

```

k21-4704@k214704-virtual-machine:~$ uname -r
5.19.0-32-generic
k21-4704@k214704-virtual-machine:~$ sudo apt-get install gcc
[sudo] password for k21-4704:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
gcc is already the newest version (4:11.2.0-1ubuntu1).
The following packages were automatically installed and are no longer required:
chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi i965-va-driver
intel-media-va-driver libaacs0 libaom3 libass9 libavcodec58 libavformat58
libavutil56 libbdplus0 libblas3 libbluray2 libbs2b0 libchromaprint1
libcodec2-1.0 libdav1d5 libflashrom1 libflite1 libftdi1-2 libgme0 libgsm1
libgstreamer-plugins-bad1.0-0 libigdgmm12 liblilv-0-0 libllvm13 libmfx1
libmysofa1 libnorm1 libopenmpt0 libpgm-5.3-0 libpostproc55 librabbitmq4
librubberband2 libserd-0-0 libshine3 libsnappy1v5 libsord-0-0 libsratom-0-0
libstrt1.4-gnutls libssh-gcrypt-4 libswresample3 libswscale5 libudfread0
libva-drm2 libva-wayland2 libva-x11-2 libva2 libvdpau1 libvidstab1.1
libx265-199 libxvidcore4 libzing2 libzmq5 libzvbi-common libzvbi0
mesa-va-drivers mesa-va-drivers pocketsphinx-en-us va-driver-all
vdpau-driver-all
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 4 not upgraded.

```

```

k21-4704@k214704-virtual-machine:~$ sudo apt-get install libncurses5-dev
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
libncurses5-dev is already the newest version (6.3-2).
The following packages were automatically installed and are no longer required:
chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi i965-va-driver
intel-media-va-driver libaacs0 libaom3 libass9 libavcodec58 libavformat58
libavutil56 libbdplus0 libblas3 libbluray2 libbs2b0 libchromaprint1
libcodec2-1.0 libdav1d5 libflashrom1 libflite1 libftdi1-2 libgme0 libgsm1
libgstreamer-plugins-bad1.0-0 libigdgmm12 liblilv-0-0 libllvm13 libmfx1
libmysofa1 libnorm1 libopenmpt0 libpgm-5.3-0 libpostproc55 librabbitmq4
librubberband2 libserd-0-0 libshine3 libsnappy1v5 libsord-0-0 libsratom-0-0
libstrt1.4-gnutls libssh-gcrypt-4 libswresample3 libswscale5 libudfread0
libva-drm2 libva-wayland2 libva-x11-2 libva2 libvdpau1 libvidstab1.1
libx265-199 libxvidcore4 libzing2 libzmq5 libzvbi-common libzvbi0
mesa-va-drivers mesa-va-drivers pocketsphinx-en-us va-driver-all
vdpau-driver-all
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 4 not upgraded.
k21-4704@k214704-virtual-machine:~$

```

```

k21-4704@k214704-virtual-machine:~$ sudo apt-get install bison
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
bison is already the newest version (2:3.8.2+dfsg-1build1).
The following packages were automatically installed and are no longer required:
chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi i965-va-driver intel-media-va-driver libaacs0 libaom3 libass9 libavcodec58 libavformat58
libavutil56 libbdplus0 libblas3 libbluray2 libbs2b0 libchromaprint1 libcodec2-1.0 libdav1d5 libflashrom1 libflite1 libftdi1-2 libgme0
libgsm1 libgstreamer-plugins-bad1.0-0 libigdgmm12 liblilv-0-0 libllvm13 libmfx1 libmysofa1 libnorm1 libopenmpt0 libpgm-5.3-0 libpostproc55
librabbitmq4 librubberband2 libserd-0-0 libshine3 libsnappy1v5 libsord-0-0 libsratom-0-0 libstrt1.4-gnutls libssh-gcrypt-4 libswresample3
libswscale5 libudfread0 libva-drm2 libva-wayland2 libva-x11-2 libva2 libvdpau1 libvidstab1.1 libx265-199 libxvidcore4 libzing2 libzmq5
libzvbi-common libzvbi0 mesa-va-drivers mesa-va-drivers pocketsphinx-en-us va-driver-all vdpau-driver-all
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 4 not upgraded.
k21-4704@k214704-virtual-machine:~$

