

TERM 2. EXAMS

Computer Systems
CFGS DAW

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TERM 1. EXAMS

1.1 Model 1

Storage administration (1 point)

Exercise 1. Calculate the space available and the space used for protection for these scenarios. Justify your answers.

(0,25 points/each)

- RAID 0: 3 disks of 1TiB each.
- RAID 01: 4 disks of 1TiB each.
- RAID 5: 4 disks of 2TiB each.
- RAID 10: 5 disks of 10 TiB each.

Linux (3 points)

Exercise 2. Write the complete command (arguments, files, directories, users, groups, etcetera) for each question.

1) Create the directory **shared** in /dev. Consider the possibility that the user has no permissions to perform this operation and send a possible error message to a file in the user's directory /home/user.

(0,3 points)

2) Given the following list of files and directories in /home/professor/daw:

(0,3 points/each)

```
-rw-r--r-- 1 profesor students 0      abr 20 11:50 file1.txt
-rw-r--r-- 1 profesor professor 120   abr 21 06:17 file2.txt
-rw-r--r-- 1 profesor professor 120   abr 23 16:34 file3.txt
-rwx----- 1 profesor professor 2001 jun 20 19:19 program
drwxrwxr-x 2 profesor professor 4096  abr 25 23:57 solutions
```

- a) Write the complete command to allow users of the group **students** to modify the *.txt* files
 - b) Write the complete command to allow users of the group **students** to execute the file *program*
 - c) Write the complete command to allow the user **daw** to execute the file *program.exe*, located in */home*, using the owner's privileges.
 - d) Create a soft link to the directory *solutions*, in */home/user* called *lsolutions*.
 - e) Change the group of the directory *solutions* to be **students**.
- 3) Suppose the following information is returned when executing the command **lsblk**. Write the complete command to:

(0,3 points/each)

NAME-SIZE-UNIT-TYPE-MOUNTPOINT

sda-10-GiB-disk

sda1-7-GiB-part-/

sda2-1-GiB-part-/swap

sda3-2-GiB-part-/home

sdb-5-GiB-disk

sdb1-2.5-GiB-part-/var

sdb2-2.5-GiB-part-/python

- a) Show only the information about the partitions of **sda**.
- b) Show the size of all partitions.
- c) Show only the mountpoint of partition **sdb2**
- d) Show only the disks' information and order by size.

Python (2,5 points)

Exercise 3. Create a script in Python that:

- 1) Must return the size of a partition disk typed in the command line together with the size unit: Gi (gibi) or Mi (mebi). The script must validate that the number of arguments is correct, otherwise it will show this error message: "The number of arguments is incorrect." and end.

The message showed must contain the name of the partition and the size conversion to the unit entered, like this: **sda size is: 7168 MiB.**

#You must comment your code.

(1,5 points)

For example: check_partition.py sda M

Result: sda size is: 7168 MiB

Remember the conversion:

1GiB = 1024 MiB

- 2) Modify the previous script so that, in case the value of the size argument is not *Mi* and *Gi*, the user will have 3 tries to enter the unit size correctly.

(1 point)

Networks (3,5 points)

This exercise must be done on paper. You must be very precise and detail each step for each exercise.

Exercise 4. The company Cyberdyne Systems Corporation needs to divide its network in 3 different subnets. Its IP address is 195.20.20.0.

1) Which must be the subnet mask? Justify it.

(2 points)

2) Complete the table.

(0,6 points)

	Network ID	Broadcast IP	IP Range (from <i>IP</i> to <i>IP</i>)
Subnet 1			
Subnet 2			
Subnet 3			

3) Are all the addresses used? Why?

(0,3 points)

4) How many hosts can connect to each subnet? Justify.

(0,3 points)

5) Justify the network device/s you would use to connect every host in its subnet.

(0,3 points)

1.2 Model 2

Storage administration (1 point)

Exercise 1. In the TI Department you are responsible for the storage administration.

