SECOND TERM ASSESSABLE ACTIVITY

Computer Systems
CFGS DAW

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Licencia

Nomenclatura

A lo largo de este tema se utilizarán distintos símbolos para distinguir elementos importantes dentro del contenido. Estos símbolos son:

SECOND TERM ASSESSABLE ACTIVITY

Read the whole activity before beginning.

1. INTRODUCTION

Your client *BiCiBiKeR S.L. is* very pleased with your job. They want to hire you again to improve their systems. They need your services to:

1. **advice in a backup/storage policy.** *BiCiBiKeR* is really worried about the data stored in its server. For this purpose, you must create a document with a backup policy for your client. The server includes:

   1.1. Database services. You should find information about database systems and how they work in order to decide the storage policy. The data stored in the databases is:

   - One database for customer information. New data and updates are not common.
   - One database for products. New data and updates are quite common.

   1.2. Web services. You should find information about web server and how they work in order to decide the storage policy.

   - The website is visited very often. Changes on the website just happen during weekends.

2. **configure two separated networks**: one for computers of *Secretary* and other network for computers that are for *Human Resources*. Also, in the network of *Secretary* we want to configure 3 new computers that have arrived and make a network between them. For this purpose, you must:

   2.1. Install Linux (Ubuntu recommended) in two computers using Virtual Box.

   2.1.1. Configure those machines to access to local network with static IPs in each operating system.

   2.1.2. Create two users for each operating system: *foreign_XXXX* and *local_XXXX,* where XXXX is *your_first_surname_your_first_lettername,* for instance if you are Alan Turing it will be *foreign_turinga* and *local_turinga.*

   2.2. **Discuss** and **justify** which is the better hardware to interconnect three computers: a hub, a switch, or a router.

   2.3. Explain which is the best network configuration, supposing that, in a not too distant future, for the network *Secretary* we will connect 50 computer, and in the network *Human resources* we will connect 64 computers.

   2.4. In one of the computers (VirtualBox virtual machines) that has Linux installed, create a folder called */sharedsamba* and share it using Samba. Configure the other computer to

mount remotely that samba resource automatically at the start (`/sharedsamba`).

2.5. Create two scripts for Linux using Python that:

2.5.1. Check every minute if a Linux machine previously launched is down and notify it using Telegram to a Telegram user.

2.5.2. Asks a username and, if several conditions are satisfied, then it creates a zip file with all his Desktop content and finally it sends it to the samba shared resource */sharedsamba*.

2. ACTIVITIES

2.1 Dossier 1

You must deliver a dossier called **Dossier_Backup_Policy.odt** (docx is also allowed). This document must include:

1) The backup policy with these sections:

a) Backup Strategy. The type of data (databases, customer information, etc.) that will be backed up and **why**. Also, the types of backups chosen.

b) Backup Schedule. The periodicity of backups.

c) Backup Software. The software chosen to perform the backups. **Justify your choice.**

2) Two RAID solutions. For each one:

a) Hardware used

i) It can be managed by *BiCiBiKeR* or externally.

b) **Justify** the advantages and disadvantages for *BiCiBiKeR.*

c) **Detailed** budget.

2.2 Dossier 2 and spreadsheet

You must deliver a dossier called **Dossier_Network_Hardware.odt** (docx is also allowed). This document must include:

1) Justifications about what kind of hardware you have chosen for your network and why you have not chosen the other two (hub, switch, or router).

2) One spreadsheet file with a comparative price between two switches (in one page) and two routers (in another page).

a) Include links for each of them.

b) Include VAT.

3) Choose the best network mask for the proposed networks and justify your decision (you

must use subnetting)

2.3 Configure operating system, network, and server

You must configure each computer to:

1) Install Linux in two computers

a) Access to local network with static IPs in each operating system.

2) Create the users.

3) Install and configure Samba in one of the Linux computers to share a folder called `/sharedsamba`.

4) Install and configure other computer to mount the samba file system remotely (`/sharedsamba`).

2.4 Scripting

You must create two Linux scripts using Python and put it in each computer.

First Python script

1) Check every minute if the Samba service previously launched is down and notify it using Telegram to a Telegram user.

