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*I confirm that I understand my coursework needs to be submitted online via Google Classroom under the relevant module page before the deadline in order for my assignment to be accepted and marked. I am fully aware that late submissions will be treated as non-submission and a mark of zero will be awarded.*

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## Introduction

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The Linux command-line interface is an essential tool for interacting with Unix-based operating systems. Unlike graphical user interfaces (GUIs), the command-line provides a more powerful, flexible, and efficient way to perform tasks such as file management, process control, and system administration. It originated as a key component of the UNIX operating system in the 1970s and has since evolved to become a standard in modern computing, particularly for developers, system administrators, and IT professionals.

Despite the availability of GUI alternatives, the Linux command-line remains indispensable due to its ability to perform complex tasks quickly and script repetitive processes for automation. For instance, commands like `whoami`, `ls`, and `cat` allow users to manage files, monitor system activity, and retrieve information about their environment with minimal resource consumption. Tools like `script` enable users to record command-line sessions for documentation and troubleshooting purposes, making it ideal for professional and academic use.

In this workshop, we explore fundamental Linux commands and their practical applications. By creating and manipulating files, listing directories, and using the `script` command to log activities, this lab demonstrates the versatility and efficiency of the Linux environment. While GUI-based tools provide accessibility for beginners, the command-line's precision and control make it a vital skill for technical users. This workshop emphasizes these capabilities, ensuring a foundational understanding of Linux command-line utilities.

## Objectives

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The objective of this workshop is to build proficiency in fundamental Linux command-line utilities by exploring user and system information commands like `whoami`, `who`, and `finger`, and practicing file management using variations of the `ls` command to list files and directories. Participants will create and manipulate files using commands like `echo` and `cat`, combine multiple files, and analyze system files such as `/etc/passwd`. Additionally, the workshop aims to demonstrate the use of the `script` command for logging command-line activities, providing hands-on experience in session documentation. Through these activities, participants will develop a foundational understanding of Linux commands, fostering confidence and preparing them for advanced system administration and development tasks.

## Required Tools and Concepts

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### Tools

a. Linux Operating System

A Unix-based OS (e.g., Ubuntu, CentOS, Fedora) is required to execute the commands and scripts.

b. Terminal/Command-Line Interface

Access to a terminal application for executing Linux commands.

c. Script Command Utility

This utility is used to log the session activities. It is pre-installed on most Linux systems.

## Concepts

### a. Basic Linux Commands

Familiarity with basic Linux commands such as whoami, who, ls, cat, echo, and finger.

### b. File and Directory Management

Understanding the basics of file creation, listing, and manipulation using commands like ls, echo, and cat.

### c. User and System Information

Knowledge of commands to retrieve information about users and accounts, such as whoami and finger.

### d. Session Logging

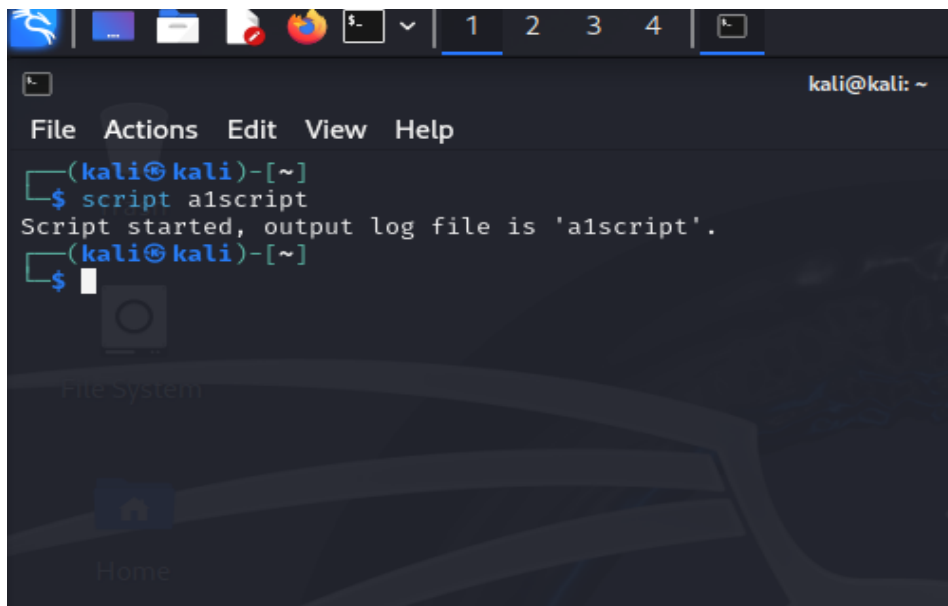
Awareness of how to start and stop session logging using the script command.

