بسم الله الرحمن الرحيم

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Gentlefolk :: Dr. Abdrazzaq…….

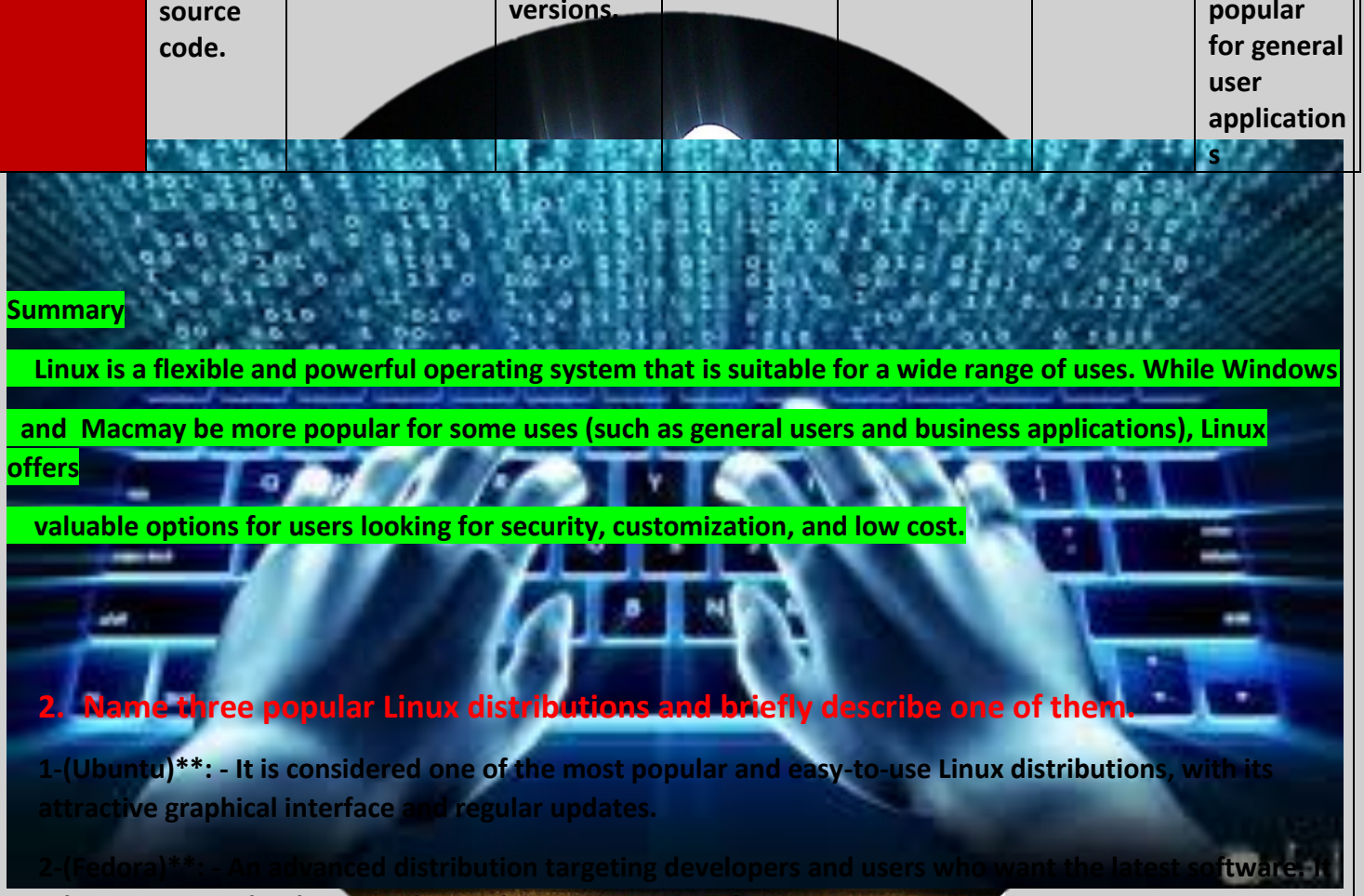
Section 1: Linux Basics

1. **What is Linux, and how does it differ from other operating systems like Windows and macOS?**

Linux is an open source operating system based on the Linux kernel created by Linus Torvalds in 1991. Linux has many features that make it different from other operating systems such as Windows and Mac.**