```

```
k21-4704@k214704-virtual-machine:~$ sudo apt-get install flex
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
flex is already the newest version (2.6.4-8build2).
The following packages were automatically installed and are no longer required:
chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi i965-va-driver intel-media-va-driver libaac0 libaom3 libass9 libavcodec58 libavformat58
libavutil56 libbdplus0 libblas3 libbluray2 libbs2b0 libchromaprint1 libcodec2-1.0 libdavid5 libflashrom1 libflite1 libftdi1-2 libgme0
libgsm1 libgstreamer-plugins-bad1.0-0 libigdgmm12 libllv-0-0 libllvm13 libmfx1 libmysofa1 libnorm1 libopenmpt0 libpgm-5.3-0 libpostproc55
librabbitmq4 librubberband2 libserd-0-0 libshine3 libsnappy1v5 libsord-0-0 libsratom-0-0 libsrtp1.4-gnutls libssh-gcrypt-4 libswresample3
libswscale5 libudfread0 libva-drm2 libva-wayland2 libva-x11-2 libva2 libvdpau1 libvidstab1.1 libx265-199 libxvidcore4 libzimg2 libzmq5
libzvt-common libzvt0 mesa-va-drivers mesa-vdpau-drivers pocketsphinx-en-us va-driver-all vdpau-driver-all
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 4 not upgraded.
k21-4704@k214704-virtual-machine:~$
```

```
k21-4704@k214704-virtual-machine:~$ sudo apt install make
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
make is already the newest version (4.3-4.1build1).
The following packages were automatically installed and are no longer required:
chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi i965-va-driver intel-media-va-driver libaac0 libaom3 libass9 libavcodec58 libavformat58
libavutil56 libbdplus0 libblas3 libbluray2 libbs2b0 libchromaprint1 libcodec2-1.0 libdavid5 libflashrom1 libflite1 libftdi1-2 libgme0
libgsm1 libgstreamer-plugins-bad1.0-0 libigdgmm12 libllv-0-0 libllvm13 libmfx1 libmysofa1 libnorm1 libopenmpt0 libpgm-5.3-0 libpostproc55
librabbitmq4 librubberband2 libserd-0-0 libshine3 libsnappy1v5 libsord-0-0 libsratom-0-0 libsrtp1.4-gnutls libssh-gcrypt-4 libswresample3
libswscale5 libudfread0 libva-drm2 libva-wayland2 libva-x11-2 libva2 libvdpau1 libvidstab1.1 libx265-199 libxvidcore4 libzimg2 libzmq5
libzvt-common libzvt0 mesa-va-drivers mesa-vdpau-drivers pocketsphinx-en-us va-driver-all vdpau-driver-all
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 4 not upgraded.
```

```
k21-4704@k214704-virtual-machine:~$ sudo apt-get install libssl-dev
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
libssl-dev is already the newest version (3.0.2-0ubuntu1.8).
The following packages were automatically installed and are no longer required:
chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi i965-va-driver intel-media-va-driver libaac0 libaom3 libass9 libavcodec58 libavformat58
libavutil56 libbdplus0 libblas3 libbluray2 libbs2b0 libchromaprint1 libcodec2-1.0 libdavid5 libflashrom1 libflite1 libftdi1-2 libgme0
libgsm1 libgstreamer-plugins-bad1.0-0 libigdgmm12 libllv-0-0 libllvm13 libmfx1 libmysofa1 libnorm1 libopenmpt0 libpgm-5.3-0 libpostproc55
librabbitmq4 librubberband2 libserd-0-0 libshine3 libsnappy1v5 libsord-0-0 libsratom-0-0 libsrtp1.4-gnutls libssh-gcrypt-4 libswresample3
libswscale5 libudfread0 libva-drm2 libva-wayland2 libva-x11-2 libva2 libvdpau1 libvidstab1.1 libx265-199 libxvidcore4 libzimg2 libzmq5
libzvt-common libzvt0 mesa-va-drivers mesa-vdpau-drivers pocketsphinx-en-us va-driver-all vdpau-driver-all
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 4 not upgraded.
```

```
k21-4704@k214704-virtual-machine:~$ sudo apt-get install libelf-dev
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
libelf-dev is already the newest version (0.186-1build1).
The following packages were automatically installed and are no longer required:
chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi i965-va-driver intel-media-va-driver libaac0 libaom3 libass9 libavcodec58 libavformat58
libavutil56 libbdplus0 libblas3 libbluray2 libbs2b0 libchromaprint1 libcodec2-1.0 libdavid5 libflashrom1 libflite1 libftdi1-2 libgme0
libgsm1 libgstreamer-plugins-bad1.0-0 libigdgmm12 libllv-0-0 libllvm13 libmfx1 libmysofa1 libnorm1 libopenmpt0 libpgm-5.3-0 libpostproc55
librabbitmq4 librubberband2 libserd-0-0 libshine3 libsnappy1v5 libsord-0-0 libsratom-0-0 libsrtp1.4-gnutls libssh-gcrypt-4 libswresample3
libswscale5 libudfread0 libva-drm2 libva-wayland2 libva-x11-2 libva2 libvdpau1 libvidstab1.1 libx265-199 libxvidcore4 libzimg2 libzmq5
libzvt-common libzvt0 mesa-va-drivers mesa-vdpau-drivers pocketsphinx-en-us va-driver-all vdpau-driver-all
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 4 not upgraded.
```

```
k21-4704@k214704-virtual-machine:~$ sudo add-apt-repository "deb http://archive.ubuntu.com/ubuntu $(lsb_release -sc) main