### e. Accessing System Files

Understanding the structure and purpose of system files, like /etc/passwd.

## Steps of Replicate

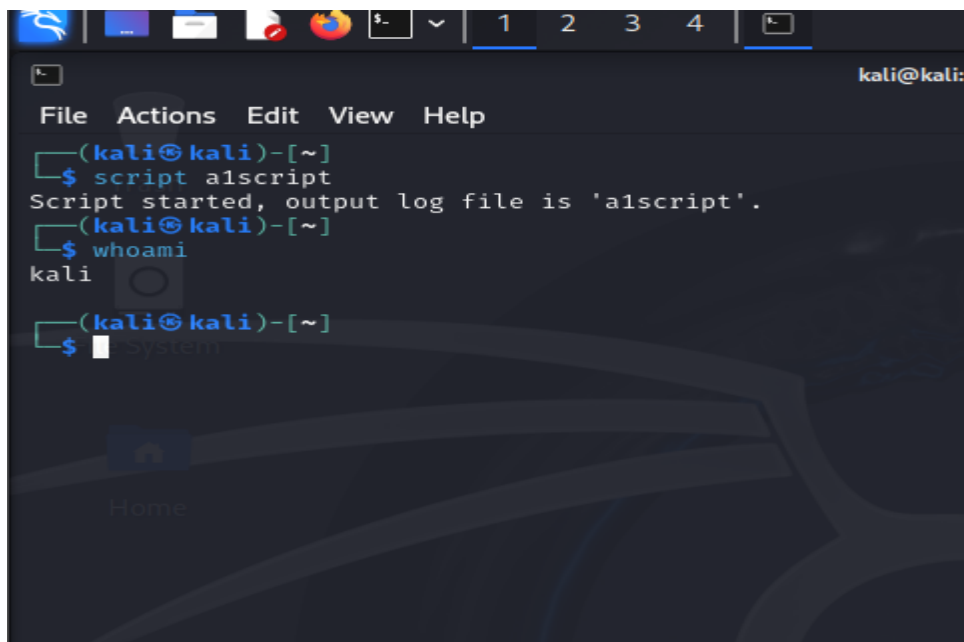
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A terminal window titled 'kali@kali: ~' with a menu bar (File, Actions, Edit, View, Help). The terminal shows the following commands and output:

```
(kali@kali)-[~]  
$ script a1script  
Script started, output log file is 'a1script'.  
(kali@kali)-[~]  
$
```

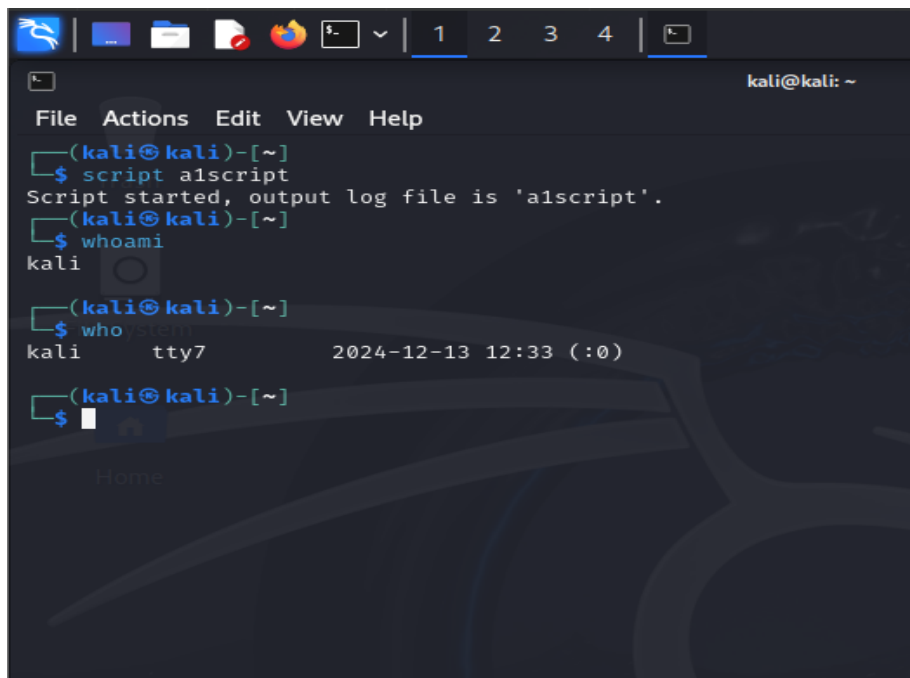
Figure 1: Start script session terminal output



