Home Work – 1

1. All three surveys completed
2. Done.
3. Done
4. Done

5. Done

6.


```
shekhar@shekhar-VirtualBox:~/Downloads$ chmod 777 exam.sh
shekhar@shekhar-VirtualBox:~/Downloads$ ./exam.sh

***************** User Information **********************

Linux shekhar-VirtualBox 4.10.0-28-generic #32~16.04.2-Ubuntu SMP Thu Jul 20 10:19:48 UTC 2017 x86_64 x86_64 x86_64 GNU/Linux
\n
uid=1000(shekhar) gid=1000(shekhar) groups=1000(shekhar),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),113(lpadmin),128(sambashare)

***************** Linx OS Info *********************

4.10.0-28-generic GNU/Linux
\n
DISTRIB_ID=Ubuntu
DISTRIB_RELEASE=16.04
DISTRIB_CODENAME=xenial
DISTRIB_DESCRIPTION="Ubuntu 16.04.3 LTS"
\n
Linux version 4.10.0-28-generic (buildd@lgw01-12) (gcc version 5.4.0 20160609 (Ubuntu 5.4.0-6ubuntu1~16.04.4) ) #32~16.04.2-Ubuntu SMP Thu Jul
 20 10:19:48 UTC 2017
\n
#32~16.04.2-Ubuntu SMP Thu Jul 20 10:19:48 UTC 2017

***************** System Arch Info *********************

x86_64

***************** Memory Info *********************

MemTotal:        4044232 kB
MemFree:         2093168 kB
MemAvailable:    2690420 kB
Buffers:           30472 kB
Cached:           764880 kB
SwapCached:            0 kB
Active:          1403688 kB
Inactive:         415060 kB
Active(anon):    1024252 kB
Inactive(anon):    15120 kB
Active(file):     379436 kB
Inactive(file):   399940 kB
Unevictable:          32 kB
Mlocked:              32 kB
SwapTotal:       4192252 kB
SwapFree:        4192252 kB
Dirty:              3948 kB
Writeback:             0 kB
AnonPages:        960960 kB
Mapped:           308848 kB
Shmem:             15980 kB
Slab:              65312 kB
SReclaimable:      41976 kB
SUnreclaim:        23336 kB
KernelStack:        7008 kB
PageTables:        28308 kB
NFS_Unstable:          0 kB
Bounce:                0 kB
WritebackTmp:          0 kB
CommitLimit:     6214368 kB
Committed_AS:    3954536 kB
VmallocTotal:   34359738367 kB
VmallocUsed:           0 kB
VmallocChunk:          0 kB
HardwareCorrupted:     0 kB
AnonHugePages:    172032 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
DirectMap4k:       96192 kB
DirectMap2M:     4098048 kB
\n
              total        used        free      shared  buff/cache   available
Mem:           3949        1064        2044          15         840        2627
Swap:          4093           0        4093
shekhar@shekhar-VirtualBox:~/Downloads$
```