universe"
Repository: 'deb http://archive.ubuntu.com/ubuntu jammy main universe'
Description:
Archive for codename: jammy components: main,universe
More info: http://archive.ubuntu.com/ubuntu
Adding repository.
Press [ENTER] to continue or Ctrl-c to cancel.
Found existing deb entry in /etc/apt/sources.list.d/archive_uri-http_archive_ubuntu_com_ubuntu-jammy.list
Archive has template, updating /etc/apt/sources.list
Found existing deb-src entry in /etc/apt/sources.list.d/archive_uri-http_archive_ubuntu_com_ubuntu-jammy.list
Updating existing entry instead of using /etc/apt/sources.list
Get:1 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Hit:2 http://pk.archive.ubuntu.com/ubuntu jammy InRelease
Get:3 http://pk.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:4 http://security.ubuntu.com/ubuntu jammy-security/main i386 Packages [265 kB]
Hit:5 http://archive.ubuntu.com/ubuntu jammy InRelease
Get:6 http://pk.archive.ubuntu.com/ubuntu jammy-backports InRelease [107 kB]
Get:7 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [680 kB]
Get:8 http://pk.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [939 kB]
Get:9 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [139 kB]
Get:10 http://security.ubuntu.com/ubuntu jammy-security/main amd64 DEP-11 Metadata [41.5 kB]
Get:11 http://security.ubuntu.com/ubuntu jammy-security/main amd64 c-n-f Metadata [8,528 B]
Get:12 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [637 kB]
Get:13 http://pk.archive.ubuntu.com/ubuntu jammy-updates/main i386 Packages [454 kB]
Get:14 http://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [99.7 kB]
Get:15 http://security.ubuntu.com/ubuntu jammy-security/universe i386 Packages [512 kB]
Get:16 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [696 kB]
Get:17 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [111 kB]
Get:18 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 DEP-11 Metadata [17.0 kB]
Get:19 http://security.ubuntu.com/ubuntu jammy-security/universe DEP-11 48x48 Icons [15.2 kB]
```

```

Get:15 http://security.ubuntu.com/ubuntu jammy-security/universe i386 Packages [512 kB]
Get:16 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [696 kB]
Get:17 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [111 kB]
Get:18 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 DEP-11 Metadata [17.0 kB]
Get:19 http://security.ubuntu.com/ubuntu jammy-security/universe DEP-11 48x48 Icons [15.2 kB]
Get:20 http://security.ubuntu.com/ubuntu jammy-security/universe DEP-11 64x64 Icons [24.3 kB]
Get:21 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [13.5 kB]
Get:22 http://pk.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [203 kB]
Get:23 http://pk.archive.ubuntu.com/ubuntu jammy-updates/main amd64 DEP-11 Metadata [102 kB]
Get:24 http://pk.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [13.6 kB]
Get:25 http://pk.archive.ubuntu.com/ubuntu jammy-updates/restricted i386 Packages [27.3 kB]
Get:26 http://pk.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [680 kB]
Get:27 http://pk.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [106 kB]
Get:28 http://pk.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 c-n-f Metadata [584 B]
Get:29 http://pk.archive.ubuntu.com/ubuntu jammy-updates/universe i386 Packages [601 kB]
Get:30 http://pk.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [877 kB]
Get:31 http://pk.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [172 kB]
Get:32 http://pk.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 DEP-11 Metadata [269 kB]
Get:33 http://pk.archive.ubuntu.com/ubuntu jammy-updates/universe DEP-11 48x48 Icons [173 kB]
Get:34 http://pk.archive.ubuntu.com/ubuntu jammy-updates/universe DEP-11 64x64 Icons [260 kB]
Get:35 http://pk.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [17.9 kB]
Get:36 http://pk.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [9,696 B]
Get:37 http://pk.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 DEP-11 Metadata [940 B]
Get:38 http://pk.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 c-n-f Metadata [444 B]
Get:39 http://pk.archive.ubuntu.com/ubuntu jammy-backports/main amd64 DEP-11 Metadata [7,972 B]
Get:40 http://pk.archive.ubuntu.com/ubuntu jammy-backports/universe i386 Packages [10.7 kB]
Get:41 http://pk.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [19.5 kB]
Get:42 http://pk.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [14.0 kB]
Get:43 http://pk.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 DEP-11 Metadata [12.5 kB]
Get:44 http://pk.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 c-n-f Metadata [392 B]
Fetched 8,566 kB in 1min 5s (131 kB/s)
Reading package lists... Done

