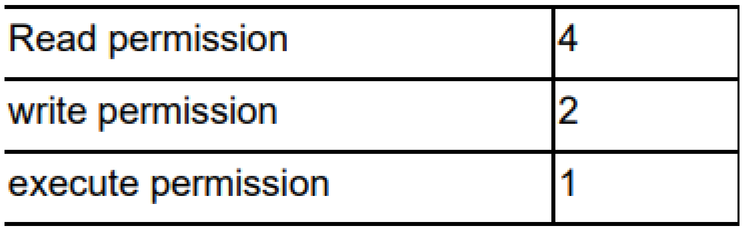
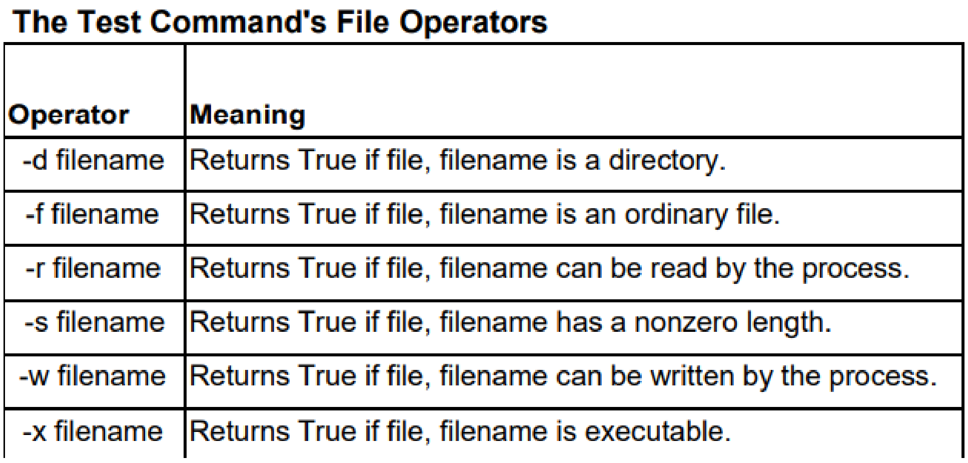
- $ su (to become another user) or $ su (to become the root user).
- .pwd stands for present working directory
- grep Description: Searches files for lines matching a specific pattern and displays the lines
- Grep stands for Global Regular Expression Parser.
- There are two basic ways to use grep::
- **<command> | grep <pattern> e.g:** e ps -a | grep R
- **grep <pattern> <filename> e.g:** $ grep hello* (for all files of dir)
- /usr/bin This directory holds user-oriented Linux programs.
- You redirect the output from cat to the desired filename: $ cat > newfile
- $ mv fileone /tmp/newfilename
- $ cp thisfile /tmp or $ cp fileone filetwo filethree /tmp
- –i flag of the cp command which forces the system to confirm any file it will overwrite when copying
- To create directory:: $ mkdir newdir
- rw-r—r— 1 fido users 163 Dec 7 14:31 myfile :: The next nine characters are broken into three groups of three, giving permissions for owner, group or users , and other Each triplet gives read, write, and execute permissions, always in that order The first digit codes permissions for the owner, the second digit codes permissions for the group, and the third digit codes permissions for other (everyone else). Therefore, a file permission of 751 means that the owner has read, write, and execute permission (4+2+1=7), the group has read and execute permission (4+1=5), and others have execute permission (1)