A terminal window titled 'kali@kali: ~' with a menu bar (File, Actions, Edit, View, Help). The terminal shows the following commands and output:

```
(kali@kali)-[~]  
$ script a1script  
Script started, output log file is 'a1script'.  
(kali@kali)-[~]  
$ whoami  
kali  
(kali@kali)-[~]  
$
```

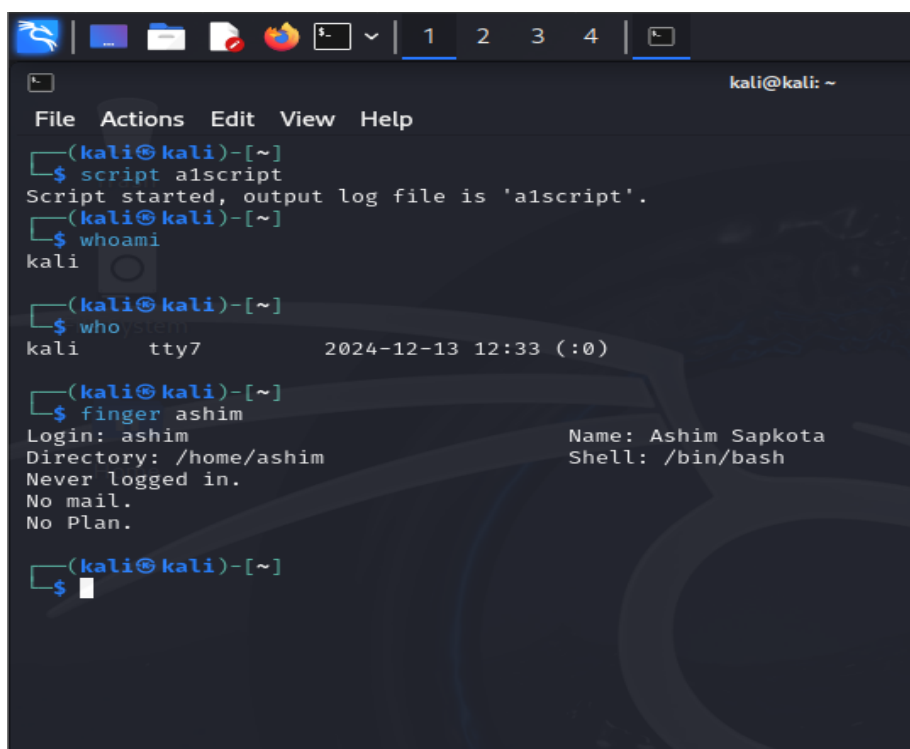
Figure 2: Display username in terminal



A terminal window on a Kali Linux system. The window title is 'kali@kali: ~'. The menu bar includes 'File', 'Actions', 'Edit', 'View', and 'Help'. The terminal shows the following commands and output:

```
(kali@kali)-[~]  
$ script a1script  
Script started, output log file is 'a1script'.  
(kali@kali)-[~]  
$ whoami  
kali
```

