UNIVERSIDAD DE LAS PALMAS DE GRAN CANARIA
Escuela de Ingeniería Informática

ADMINISTRACIÓN DE SISTEMAS OPERATIVOS
Grado en Ingeniería Informática
Examen parcial – Segunda parte
20 de diciembre de 2013

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Full name   **DNI/NIE**

The duration of the exam is 120 minutes. The exam has five questions.

*You must send yours solutions in a PLAIN TEXT file. You must load this file to Campus Virtual. Other file formats, such as: PDF, Word, OpenOffice, **are not allowed**. Make you sure to write your full name at the beginning of the file and numerate the solutions.*
To pass the exam, you must obtain in questions that score more than one point at least 30% of the score.
Complete this page with your personal data and return it back at the end of the exam.

1. **(2.5 points)** We have detected that today, an unknown user has performed inadequate actions within our system. Therefore, we need to find out what user accounts have been opening sessions today. Write a Korn Shell program that uses the standard system log files to print out what users have opened sessions today.
   NOTE: Today = December 20th, 2013

2. **(1 point)** We have a directory `/tmp/foo`, with these attributes: owner user `root`, owner group `root` and access rights `rwxr-xr-x.`

   By using ACL exclusively, get users in group profes to have full rights (file creation/erase/listing) in this directory `/tmp/foo`, except for user `eduardo`, which belongs to group `profes`, who must be denied all kinds of access to that directory. For other users not in `profes`, access rights must be kept as defined originally.

3. **(1 point)** A new user `mojamuto` has just been created. It is planned to apply to him a quota of 4 gigabytes in the root directory. In addition, this user may override this limit in one additional gigabyte, only during the grace period that is setup systemwide. What commands should you call?

   Additional requirements:

   o The root file system is formatted as `EXT4`.

   o Quotas are already activated in the root file system.

   o The file system block size is 512 bytes.

4. **(2.0 points)** We are in charge of a CentOS 6.4 system. This is the current contents of `/etc/fstab:`

`/dev/sda1 / ext4 defaults 0 1`

`/dev/sda2 /boot ext3 defaults 0 2`

`/dev/sda3 /home ext4 usrquota,grpquota 0 2`

At this moment, all systems are correctly mounted.

We have detected a block data failure in the system `/dev/sda3`. Fortunately, damages are small and we have a full system backup that is old, but able to retrieve the original, correct data. The backup is in `/dev/sdb1` and it is a clone of the original `/dev/sda3.`

The damages in `/dev/sda3` lay in a contiguous area of 64KB that begins at byte 10.240, counting from the partition start. We will patch this area by making a low level copy from the original correct blocks that are still stored in `/dev/sdb1`.

When the patch is complete, we must check `/dev/sda3` to confirm that there are no more failures in the file system structure. We will execute this checks with the standard command that Linux systems provide for this purpose.

As we perform the recovery, `/dev/sda3` must be unmounted all the time. In addition, before the recovery starts, we have to mount the backup system `/dev/sdb1` as a read-only system in the same point where `/dev/sda3` was mounted. This way, users will be able to read their files during the process. Once the recovery is successful, we will revert all the file systems to their initial mount setup.

Assignment: You have to write the sequence of commands that the system administrator should invoke in order to complete the recovery plan that is described above.

5. **(3.5 points)** The classroom PC contains a disk with some partitions that are intended to store the operating system of each student lab team, up to partition `/dev/sda8`. The disk extended partition still contains some free space.

   A. **(1 point)** Describe the steps to create a new partition on the extended partition, 8GB size, Linux type.

   B. **(1 point)** On the former partition, create an **EXT3** file system, with block size 1024, inode count 512, journaling enabled and a 7% of superuser-reserved blocks.

   Create a directory called **"nucleos"** in the root of the newly created filesystem.

   Copy on this directory **"nucleos"** our existing version of `vmlinuzxxx, intramfsxxx`, and `System.map-xxx`, which are stored in our partition `/boot directory.`

   C. **(1.5 points)** Modify `grub.conf` so that the kernel can be booted from `/dev/sda9` partition, with the following requirements:

      ○ Title **"nucleo en particion sda9"**

      ○ Prevent GRUB menu from hiding.

      ○ This has to be the default boot option.

      ○ After a 13 second timeout, this kernel will boot automatically.

      ○ The kernel will use your own filesystem, the one that you created in your first CentOS installation.