

Operating System Practicals

Assignment 1

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1.

```
#!/bin/sh

echo 'ls';
ls # Lists files and directories inside folder

echo 'ls -a';
ls -a # Lists all files including hidden files

echo 'ls -la';
ls -la # Long format list

echo 'ls -ls';
ls -ls # Long format list sorted by size
```

```
ls:
1.sh
ls -a
. .. 1.sh
ls -la
total 1
drwxrwxrwx 1 root root 144 Jan  5 15:46 .
drwxrwxrwx 1 root root 160 Jan  5 15:44 ..
-rwxrwxrwx 1 root root 231 Jan  5 15:48 1.sh
ls -ls
total 1
-rwxrwxrwx 1 root root 231 Jan  5 15:48 1.sh
```

```
#!/bin/sh

echo 'date'
date # Displays date

echo 'date +%d'
date +%d # Displays day of month

echo 'date +%m'
date +%m # Displays month of year

echo 'date "+%H%M%S"'
date '+%H %M %S' #Displays Time
```

```
date
Tue 5 Jan 15:51:32 IST 2021
date +%d
05
date +%m
01
date "+%H%M%S"
15 51 32
```

```
#!/bin/sh
```

```
help # Displays help options
```

```
help false # Gives help related with false keyword
```

```
GNU bash, version 5.0.17(1)-release (x86_64-pc-linux-gnu)
These shell commands are defined internally. Type 'help' to see this list.
Type 'help name' to find out more about the function 'name'.
Use 'info bash' to find out more about the shell in general.
Use 'man -k' or 'info' to find out more about commands not in this list.
```

A star (*) next to a name means that the command is disabled.

job_spec [d]	history [-c] [-d offset] [n] or history -anrw [filename] or >
((expression))	if COMMANDS; then COMMANDS; [elif COMMANDS; then COMMANDS; >
. filename [arguments]	jobs [-lnprs] [jobspec ...] or jobs -x command [args]
:	kill [-s sigspec -n signum -sigspec] pid jobspec ... o>
[arg...]	let arg [arg ...]
[[expression]]	local [option] name[=value] ...
alias [-p] [name[=value] ...]	logout [n]
bg [job_spec ...]	mapfile [-d delim] [-n count] [-O origin] [-s count] [-t] [->
bind [-lpsvPSVX] [-m keymap] [-f filename] [-q name] [-u name]>	popd [-n] [+N -N]
break [n]	printf [-v var] format [arguments]
builtin [shell-builtin [arg ...]]	pushd [-n] [+N -N dir]
caller [expr]	pwd [-LP]
case WORD in [PATTERN] [PATTERN]...) COMMANDS ;;)... esac	read [-ers] [-a array] [-d delim] [-i text] [-n nchars] [-N >
cd [-L] [-P [-e]] [-@]] [dir]	readarray [-d delim] [-n count] [-O origin] [-s count] [-t] >
command [-pV] command [arg ...]	readonly [-aAf] [name[=value] ...] or readonly -p
compgen [-abcdefgjkuv] [-o option] [-A action] [-G globpat] >	return [n]
complete [-abcdefgjkuv] [-pr] [-DEI] [-o option] [-A action]>	select NAME [in WORDS ... ;] do COMMANDS; done
comptopt [-o +o option] [-DEI] [name ...]	set [-abefhkmnptuvxBCHP] [-o option-name] [--] [arg ...]
continue [n]	shift [n]
coproc [NAME] command [redirections]	shopt [-pqsu] [-o] [optname ...]
declare [-aAfFgIlNrtux] [-p] [name[=value] ...]	source filename [arguments]
dirs [-clpv] [+N] [-N]	suspend [-f]
disown [-h] [-ar] [jobspec ... pid ...]	test [expr]
echo [-neE] [arg ...]	time [-p] pipeline
enable [-a] [-dnps] [-f filename] [name ...]	times

