COMPILING THE LATEST STABLE KERNEL AND DUAL BOOTING IT WITH THE CURRENT VERSION

Submitted By:

Kolli Jogi Naidu

B190605CS

TABLE OF CONTENTS:

1. Introduction:

What is kernel?

Kernel is central component of operating system that manages the operations of computer and hardware. It establishes communication between user level application and hardware. It decides state of incoming processes. It plays key role in disk management, memory management, task management.

2. Problem Statement:

Download the latest stable Linux kernel from kernel.org, compile it, and dual boot it with your current Linux version. Your current version as well as the new version should be present in the grub-menu.

3. Methodology:

The Latest Linux kernel compilation and installation includes the following steps:

1. Downloading the kernel
2. Extracting the source
3. Configuring the kernel
4. Installing the requirements
5. Compiling and installing the kernel
6. Grub menu

4. Explanation with Screenshots:

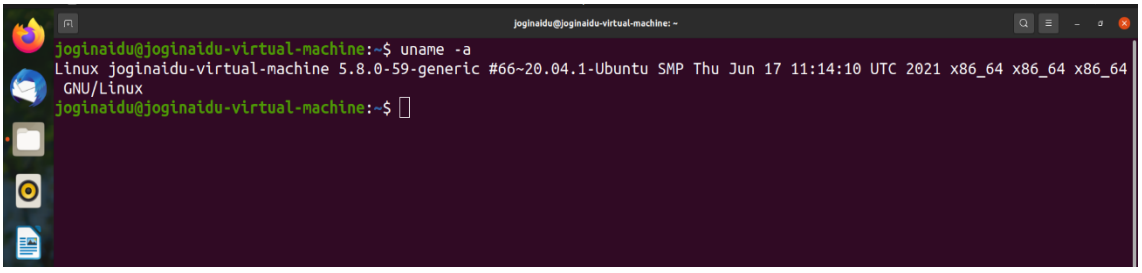
Step 1: Downloading the kernel

a. Check the current system Information by running the command:

uname -a

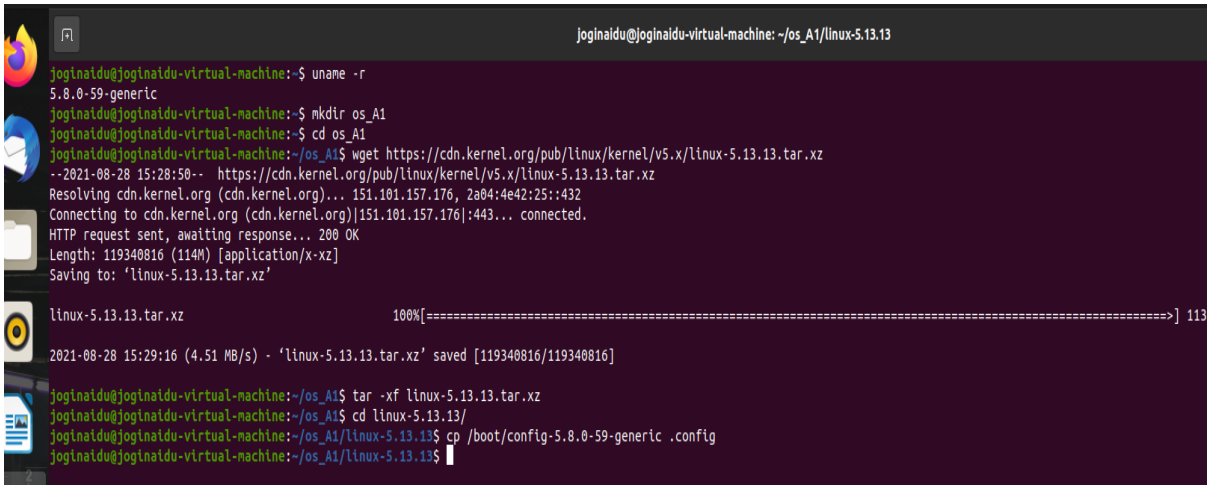
For checking the current version enter the following command:

uname -r



b. Now download the latest kernel source file from kernel.org with the following command in the terminal (**The latest kernel now available is 5.13.13**):

wget https://cdn.kernel.org/pub/linux/kernel/v5.x/linux-5.13.13.tar.xz



Step 2: Extracting the source

a. Extract the kernel source with the command within our newly downloaded kernel directory:

tar -xf linux-5.13.13.tar.xz

b. Change into the newly created directory with the following command:

cd linux-5.13.13/

step3: Configuring the kernel

Before compiling the kernel, we need to install required modules to include in it. With a single command we can copy the current kernel's config file and then use the tried-and-true menuconfig command to make necessary changes.

