1. How can you install Linux on a Windows system using WSL2?

Answer:

- Open PowerShell as Administrator.
- Run the command: `wsl --install`.
- Restart your system to complete the installation.
- Launch WSL from the Start Menu and set up your Linux distribution.

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2. Which command is used to check the current working directory in Linux?

Answer:
`pwd` (Print Working Directory) is used to display the full path of the current directory.

---

3. How do you list all files and directories in the current directory?

Answer:
Use the `ls` command to list all files and directories.

---

4. Write the command to change to the `/home/user/documents` directory.

Answer:

```
cd /home/user/documents
```

---

5. How do you create a new file named `example.txt` using the terminal?

Answer:

```
touch example.txt
```

---

6. How can you rename `file1.txt` to `file2.txt`?

Answer:
```
mv file1.txt file2.txt
```

---

7. Write the command to delete a file named `old_file.txt`.

Answer:
```
rm old_file.txt
```

---

8. Which command can be used to view the contents of a file in Linux?

Answer:
Commands to view file contents:

- `cat filename` - Displays the entire content.
- `less filename` - Allows scrolling through the file.
- `head filename` - Displays the first 10 lines of the file.

---

9. How do you add the text "Hello, Linux!" to a file named `greetings.txt`?

Answer:
```
echo "Hello, Linux!" > greetings.txt
```

---

10. How do you edit a file named `notes.txt` using a command-line editor?

Answer:
```
nano notes.txt
```

11. What is the difference between `cat` and `less` commands in Linux?

Answer:

- `cat`: Displays the entire content of a file at once. Useful for smaller files.
- `less`: Allows you to view the file one page at a time with navigation options (e.g., scroll up and down). Ideal for larger files.

---

12. How do you display the calendar for the current month in Linux?

Answer:
Run the command:
`cal`
It displays the calendar for the current month.

---

13. Which command is used to clear the terminal screen?

Answer:
`clear`
This command clears all previous output from the terminal screen.

---

14. How can you find the location of an installed command in Linux?

Answer:
Use the `which` command. For example:
`which ls`
This will display the location of the `ls` command.

---

15. What does the `df -h` command display?

Answer:
`df -h` displays the available and used disk space in a human-readable format (e.g., MB, GB).

---

16. How do you display the system uptime in Linux?

Answer:
Run the command:
`uptime`
It shows how long the system has been running, along with the load average.

---

17. What does the `sort -r` command do, and when would you use it?

Answer:
`sort -r` sorts the contents of a file in reverse order.
Use it when you need to reverse the default ascending order of sorting.

---

18. How can you search for files with a specific extension in a directory?

Answer:
Use the `find` command. For example:
`find /path/to/directory -name "*.txt"`
This searches for all `.txt` files in the specified directory.

---

19. What is the difference between `wget` and `curl` commands?

Answer:

- `wget`: Primarily used for downloading files from the web. Supports recursive downloading.
- `curl`: A versatile tool to interact with URLs. Can send HTTP requests, upload files, and handle APIs, in addition to downloading.

---

20. How do you append text to an existing file using the `echo` command?

Answer:
Use the `>>` operator. For example:
`echo "New line of text" >> filename`
This appends the text "New line of text" to the file named `filename`.

---

21. How can you list directory contents with detailed information, such as permissions and ownership?

Answer:
Use the command:
`ls -l`
This displays details like file type, permissions, ownership, group ownership, file size, and last modification time.

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22. What does the first column of the `ls -l` output represent?

Answer:
The first column shows the file type and permissions in the format:
`-rwxr-xr--`

- First character: File type (`-` for regular file, `d` for directory, `l` for symlink, etc.).
- Next 9 characters: Permissions (read `r`, write `w`, execute `x`) for owner, group, and others.