Read permission	4
write permission	2
execute permission	1

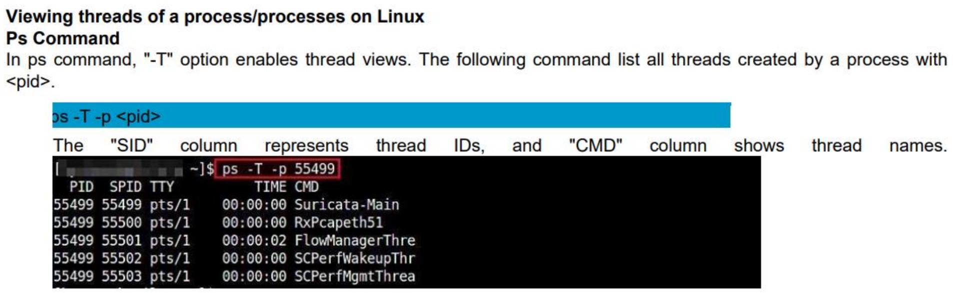
-
- •Environment variables are part of the system environment, and they do not need to be defined. They can be used in shell programs. Some of them such as PATH can also be modified within the shell program.
- •Built-in variables are provided by the system. Unlike environment variable they cannot be modified.
- •User variables are defined by the user when he writes the script. They can be used and modified at will within the shell program.
- Sum=$((10+3))   echo "Sum = $Sum"



The Test Command's File Operators

Operator	Meaning
-d filename	Returns True if file, filename is a directory.
-f filename	Returns True if file, filename is an ordinary file.
-r filename	Returns True if file, filename can be read by the process.
-s filename	Returns True if file, filename has a nonzero length.
-w filename	Returns True if file, filename can be written by the process.
-x filename	Returns True if file, filename is executable.

- The shift command moves the current values stored in the positional parameters to the left one position.
- The exit statement can be used to exit a shell program
- The easiest method of finding out what processes are running on your system is to use the ps (process status) command : $ ps
- Fork system call use for creates a new process, which is called child process, which runs concurrently with parent process
- zombie process" or defunct process is a process that has completed execution but still has an entry in the process table
- An “orphan process" is a computer process whose parent process has finished or terminated, though it remains running itself.
- Types of Threads: User Level thread (ULT) – Kernel Level Thread (KLT) –



Viewing threads of a process/processes on Linux
Ps Command
In ps command, "-T" option enables thread views. The following command list all threads created by a process with <pid>.

```
ps -T -p <pid>
```

The "SID" column represents thread IDs, and "CMD" column shows thread names.

```
[[redacted] ~]$ ps -T -p 55499
  PID  SPID TTY          TIME CMD
55499 55499 pts/1    00:00:00 Suricata-Main
55499 55500 pts/1    00:00:00 RxPcapeth51
55499 55501 pts/1    00:00:02 FlowManagerThre
55499 55502 pts/1    00:00:00 SCPerfWakeupThr
55499 55503 pts/1    00:00:00 SCPerfMgmtThrea
```

- • run() – The run() method is the entry point for a thread.
- • start() – The start() method starts a thread by calling the run method.
- • join([time]) – The join() waits for threads to terminate.
- • isAlive() – The isAlive() method checks whether a thread is still executing.
- • getName() – The getName() method returns the name of a thread.
- • setName() – The setName() method sets the name of a thread.
- Turn Around Time = Completion Time – Arrival Time
- Waiting Time = Turn Around Time – Burst Time
- Semaphore is a simply a variable. This variable is used to solve critical section problem and to achieve process synchronization in the multi-processing environment.
- Counting semaphore can take non-negative integer values and
- Binary semaphore can take the value 0 & 1. only.
- A semaphore can only be accessed using the following operations: wait() and signal().

- [In python, acquire() and release() provide wait() and signal() functionality, respectively]
- The mutex semaphore provides mutual exclusion for accesses to the buffer pool and is initialized to the value 1. The empty and full semaphores count the number of empty and full buffers. The semaphore empty is initialized to the value n (n =5 in this example); the semaphore full is initialized to the value 0.
- Inter process communication (IPC) is a mechanism which allows processes to communicate with each other and synchronize their actions. There are several different ways to implement IPC, for example pipe, shared memory, message passing
- Two pipes are required to establish two-way communication.
- os.pipe() method in Python is used to create a pipe
- Multiprocessing is the use of two or more central processing units (CPUs) within a single computer system".
- Deadlock (DL) can be defined as the permanent blocking of a set of processes that either compete for system resources or communicate with each other. In a multiprogramming environment, several processes may compete for a finite number of resources

- A deadlock-avoidance algorithm dynamically examines the resource-allocation state to ensure that a circular-wait condition can never exist. The resource allocation state is defined by the number of available and allocated resources and the maximum demands of the processes.