We can do this by copying the existing kernel config file using the following command:

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

(Since the version might be slightly different, give uname -r)

To configure the kernel:

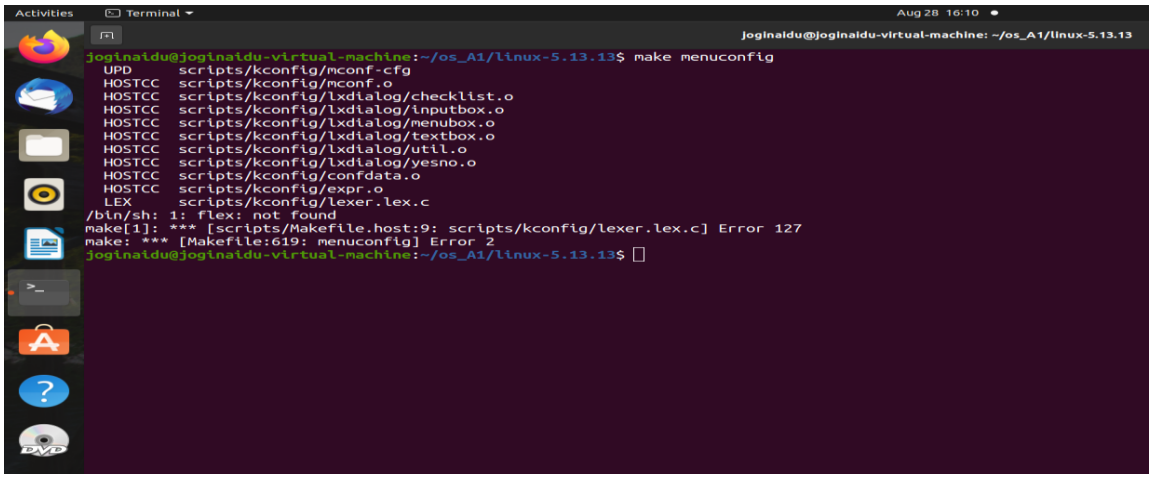
We need to configure before compiling it because we need to specify which modules we want to be installed and which to not. We have the option of just

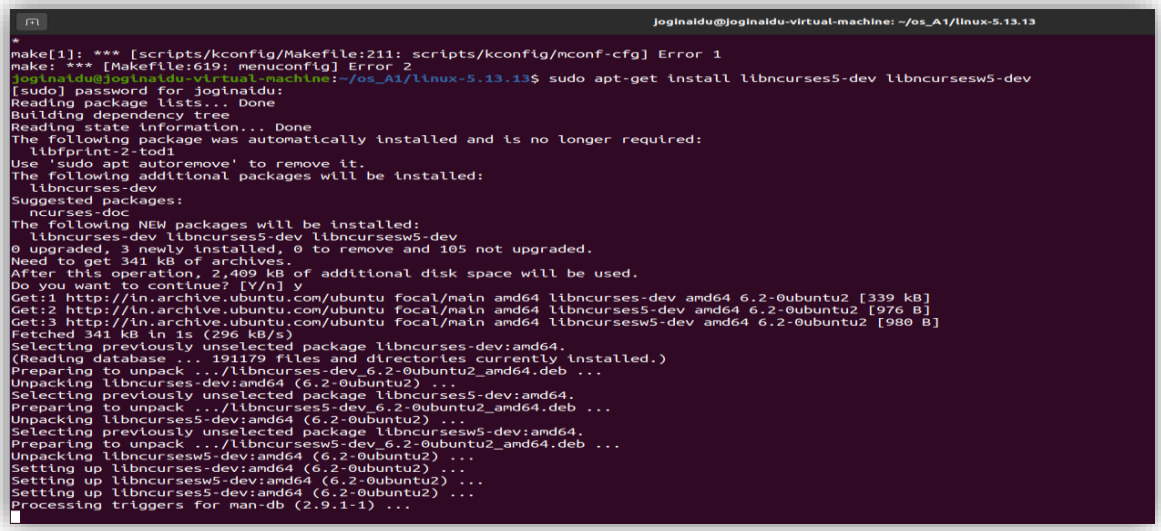
sticking with the configuration offered by the kernel or to alter the existing configuration or add your own, we will use the default configuration.