eval [arg ...]	trap [-lp] [[arg] signal_spec ...]
exec [-cl] [-a name] [command [arguments ...]] [redirection >	true
exit [n]	type [-afptP] name [name ...]
export [-fn] [name[=value] ...] or export -p	typeset [-aAfFgIlNrtux] [-p] name[=value] ...
false	ulimit [-SHabcdefiklmnpqrstuvxPT] [limit]
fc [-e ename] [-lnr] [first] [last] or fc -s [pat=rep] [comma>	umask [-p] [-S] [mode]
fg [job_spec]	unalias [-a] name [name ...]
for NAME [in WORDS ...] ; do COMMANDS; done	unset [-f] [-v] [-n] [name ...]
for ((exp1; exp2; exp3)); do COMMANDS; done	until COMMANDS; do COMMANDS; done
function name { COMMANDS ; } or name () { COMMANDS ; }	variables - Names and meanings of some shell variables
getopts optstring name [arg]	wait [-fn] [id ...]
hash [-lr] [-p pathname] [-dt] [name ...]	while COMMANDS; do COMMANDS; done
help [-dms] [pattern ...]	{ COMMANDS ; }
false: false	
Return an unsuccessful result.	

Exit Status:
Always fails.

```
#!/bin/sh
```

```
echo 'man'
```

```
man # Displays options for manual
```

```
echo 'man ls'
```

```
man ls # Displays manual for ls
```

```
GNU coreutils online help: <https://www.gnu.org/software/coreutils/>  
Report ls translation bugs to <https://translationproject.org/team/>
```

```
LS(1)
```

```
User Commands
```

```
LS(1)
```

```
NAME
```

```
ls - list directory contents
```

```
SYNOPSIS
```

```
ls [OPTION]... [FILE]...
```

```
DESCRIPTION
```

```
#!/bin/sh
```

```
who # Displays current user info
```

```
krhero :0 2021-01-05 08:51 (:0)
```

```
#!/bin/sh
```

```
pwd # Present Working Directory
```

```
/mnt/0FB812900FB81290/BTech/Assignments/3rd_Year/OS/Assignment_1
```

```
#!/bin/sh
```

```
cat ./cat.sh # Displays file content
```

```
cat ./cat.sh > ./temp.txt # Appends file temp.txt with cat.sh
```

```
#!/bin/sh
```

```
cat ./cat.sh # Displays file content
```

```
cat ./cat.sh > ./temp.txt # Appends file temp.txt with cat.sh
```

```
#!/bin/sh
```

```
more temp.txt # Opens file temp.txt
```

```
#!/bin/sh
```

```
cat ./cat.sh # Displays file content
```

```
cat ./cat.sh > ./temp.txt # Appends file temp.txt with cat.sh
```

```
#!/bin/sh
```

```
