1. **Information Gathering**
2. **Look at the man page for the "open()" system call, found in section two of the manpages.**
   1. **List the BUGS when using the system call.**

Copied from the “BUGS” secion of the open(2) manpage:

Currently, it is not possible to enable signal-driven I/O by specifying O\_ASYNC when calling open(); use fcntl(2) to enable this flag.

One must check for two different error codes, EISDIR and ENOENT, when trying to determine whether the kernel supports O\_TMPFILE functionality.

When both O\_CREAT and O\_DIRECTORY are specified in flags and the file specified by pathname does not exist, open() will create a regular file (i.e., O\_DIRECTORY is ignored).

* 1. **What files need to be included to use this function?**#include <sys/types.h>  
     #include <sys/stat.h>  
     #include <fcntl.h>

* 1. **List the first three related system calls to open().**

Under the “SEE ALSO” section, the first three system calls are chmod(2), chown(2), close(2).

* 1. **Choose one of the system calls from above and list its bugs (also list what system call you chose) and files needing to be included to use the system call.**

The close() system call requires the “unistd.h” header file to be included.

The chmod(), chown(), and close() system calls do not have “BUGS” sections.

They do have “ERRORS” sections, but this is not the same thing.

1. **Use http://lxr.free-electrons.com to search for the following:**

**A. Search for "usb\_device". In what file is the structure defined, and what are the first five members of the struct?**

<https://elixir.bootlin.com/linux/v4.16.1/source/include/linux/usb.h#L621>

int devnum;

char devpath[16];

u32 route;

enum usb\_device\_state state;

enum usb\_device\_speed speed;

**B. In what header file is the type declared for the 5th member of the struct? (hint: don't look in test tools or staging directories).**

<https://elixir.bootlin.com/linux/v4.16.1/source/include/uapi/linux/usb/ch9.h#L1137>

Searched against kernel v4.16.1.

**C. Include the entire enumeration declaration from above.**

enum usb\_device\_speed {

USB\_SPEED\_UNKNOWN = 0, /\* enumerating \*/

USB\_SPEED\_LOW, USB\_SPEED\_FULL, /\* usb 1.1 \*/

USB\_SPEED\_HIGH, /\* usb 2.0 \*/

USB\_SPEED\_WIRELESS, /\* wireless (usb 2.5) \*/

USB\_SPEED\_SUPER, /\* usb 3.0 \*/

USB\_SPEED\_SUPER\_PLUS, /\* usb 3.1 \*/

};

**B. Basic Linux Use:**

The submitted file “typescript1.txt” contains the requested steps. Also, due to completing this assignment on a work computer, I removed a few lines containing some private company information.

**C. Basic C Programming in Linux:**

The submitted file “SimpleCProgram.c” contains a very basic addition output.

The file “typescript2.txt” contains the command line execution of the program, with and without error.

**D. Hello, Kernel:**

The submitted file “HelloKernel.c” contains the requested module code. The submitted file “typescript3.txt” contains the script of the “dmesg” command after “HelloKernel.ko” was added and then removed with “insmod” and “rmmod”, respectively.