Experiment No.2
Linux shell script 2.1 Write shell scripts to do the following: a. Display OS version, release number, kernel version b. Display top 10 processes in descending order c. Display processes with highest memory usage. d. Display current logged in user and log name. Display current shell, home directory, operating system type, current path setting, current working directory
Date of Performance:
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Sign:

Aim: Linux shell script 2.1 Write shell scripts to do the following:

Objective:

a. Display OS version, release number, kernel version

b. Display top 10 processes in descending order

c. Display processes with highest memory usage.

d. Display current logged in user and log name.

e. Display current shell, home directory, operating system type, current path setting, current working directory

Theory:

Shell is a user program, or its environment is provided for user interaction. It is a command prompt within Linux where you can type commands. It is a program that takes your commands from the keyboard and gives them to the OS to perform. Shell is not part of system KERNAL but it uses system KERNAL to execute programs, create files,etc. A Shell Script is a text file that contains a sequence of commands for a UNIX based OS. It is called a Shell Script because it combines into a "Script" in a single file a sequence of commands, that would otherwise have to be presented to the system from a keyboard one at a time. A Shell Script is usually created for command sequences for which a user has a repeated need. You initiate the sequence of commands in Shell Script by simply entering the name of the Shell Script on a command line.

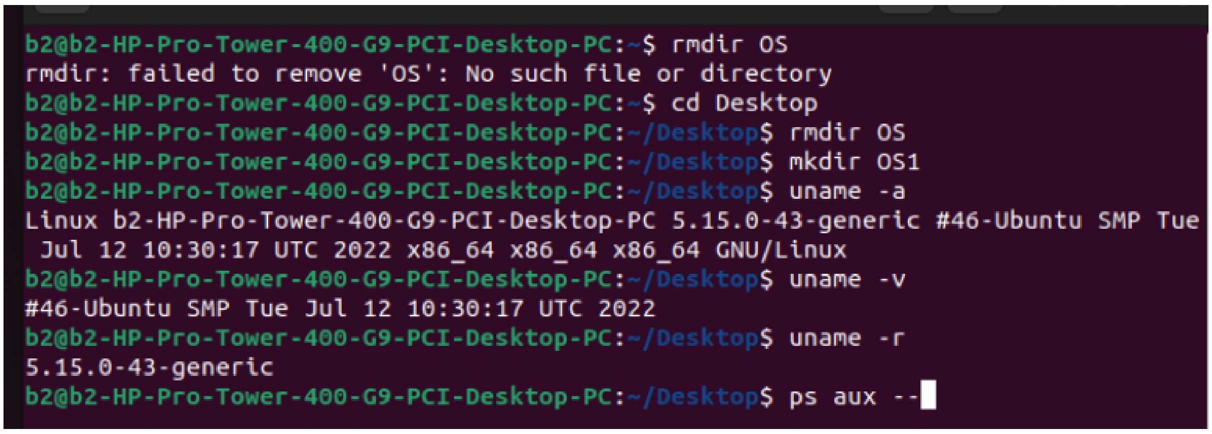
Types of Shell Script :-

1. sh - Simple Shell
2. bash - Bourne Again Shell
3. ksh - Korne Shell
4. csh - C Shell
5. ssh - Secure Shell

To use a particular Shell type the Shell name at the command prompt. Eg:- $csh - It will switch the current Shell to C Shell. To view the current Shell that is being used, type echo $ SHELL at the command prompt.

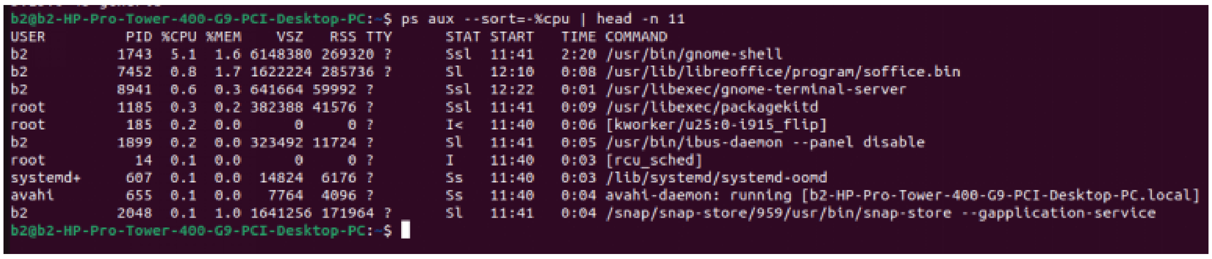
Output:

1. Display OS version, Release number and kernel version



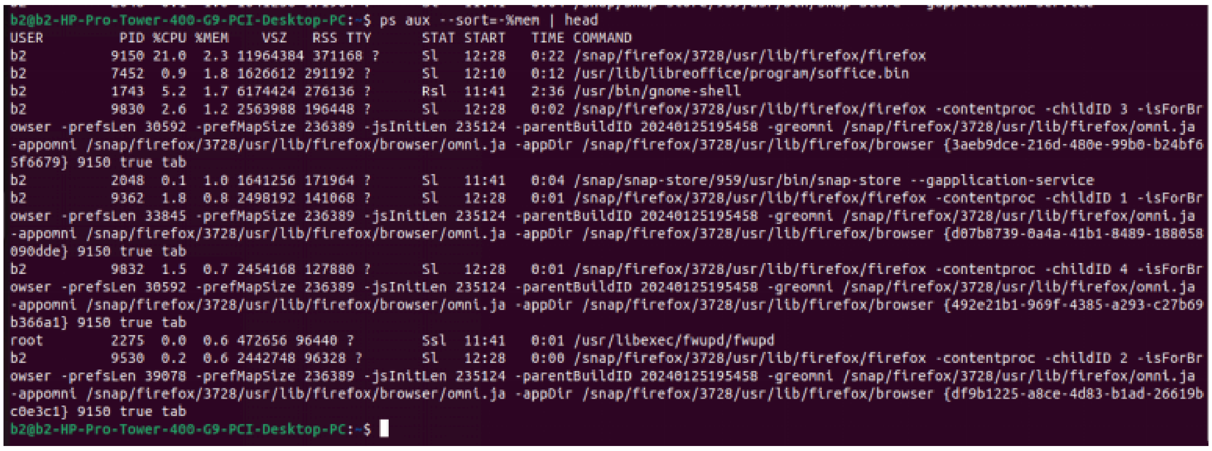
```
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~$ rmdir OS
rmdir: failed to remove 'OS': No such file or directory
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~$ cd Desktop
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Desktop$ rmdir OS
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Desktop$ mkdir OS1
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Desktop$ uname -a
Linux b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC 5.15.0-43-generic #46-Ubuntu SMP Tue
 Jul 12 10:30:17 UTC 2022 x86_64 x86_64 x86_64 GNU/Linux
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Desktop$ uname -v
#46-Ubuntu SMP Tue Jul 12 10:30:17 UTC 2022
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Desktop$ uname -r
5.15.0-43-generic
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Desktop$ ps aux --
```

2. Display top 10 processes in descending order



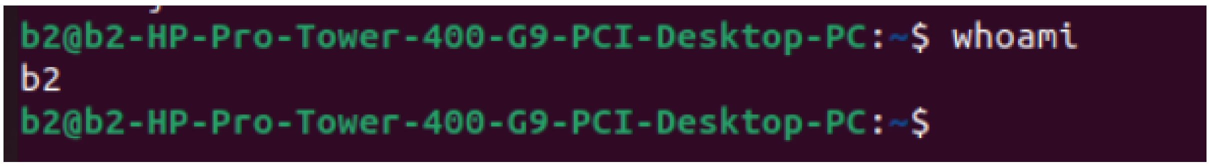
```
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~$ ps aux --sort=-%cpu | head -n 11
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
b2          1743  5.1  1.6 6148380 269320 ?      Ssl  11:41   2:20 /usr/bin/gnome-shell
b2          7452  0.8  1.7 1622224 285736 ?      Sl   12:10   0:08 /usr/lib/libreoffice/program/soffice.bin
b2          8941  0.6  0.3 641664 59992 ?        Ssl  12:22   0:01 /usr/libexec/gnome-terminal-server
root        1185  0.3  0.2 382388 41576 ?        Ssl  11:41   0:09 /usr/libexec/packagekitd
root         185  0.2  0.0      0     0 ?        I<   11:40   0:06 [kworker/u25:0-i915_flip]
b2          1899  0.2  0.0 323492 11724 ?        Sl   11:41   0:05 /usr/bin/ibus-daemon --panel disable
root          14  0.1  0.0      0     0 ?        I    11:40   0:03 [rcu_sched]
systemd+     607  0.1  0.0  14824  6176 ?        Ss   11:40   0:03 /lib/systemd/systemd-oomd
avahi        655  0.1  0.0   7764  4096 ?        Ss   11:40   0:04 avahi-daemon: running [b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC.local]
b2          2048  0.1  1.0 1641256 171964 ?      Sl   11:41   0:04 /snap/snap-store/959/usr/bin/snap-store --gapplication-service
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~$
```