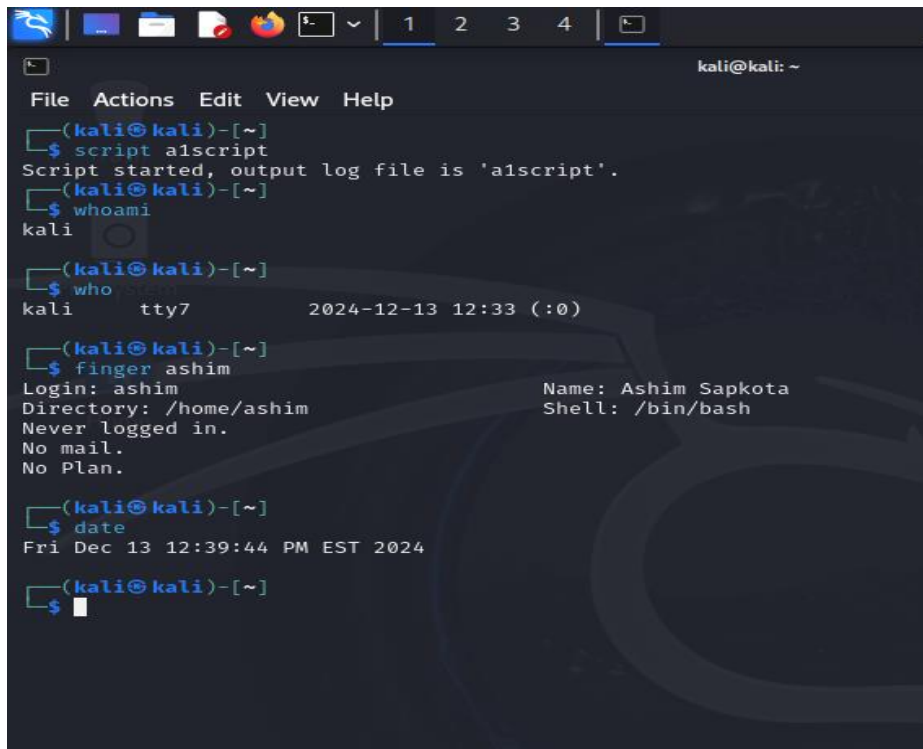
Figure 3: List of logged-in users in terminal



A terminal window on a Kali Linux system, showing the output of the 'who' command. The window title is 'kali@kali: ~'. The menu bar includes 'File', 'Actions', 'Edit', 'View', and 'Help'. The terminal shows the following commands and output:

```
(kali@kali)-[~]  
$ script a1script  
Script started, output log file is 'a1script'.  
(kali@kali)-[~]  
$ whoami  
kali  
  
(kali@kali)-[~]  
$ who  
kali      tty7          2024-12-13 12:33 (:0)
```

Figure 4: Detailed user information displayed in terminal

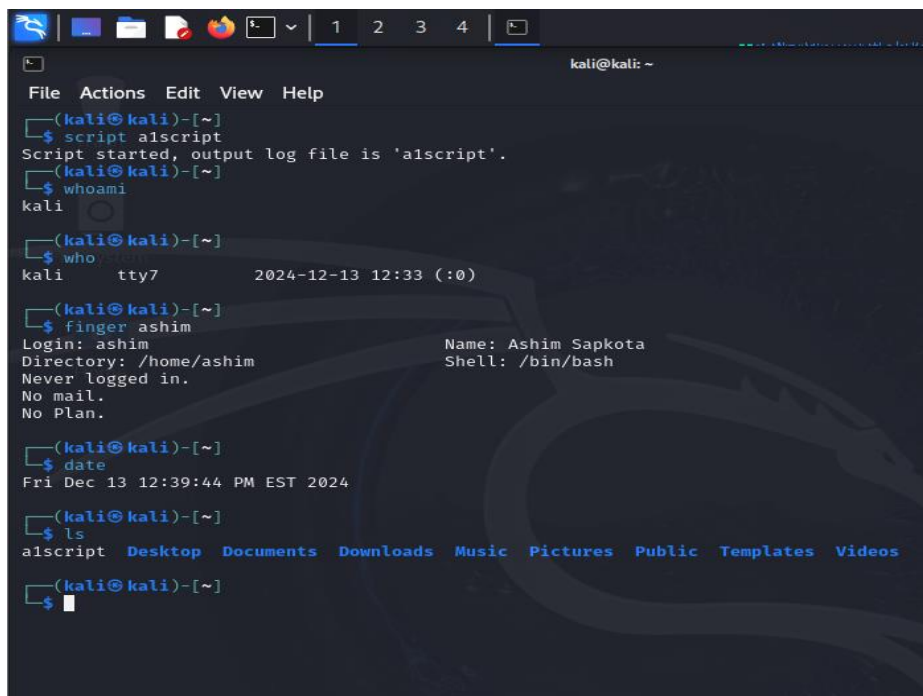


A terminal window on a Kali Linux system. The window title is 'kali@kali: ~'. The menu bar includes 'File', 'Actions', 'Edit', 'View', and 'Help'. The terminal shows the following commands and output:

```
(kali@kali)-[~]
$ script alscript
Script started, output log file is 'alscript'.
(kali@kali)-[~]
$ whoami
kali
(kali@kali)-[~]
$ who
kali      tty7      2024-12-13 12:33 (:0)
(kali@kali)-[~]
$ finger ashim
Login: ashim      Name: Ashim Sapkota
Directory: /home/ashim      Shell: /bin/bash
Never logged in.
No mail.
No Plan.
```

The terminal background features a faint Kali Linux dragon logo.