```

```

k21-4704@k214704-virtual-machine:~$ sudo apt-get update
Hit:1 http://archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://pk.archive.ubuntu.com/ubuntu jammy InRelease
Hit:3 http://pk.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:4 http://security.ubuntu.com/ubuntu jammy-security InRelease
Hit:5 http://pk.archive.ubuntu.com/ubuntu jammy-backports InRelease
Reading package lists... Done
k21-4704@k214704-virtual-machine:~$

```

```

k21-4704@k214704-virtual-machine:~$ sudo apt-get upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done

The following packages were automatically installed and are no longer required:
 chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi i965-va-driver intel-media-va-driver libaacs0 libaom3 libass9 libavcodec58 libavformat58
 libavutil56 libbdplus0 libblas3 libbluray2 libbs2b0 libchromaprint1 libcodec2-1.0 libdav1d5 libflashrom1 libflite1 libftdi1-2 libgme0
 libgsm1 libgstreamer-plugins-bad1.0-0 libigdgmm12 libllv-0-0 libllvm13 libmfx1 libmysofa1 libnorm1 libopenmpt0 libpgm-5.3-0 libpostproc55
 librabbitmq4 librubberband2 libserd-0-0 libshine3 libsnappy1v5 libsord-0-0 libsratom-0-0 libstr1.4-gnutls libssh-gcrypt-4 libswresample3
 libswscale5 libudfread0 libva-drm2 libva-wayland2 libva-x11-2 libva2 libvdpau1 libvidstab1.1 libx265-199 libxvidcore4 libzing2 libznq5
 libzybi-common libzybi0 mesa-va-drivers mesa-vdpau-drivers pocketsphinx-en-us va-driver-all vdpau-driver-all

Use 'sudo apt autoremove' to remove them.

The following packages have been kept back:
 gnome-remote-desktop linux-generic-hwe-22.04 linux-headers-generic-hwe-22.04 linux-image-generic-hwe-22.04 python3-software-properties
 software-properties-common software-properties-gtk ubuntu-advantage-tools

The following packages will be upgraded:
 chromium-codecs-ffmpeg-extra evince evince-common fonts-opensymbol gir1.2-javascriptcoregtk-4.0 gir1.2-pango-1.0 gir1.2-webkit2-4.0
 intel-microcode isc-dhcp-client isc-dhcp-common libcurl3-gnutls libcurl4 libevdocument3-4 libevview3-3 libgnutls30
 libjavascriptcoregtk-4.0-18 libbim-glib4 libbim-proxy libmm-glib0 libnss3 libpango-1.0-0 libpangocairo-1.0-0 libpangoft2-1.0-0
 libpangoxft-1.0-0 libqmi-glib5 libqmi-proxy libreoffice-base-core libreoffice-calc libreoffice-common libreoffice-core libreoffice-draw
 libreoffice-gnome libreoffice-gtk3 libreoffice-help-common libreoffice-help-en-us libreoffice-impress libreoffice-math