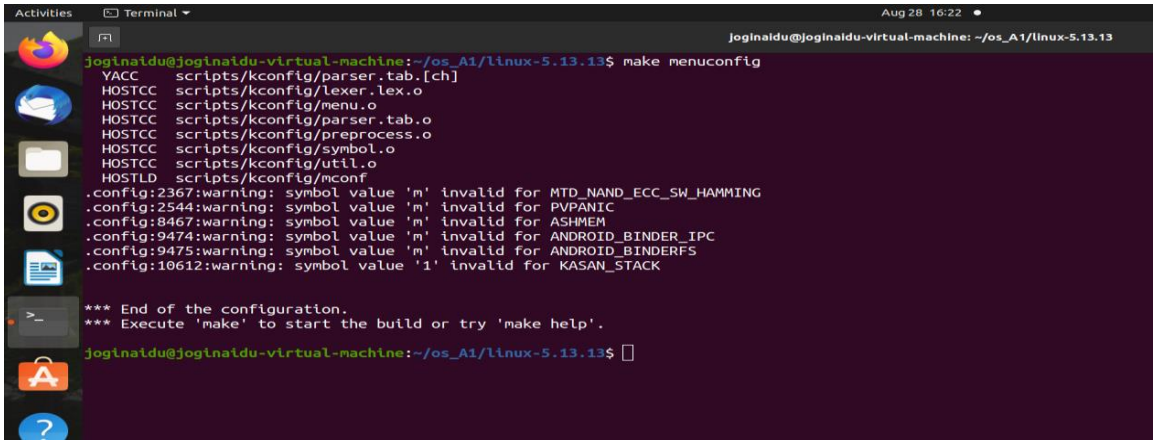
The following command will configure the kernel:

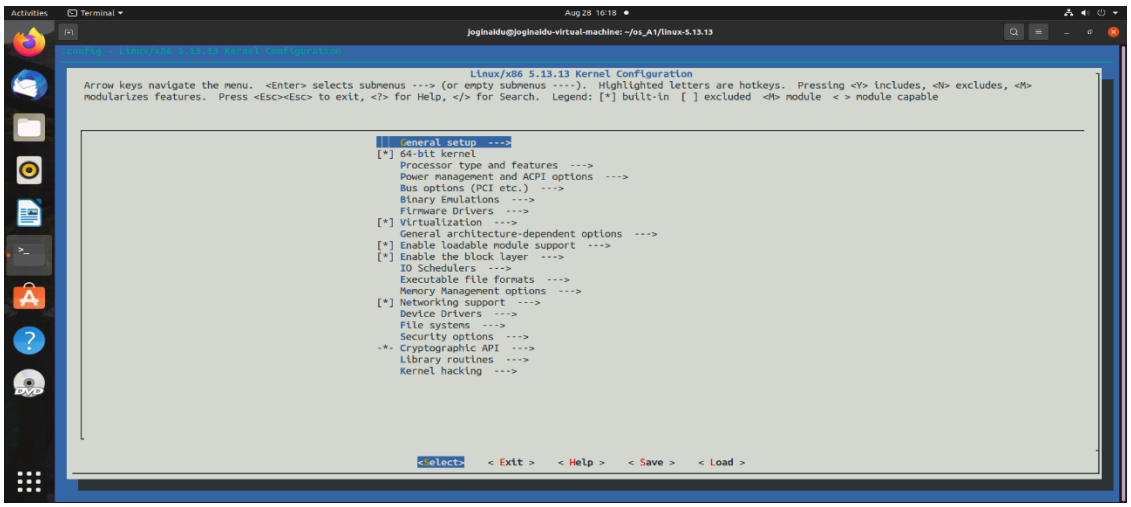
```
make menuconfig
```

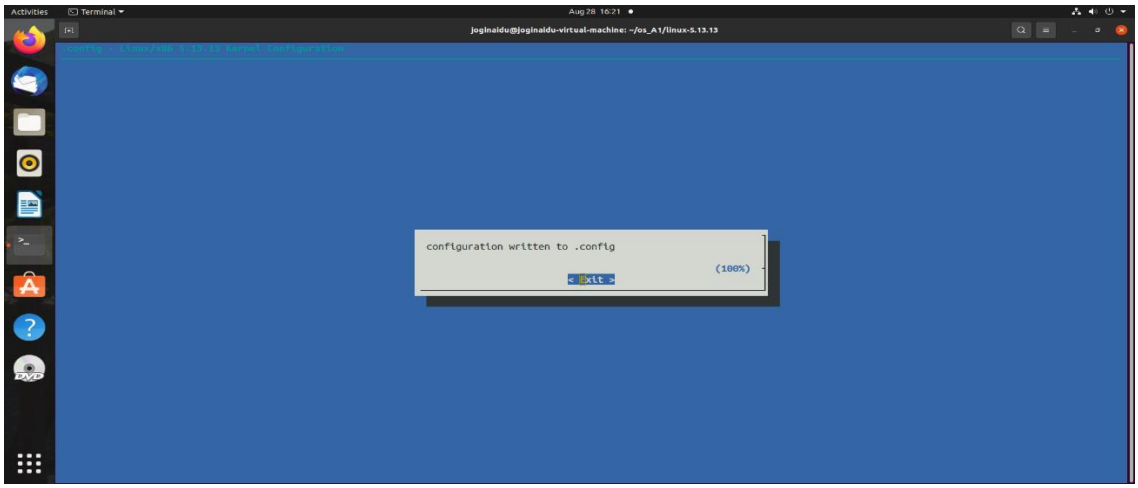
This command will open up a tool that allows us to go through every module available and enable or disable what we need or not. If any errors are prompted try figuring out by installing necessary packages to configure the kernel. Save config file in .config and exit the text-based menu.