2) The samba service will be passed by parameter. You can find information about how to pass parameters from command line here:

https://www.tutorialspoint.com/python/python_command_line_arguments.htm

Second Python script

1) Check if you are *root*. If not, it will display an error message.

2) If you are *root*, it must ask you a username. The program has to check if the directory of that username exists in `/home`

a) If not exists, an error message must be displayed.

b) If it exists, you must check two conditions:

i) **Condition 1**: even number of files `/home/username` and its subdirectories.

ii) **Condition 2**: file *nobackup* doesn't exist in `/home/username`.

c) If one or two condition fails: an error message has to be displayed.

d) If both conditions are satisfied: `/home/username` directory has to be compressed in a zip and has to be saved in a file with name *username.date.time.zip* (where *username* is the

name of the home, date is the current date and time is the current time) and send to `/sharedsamba`

3. DELIVERY

The delivery will be divided in two parts:

First Delivery ***Sunday 4th April 2021 at 23:55***

1) Backup dossier. A dossier with the sections described in Dossier 1. The maximum number of pages is 3.

2) A dossier describing network hardware chosen and the network configuration to make isolated networks. In this dossier also you must include an explanation of best network configuration for 50 computer / 64 computers as required. The maximum number of pages is 3.

3) A spreadsheet[1] comparing network hardware.

> Remember to present final prices, with and without VAT

4) A video demonstrating that your computers work properly and share the resource */sharedsamba.* To do this you have to use the *ping*[2] command.

The video must have a good resolution so that the demonstration will be clear and easy to follow the actions recorded.

Second Delivery ***Sunday 25th April 2021 at 23:55***

5) Source code of the script with detailed comments.

> The code will be tested in Linux (Ubuntu) environment and using Visual Studio Code. Also, Windows environment is allowed.

> It is mandatory that the code is **well commented** explaining which steps have been implemented.
>
> You can look at this article about commenting code:
>
> https://www.elegantthemes.com/blog/wordpress/how-to-comment-your-code-like-a-pro-best-practices-and-good-habits

1 LibreOffice/OpenOffice *.ods* format recommended
2 *ping* is one of the most basic commands for network management. Investigate its operation

4. DOCUMENTATION

Documentation sometimes can be a tedious task; however, it is one of the most important in software development and systems administration.

It is very important that if you use external libraries, programming techniques or other sources different from the ones published in the course, you **must** include a text file (.odt or .docx), with very detailed instructions:

- about how to run your code,
- and/or about how to install external libraries,
- and/or explaining your programming technique (object-oriented, …),
- and/or about the samba service,
- and/or whatever explanations that helps to assess properly the task.

5. ASSESSMENT

The activity is individual and non-transferable.

To consider it completed, it is not enough just to deliver the dossier.

The student must be able **to defend** his/her exercise at the request of the teacher and be able to make small modifications related to it, in order to demonstrate the acquisition of knowledge and avoid any suspicion of cheating.

↯ The copy (full or partial) is punished with the fail of the task.

The evaluation is done in *a global way* and considers elements such as:

1) Correction in the explanations.

2) Nice visual presentation of documents.

3) A right structure in the generated documents:

a) Index

b) Page break

c) Styles on the page

d) Numeration

e) Header and footer

f) References and functions in spread sheet.

6. RECOMMENDATIONS

The assessable activity is designed in order to put into practice the theoretical knowledge. The objective is not to assemble the perfect computers, but to face the practical problem of setting up a computer from scratch.

The main objectives are:

- Select properly network hardware.
- Make a budget.
- Write documentation properly. Remember, you are not talking in a WhatsApp Chat with your friends, you are writing formal documents.
- Install two different operating systems and be able to boot each one.
- Configure operative systems and set them in a network
- Install and configure a simple Samba.
- Improve your skills programming Python in Linux.

The different parts will have these weights in the final mark:

1) **Backup policy dossier (mandatory):** 15 %
2) **Network hardware dossier (mandatory):** 20%.
3) Spreadsheet. 10%
4) Video. 30%
5) Python. 25%

Besides, if any document delivered does not meet the format specified (docx, odt, pptx, etc) it will not be evaluated. Also **plagiarizing, cheating and/or copying** the work of another student or other source will receive a mark of 0 in the part affected (dossiers, spreadsheet, video, python).