```



```
Setting up libqmi-glib5:amd64 (1.32.0-1ubuntu0.22.04.1) ...
Setting up libuno-cppuhelpergcc3-3 (1:7.3.7-0ubuntu0.22.04.2) ...
Setting up libqmi-proxy (1.32.0-1ubuntu0.22.04.1) ...
Setting up ure (1:7.3.7-0ubuntu0.22.04.2) ...
Setting up modemmanager (1.20.0-1~ubuntu22.04.1) ...
Setting up libreoffice-common (1:7.3.7-0ubuntu0.22.04.2) ...
Setting up libreoffice-core (1:7.3.7-0ubuntu0.22.04.2) ...
Setting up libreoffice-math (1:7.3.7-0ubuntu0.22.04.2) ...
Setting up libreoffice-gtk3 (1:7.3.7-0ubuntu0.22.04.2) ...
Setting up libreoffice-pdfimport (1:7.3.7-0ubuntu0.22.04.2) ...
Setting up libreoffice-draw (1:7.3.7-0ubuntu0.22.04.2) ...
Setting up libreoffice-help-common (1:7.3.7-0ubuntu0.22.04.2) ...
Setting up libreoffice-gnome (1:7.3.7-0ubuntu0.22.04.2) ...
Setting up libreoffice-impress (1:7.3.7-0ubuntu0.22.04.2) ...
Setting up libreoffice-base-core (1:7.3.7-0ubuntu0.22.04.2) ...
Setting up libreoffice-help-en-us (1:7.3.7-0ubuntu0.22.04.2) ...
Setting up python3-uno (1:7.3.7-0ubuntu0.22.04.2) ...
Setting up libreoffice-ogltrans (1:7.3.7-0ubuntu0.22.04.2) ...
Setting up libreoffice-calc (1:7.3.7-0ubuntu0.22.04.2) ...
Setting up libreoffice-writer (1:7.3.7-0ubuntu0.22.04.2) ...
Processing triggers for gnome-menus (3.36.0-1ubuntu3) ...
Processing triggers for libgl1-mesa-dev:amd64 (2.72.4-0ubuntu1) ...
Processing triggers for libc-bin (2.35-0ubuntu3.1) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for dbus (1.12.20-2ubuntu4.1) ...
Processing triggers for shared-mime-info (2.1-2) ...
Processing triggers for mailcap (3.70+nmu1ubuntu1) ...
Processing triggers for fontconfig (2.13.1-4.2ubuntu5) ...
Processing triggers for desktop-file-utils (0.26-1ubuntu3) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for initramfs-tools (0.140ubuntu13.1) ...
update-initramfs: Generating /boot/initrd.img-5.19.0-32-generic
k21-4704@k214704-virtual-machine:~$
```

```
k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13/hello$ gedit hello.c
k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13/hello$ gedit Makefile
k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13/hello$ cd ..
k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13$ cd arch/x86/entry/syscalls
k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13/arch/x86/entry/syscalls$ cd ..
k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13/arch/x86/entry$ cd ..
k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13/arch/x86$ cd ..
k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13/arch$ cd ..
k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13$
```

```

1 # SPDX-License-Identifier: GPL-2.0
2 VERSION = 6
3 PATCHLEVEL = 1
4 SUBLEVEL = 13
5 EXTRAVERSION = -214704
6 NAME = Hurr durr I'ma ninja sloth
7
8 # *DOCUMENTATION*
9 # To see a list of typical targets execute "make help"
10 # More info can be located in ./README
11 # Comments in this file are targeted only to the developer, do not
12 # expect to learn how to build the kernel reading this file.
13
14 $(if $(filter __%, $(MAKECMDGOALS)), \
15     $(error targets prefixed with '__' are only for internal use))
16
17 # That's our default target when none is given on the command line
18 PHONY := __all
19 __all:
20
21 # We are using a recursive build, so we need to do a little thinking
22 # to get the ordering right.
23 #
24 # Most importantly: sub-Makefiles should only ever modify files in
25 # their own directory. If in some directory we have a dependency on
26 # a file in another dir (which doesn't happen often, but it's often
27 # unavoidable when linking the built-in.a targets which finally