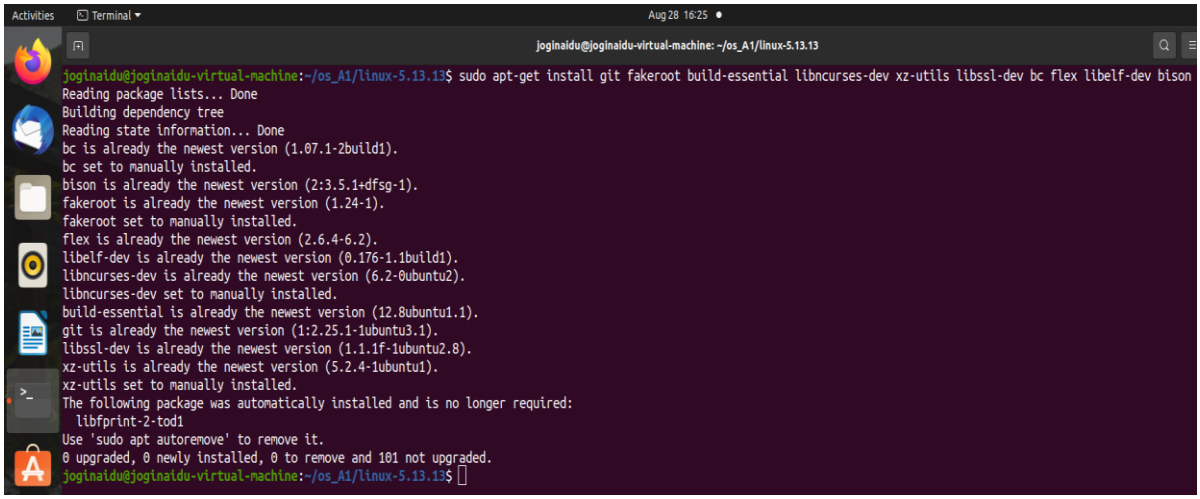




Step 4: Installing the requirements

We need to install the requirements before the compilation of kernel. We use the following command:

sudo apt-get install git fakeroot build-essential libncurses-dev xz-utils libssl-dev bc flex libelf-dev bison



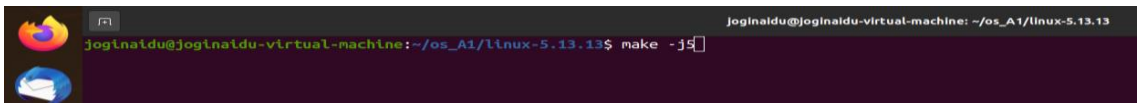
Step 5: Compiling and installing the Kernel

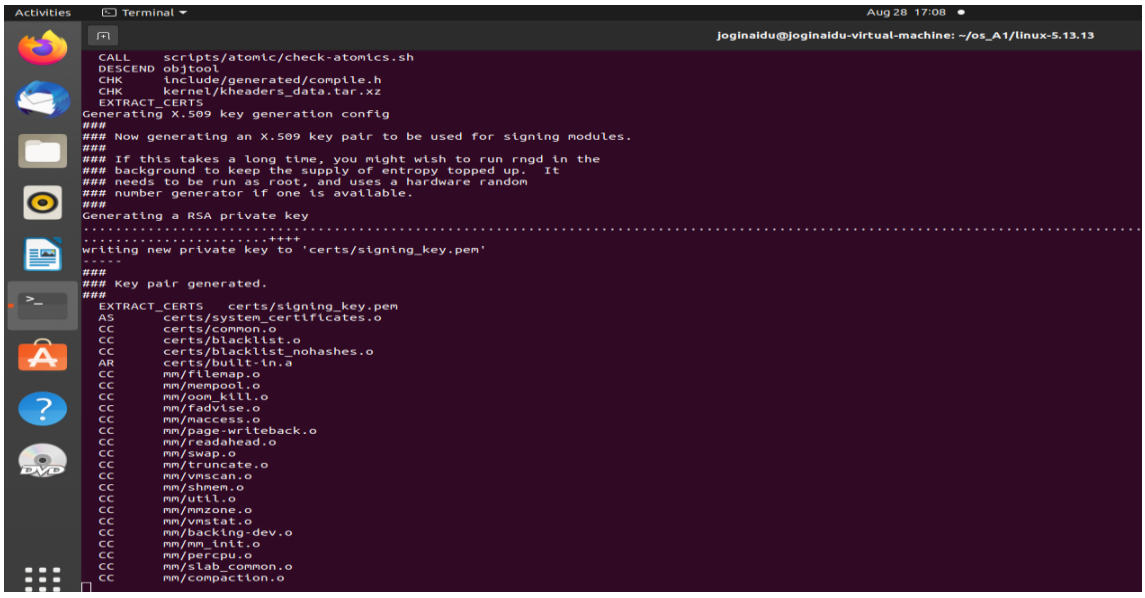
a. We use make command to compile the kernel. The command is

