Free & Open Source Software
Lab Report

Experiments 4, 5, 6, 7, 9
Shell Programming - Set 1

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Contents

1 Shell Programming - System Configurations

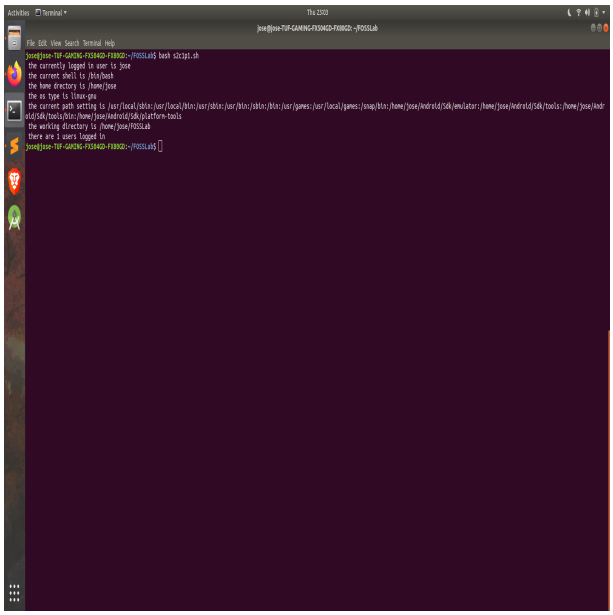
1.1 Aim

Write shell script to show various system configuration like
• Currently logged user and his login name
• Your current shell
• Your home directory
• Your operating system type
• Your current path setting
• Your current working directory
• Number of users currently logged in

1.2 Source Code

```
echo " the currently logged in user is $USER "
echo " the current shell is $SHELL "
echo " the home drectory is $HOME "
echo " the os type is $OSTYPE "
echo " the current path setting is $PATH "
echo " the working directory is $PWD "
echo " there are $(who | wc -l) users logged in "
```

1.3 Sample



1.4 Result

The shell script for displaying various system configurations were made and the output was verified. The script was run on Ubuntu 18.04.3 LTS.