```

319 308	common	seems	sys_seems
320 309	common	getcpu	sys_getcpu
321 310	64	process_vm_readv	sys_process_vm_readv
322 311	64	process_vm_writev	sys_process_vm_writev
323 312	common	kcmp	sys_kcmp
324 313	common	finit_module	sys_finit_module
325 314	common	sched_setattr	sys_sched_setattr
326 315	common	sched_getattr	sys_sched_getattr
327 316	common	renameat2	sys_renameat2
328 317	common	seccomp	sys_seccomp
329 318	common	getrandom	sys_getrandom
330 319	common	memfd_create	sys_memfd_create
331 320	common	kexec_file_load	sys_kexec_file_load
332 321	common	bpf	sys_bpf
333 322	64	execveat	sys_execveat
334 323	common	userfaultfd	sys_userfaultfd
335	64	hello	sys_hello
336 324	common	membarrier	sys_membarrier
337 325	common	mlock2	sys_mlock2
338 326	common	copy_file_range	sys_copy_file_range
339 327	64	preadv2	sys_preadv2
340 328	64	pwritev2	sys_pwritev2
341 329	common	pkey_mprotect	sys_pkey_mprotect
342 330	common	pkey_alloc	sys_pkey_alloc
343 331	common	pkey_free	sys_pkey_free
344 332	common	statx	sys_statx
345 333	common	io_pgetevents	sys_io_pgetevents
346 334	common	rseq	sys_rseq
347	# don't use numbers 387 through 423, add new calls after the last		
348	# 'common' entry		
349 424	common	pidfd_send_signal	sys_pidfd_send_signal
350 425	common	io_uring_setup	sys_io_uring_setup

```

k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13$ gedit arch/x86/entry/syscalls/syscall_64.tbl
k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13$ gedit include/linux/syscalls.h
k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13$ gedit Makefile
k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13$ gedit ls /boot | grep config
k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13$ ls /boot | grep config
config-5.15.0-43-generic
config-5.19.0-32-generic
k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13$ pwd
/home/k21-4704/Downloads/linux-6.1.13
k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13$ cp /boot/config-5.15.0-43-generic /home/k21-4704/Downloads/linux-6.1.13
k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13$ ls
arch          COPYING      fs           ipc          LICENSES    README      sound
block        CREDITS     hello       Kbuild      MAINTAINERS rust        tools
certs        crypto      include     Kconfig     Makefile    samples     usr
config-5.15.0-43-generic Documentation init        kernel      mm          scripts     virt
config-5.19.0-32-generic drivers      io_uring    lib         net         security    vmlinux-gdb.py
k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13$