Figure 5: Current date and time terminal display



A terminal window on a Kali Linux system, showing the same sequence of commands as Figure 5, followed by a file listing command:

```
(kali@kali)-[~]
$ date
Fri Dec 13 12:39:44 PM EST 2024
(kali@kali)-[~]
$ ls
alscript  Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos
```

The terminal background features a faint Kali Linux dragon logo.

Figure 6: List of visible files in terminal



```

(kali@kali)-[~]
$ date
Fri Dec 13 12:39:44 PM EST 2024

(kali@kali)-[~]
$ ls
alscript Desktop Documents Downloads Music Pictures Public Templates Videos

(kali@kali)-[~]
$ ls -a
. .face.icon .vboxclient-display-svg-x11-tty7-control.pid
.. .gnupg .vboxclient-display-svg-x11-tty7-service.pid
alscript .ICEauthority .vboxclient-draganddrop-tty7-control.pid
.bash_logout .java .vboxclient-draganddrop-tty7-service.pid
.bashrc .local .vboxclient-hostversion-tty7-control.pid
.bashrc.original Music .vboxclient-seamless-tty7-control.pid
.cache Pictures .vboxclient-seamless-tty7-service.pid
.config .profile .vboxclient-vmvga-session-tty7-control.pid
Desktop Public Videos
.dmrc .sudo_as_admin_successful .Xauthority
Documents Templates .xsession-errors
Downloads .vboxclient-clipboard-tty7-control.pid .zsh_history
.face .vboxclient-clipboard-tty7-service.pid .zshrc

(kali@kali)-[~]
$

```

Figure 7: List of all files including hidden files

```

Documents Templates .xsession-errors
Downloads .vboxclient-clipboard-tty7-control.pid .zsh_history
.face .vboxclient-clipboard-tty7-service.pid .zshrc

(kali@kali)-[~]
$ ls -a -l
total 172
drwx----- 15 kali kali 4096 Dec 13 12:37 .
drwxr-xr-x 4 root root 4096 Dec 13 12:35 ..
-rw-rw-r-- 1 kali kali 4096 Dec 13 12:40 alscript
-rw-r--r-- 1 kali kali 220 Aug 18 15:57 .bash_logout
-rw-r--r-- 1 kali kali 5551 Aug 18 15:57 .bashrc
-rw-r--r-- 1 kali kali 3526 Aug 18 15:57 .bashrc.original
drwxrwxr-x 6 kali kali 4096 Dec 13 12:33 .cache
drwxr-xr-x 12 kali kali 4096 Dec 13 12:33 .config
drwxr-xr-x 2 kali kali 4096 Dec 13 12:33 Desktop
-rw-r--r-- 1 kali kali 35 Dec 13 12:33 .dmrc
drwxr-xr-x 2 kali kali 4096 Dec 13 12:33 Documents
drwxr-xr-x 2 kali kali 4096 Dec 13 12:33 Downloads
-rw-r--r-- 1 kali kali 11759 Aug 18 15:57 .face
lrwxrwxrwx 1 kali kali 5 Aug 18 15:57 .face.icon -> .face
drwx----- 3 kali kali 4096 Dec 13 12:33 .gnupg
-rw----- 1 kali kali 0 Dec 13 12:33 .ICEauthority
drwxr-xr-x 3 kali kali 4096 Aug 18 15:57 .java
drwxr-xr-x 4 kali kali 4096 Dec 13 12:33 .local
drwxr-xr-x 2 kali kali 4096 Dec 13 12:33 Music
drwxr-xr-x 2 kali kali 4096 Dec 13 12:40 Pictures
-rw-r--r-- 1 kali kali 807 Aug 18 15:57 .profile
drwxr-xr-x 2 kali kali 4096 Dec 13 12:33 Public
-rw-r--r-- 1 kali kali 0 Dec 13 12:34 .sudo_as_admin_successful
drwxr-xr-x 2 kali kali 4096 Dec 13 12:33 Templates
-rw-r----- 1 kali kali 5 Dec 13 12:33 .vboxclient-clipboard-tty7-control.pid
-rw-r----- 1 kali kali 5 Dec 13 12:33 .vboxclient-clipboard-tty7-service.pid
-rw-r----- 1 kali kali 5 Dec 13 12:33 .vboxclient-display-svg-x11-tty7-control.pid
-rw-r----- 1 kali kali 5 Dec 13 12:33 .vboxclient-display-svg-x11-tty7-service.pid
-rw-r----- 1 kali kali 5 Dec 13 12:33 .vboxclient-draganddrop-tty7-control.pid
-rw-r----- 1 kali kali 5 Dec 13 12:33 .vboxclient-draganddrop-tty7-service.pid
-rw-r----- 1 kali kali 5 Dec 13 12:33 .vboxclient-hostversion-tty7-control.pid
-rw-r----- 1 kali kali 5 Dec 13 12:33 .vboxclient-seamless-tty7-control.pid
-rw-r----- 1 kali kali 5 Dec 13 12:33 .vboxclient-seamless-tty7-service.pid
-rw-r----- 1 kali kali 5 Dec 13 12:33 .vboxclient-vmvga-session-tty7-control.pid
drwxr-xr-x 2 kali kali 4096 Dec 13 12:33 Videos
-rw----- 1 kali kali 49 Dec 13 12:33 .Xauthority
-rw----- 1 kali kali 8680 Dec 13 12:39 .xsession-errors
-rw----- 1 kali kali 260 Dec 13 12:37 .zsh_history
-rw-r--r-- 1 kali kali 10868 Aug 18 15:57 .zshrc

(kali@kali)-[~]
$