3. Display processes with highest memory usage



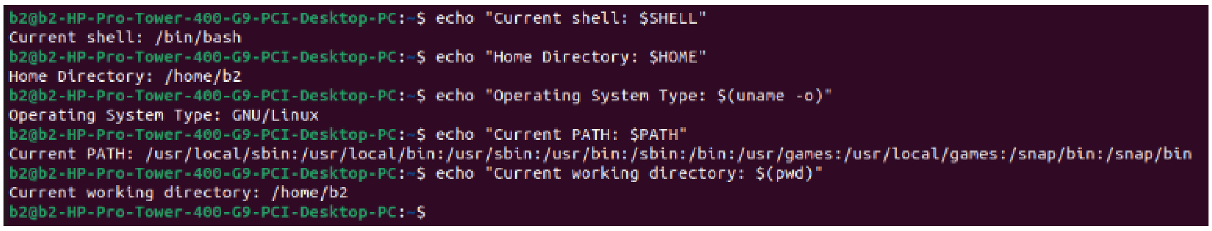
```
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~$ ps aux --sort=-%mem | head
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
b2          9150 21.0  2.3 11964384 371168 ?     Sl   12:28   0:22 /snap/firefox/3728/usr/lib/firefox/firefox
b2          7452  0.9  1.8 1626612 291192 ?      Sl   12:10   0:12 /usr/lib/libreoffice/program/soffice.bin
b2          1743  5.2  1.7 6174424 276136 ?      Rsl  11:41   2:36 /usr/bin/gnome-shell
b2          9830  2.6  1.2 2563988 196448 ?      Sl   12:28   0:02 /snap/firefox/3728/usr/lib/firefox/firefox -contentproc -childID 3 -isForBr
owser -prefsLen 30592 -prefMapSize 236389 -jsInitLen 235124 -parentBuildID 20240125195458 -greomni /snap/firefox/3728/usr/lib/firefox/omni.ja
-appomni /snap/firefox/3728/usr/lib/firefox/browser/omni.ja -appDir /snap/firefox/3728/usr/lib/firefox/browser {3aeb9dce-216d-480e-99b0-b24bf6
5f6679} 9150 true tab
b2          2048  0.1  1.0 1641256 171964 ?      Sl   11:41   0:04 /snap/snap-store/959/usr/bin/snap-store --gapplication-service
b2          9362  1.8  0.8 2498192 141068 ?      Sl   12:28   0:01 /snap/firefox/3728/usr/lib/firefox/firefox -contentproc -childID 1 -isForBr
owser -prefsLen 33845 -prefMapSize 236389 -jsInitLen 235124 -parentBuildID 20240125195458 -greomni /snap/firefox/3728/usr/lib/firefox/omni.ja
-appomni /snap/firefox/3728/usr/lib/firefox/browser/omni.ja -appDir /snap/firefox/3728/usr/lib/firefox/browser {d07b8739-0a4a-41b1-8489-188058
090dde} 9150 true tab
b2          9832  1.5  0.7 2454168 127880 ?      Sl   12:28   0:01 /snap/firefox/3728/usr/lib/firefox/firefox -contentproc -childID 4 -isForBr
owser -prefsLen 30592 -prefMapSize 236389 -jsInitLen 235124 -parentBuildID 20240125195458 -greomni /snap/firefox/3728/usr/lib/firefox/omni.ja
-appomni /snap/firefox/3728/usr/lib/firefox/browser/omni.ja -appDir /snap/firefox/3728/usr/lib/firefox/browser {492e21b1-969f-4385-a293-c27b69
b366a1} 9150 true tab
root        2275  0.0  0.6 472656 96440 ?        Ssl  11:41   0:01 /usr/libexec/fwupd/fwupd
b2          9530  0.2  0.6 2442748 96328 ?       Sl   12:28   0:00 /snap/firefox/3728/usr/lib/firefox/firefox -contentproc -childID 2 -isForBr
owser -prefsLen 39078 -prefMapSize 236389 -jsInitLen 235124 -parentBuildID 20240125195458 -greomni /snap/firefox/3728/usr/lib/firefox/omni.ja
-appomni /snap/firefox/3728/usr/lib/firefox/browser/omni.ja -appDir /snap/firefox/3728/usr/lib/firefox/browser {df9b1225-a8ce-4d83-b1ad-26619b
c0e3c1} 9150 true tab
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~$
```