System name	The source	Customization	Distributions	Security	Cost	Interface	System Uses
Linux	- **Linux**: Open source, which means that anyone can view, modify, and use the source code. Developers and users can contribute to its improvement.	Linux**: Allows a high degree of customization. Users can modify the system to suit their specific needs.	- **Linux**: Comes in several distributions (such as Ubuntu, Fedora, Debian, etc.), providing different options for users depending on their needs.	- **Linux**: Considered more secure due to its structure and design, and because many viruses and malicious applications target Windows systems more.	- **Linux**: Free to use and download, making it a popular choice for users who want a no-cost operating system.	- **Linux**: Provides multiple user interfaces (such as GNOME, KDE, XFCE), allowing for diversity in look and feel.	- **Linux**: is commonly used in web servers, embedded systems, and also by developers and power users.

Windows And macOS	Windows and Mac**: Closed source systems. Users cannot access or modify the source code.	Windows and Mac**: Limited options in terms of customization	- **Windows and Mac**: Limited options, as Microsoft and Apple offer specific major versions.	- **Windows**: More vulnerable to viruses and malware.	- **Windows**: Requires a license purchase, and Mac systems often come at a high price.	Windows and Mac**: have fairly fixed user interfaces, with minimal options for change.	- **Windows**: is widely used in business and gaming environments, and is the most popular for general user applications



Summary

Linux is a flexible and powerful operating system that is suitable for a wide range of uses. While Windows and Macmay be more popular for some uses (such as general users and business applications), Linux offers valuable options for users looking for security, customization, and low cost.

2. Name three popular Linux distributions and briefly describe one of them.

1-(Ubuntu)**: - It is considered one of the most popular and easy-to-use Linux distributions, with its attractive graphical interface and regular updates.

2-(Fedora)**: - An advanced distribution targeting developers and users who want the latest software. It relies on new technologies and provides strong support for open source tools.

3. ** (Arch Linux)**: - A dedicated distribution that aims to provide a simple and customizable system environment. It is ideal for advanced users who want full control over their system.

. ### Description (Ubuntu): Ubuntu is a Linux distribution based on Debian, focusing on ease of use and the perfect user experience. It comes with a wide range of pre-installed software, making it suitable for beginners and professionals alike. Ubuntu supports periodic updates every six months, and has a five-year LTS version, providing greater stability for users who need a reliable system. It also contains huge reservoirs of software, making it easier for users to easily install the required applications.

3. What is the root directory in Linux, and what is its significance?

The root directory (/) in Linux is the highest and most important directory in the file system hierarchy. It is the starting point or the topmost level of the file system. Some key points about the root directory in Linux:

its importance:

1. All other directories and files are organized under the root directory. It is the base or foundation of the entire Linux file system.

2. The root directory is denoted by the forward slash "/" character. This is the absolute path reference for the top-level directory.

3. The root directory contains critical system files, directories, and subdirectories that are necessary for the proper functioning of the Linux operating system.

4. It provides a unified file system structure, allowing all other directories and files to be accessed through the root directory.

5. The root user (also called superuser or administrator) has full access and control over the root directory and the entire file system.

6. The importance of the root directory lies in the fact that it serves as the entry point and organizational hub for the entire Linux file system hierarchy. Without a properly functioning root directory, the operating system would not be able to boot up or run properly.

In summary, the root directory is the most critical and fundamental directory in the Linux file system, providing the organizational structure and access point for all other files and directories on the system.

4. Explain the difference between an absolute path and a relative path in Linux.

There is a clear difference between absolute path and relative path in the Linux file system:

Absolute Path: -

- The absolute path always starts from the root directory (/) and describes the full location of the file or directory
- The absolute path provides an accurate and unambiguous way to specify the location of a file or directory, regardless of the current user's location in the file system.
- Example of an absolute path: /home/username/documents/file.txt

Relative Path: -

- The relative path depends on the current location of the user in the file system.
- The relative path describes the location of the file or directory relative to the current working directory.
- Example of a relative path: documents/file.txt

- The relative path does not start with a forward slash (/), and it requires knowledge of the user's current location.

The main difference is that the absolute path provides a complete and precise location of the file or directory, regardless of the user's current location, while the relative path depends on the user's current position in the file system.

Using the absolute path is useful when you want to access a file or directory in a reliable way and regardless of the current location. The relative path is more convenient for daily tasks where the user can work within a specific folder.