There is one server with the following partitions:

- sda1: reserved space
- sda2: operating system
- sda3: swap
- sdb1: database (uses 100 MiB of data)
- sdc1: shared directories (uses 1 TiB of data)

And there are 50 clients with the following partitions:

- sda1: reserved space
- sda2: operating system

1) If you have 3 hard disks of 2 TiB capacity, **explain** the best storage configuration to guarantee server data redundancy, if possible, of *sdc1*.

(0,75 points)

2) Suppose you have a client operating system image. In case you should restore that image to 20 clients, how would you do it faster? Why?

(0,25 points)

Linux (3 points)

Exercise 2. Write the complete command (arguments, files, directories, users, groups, etcetera) for each question.

1) In the terminal, you are logged in as **professor**. Given the following list of files and directories in `/home/professor/daw`:

(0,3 points/each)

```
-rw-r--r--  1 profesor students    0    abr 20 11:50 file1.txt
-rw-rw-r--  1 studentA students  120   abr 21 06:17 file2.txt
-rw-r--r--  1 profesor professor  120   abr 23 16:34 file3.txt
-rw-----  1 profesor professor  120   abr 23 16:34 users.txt
-rwx-----  1 profesor professor 2001   jun 20 19:19 program
drwxrwxrwt  2 profesor professor 4096   abr 25 23:57 solutions
```

- a) Write the complete command/s to deny all permissions to the *other users* for the `.txt` files. Use octal notation.
- b) Write the complete command/s to allow read all the other users for the `.txt` files. Use octal notation.
- c) Write the complete command/s to allow the group **students** to execute the file `program`, using the owner's privileges.
- d) Suppose that in the `solutions` directory there are 3 regular files whose owner is **studentA**. What would happen if a third user, **studentB**, accesses this directory and tries to delete one file? Justify.
- e) Change the owner and group of `file2.txt` to be professor, both.

2) How would you get only the users of the group **students** and append it to an existing file?

(0,3 point)

```
students:x:1003:sarah,john,T1000
```

3) Suppose the following information is returned when executing the command **cat /etc/fstab**. Write the complete commands to:

(0,3 points/each)

# file system	mount point	type	options	dump	pass
/dev/sda1	/boot	ext4	defaults	1	2
/dev/sda2	/	ext4	rw	1	1
/dev/sda3	/home	ext4	defaults	0	0
/dev/sda4	/storage	ext4	ro	1	2
/dev/sdb1	swap	swap	defaults	0	0

- a) Show only the information about the partitions with type **ext4**.
- b) Show only the information of partitions **sda1** and **sdb1**.
- c) Suppose you execute **cat /etc/fstab**. This will show an error message. How would you append that message to an existing file named *error.log*?
- d) Save this information to a new file named *fstab.log*.

Python (2,5 points)

Exercise 3. Create a script in Python that:

- 1) Must ask for a username and return his/her processes running. The image shows an example of the execution of the command **ps -aF**

The script must validate that the length of the username should be at least of 4 characters, otherwise it will show this error message: "The length of **USERNAME** must be at least 4 characters." where **USERNAME** is the value typed in the terminal.

```
USER,PROCESSID,TTY,CMD
sarah,1020,pts/0,firefox
john,2387,tty1,bash
sarah,1021,tty1,vscode
t800,800,pts/0,execute
```

#You must comment your code.

(1,25 points)

- 2) Modify the previous script so that the username must exist in the list below, otherwise the script will end with an error message.

```
#This list must be included in the script  
users=["T800","sarah","reese","dyson"]
```

(1,25 points)

Networks (3,5 points)

This exercise must be done on paper. You must be very precise and detail each step for each exercise.

Exercise 1. The company Cyberdyne Systems Corporation needs to have 28 hosts connected in each subnet. Its IP address is 200.10.10.0.

- 1) Which must be the subnet mask? Justify it.

(2 points)

- 2) Which is the network address of the last subnet? Justify.

(0,4 points)

- 3) Which is the broadcast address of the first subnet? Justify.

(0,4 points)

- 4) How many subnets have been created? Justify.

(0,4 points)

- 5) How would you allow a host in a subnet to access Internet using its private address? Justify.

(0,3 points)