7.

```
shekhar@shekhar-VirtualBox:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            1.4G     0  1.4G   0% /dev
tmpfs           276M  4.6M  271M   2% /run
/dev/sda1        37G  4.4G   31G  13% /
tmpfs           1.4G  212K  1.4G   1% /dev/shm
tmpfs           5.0M  4.0K  5.0M   1% /run/lock
tmpfs           1.4G     0  1.4G   0% /sys/fs/cgroup
tmpfs           276M   96K  276M   1% /run/user/1000
shekhar@shekhar-VirtualBox:~$
```

```
shekhar@shekhar-VirtualBox:~$ dpkg --list | grep linux-image
ii  linux-image-4.10.0-28-generic            4.10.0-28.32~16.04.2
         amd64        Linux kernel image for version 4.10.0 on 64 bit x86 SMP
ii  linux-image-extra-4.10.0-28-generic      4.10.0-28.32~16.04.2
         amd64        Linux kernel extra modules for version 4.10.0 on 64 bit
 x86 SMP
ii  linux-image-generic-hwe-16.04            4.10.0.28.31
         amd64        Generic Linux kernel image
```

```
shekhar@shekhar-VirtualBox:~$ ls -lha /boot
total 53M
drwxr-xr-x  3 root root 4.0K Jan 24 12:29 .
drwxr-xr-x 24 root root 4.0K Jan 24 12:12 ..
-rw-r--r--  1 root root 1.4M Jul 20  2017 abi-4.10.0-28-generic
-rw-r--r--  1 root root 201K Jul 20  2017 config-4.10.0-28-generic
drwxr-xr-x  5 root root 4.0K Jan 24 12:29 grub
-rw-r--r--  1 root root  40M Jan 24 12:29 initrd.img-4.10.0-28-generic
-rw-r--r--  1 root root 179K Jan 28  2016 memtest86+.bin
-rw-r--r--  1 root root 181K Jan 28  2016 memtest86+.elf
-rw-r--r--  1 root root 181K Jan 28  2016 memtest86+_multiboot.bin
-rw-------  1 root root 3.6M Jul 20  2017 System.map-4.10.0-28-generic
-rw-r--r--  1 root root 7.1M Jan 24 12:09 vmlinuz-4.10.0-28-generic
```

```
  LD [M]  sound/soundcore.ko
  LD [M]  sound/synth/emux/snd-emux-synth.ko
  LD [M]  sound/synth/snd-util-mem.ko
  LD [M]  sound/usb/6fire/snd-usb-6fire.ko
  LD [M]  sound/usb/bcd2000/snd-bcd2000.ko
  LD [M]  sound/usb/caiaq/snd-usb-caiaq.ko
  LD [M]  sound/usb/hiface/snd-usb-hiface.ko
  LD [M]  sound/usb/line6/snd-usb-line6.ko
  LD [M]  sound/usb/line6/snd-usb-pod.ko
  LD [M]  sound/usb/line6/snd-usb-podhd.ko
  LD [M]  sound/usb/line6/snd-usb-toneport.ko
  LD [M]  sound/usb/line6/snd-usb-variax.ko
  LD [M]  sound/usb/misc/snd-ua101.ko
  LD [M]  sound/usb/snd-usb-audio.ko
  LD [M]  sound/usb/snd-usbmidi-lib.ko
  LD [M]  sound/usb/usx2y/snd-usb-us122l.ko
  LD [M]  sound/usb/usx2y/snd-usb-usx2y.ko
  LD [M]  virt/lib/irqbypass.ko
shekhar@shekhar-VirtualBox:~/linux-4.14.13$
```

```
 INSTALL sound/synth/snd-util-mem.ko
 INSTALL sound/usb/6fire/snd-usb-6fire.ko
 INSTALL sound/usb/bcd2000/snd-bcd2000.ko
 INSTALL sound/usb/caiaq/snd-usb-caiaq.ko
 INSTALL sound/usb/hiface/snd-usb-hiface.ko
 INSTALL sound/usb/line6/snd-usb-line6.ko
 INSTALL sound/usb/line6/snd-usb-pod.ko
 INSTALL sound/usb/line6/snd-usb-podhd.ko
 INSTALL sound/usb/line6/snd-usb-toneport.ko
 INSTALL sound/usb/line6/snd-usb-variax.ko
 INSTALL sound/usb/misc/snd-ua101.ko
 INSTALL sound/usb/snd-usb-audio.ko
 INSTALL sound/usb/snd-usbmidi-lib.ko
 INSTALL sound/usb/usx2y/snd-usb-us122l.ko
 INSTALL sound/usb/usx2y/snd-usb-usx2y.ko
 INSTALL virt/lib/irqbypass.ko
 DEPMOD  4.14.13
shekhar@shekhar-VirtualBox:~/linux-4.14.13$
```

```
shekhar@shekhar-VirtualBox:~/linux-4.14.13$ sudo make install
sh ./arch/x86/boot/install.sh 4.14.13 arch/x86/boot/bzImage \
        System.map "/boot"
run-parts: executing /etc/kernel/postinst.d/apt-auto-removal 4.14.13 /boot/vmlinuz-4.14.13
run-parts: executing /etc/kernel/postinst.d/initramfs-tools 4.14.13 /boot/vmlinuz-4.14.13
update-initramfs: Generating /boot/initrd.img-4.14.13
run-parts: executing /etc/kernel/postinst.d/pm-utils 4.14.13 /boot/vmlinuz-4.14.13
run-parts: executing /etc/kernel/postinst.d/unattended-upgrades 4.14.13 /boot/vmlinuz-4.14.13
run-parts: executing /etc/kernel/postinst.d/update-notifier 4.14.13 /boot/vmlinuz-4.14.13
run-parts: executing /etc/kernel/postinst.d/zz-update-grub 4.14.13 /boot/vmlinuz-4.14.13
Generating grub configuration file ...
Warning: Setting GRUB_TIMEOUT to a non-zero value when GRUB_HIDDEN_TIMEOUT is set is no longer supported.
Found linux image: /boot/vmlinuz-4.14.13
Found initrd image: /boot/initrd.img-4.14.13
Found linux image: /boot/vmlinuz-4.10.0-28-generic
Found initrd image: /boot/initrd.img-4.10.0-28-generic
Found memtest86+ image: /boot/memtest86+.elf
Found memtest86+ image: /boot/memtest86+.bin
done
shekhar@shekhar-VirtualBox:~/linux-4.14.13$
```

```
shekhar@shekhar-VirtualBox:~/linux-4.14.13$ dpkg --list |grep linux-image