mv ./temp.txt ../temp.txt # Moves temp.txt to parent directory
```

```
rm ../temp.txt # Deletes temp.txt from parent directory
```

```
#!/bin/sh
```

```
chmod u+x ./chmod.sh # Gives the user who owns the file to execute it
```

```
chmod u+rw ./chmod.sh # Gives the user rights to reach and write to file/directory
```

```
#!/bin/sh
```

```
whoami # Displays current logged in user
```

```
krhero
```

```
#!/bin/bash
```

```
logout # Logs out current user
```

```
#!/bin/bash
```

```
wc -l ./wc.sh # Counts lines in file
```

```
wc -w ./wc.sh # Counts words in file
```

```
wc -c ./wc.sh # Counts characters in file
```

```
6 ./wc.sh
```

```
26 ./wc.sh
```

```
131 ./wc.sh
```

```
#!/bin/bash
```

```
grep ep ./grep.sh # Search for pattern in file
```

```
grep -F ep ./grep.sh # Search for exact string
```

```
grep -RI sh . # Search for pattern recursively in file
```

```
grep -RI sh . # Search for pattern recursively in file
grep ep ./grep.sh # Search for pattern in file
grep -F ep ./grep.sh # Search for exact string
grep -RI sh . # Search for pattern recursively in file
./cat.sh:#! /bin/sh
./cat.sh:cat ./cat.sh # Displays file content
./cat.sh:cat ./cat.sh > ./temp.txt # Appends file temp.txt with cat.sh
./chmod.sh:#! /bin/sh
./chmod.sh:chmod u+x ./chmod.sh # Gives the user who owns the file to execute it
./chmod.sh:chmod u+rw ./chmod.sh # Gives the user rights to reach and write to file/directory
./date.sh:#! /bin/sh
./grep.sh:#! /bin/bash
./grep.sh:grep ep ./grep.sh # Search for pattern in file
./grep.sh:grep -F ep ./grep.sh # Search for exact string
./grep.sh:grep -RI sh . # Search for pattern recursively in file
./help.sh:#! /bin/sh
./logout.sh:#! /bin/bash
./ls.sh:#! /bin/sh
./man.sh:#! /bin/sh
./more.sh:#! /bin/sh
./mv.sh:#! /bin/sh
./pwd.sh:#! /bin/sh
./wc.sh:#! /bin/bash
./wc.sh:wc -l ./wc.sh # Counts lines in file
./wc.sh:wc -w ./wc.sh # Counts words in file
./wc.sh:wc -c ./wc.sh # Counts characters in file
./who.sh:#! /bin/sh
./whoami.sh:#! /bin/sh
```

```
#! /bin/bash

echo 'File before sorting:'
cat ./temp.txt

echo ''
echo 'File after sorting:'
sort ./temp.txt # Sorts a file in ascending order
```

