how to unpack a tgz-archive (e.g., nano.tgz) in the folder /tmp
cd /tmp
tar xvzf /path/to/nano.tgz

18. Explain how to perform a remote login to a computer (e.g., remote.hh.se) with a given user (e.g., alfa)
ssh alfa@remote.hh.se

19. Explain what basic configurations that are needed to either perform or to check when you install a web server
You need to know or set the root folder for the html hierarchy (DocumentRoot) as well as for the cgi-scripts (ScriptAlias).

20. Explain what basic configurations that are needed to either perform or to check when you install a database server
You need to set the administrative password and specify the port for database access.

Estimated number of Linux users today:

29.000.001