ii  linux-image-4.10.0-28-generic        4.10.0-28.32~16.04.2        amd64    Linux kernel image for version 4.10.0 o
n 64 bit x86 SMP
ii  linux-image-extra-4.10.0-28-generic  4.10.0-28.32~16.04.2        amd64    Linux kernel extra modules for version
4.10.0 on 64 bit x86 SMP
ii  linux-image-generic-hwe-16.04        4.10.0.28.31                amd64    Generic Linux kernel image
shekhar@shekhar-VirtualBox:~/linux-4.14.13$ ls -lha /boot
total 443M
drwxr-xr-x  3 root root 4.0K Jan 24 23:48 .
drwxr-xr-x 24 root root 4.0K Jan 24 21:59 ..
-rw-r--r--  1 root root 1.4M Jul 20  2017 abi-4.10.0-28-generic
-rw-r--r--  1 root root 201K Jul 20  2017 config-4.10.0-28-generic
-rw-r--r--  1 root root 209K Jan 24 23:47 config-4.14.13
drwxr-xr-x  5 root root 4.0K Jan 24 23:48 grub
-rw-r--r--  1 root root  40M Jan 24 22:00 initrd.img-4.10.0-28-generic
-rw-r--r--  1 root root 378M Jan 24 23:48 initrd.img-4.14.13
-rw-r--r--  1 root root 179K Jan 28  2016 memtest86+.bin
-rw-r--r--  1 root root 181K Jan 28  2016 memtest86+.elf
-rw-r--r--  1 root root 181K Jan 28  2016 memtest86+_multiboot.bin
-rw-------  1 root root 3.6M Jul 20  2017 System.map-4.10.0-28-generic
-rw-r--r--  1 root root 3.7M Jan 24 23:47 System.map-4.14.13
-rw-r--r--  1 root root 7.1M Jan 24 21:56 vmlinuz-4.10.0-28-generic
-rw-r--r--  1 root root 7.8M Jan 24 23:47 vmlinuz-4.14.13
shekhar@shekhar-VirtualBox:~/linux-4.14.13$
```

```
shekhar@shekhar-VirtualBox:~/linux-4.14.13$ sudo vim /etc/default/grub
sudo: vim: command not found
shekhar@shekhar-VirtualBox:~/linux-4.14.13$ sudo nano /etc/default/grub
shekhar@shekhar-VirtualBox:~/linux-4.14.13$ sudo grub-mkconfig -o /boot/grub/grub.cfg
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-4.14.13
Found initrd image: /boot/initrd.img-4.14.13
Found linux image: /boot/vmlinuz-4.10.0-28-generic
Found initrd image: /boot/initrd.img-4.10.0-28-generic
Found memtest86+ image: /boot/memtest86+.elf
Found memtest86+ image: /boot/memtest86+.bin
done
```

```
GNU GRUB  version 2.02~beta2-36ubuntu3.12

*Ubuntu, with Linux 4.14.13
 Ubuntu, with Linux 4.14.13 (upstart)
 Ubuntu, with Linux 4.14.13 (recovery mode)
 Ubuntu, with Linux 4.10.0-28-generic
 Ubuntu, with Linux 4.10.0-28-generic (upstart)
 Ubuntu, with Linux 4.10.0-28-generic (recovery mode)
```

```
shekhar@shekhar-VirtualBox:~/Downloads$ ./exam.sh

***************** User Information **********************

Linux shekhar-VirtualBox 4.14.13 #1 SMP Wed Jan 24 23:18:40 MST 2018 x86_64 x86_64 x86_64 GNU/Linux
\n
uid=1000(shekhar) gid=1000(shekhar) groups=1000(shekhar),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),11
3(lpadmin),128(sambashare)

***************** Linx OS Info **********************

4.14.13 GNU/Linux
\n
DISTRIB_ID=Ubuntu
DISTRIB_RELEASE=16.04
DISTRIB_CODENAME=xenial
DISTRIB_DESCRIPTION="Ubuntu 16.04.3 LTS"
\n
Linux version 4.14.13 (shekhar@shekhar-VirtualBox) (gcc version 5.4.0 20160609 (Ubuntu 5.4.0-6ubuntu1~16.
04.4)) #1 SMP Wed Jan 24 23:18:40 MST 2018
\n
#1 SMP Wed Jan 24 23:18:40 MST 2018

***************** System Arch Info **********************

x86_64

***************** Memory Info **********************

MemTotal:        4036348 kB
MemFree:         2868328 kB
MemAvailable:    3208740 kB
Buffers:           29580 kB
Cached:           503856 kB
SwapCached:            0 kB
Active:           739880 kB
Inactive:         317164 kB
```

```
Unevictable:             32 kB
Mlocked:                 32 kB
SwapTotal:          4192252 kB
SwapFree:           4192252 kB
Dirty:                  408 kB
Writeback:                0 kB
AnonPages:           501368 kB
Mapped:              174064 kB
Shmem:                 7320 kB
Slab:                 54232 kB
SReclaimable:         32132 kB
SUnreclaim:           22100 kB
KernelStack:           5696 kB
PageTables:           25008 kB
NFS_Unstable:             0 kB
Bounce:                   0 kB
WritebackTmp:             0 kB
CommitLimit:        6210424 kB
Committed_AS:       2994668 kB
VmallocTotal:     34359738367 kB
VmallocUsed:              0 kB
VmallocChunk:             0 kB
HardwareCorrupted:        0 kB
AnonHugePages:       266240 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
DirectMap4k:          71616 kB
DirectMap2M:        4122624 kB
\n
              total        used        free      shared  buff/cache   available
Mem:           3941         566        2800           7         573        3133
Swap:          4093           0        4093
```

