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1) What is a device driver program? In operating system role of device driver programming in

Unix and Linux environment comparison with appropriate library and function descriptions?

A) Device driver acts a abstraction layer between hardware and OS. It allows us to access the hardware using high level programming language. You need to write device driver for each type of hardware for which you want to use in operating system .

[**usb\_skel**](https://elixir.bootlin.com/linux/latest/ident/usb_skel)**.c** is an example of pci usb skeleton device driver .

[Usb\_find\_interface finds the](https://elixir.bootlin.com/linux/latest/ident/usb_find_interface) usb interface .

usb\_get\_intfdata(interface) is used to get the data from the interface.

2) How do write the device driver program and how to port the new device driver program in

your system?

A) Driver never runs by itself. It is similar to a library that is loaded for its functions to be invoked by a running application. It is written in C, but lacks a main() function. Moreover, it will be loaded/linked with the kernel, so it needs to be compiled in a similar way to the kernel, and the header files you can use are only those from the kernel sources, not from the standard /usr/include.

One interesting fact about the kernel is that it is an object-oriented implementation in C, as we will observe even with our first driver. Any Linux driver has a constructor and a destructor. The module’s constructor is called when the module is successfully loaded into the kernel, and the destructor when rmmod succeeds in unloading the module. These two are like normal functions in the driver, except that they are specified as the *init* and *exit* functions, respectively, by the macros module\_init() and module\_exit(), which are defined in the kernel header module.h.

Once we have the C code, it is time to compile it and create the module file ofd.ko. We use the kernel build system to do this. The following Makefile invokes the kernel’s build system from the kernel source, and the kernel’s Makefile will, in turn, invoke our first driver’s Makefile to build our first driver.

To build a Linux driver, you need to have the kernel source (or, at least, the kernel headers) installed on your system. The kernel source is assumed to be installed at /usr/src/linux. If it’s at any other location on your system, specify the location in the KERNEL\_SOURCE variable in this Makefile.

3) What is the programmer role in writing device driver program? What are the methodologies and policies a programmer should imply on device driver program.

A) Programmer first needs to write the code in c for linux operating . After writing the code one has to compile the package and create a module file . To do this we need to use the build system . The kernel build system will needs to present in your system to develop this driver.