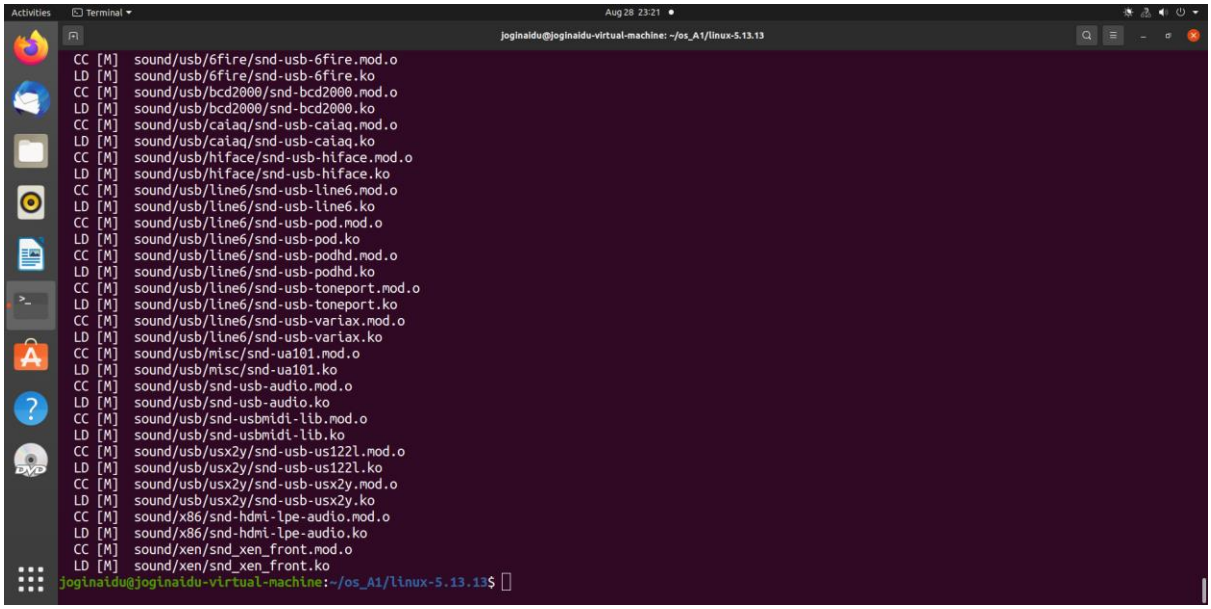
make -j5

The -j parameter is to customize the number of threads we are allocating for compilation process.