2 System Configurations (Continued)

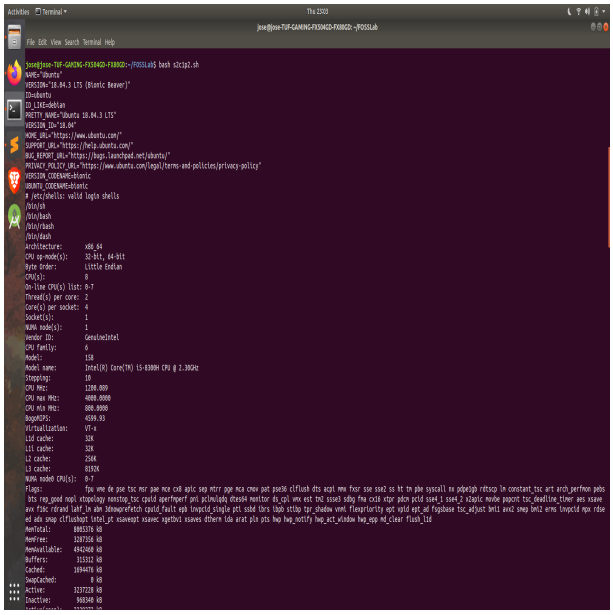
2.1 Aim

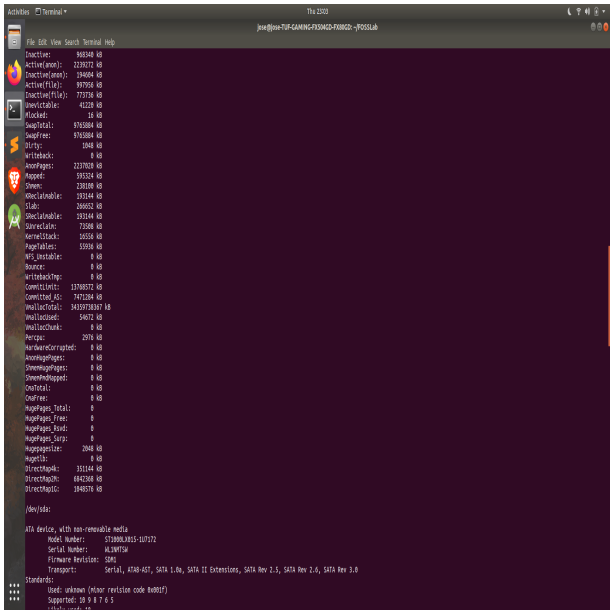
Write shell script to show various system configurations like
• your OS and version, release number, kernel version
• all available shells
• computer CPU information like processor type, speed etc
• memory information
• hard disk information like size of hard-disk, cache memory, model etc
• File system (Mounted)

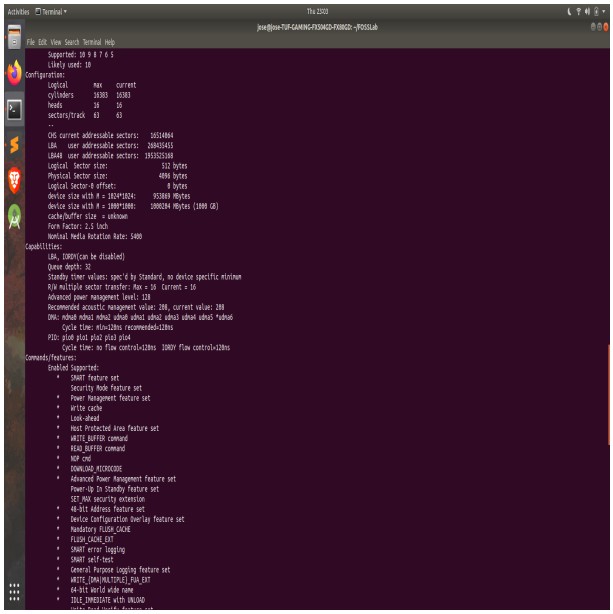
2.2 Source Code

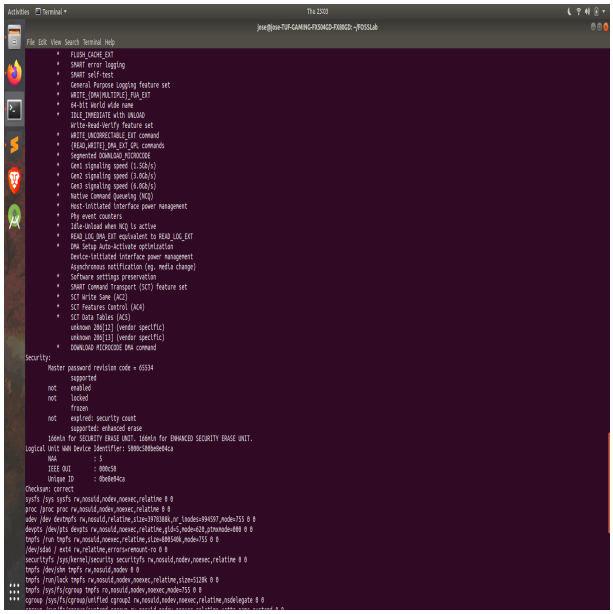
```
cat /etc/os-release
cat /etc/shells
lscpu
cat /proc/meminfo
sudo hdparm -I /dev/sda
cat /proc/mounts
```