File before sorting:

delhi
mumbai
chicago
losangeles
kolkata
london
cairo
shanghai
tokyo
kabul
sydney
singapore
wellington

File after sorting:

cairo
chicago
delhi
kabul
kolkata
london
losangeles
mumbai
shanghai
singapore
sydney
tokyo
wellington

```
#!/bin/bash
```

```
mkdir tp # Creates directory
```

```
echo 'Created dir tp!'
```

```
rmdir tp # Removes directory
```

```
echo 'Removed dir tp!'
```

```
Created dir tp!
```

```
Removed dir tp!
```

```
#!/bin/bash
```

```
cd .. # Moves to parent directory
```

```
cd ../Assignment_1 # Moves to folder Assignment_1
```

```
#!/bin/sh
```

```
echo 'Last 5 Lines:'
```

```
tail -n 5 temp.txt # Displays last 5 lines in temp.txt
```



```
echo '\nLine 5 and after:'  
tail -n +5 temp.txt # Displays since 5th line in temp.txt
```

```
Last 5 Lines:  
tokyo  
kabul  
sydney  
singapore  
wellington  
Line 5 and after:  
kolkata  
london  
cairo  
shanghai  
tokyo  
kabul  
sydney  
singapore  
wellingtonkrhero@hellblazer
```

```
#!/bin/bash  
  
cmp ./temp.txt ./temp1.txt # Find difference in two files  
./temp.txt ./temp1.txt differ: byte 7, line 2
```

```
#!/bin/bash  
  
diff ./temp.txt ./temp1.txt # Find difference and its description between two files  
2,3c2  
< mumbai  
< chicago  
---  
> cairo  
4a4,6  
> sydney  
> singapore  
> wellington  
7d8  
< cairo  
8a10,11  
> mumbai  
> chicago  
10,13c13  
< kabul  
< sydney  
< singapore  
< wellington  
\ No newline at end of file  
---
```

```
#!/bin/sh  
  
cp ./temp.txt ./temp2.txt # Copies temp.txt into temp2.txt
```

```
#!/bin/bash
```

```
clear # Clear the screen
```

```
#!/bin/bash
```

```
df # Display all file systems and disk usage
```

```
du -sh ./# Displays disk usage size in human readable units
```

```
#!/bin/bash
```

```
uname -a # Displays all available system information
```

```
Linux hellblazer 5.4.0-58-generic #64-Ubuntu SMP Wed Dec 9 08:16:25 UTC 2020 x86_64 x86_64 x86_64 GNU/Linux
```

```
#!/bin/sh
```

```
apt-get list # Lists all installed packages
```

```
apt-get update # Updates package sources
```

```
apt-get upgrade # Upgrades packages to latest distributions
```

```
#!/bin/sh
```

```
find ./ -name '*.sh' # Finds file in directory with sh extension
```

```
./apt-get.sh  
./cat.sh  
./cd.sh  
./chmod.sh  
./clear.sh  
./cmp.sh  
./cp.sh  
./date.sh  
./df.sh  
./diff.sh  
./dir.sh  
./find.sh  
./grep.sh  
./help.sh  
./logout.sh
```

```
#!/bin/bash
```

```
wget https://www.google.com/ # Download content from URL
```



```
#!/bin/sh
```

```
top # Displa dynamic realtime information about running processes
```

```
Display dynamic real-time information about running processes.
```

```
top - 16:40:31 up 7:51, 1 user, load average: 1.45, 1.53, 1.65
```

```
Tasks: 374 total, 1 running, 370 sleeping, 0 stopped, 3 zombie
```

```
%Cpu(s): 11.3 us, 3.8 sy, 0.0 ni, 83.2 id, 0.0 wa, 0.0 hi, 1.7 si, 0.0 st
```

```
MiB Mem : 7870.6 total, 228.4 free, 4447.1 used, 3195.1 buff/cache
```

```
MiB Swap: 2048.0 total, 1895.2 free, 152.8 used. 2876.2 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
27339	krhero	20	0	18.8g	300636	111468	S	64.7	3.7	22:13.46	chrome
1566	krhero	9	-11	1933176	13852	11296	S	19.5	0.2	51:49.78	pulseaudio
2415	krhero	20	0	4883772	301212	80756	S	10.6	3.7	19:57.02	gnome-shell
24745	krhero	20	0	1097244	61112	49880	S	9.9	0.8	3:48.72	chrome
17910	krhero	20	0	647256	154448	52732	S	6.9	1.9	4:50.36	steamwebhelper
1578	root	20	0	454500	101464	30040	S	5.6	1.3	17:06.73	Xorg
24061	krhero	20	0	901312	315412	168016	S	4.3	3.9	4:20.52	chrome
17733	krhero	20	0	713560	212536	84600	S	2.6	2.6	22:46.95	steam
17784	krhero	20	0	591424	151340	86132	S	2.6	1.9	3:34.77	steamwebhelper
26125	krhero	20	0	18.8g	293168	106504	S	2.6	3.6	8:58.60	code
24102	krhero	20	0	360880	101924	65848	S	2.3	1.3	1:16.89	chrome
1703	root	-51	0	0	0	0	S	1.0	0.0	5:28.20	irq/132-nvidia
2651	krhero	20	0	162908	5112	4900	S	0.7	0.1	0:19.52	at-spi2-registr
26385	krhero	20	0	4842872	282052	101964	S	0.7	3.5	3:33.24	chrome

