Cross-compiler and kernel environment for rpi4

I. Steps to flash Raspbian OS onto sd card:

On Host(ubuntu) :

1. Open terminal

```
$ sudo apt install rpi-imager
$ rpi-imager
```

Choose OS : Raspberry Pi OS (other) => raspberry pi OS LITE 32-bit
Choose storage : choose your sd card
Click on write and then click on yes - This will take some time.

2. After completing flashing image plug out sd card and insert sd card again.

```
$ cd  /media/<user-name>/boot
$  touch ssh
$ touch wpa_supplicant.conf
$ vim wpa_supplicant.conf
```

Write the following code in wpa_supplicant.conf file and save it.

```
country=IN
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
network={
        ssid="PrasadMob"
        psk="prasad@08"
        key_mgmt=WPA-PSK

}
```

3. Plug out sd card and insert into your raspberry pi board.
4. Board will start booting and access it.

II. Steps for cross-compiling kernel :

On Host (ubuntu) :

1. Install Required dependencies :

```
$ sudo apt install git bc bison flex libssl-dev make libc6-dev libncurses5-dev
```

2. Install 32-bit toolchain

```
$ sudo apt install crossbuild-essential-armhf
```

3. Download/clone kernel source

~ $ mkdir rpi
$ cd rpi
$ git clone --depth=1 --branch rpi-5.10.y https://github.com/raspberrypi/linux
$ cd linux

4. Apply the config file of rpi4 :

Check config file for your board(rpi4) using below command

$ ls arch/arm/configs

Default config file for rpi4 is bcm2711_defconfig

Now apply config file using below command

$ make ARCH=arm CROSS_COMPILE=arm-linux-gnueabihf- bcm2711_defconfig

5. Build kernel image and kernel modules for rpi4 :

$ make -j8 ARCH=arm CROSS_COMPILE=arm-linux-gnueabihf- zImage modules dtbs

Result of above command :

$ ls arch/arm/boot

zImage

6. Plug in your sd card to your HOST PC(ubuntu)

$ cp arch/arm/boot/zImage /media/<user_name>/boot

7. Install modules onto rootfs partition of SDcard

$ make ARCH=arm CROSS_COMPILE=arm-linux-gnueabihf- INSTALL_MOD_PATH=<path-to-sdcard rootfs partition> modules_install

Example In my pc :

$ make ARCH=arm CROSS_COMPILE=arm-linux-gnueabihf- INSTALL_MOD_PATH=/media/embedded/rootfs modules_install

Modules gets installed in rootfs/lib/modules path

8. Configuring config.txt to boot our new kernel

$ cd /media/<user-name>/boot

Open config.txt:

$ vim config.txt

Add below line at the end of the file and save file :

kernel=zImage

9. If “ssh” and “wpa_supplicant.conf” files are not in your boot partition then follow steps of 2 of flashing raspbian OS.
10. Plug out sd card and insert into your raspberry pi board.
11. Board will start booting and access it .