

**ADMINISTRACIÓ DE SISTEMES OPERATIUS**January 25th 2008**The exam is individual and you can't use any book or notes.****Answer in the given space.****Write your Name in all sheets.****Time: 2 hours. (You can't leave the room before the first hour)**

1. **(1.5 points)** We have a mail server with spam and anti-virus filters that works in the following way for each incoming message:
- First, it goes through the spam filter. The spam filter uses the latest Bayesian techniques to detect which mails are spam and deletes them completely.
  - Then, the server passes the messages to the anti-virus filter. This filter detects messages with viruses and marks them by adding the line “\*\*\* VIRUS MESSAGE \*\*\*” at the end of the message Subject and allows the message to continue because of the possibility of false positives.
  - All messages that are allowed to go through both filters are delivered to the users' mailboxes.

a) Discuss the presented scenario. What is it ok and what is wrong?

b) Propose a better solution.

2. **(1.5 points)** In one system we are monitoring we obtain the following information from the top command:

```
top - 10:03:12 up 5 days, 22:26, 4 users, load average: 0.3, 2.17, 4.02
Tasks: 62 total, 1 running, 61 sleeping, 0 stopped, 0 zombie
Cpu(s): 0.7%us, 0.3%sy, 0.0%ni, 99.0%id
Mem: 207960k total, 201968k used, 5992k free, 26860k buffers
Swap: 0k total, 0k used, 0k free, 101588k cached
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
27838	aduran	15	0	2304	1056	844	R	0.7	0.5	0:00.24	top
1	root	15	0	2080	696	600	S	0.0	0.3	0:03.11	init
2	root	10	-5	0	0	0	S	0.0	0.0	0:00.01	kthreadd
3	root	RT	-5	0	0	0	S	0.0	0.0	0:00.00	migration/0
4	root	34	19	0	0	0	S	0.0	0.0	0:00.01	ksoftirqd/0
5	root	RT	-5	0	0	0	S	0.0	0.0	0:00.00	watchdog/0
6	root	10	-5	0	0	0	S	0.0	0.0	0:00.02	events/0
7	root	10	-5	0	0	0	S	0.0	0.0	0:00.01	khelper

a) What do the different CPU percentages from top mean?

b) Do you think there's any problem currently in this system? Which one? In case there's a problem which steps would you follow to solve it?

After a while, we see the following output from the ps and iostat (iostat has a one second frequency) commands:

```
root@server:~$ ps -f
UID          PID    PPID  C STIME TTY          TIME CMD
dbserver    2597    2490  0 09:08 ?           02:34:55 dbserver --secure
queries    22758  21835  1 15:34 pts/10    00:00:15 query-daily -verbose
root@server:~$ iostat -d /dev/sda1 1
Device:            tps    Blk_read/s    Blk_wrtn/s    Blk_read    Blk_wrtn
sda1                0.13         0.13          0.00         2562         0
sda1                0.00         0.00          0.00          0           0
sda1                0.00         0.00          0.00          0           0
sda1                0.00         0.00          0.00          0           0
sda1             35356.86    35356.86      0.00         36064         0
sda1             72784.31    72784.31      0.00         74240         0
sda1             73537.25    73537.25      0.00         75008         0
sda1             56988.24    56988.24      0.00         58128         0
sda1             60988.24    60988.24      0.00         62208         0
sda1             73537.25    73537.25      0.00         75008         0
```

c) Can you explain what's happening in the machine?

3. **(1.5 points)** At some point, in one of our systems appears the following message related to a disk containing /home: "kernel: hda: media error (bad sector): error=0x3"

a) Describe which steps would you follow to verify the integrity of the disk.

b) How would your solution change if the root partition was in the disk?

4. **(1.5 points)** In our system we have 6 users (pep, lluis, elena, laura and carles) who are working on different projects (proj1, proj2 i proj3) as explained in the following table:

Project	Users
proj1	pep, lluis, carles
proj2	elena, lluis
proj3	laura, elena, pep

We want the users from the different projects can share the files that are specific to a project between them (and only them). Also, there are some parts of the projects which are common to two of them and some other files which are common to the three of them. We also want these files to be shared between the appropriate users.

- a) Describe how would you configure a traditional UNIX system to fulfill these requirements. Take into account in your solution that in the future there can be new users not related to these projects.
- b) Is there any technology which we could have used to make it simpler? Which one? Why?

5. **(2 points)** Fill the gaps in each sentence with one or more words so each sentence is true. (Each bad answer takes away half good answer).

- a) The admin applications are usually located at \_\_\_\_\_ and \_\_\_\_\_.
- b) Depending on our necessities, we'll use \_\_\_\_\_ or \_\_\_\_\_ to differ once the execution of a task.
- c) We need \_\_\_\_\_ and \_\_\_\_\_ permissions in a directory to be able to create a file.
- d) We can have swap areas in a \_\_\_\_\_ and in a \_\_\_\_\_.

- e) NFS is \_\_\_\_\_ with the inetd superserver because it uses RPCs
- f) A good security policy is following the \_\_\_\_\_ access principle.
- g) An advantage of installing an application from its source code is \_\_\_\_\_.
- h) The key principle behind the DNS service is the \_\_\_\_\_ delegation.
6. **(2 points)** We want to define a policy for backup copies for an organization with the following characteristics:
- There are 20 users.
  - Each user has a home (average size of 1 GB) and a mailbox (average size of 200 Mb).
  - There's also an intranet for the organization (30 Mb) with dynamic content (data of the organization) stored in a database (2 Gb).
- a) Which kind(s) of device(s) will you use? Why?
- b) Which kind(s) of backup(s) will you use and with which frequency? Which data will you store in each backup? Why?
- c) Is there any other aspect related to the backup policy that you would take into account?