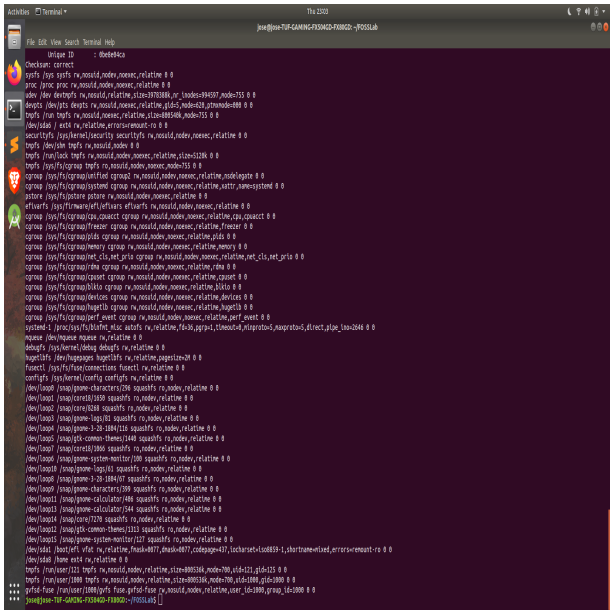
2.3 Sample




Activities
Terminal
Thu 23:03
jose@jose-TUF-GAMING-FX504GD-FX80GD: ~/FOSSLab
File Edit View Search Terminal Help
Inactive: 988548 kB
Active(anon): 2239272 kB
Inactive(anon): 194604 kB
Active(file): 997956 kB
Inactive(file): 773736 kB
Unevictable: 41228 kB
Mlocked: 16 kB
SwapTotal: 9765884 kB
SwapFree: 9765884 kB
Dirty: 1048 kB
Writeback: 0 kB
AnonPages: 2227020 kB
Mapped: 595324 kB
Shmem: 238108 kB
KReclaimable: 193144 kB
Slab: 296052 kB
SReclaimable: 193144 kB
SUnreclaim: 71508 kB
KernelStack: 16256 kB
PageTables: 55936 kB
NFS_Unstable: 0 kB
Bounce: 0 kB
WritebackTmp: 0 kB
CommitLimit: 13780572 kB
Committed_AS: 7471284 kB
VmallocTotal: 34359738367 kB
VmallocUsed: 54072 kB
VmallocChunk: 0 kB
Percpu: 2976 kB
HardwareCorrupted: 0 kB
AnonHugePages: 0 kB
ShmemHugePages: 0 kB
ShmemPmdMapped: 0 kB
CmaTotal: 0 kB
CmaFree: 0 kB
HugePages_Total: 0
HugePages_Free: 0
HugePages_Rsvd: 0
HugePages_Surp: 0
Hugepagesize: 2048 kB
Hugetlb: 0 kB
DirectMap4k: 351144 kB
DirectMap2M: 6842368 kB
DirectMap1G: 1048576 kB
/dev/sda:
ATA device, with non-removable media
Model Number: ST1000LX015-1U7172
Serial Number: WL1MF5JW
Firmware Revision: SDM3
Transport: Serial, ATA8-AST, SATA 1.0a, SATA II Extensions, SATA Rev 2.5, SATA Rev 2.6, SATA Rev 3.0
Standards:
Used: unknown (minor revision code 0x001f)
Supported: 10 9 8 7 6 5