```

```

k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13$ yes "" | make oldconfig -j4
HOSTCC scripts/kconfig/conf.o
HOSTCC scripts/kconfig/confdata.o
LEX scripts/kconfig/lexer.lex.c
HOSTCC scripts/kconfig/expr.o
YACC scripts/kconfig/parser.tab.[ch]
HOSTCC scripts/kconfig/menu.o
HOSTCC scripts/kconfig/parser.tab.o
HOSTCC scripts/kconfig/preprocess.o
HOSTCC scripts/kconfig/symbol.o
HOSTCC scripts/kconfig/util.o
HOSTCC scripts/kconfig/lexer.lex.o
HOSTLD scripts/kconfig/conf
#
# No change to .config
#
k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13$

```

```

k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13$ make clean -j4
CLEAN arch/x86/crypto
CLEAN arch/x86/entry/vdso
CLEAN arch/x86/kernel/cpu
CLEAN arch/x86/kernel
CLEAN arch/x86/kvm
CLEAN arch/x86/purgatory
CLEAN arch/x86/realmode/rm
CLEAN arch/x86/tools
CLEAN init
CLEAN kernel/debug/kdb
CLEAN fs/unicode
CLEAN kernel
CLEAN usr
CLEAN .

```

```

ISX async abort: NOT affected
k21-4704@k214704-virtual-machine:~/Downloads/linux-6.1.13$ make -j4
SYSHDR arch/x86/include/generated/uapi/asm/unistd_32.h
SYSHDR arch/x86/include/generated/uapi/asm/unistd_64.h
HOSTCC scripts/basic/fixdep
SYSHDR arch/x86/include/generated/uapi/asm/unistd_x32.h
SYSTBL arch/x86/include/generated/asm/syscalls_32.h
SYSHDR arch/x86/include/generated/asm/unistd_32_ia32.h
SYSHDR arch/x86/include/generated/asm/unistd_64_x32.h
SYSTBL arch/x86/include/generated/asm/syscalls_64.h
HYPERCALLS arch/x86/include/generated/asm/xen-hypercalls.h
DESCEND objtool
HOSTCC arch/x86/tools/relocs_32.o
HOSTCC arch/x86/tools/relocs_64.o
HOSTCC arch/x86/tools/relocs_common.o
HOSTCC /home/k21-4704/Downloads/linux-6.1.13/tools/objtool/fixdep.o
HOSTLD /home/k21-4704/Downloads/linux-6.1.13/tools/objtool/fixdep-in.o
HOSTCC scripts/genksyms/genksyms.o
LINK /home/k21-4704/Downloads/linux-6.1.13/tools/objtool/fixdep
CC /home/k21-4704/Downloads/linux-6.1.13/tools/objtool/exec-cmd.o
HOSTLD arch/x86/tools/relocs
CC /home/k21-4704/Downloads/linux-6.1.13/tools/objtool/arch/x86/special.o
CC /home/k21-4704/Downloads/linux-6.1.13/tools/objtool/help.o

```

Checking Kernel Version with Roll number and System Call

```

k21-4704@k214704-virtual-machine:~$ uname -r
6.1.13-214704

```

```

Open  [icon] userspace.c ~/
1 #include <stdio.h>
2 #include <linux/kernel.h>
3 #include <sys/syscall.h>
4 #include <unistd.h>
5 int main()
6 {
7     long int i = syscall(335);
8     printf("system call sys_hello returned %ld\n", i);
9     return 0;
10

```

```

t: Supported (#1)
[ 277.726310] ISO 9660 Extensions: Microsoft Joliet Level 3
[ 278.318455] ISO 9660 Extensions: RRIP_1991A
[ 942.020650] Hello World

```