```

Figure 8: Detailed file listing with permissions and size

```

drwxr-xr-x  2 kali kali  4096 Dec 13 12:40 Pictures
-rw-r--r--  1 kali kali   807 Aug 18 15:57 .profile
drwxr-xr-x  2 kali kali  4096 Dec 13 12:33 Public
-rw-r--r--  1 kali kali    0 Dec 13 12:34 .sudo_as_admin_successful
drwxr-xr-x  2 kali kali  4096 Dec 13 12:33 Templates
-rw-r----- 1 kali kali    5 Dec 13 12:33 .vboxclient-clipboard-tty7-control
-rw-r----- 1 kali kali    5 Dec 13 12:33 .vboxclient-clipboard-tty7-service
-rw-r----- 1 kali kali    5 Dec 13 12:33 .vboxclient-display-svg-x11-tty7
-rw-r----- 1 kali kali    5 Dec 13 12:33 .vboxclient-display-svg-x11-tty7
-rw-r----- 1 kali kali    5 Dec 13 12:33 .vboxclient-draganddrop-tty7-control
-rw-r----- 1 kali kali    5 Dec 13 12:33 .vboxclient-draganddrop-tty7-service
-rw-r----- 1 kali kali    5 Dec 13 12:33 .vboxclient-hostversion-tty7-control
-rw-r----- 1 kali kali    5 Dec 13 12:33 .vboxclient-seamless-tty7-control
-rw-r----- 1 kali kali    5 Dec 13 12:33 .vboxclient-seamless-tty7-service
-rw-r----- 1 kali kali    5 Dec 13 12:33 .vboxclient-vmvga-session-tty7-control
drwxr-xr-x  2 kali kali  4096 Dec 13 12:33 Videos
-rw-r----- 1 kali kali    49 Dec 13 12:33 .Xauthority
-rw-r----- 1 kali kali  8680 Dec 13 12:39 .xsession-errors
-rw-r----- 1 kali kali   260 Dec 13 12:37 .zsh_history
-rw-r--r--  1 kali kali 10868 Aug 18 15:57 .zshrc

(kali@kali)-[~]
$ cat/etc/passwd
zsh: no such file or directory: cat/etc/passwd

(kali@kali)-[~]
$
```