Activities
Terminal
Thu 23:03
jose@jose-TUF-GAMING-FX504GD-FX80GD: ~/FOSSLab
File Edit View Search Terminal Help
Supported: 10 9 8 7 6 5
Likely used: 10
Configuration:
Logical max current
cylinders 16383 16383
heads 16 16
sectors/track 63 63
--
CHS current addressable sectors: 16514064
LBA user addressable sectors: 268435455
LBA48 user addressable sectors: 1953525168
Logical Sector size: 512 bytes
Physical Sector size: 4096 bytes
Logical Sector-0 offset: 0 bytes
device size with M = 1024*1024: 953869 MBytes
device size with M = 1000*1000: 1000204 MBytes (1000 GB)
cache/buffer size = unknown
Form Factor: 2.5 inch
Nominal Media Rotation Rate: 5400
Capabilities:
LBA, IORDY(can be disabled)
Queue depth: 32
Standby timer values: spec'd by Standard, no device specific minimum
R/W multiple sector transfer: Max = 16 Current = 16
Advanced power management level: 128
Recommended acoustic management value: 208, current value: 208
DMA: mdma0 mdma1 mdma2 udma0 udma1 udma2 udma3 udma4 udma5 *udma6
Cycle time: min=120ns recommended=120ns
PIO: pio0 pio1 pio2 pio3 pio4
Cycle time: no flow control=120ns IORDY flow control=120ns
Commands/features:
Enabled Supported:
* SMART feature set
Security Mode feature set
* Power Management feature set
* Write cache
* Look-ahead
* Host Protected Area feature set
* WRITE_BUFFER command
* READ_BUFFER command
* NOP cmd
* DOWNLOAD_MICROCODE
* Advanced Power Management feature set
Power-Up In Standby feature set
SET_MAX security extension
* 48-bit Address feature set
* Device Configuration Overlay feature set
* Mandatory FLUSH_CACHE
* FLUSH_CACHE_EXT
* SMART error logging
* SMART self-test
* General Purpose Logging feature set
* WRITE_{DMA|MULTIPLE}_FUA_EXT
* 64-bit World wide name
* IDLE_IMMEDIATE with UNLOAD





2.4 Result

The shell script for displaying required system configurations was made and the output was verified. The shell script was run on Ubuntu 18.04.3 LTS.

3 Menu-Driven Calculator

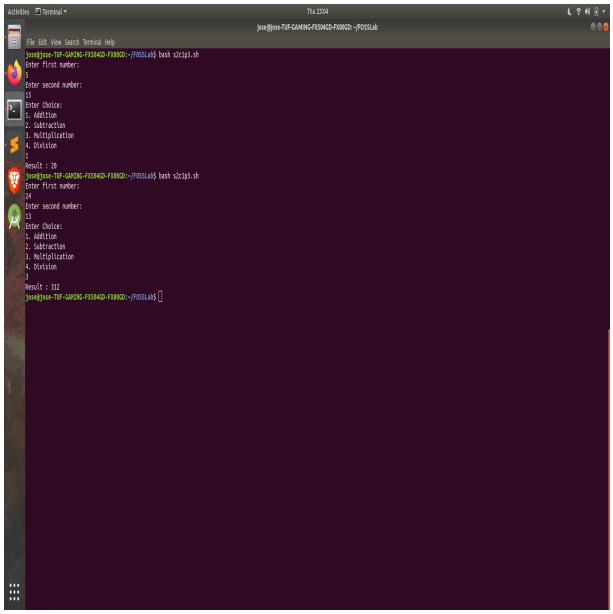
3.1 Aim

Write a shell script to implement a menu driven calculator with following functions:
• Addition
• Subtraction
• Multiplication
• Division
• Modulus

3.2 Source Code

```
echo "Enter first number: "
read a
echo "Enter second number: "
read b
echo "Enter Choice: "
echo "1. Addition"
echo "2. Subtraction"
echo "3. Multiplication"
echo "4. Division"
read ch
case $ch in
  1)res=‘echo $a + $b | bc‘
  ;;
  2)res=‘echo $a - $b | bc‘
  ;;
  3)res=‘echo $a \* $b | bc‘
  ;;
  4)res=‘echo "scale=2; $a / $b" | bc‘
  ;;
esac
echo "Result : $res"
```

3.3 Sample



3.4 Result

The shell script for a simple menu driven calculator was made and the output was verified. The script was run in Ubuntu 18.04.3 LTS and screenshot of output is attached above.