---

23. How do you create a new file and a new directory in Linux?

Answer:

- Create a new file: `touch filename`
- Create a new directory: `mkdir dirname`

---

24. How can you copy, move, and delete a file in Linux?

Answer:

- Copy: `cp source_file destination_file`
- Move: `mv source_file destination_file`
- Delete: `rm filename`

---

25. How do you change file permissions using symbolic notation?

Answer:
Use the `chmod` command with symbolic notation.
For example:

- Add execute permission for the owner: `chmod u+x filename`
- Remove write permission for others: `chmod o-w filename`

---

26. How do you change file permissions using octal notation?

Answer:
Use `chmod` with numeric values representing permissions:

- Read = 4, Write = 2, Execute = 1.
  For example:
- Grant full permissions to the owner, and read-only for others: `chmod 744 filename`.

---

27. How do you change the ownership of a file?

Answer:
Use the `chown` command.
For example:
`chown username filename`
This sets `username` as the new owner of the file.

---

28. How do you change the group ownership of a file?

Answer:
Use the `chgrp` command.
For example:
`chgrp groupname filename`
This sets `groupname` as the group owner of the file.

---

29. What are setuid, setgid, and sticky bit permissions, and how are they applied?

Answer:

- **setuid**: Executes a file with the file owner's privileges.
  Apply it using: `chmod u+s filename`.
- **setgid**: Executes a file with the group owner's privileges or makes new files in a directory inherit its group.
  Apply it using: `chmod g+s filename_or_directory`.
- **Sticky bit**: Ensures only the owner can delete files in a directory.
  Apply it using: `chmod +t directory`.

---

30. How do you create soft and hard links in Linux?

Answer:

- **Soft link (symbolic link)**:
  `ln -s target_file link_name`
- **Hard link**:
  `ln target_file link_name`

---

31. How can you simulate and resolve a permission error when trying to write to a file?

Answer:

1. **Simulate the error**: Remove write permission for the owner:
   `chmod u-w filename`.
2. **Resolve the error**: Add write permission back using:
   `chmod u+w filename`
   Or change the ownership with:
   `chown username filename`.

32. **What is the significance of the `setuid` and `setgid` bits in file permissions?**
- **Answer:**
    - The `setuid` bit allows a program to run with the privileges of the file owner, regardless of the user executing it.
    - The `setgid` bit allows a program or file to inherit the group ID of its owning group when executed or created. For directories, files created inside inherit the directory's group.

---

33. **How can you restrict file access to the file owner only?**
- **Answer:** Use the `chmod 700 filename` command. This sets permissions to allow only the owner to read, write, and execute the file.

---

34. **How do you remove write permissions for a group on a file using `chmod`?**
- **Answer:** Use the `chmod g-w filename` command.

---

35. **How can you check the number of hard links associated with a file?**
- **Answer:** Use the `ls -l filename` command. The second column in the output displays the number of hard links.

---

36. **What is the purpose of the sticky bit in directory permissions?**
- **Answer:**
  The sticky bit ensures that only the file owner or root can delete or modify files within a directory, even if other users have write permissions. This is commonly used for shared directories like `/tmp`.

---

37. **How do you recursively change the permissions of all files and subdirectories within a directory?**
- **Answer:** Use the `chmod -R permissions directory_name` command, where `permissions` specify the desired permission settings.

---

38. **How can you create a file and assign specific permissions at the same time?**
- **Answer:** Use the `umask` command to set default permissions and then create the file. Alternatively, you can use `touch filename && chmod permissions filename`.

---

39. **What command is used to view the effective permissions of a symbolic link?**
- **Answer:** Use the `ls -l` command. The permissions of the symbolic link itself are displayed, and the arrow (`->`) points to the target file or directory.

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40. **How do you check and modify default permissions for newly created files in Linux?**
- **Answer:**
    - Check default permissions using the `umask` command.
    - Modify default permissions by setting a new mask with `umask value`. For example, `umask 022` sets default permissions to `755` for directories and `644` for files.

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41. **What is the command to change the ownership of a directory and all its contents?**
    - **Answer:** Use the `chown -R user:group directory_name` command, where `user` and `group` are the new owner and group, respectively.

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