Figure 9: Contents of cat/etc/passwd file displayed in terminal

```

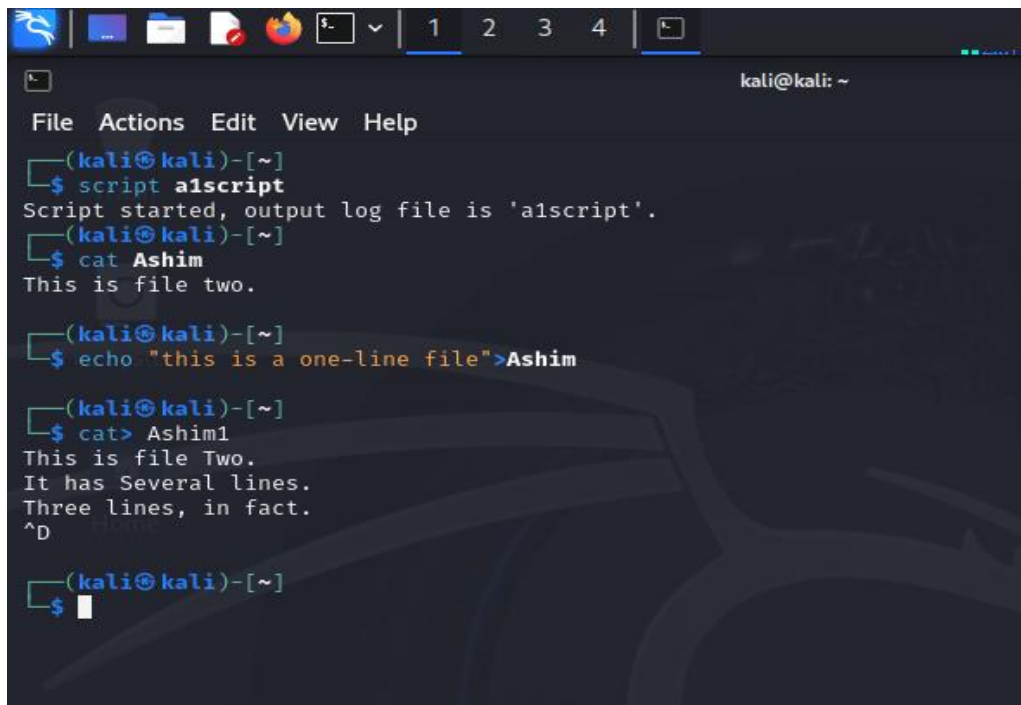
-rw-r----- 1 kali kali    5 Dec 13 12:33 .vboxclient-seamless-tty7-control
-rw-r----- 1 kali kali    5 Dec 13 12:33 .vboxclient-seamless-tty7-service
-rw-r----- 1 kali kali    5 Dec 13 12:33 .vboxclient-vmvga-session-tty7-control
drwxr-xr-x  2 kali kali  4096 Dec 13 12:33 Videos
-rw-r----- 1 kali kali    49 Dec 13 12:33 .Xauthority
-rw-r----- 1 kali kali  8680 Dec 13 12:39 .xsession-errors
-rw-r----- 1 kali kali   260 Dec 13 12:37 .zsh_history
-rw-r--r--  1 kali kali 10868 Aug 18 15:57 .zshrc

(kali@kali)-[~]
$ cat/etc/passwd
zsh: no such file or directory: cat/etc/passwd

(kali@kali)-[~]
$ echo "this is a one-line file">Ashim

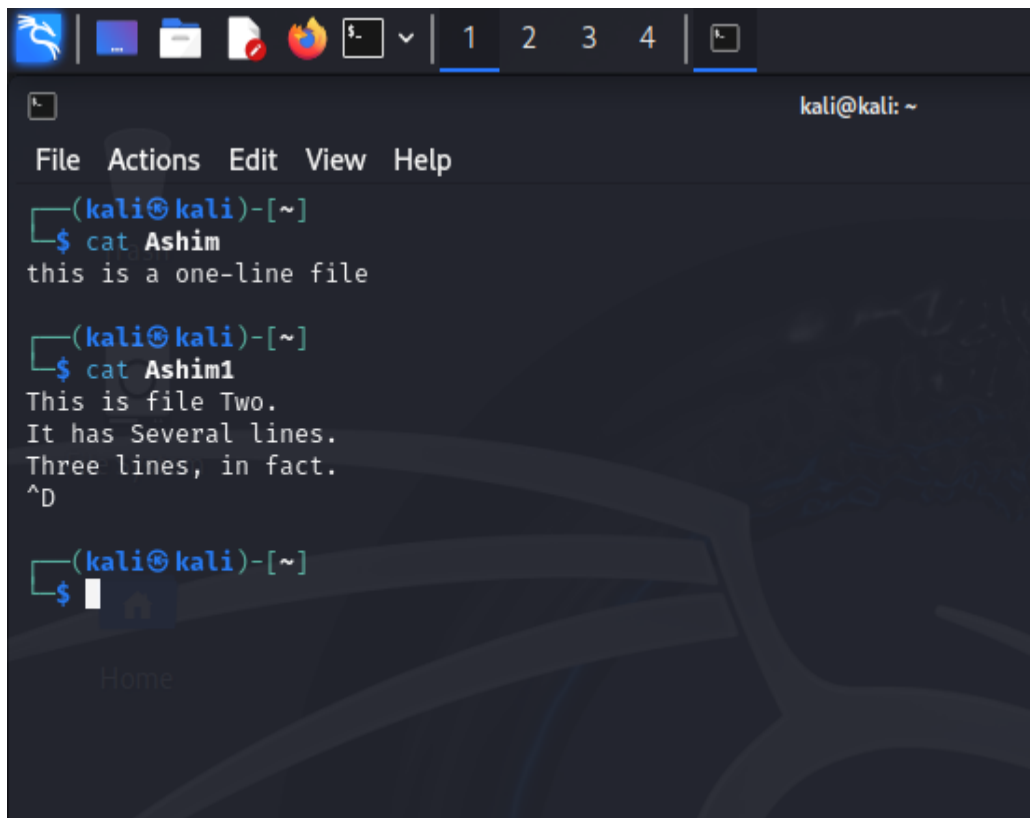
(kali@kali)-[~]
$
```

