

Home Work – 1

1. All three surveys completed
2. Done.
3. Done
4. Done
5. Done
- 6.

```
shekhar@shekhar-VirtualBox:~/Downloads$ gcc --version
gcc version 5.4.0 20160609 (Ubuntu 5.4.0-6ubuntu1-16.04.4)
shekhar@shekhar-VirtualBox:~/Downloads$
```

```
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
uid=1000(shekhar) gid=1000(shekhar) groups=1000(shekhar),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),113(lpadmin),128(sambashare)

***** Linux OS Info *****

4.10.0-28-generic GNU/Linux
DISTRIB_ID=Ubuntu
DISTRIB_RELEASE=16.04
DISTRIB_CODENAME=xenial
DISTRIB_DESCRIPTION="Ubuntu 16.04.3 LTS"

Linux version 4.10.0-28-generic (build@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

#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:        1403680 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

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 --get-architecture | 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-r----- 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-variak.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-variata.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 --get-selections | 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-r--r-- 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

```

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 \$'\nbuiding 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'
```

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

```
./my_build_kernel > build.log2
```