The compilation will look like this

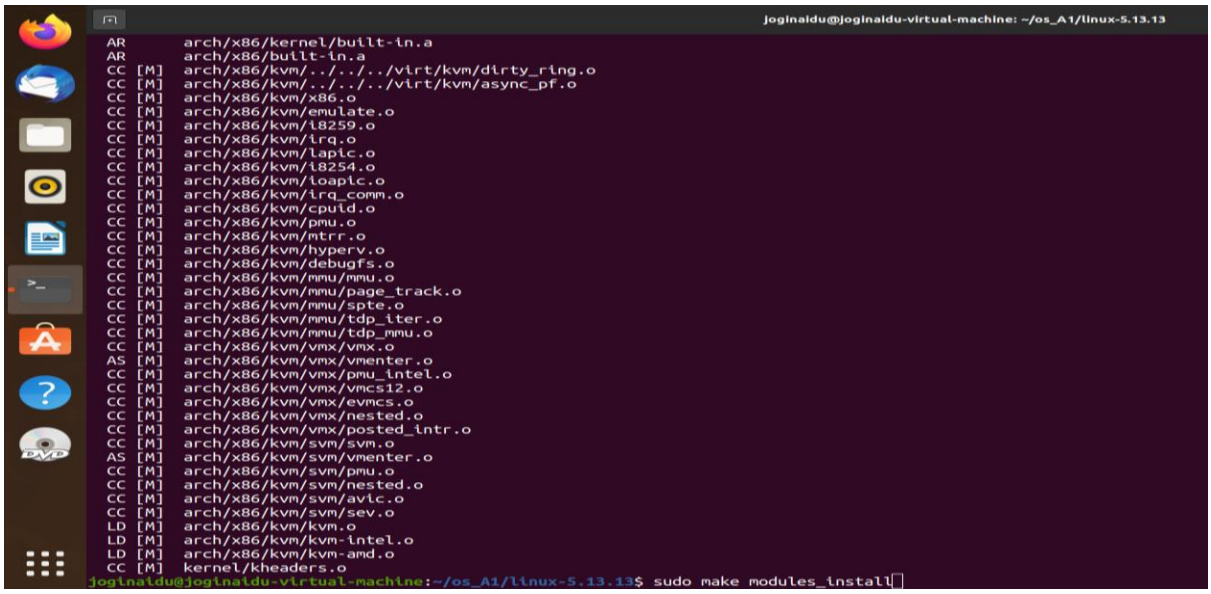


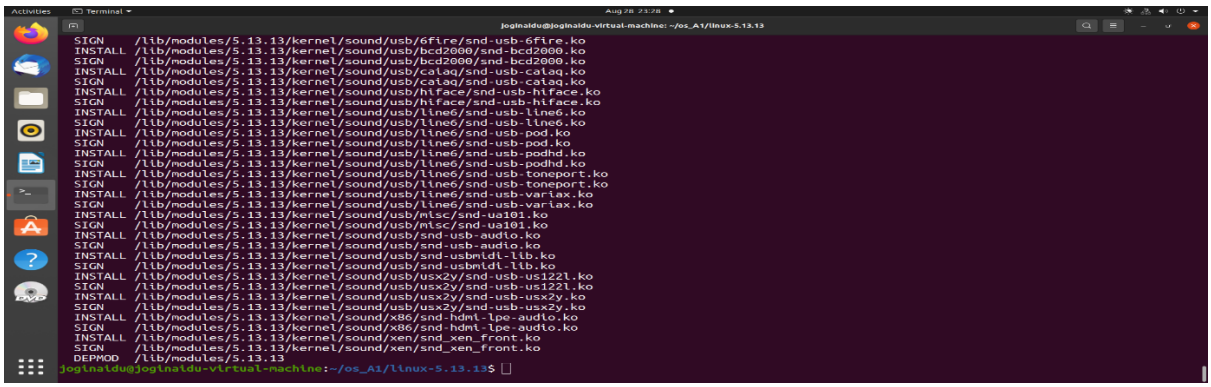




b. After completing the compilation process, we can install the modules we have enabled with the following command