```
#!/bin/sh
```

```
mpstat -P ALL # Displays Processor info
```

```
#!/bin/sh
```

```
netstat # Displays network activity status on PC
```

```
Active Internet connections (w/o servers)
```

Proto	Recv-Q	Send-Q	Local Address	Foreign Address	State
tcp	0	0	hellblazer:48882	bom05s12-in-f14.1:https	ESTABLISHED
tcp	0	0	hellblazer:58214	bom05s15-in-f3.1e:https	TIME WAIT
tcp	0	0	hellblazer:47830	a23-212-242-118.d:https	ESTABLISHED
tcp	0	0	hellblazer:36244	ec2-54-199-213-24:https	ESTABLISHED
tcp	0	0	hellblazer:34366	114.89.213.35.bc.:https	ESTABLISHED
tcp	0	0	hellblazer:47748	a23-212-242-118.d:https	ESTABLISHED
tcp	0	0	hellblazer:48142	bom05s09-in-f14.1:https	ESTABLISHED
tcp	0	0	hellblazer:39604	ec2-52-86-149-112:https	ESTABLISHED
tcp	0	0	hellblazer:57968	151.101.154.49:https	ESTABLISHED
tcp	0	0	hellblazer:45006	ec2-44-242-123-66:https	ESTABLISHED
tcp	0	0	hellblazer:52556	bom07s25-in-f10.1:https	ESTABLISHED
tcp	0	0	hellblazer:54838	bom07s20-in-f3.1e:https	ESTABLISHED

```
#!/bin/bash
```

```
sar -b 1 # Report IO and transfer rate issued to physical devices
```

	tps	rtps	wtps	dtps	bread/s	bwrtn/s	bdsd/s
16:45:48							
16:45:49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16:45:50	14.00	0.00	14.00	0.00	0.00	104.00	0.00
16:45:51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16:45:52	3.00	0.00	3.00	0.00	0.00	24.00	0.00
16:45:53	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16:45:54	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16:45:55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16:45:56	29.00	0.00	29.00	0.00	0.00	648.00	0.00
16:45:57	1.00	0.00	1.00	0.00	0.00	32.00	0.00

2.

```
#!/bin/sh
```

```
ps # Shows all processes
```

```
ps aux # Shows all background processes
```

```
pidof chrome # Gets Process ID of processes with name chrome
```

```
kill -9 1235 # Forcefully kills process with PID 1235
```

USER	PID	%CPU	%MEM	VSZ	RSS	TTY	STAT	START	TIME	COMMAND
root	1	0.1	0.1	171104	13376	?	Ss	08:48	0:43	/sbin/init splash
root	2	0.0	0.0	0	0	?	S	08:48	0:00	[kthreadd]
root	3	0.0	0.0	0	0	?	I<	08:48	0:00	[rcu_gp]
root	4	0.0	0.0	0	0	?	I<	08:48	0:00	[rcu_par_gp]
root	6	0.0	0.0	0	0	?	I<	08:48	0:00	[kworker/0:0H-kblockd]
root	9	0.0	0.0	0	0	?	I<	08:48	0:00	[mm_percpu_wq]
root	10	0.0	0.0	0	0	?	S	08:48	0:00	[ksoftirqd/0]
root	11	0.1	0.0	0	0	?	I	08:48	0:50	[rcu_sched]
root	12	0.0	0.0	0	0	?	S	08:48	0:00	[migration/0]
root	13	0.0	0.0	0	0	?	S	08:48	0:00	[idle_inject/0]
root	14	0.0	0.0	0	0	?	S	08:48	0:00	[cpuhp/0]
root	15	0.0	0.0	0	0	?	S	08:48	0:00	[cpuhp/1]
root	16	0.0	0.0	0	0	?	S	08:48	0:00	[idle_inject/1]
root	17	0.0	0.0	0	0	?	S	08:48	0:00	[migration/1]
root	18	0.0	0.0	0	0	?	S	08:48	0:01	[ksoftirqd/1]
root	20	0.0	0.0	0	0	?	I<	08:48	0:00	[kworker/1:0H-kblockd]
root	21	0.0	0.0	0	0	?	S	08:48	0:00	[cpuhp/2]
root	22	0.0	0.0	0	0	?	S	08:48	0:00	[idle_inject/2]
root	23	0.0	0.0	0	0	?	S	08:48	0:00	[migration/2]
root	24	0.0	0.0	0	0	?	S	08:48	0:00	[ksoftirqd/2]
root	26	0.0	0.0	0	0	?	I<	08:48	0:00	[kworker/2:0H-kblockd]