8.

To build/setUp new kernel

sudo apt-get update

#get the linux kernel tar ball from the follwing URL with wgets

echo $'\n Getting the Linux Kernel and Untaring \n'

wget https://cdn.kernel.org/pub/linux/kernel/v4.x/linux-4.14.13.tar.xz

Untar-ing the kernel

tar -xf linux-4.14.13.tar.xz

change directory to linux kernel

cd linux-4.14.13

```
# Configure the linux kernel

echo $'\nConfiguring Linux Kernel\n'

cp /boot/config-$(uname -r) .config


# a GUI pops up - which needs to be configured manually - its doing the same cp config
command in GUI form

make menuconfig



echo  $'\nbuilding Kernel.\n'


# Build the kernel

make -j 2



echo $'\nInstalling kernel modules\n'


# Install the kernel modules

make -j 2 modules_install


echo $'\nInstalling kernel\n'


# Copy  kernel and .config file to /boot folder to generate system.map

make -j 2 install


echo $'\nKernel install done..few more steps\n'


# to use new kernel after the next boot up


update-initramfs -c -k linux-4.14.13
```

for the GRUB to automatically look for the available kernels in /boot folder

update-grub

update-grub2

echo $'\nKernel install done.\n'

********************* PATH ADDED HERE **************************

To have this execute in the command line to a log file
type :

./my_build_kernel > build.log

Open ▼ ⊞   Save

Hit:1 http://us.archive.ubuntu.com/ubuntu xenial InRelease
Get:2 http://us.archive.ubuntu.com/ubuntu xenial-updates InRelease [102 kB]
Get:3 http://security.ubuntu.com/ubuntu xenial-security InRelease [102 kB]
Get:4 http://us.archive.ubuntu.com/ubuntu xenial-backports InRelease [102 kB]
Fetched 306 kB in 0s (445 kB/s)
Reading package lists...

 Getting the Linux Kernel and Untaring

Configuring Linux Kernel

  HOSTCC   scripts/basic/fixdep
  HOSTCC   scripts/kconfig/mconf.o
  SHIPPED scripts/kconfig/zconf.tab.c
  SHIPPED scripts/kconfig/zconf.lex.c
  HOSTCC   scripts/kconfig/zconf.tab.o
  HOSTCC   scripts/kconfig/lxdialog/checklist.o
  HOSTCC   scripts/kconfig/lxdialog/util.o
  HOSTCC   scripts/kconfig/lxdialog/inputbox.o
  HOSTCC   scripts/kconfig/lxdialog/textbox.o
  HOSTCC   scripts/kconfig/lxdialog/yesno.o
  HOSTCC   scripts/kconfig/lxdialog/menubox.o
  HOSTLD   scripts/kconfig/mconf
scripts/kconfig/mconf Kconfig