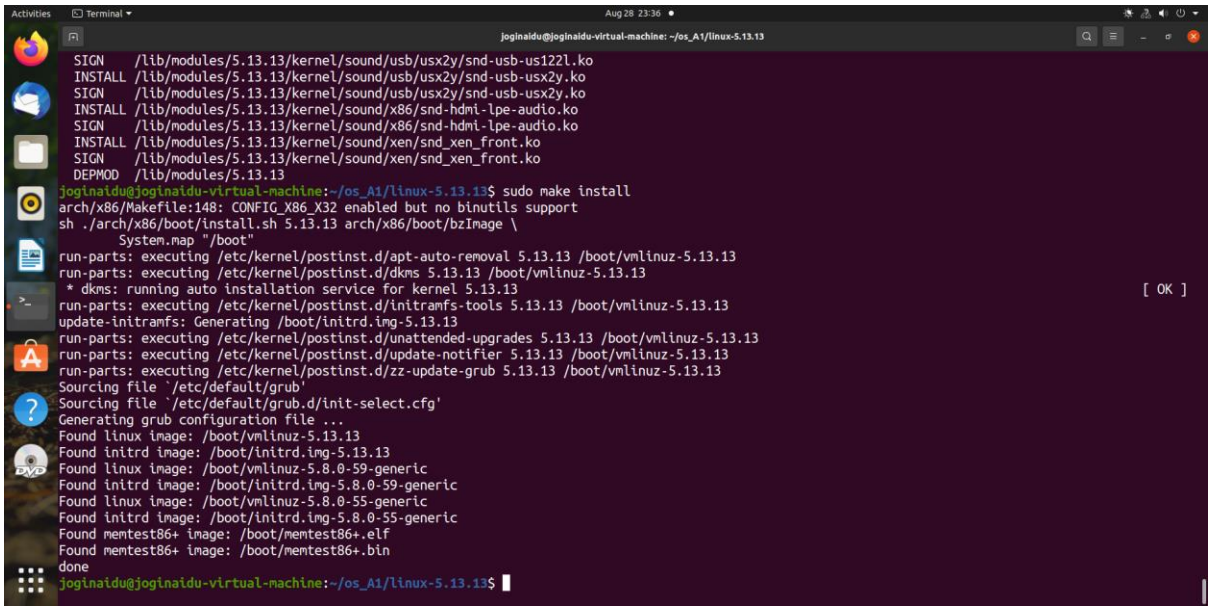
```
sudo make modules_install
```





c. Now we can install the kernel with the following command

```
sudo make install
```



The above process in itself updates the initramfs, which is responsible to look for kernels in the /boot/folder and add them to the grub's configuration file.

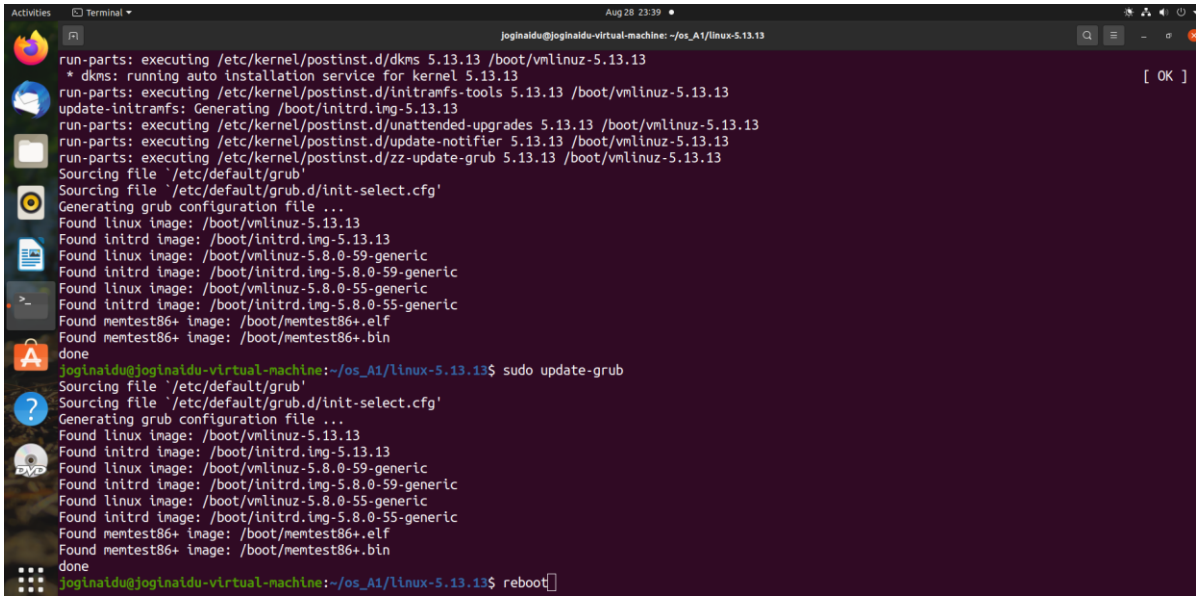
We need to update the grub before rebooting and for that we need to run the following command

```
sudo update-grub
```

Now reboot the virtual machine and hold the right shift key button to access the **GRUB bootloader**.

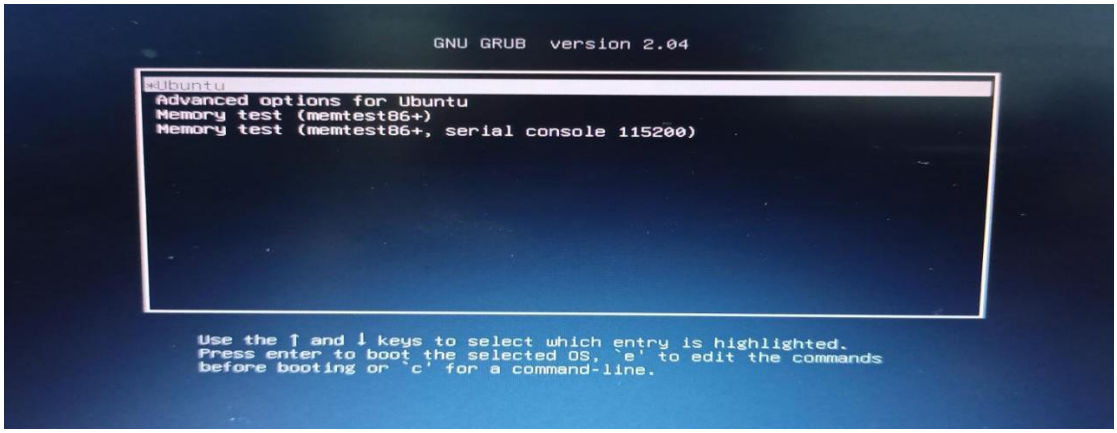
To reboot enter the following command:

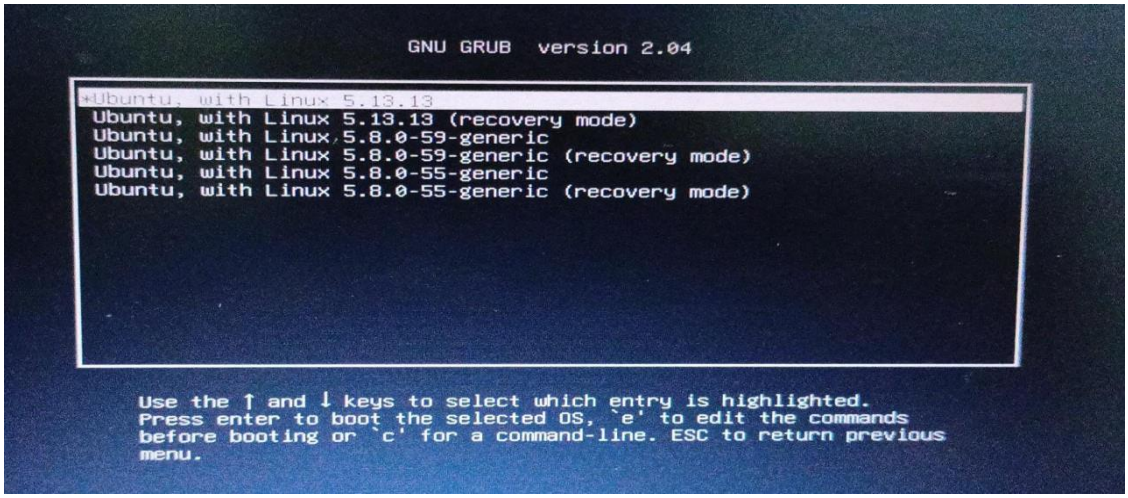
```
reboot
```



Step 6: GRUB MENU

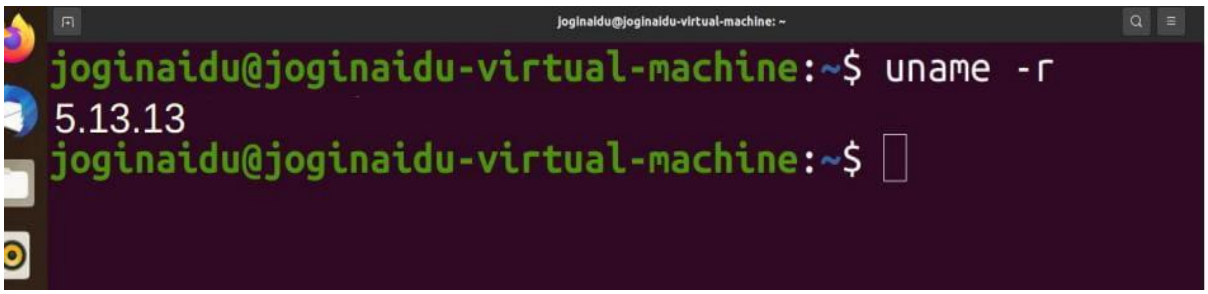
While accessing the GRUB MENU click on Advanced options to see different versions installed and after that choose the latest kernel on top of it (i.e., *Ubuntu, with Linux-5.13.13 generic)





To show that latest kernel is installed, run the following command:

uname -r



5.Summary:

We have successfully compiled the latest stable kernel (**Linux-5.13.13**) by following the above steps, resolving the errors and installing the requirements and we have dual booted it with the current version.

6.References:

https://www.guru99.com/operating-system-tutorial.html

https://www.geeksforgeeks.org/operating-systems/?ref=ghm

https://www.cyberciti.biz/tips/compiling-linux-kernel-26.html

https://www.freecodecamp.org/news/building-and-installing-the-latest- linux-kernel-from-source-6d8df5345980/