4 Script that accepts two arguments from the command line and operates on them

4.1 Aim

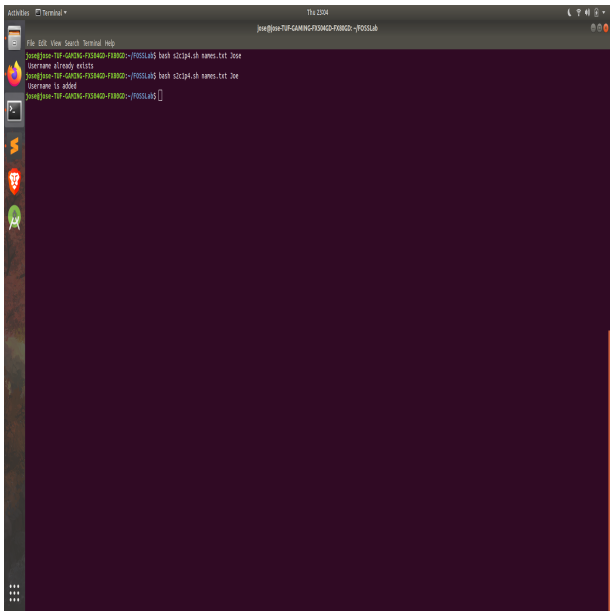
Write a script called addnames that is to be called as follows ./addnames ulist username Here ulist is the name of the file that contains list of user names and username is a particular student's username. The script should
• check that the correct number of arguments was received and print a message, in case the number of arguments is incorrect
• check whether the ulist file exists and print an error message if it does not
• check whether the username already exists in the file. If the username exists, print a message stating that the name already exists. Otherwise, add the username to the end of the list

4.2 Source Code

```
if [[ $# -ne 2 ]]
then
```

```
echo " Invalid number of arguments "
exit
fi
if [[ ! ( -a $1 ) ]]
then
echo " Not a valid file location or file dosent exist "
exit
fi
NO=$( grep -c -e $2 $1 )
if [[ $NO -eq 0 ]]
then
echo $2 >> $1
echo " Username is added "
exit
else
echo " Username already exists "
exit
fi
```

4.3 Sample



4.4 Result

The required shell script was made and the output was verfied. The script was run on Ubuntu 18.04.3 LTS.

5 Killer Shell Script

5.1 Aim

Shell script which starts on system boot up and kills every process which uses more than a specified amount of memory or CPU.

5.2 Source Code

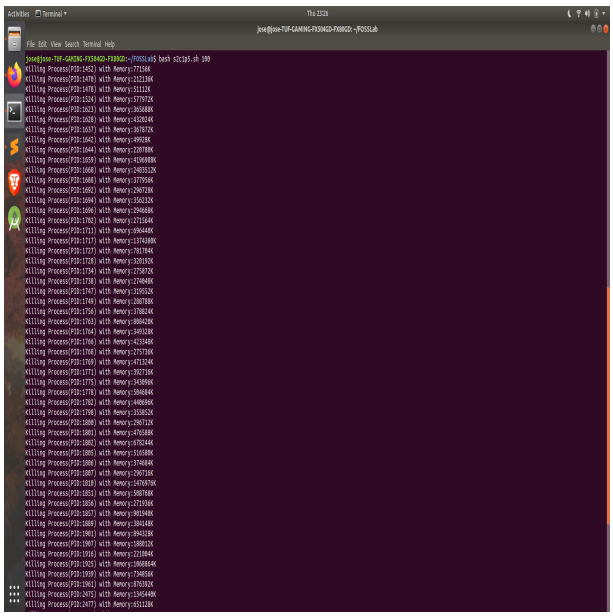
```
if [ ! $# -eq 1 ]; then
 echo Provide MEMORY threshold as arguement.
 exit 0
fi

MAX_MEMORY=$1

processes=$(ps -o pid ax | grep -v PID)

for p in $processes; do
 memory=$(pmap $p | tail -n 1 | awk -F '[^0-9]*' '/[0-9]K/{ print $2 }')
 if [ ! -z $memory ] && [ $memory -gt $MAX_MEMORY ]; then
 echo Killing Process\(PID:$p\) with Memory:${memory}K
 # kill $p
 fi
done
```

5.3 Sample



5.4 Result

A shell script for killing processes that consume more than a specific amount of memory and cpu was made and the output was verified. The shell script was run on Ubuntu 18.04.3 LTS.