Figure 10: Create a file with echo command terminal



```
kali@kali: ~  
File Actions Edit View Help  
(kali@kali)-[~]  
$ script a1script  
Script started, output log file is 'a1script'.  
(kali@kali)-[~]  
$ cat Ashim  
This is file two.  
  
(kali@kali)-[~]  
$ echo "this is a one-line file">Ashim  
  
(kali@kali)-[~]  
$ cat> Ashim1  
This is file Two.  
It has Several lines.  
Three lines, in fact.  
^D  
  
(kali@kali)-[~]  
$
```

Figure 11: Create multi-line file with cat command terminal



```
kali@kali: ~  
File Actions Edit View Help  
(kali@kali)-[~]  
$ cat Ashim  
this is a one-line file  
  
(kali@kali)-[~]  
$ cat Ashim1  
This is file Two.  
It has Several lines.  
Three lines, in fact.  
^D  
  
(kali@kali)-[~]  
$
```

Figure 12: Display contents of Ashim and Ashim1 file in terminal

```
(kali㉿kali)-[~]
└─$ cat Ashim Ashim1
this is a one-line file
This is file Two.
It has Several lines.
Three lines, in fact.
^D

(kali㉿kali)-[~]
└─$ cat Ashim Ashim1>combined_Ashim

(kali㉿kali)-[~]
└─$ cat combined_Ashim
this is a one-line file
This is file Two.
It has Several lines.
Three lines, in fact.
^D

(kali㉿kali)-[~]
└─$
```

Figure 13: Combine two files into one using cat command terminal

```
(kali㉿kali)-[~]
└─$ cat combined_Ashim
this is a one-line file
This is file Two.
It has Several lines.
Three lines, in fact.
^D

(kali㉿kali)-[~]
└─$ exit
Script done.

(kali㉿kali)-[~]
└─$
```

Figure 14: Exit script session and save recording terminal

## Conclusion

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In this workshop, I gained practical experience with fundamental Linux commands and their applications. I learned to retrieve user and system information using commands like `whoami`, `who`, and `finger`, which helped me understand how to access account details and active user sessions. Exploring file management with `ls` and its variations provided me with insights into listing files and directories, including hidden files and detailed metadata. I practiced creating and manipulating files using commands like `echo` and `cat`, which allowed me to combine files and view their contents efficiently. Analyzing the `/etc/passwd` file deepened my understanding of system files and their significance in user account configurations. Using the `script` command, I successfully logged my command-line activities, which is a valuable skill for documentation and troubleshooting. This workshop helped me enhance my confidence in using Linux commands, laying a strong foundation for more advanced system administration and development tasks. Overall, I found this workshop engaging and essential for improving my proficiency with the Linux operating system.

## References

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Sobell, M. G. (2017). The Utilities. In P. Education, *A practical Guide to Linux Commands,Editors and Shell Programming* (pp. 58-87).