5. What command would you use to update the package list on a Debian-based system?

```
┌──(kali㉿kali)[~]
└─$ sudo apt update
Ign:1 http://http.kali.org/kali kali-rolling InRelease
Ign:1 http://http.kali.org/kali kali-rolling InRelease
Ign:1 http://http.kali.org/kali kali-rolling InRelease
Err:1 http://http.kali.org/kali kali-rolling InRelease
  Temporary failure resolving 'http.kali.org'
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
All packages are up to date.
W: Failed to fetch http://http.kali.org/kali/dists/kali-rolling/InRelease  Temporary failure resolving 'http.kali.org'

W: Some index files failed to download. They have been ignored, or old ones used instead

┌──(kali㉿kali)[~]
└─$
```

Section 2: Basic Commands and Navigation

6. Write the command to display the current working directory.

```
┌──(kali㉿kali)-[~]
```

└─$ pwd

/home/kali

7. How do you change to the `/etc` directory from your current location?

┌──(kali㉿kali)-[~]

└─$ cd /etc

┌──(kali㉿kali)-[/etc]

└─$

8. List the contents of the `/home` directory, including hidden files, in a detailed list format.

┌──(root㉿kali)-[~]

└─# ls -a /home

. .. kali

┌──(root㉿kali)-[~]

└─# ls -la /home

total 12

drwxr-xr-x 3 root root 4096 Aug 21 2023 .

drwxr-xr-x 18 root root 4096 Aug 21 2023 ..

drwx------ 16 kali kali 4096 Aug 10 18:03 kali

9. Explain the purpose of the `ls -l` command and what information it provides.

The `ls -l` command in Linux is used to list the contents of a directory in a detailed format.

When you use this command, it provides the following information about each file or directory in the directory: Permissions: Shows the permissions granted to the file or directory for the user, group, and others .

Number of Links: Indicates the number of links pointing to the file or directory . Owner Name: Shows who owns the file or directory Group Name: Indicates the group the file or directory belongs to

Size: Displays the size of the file or directory In bytes

Date and Time: Shows the last modification date and time of the file or directory

10. What command can be used to return to your home directory from any location in the file system?

~ cd

Section 3: File Management:

11. Write the command to create an empty file named `testfile.txt`.

Touch testfile.txt

12. How do you create a directory named `testdir`?

Mkdir testdir

13. Write the command to copy `testfile.txt` to `backup_testfile.txt`.

Cp testfile.txt backup_testfile.txt

14. What command would you use to move (rename) `testfile.txt` to `newfile.txt`?

Mv testfile.txt newfile.txt

15. Write the command to remove the directory `testdir` and its contents.

Rm -r testdir

Section 4: User and Group Management

16. How can you list all existing users on the system?

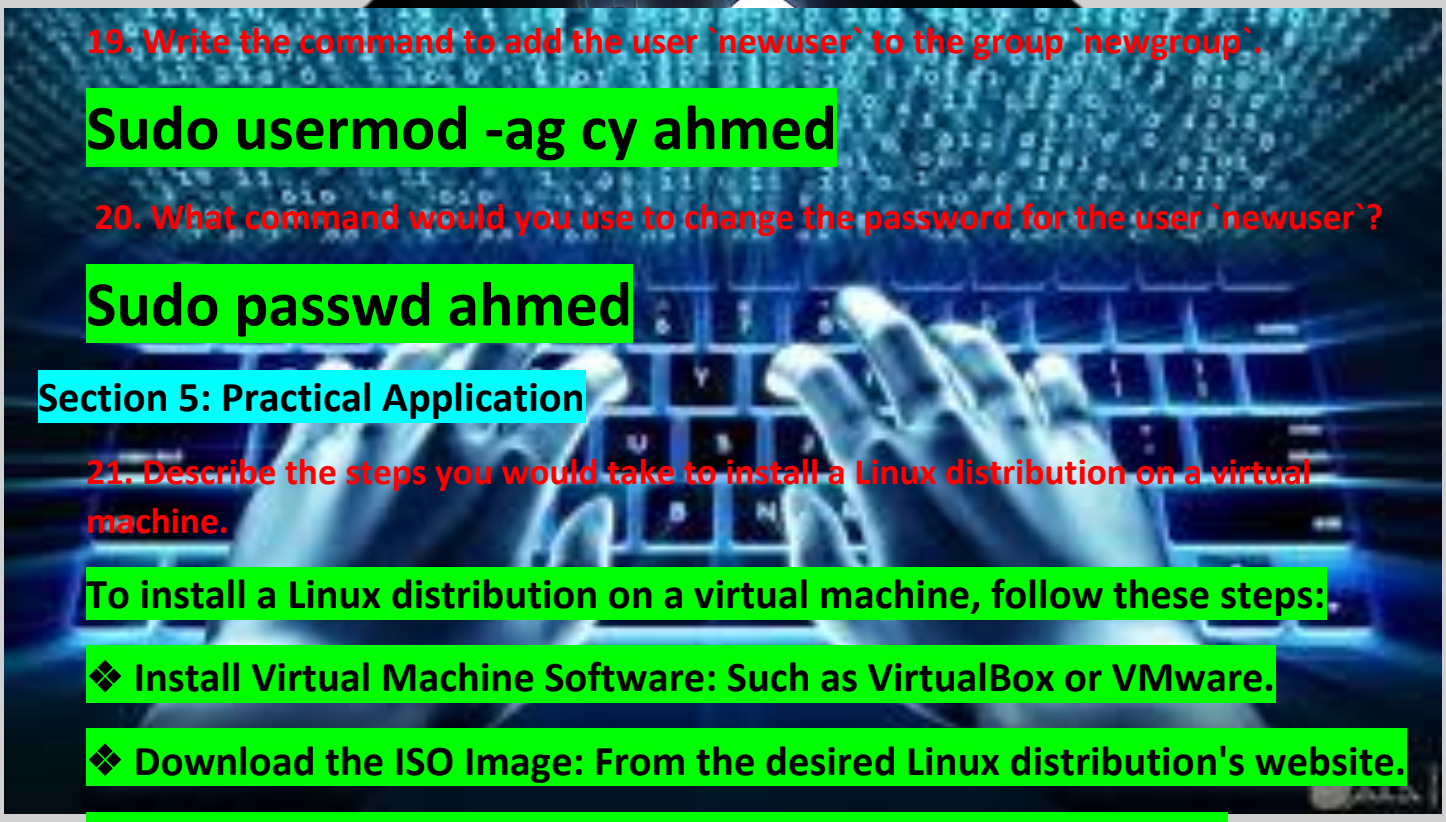
Sudo cat /etc/shadow

17. Write the command to create a new user with the username `newuser`.

Sudo useradd ahmed

18. How do you create a new group named `newgroup`?

Sudo groupadd cy



19. Write the command to add the user `newuser` to the group `newgroup`.

Sudo usermod -ag cy ahmed

20. What command would you use to change the password for the user `newuser`?

Sudo passwd ahmed

Section 5: Practical Application

21. Describe the steps you would take to install a Linux distribution on a virtual machine.

To install a Linux distribution on a virtual machine, follow these steps:

- ❖ Install Virtual Machine Software: Such as VirtualBox or VMware.
- ❖ Download the ISO Image: From the desired Linux distribution's website.
- ❖ Create a Virtual Machine: Using the virtual machine software.
- ❖ Configure Resources: Allocate memory and disk size.
- ❖ Attach the ISO Image: As the boot medium.
- ❖ Start the Virtual Machine: And install the distribution from the ISO.
- ❖ Follow Installation Instructions: To set up the distribution and configure user accounts

22. If you are in the `/home/user` directory, what command would you use to navigate to `/var/log`?

Cd /var/log

23. How do you display the contents of the current directory in a human-readable format?

Ls -lh

24. Explain what the following command does: `cp -r /home/user/docs /home/user/docs_backup`.

cp ::This Is the command for copying files and directories

-r ::This option stands for "recursive," which means it will copy directories and their contents

/home/user/docs ::This Is the path to the source directory you want to copy

/home/user/docs_backup ::This is the path to the destination where the directory will be copied

25. What is the difference between the `rm` and `rm -r` commands?

rm ::This command is used to delete files only. It will fail with an error if you try to delete a directory with it

rm -r:: This command is used to delete files and directories recursively. The `-r` option stands for "recursive," allowing it to delete directories and all their contents, including subdirectories and files.

26. Explain the significance of the `/etc` directory in Linux

the `/etc` directory contains essential configuration files for the system and applications, such as network settings, user information, and service configurations. It is crucial for system management and customization

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