4. Display current logged in users and log name



```
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~$ whoami
b2
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~$
```

5. Display current shell, home directory, os type , current path setting and current working directory



```
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~$ echo "Current shell: $SHELL"
Current shell: /bin/bash
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~$ echo "Home Directory: $HOME"
Home Directory: /home/b2
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~$ echo "Operating System Type: $(uname -o)"
Operating System Type: GNU/Linux
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~$ echo "Current PATH: $PATH"
Current PATH: /usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin:/snap/bin
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~$ echo "Current working directory: $(pwd)"
Current working directory: /home/b2
b2@b2-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~$
```

Conclusion:

What is a Shell ?

A shell is a command-line interface (CLI) program that serves as the primary interface between a user and an operating system. It allows users to interact with the system by typing commands in a text-based environment rather than relying solely on graphical user interfaces (GUIs). Shells interpret user input, execute commands, and manage the execution of programs. They provide functionalities such as command execution, input/output redirection, piping (connecting the output of one command to the input of another), scripting (automating sequences of commands), and environment variable manipulation. Shells also typically provide features like command history, tab completion, and customizable prompt settings to enhance user productivity. Common examples of shells include Bash (Bourne Again SHell), Zsh (Z shell), and PowerShell, each with its own syntax, features, and extensions. Overall, shells play a crucial role in enabling users to interact with the operating system efficiently and perform various tasks ranging from simple file manipulation to complex system administration tasks.

Name different types of shell?

There are several types of shells available in Unix-like operating systems, each with its own features and capabilities.

1. Bourne Shell (sh): Developed by Stephen Bourne at AT&T Bell Labs, the Bourne Shell was one of the earliest Unix shells. It provides basic command-line interface functionality and scripting capabilities. While it lacks some of the advanced features of later shells, it remains a fundamental component of Unix systems.

2. Bourne-Again Shell (bash): Created as an enhanced version of the Bourne Shell, bash has become one of the most widely used shells in Unix-like operating systems. It offers features such as command-line editing, history, aliases, and programmable completion, making it powerful for both interactive use and scripting.

3. C Shell (csh): Developed by Bill Joy at the University of California, Berkeley, the C Shell provides a syntax similar to the C programming language. It offers interactive features like command-line history and aliases. While popular among some users, its scripting capabilities are considered less robust compared to bash.

4. Korn Shell (ksh): Developed by David Korn at AT&T Bell Labs, the Korn Shell combines features from the Bourne Shell and the C Shell, offering a rich set of programming features for scripting. It provides advanced scripting constructs, command-line editing, and job control, making it popular among power users and system administrators.

5. Z Shell (zsh): Zsh is an extended version of the Bourne Shell with additional features such as advanced tab completion, spelling correction, and customizable prompts. It aims to provide an interactive experience with enhanced usability and productivity for users.

6. Fish Shell (fish): Fish, short for "friendly interactive shell," is designed to be user-friendly and intuitive for interactive use. It offers features like syntax highlighting, autosuggestions, and powerful scripting capabilities while focusing on simplicity and ease of use.