UNX511 Lab 3: I/O Control

Due: Sunday, June 1, 2025 (11:59pm)

In this lab you will make use of I/O control (ioctl) and sockets to get information from a network interface. You will use ioctl's to retrieve an interface's MAC address, IP address, netmask, and broadcast address.

Your program will ask you for the name of a network interface. To see the network interfaces on your machine type:
$ ifconfig

A user interface will give the user the following selections:

Choose from the following:
1. Hardware address
2. IP address
3. Network mask
4. Broadcast address
0. Exit

A program has already been created that prompts the user for the network interface name, that displays the above user interface, and that already retrieves a network interface's MAC address - etherCtrl.cpp. You need to complete this program to retrieve:
1. The IP address (case 2),
2. The Network mask (case 3),
3. The Broadcast address (case 4).

Please provide a Makefile for this program.

For documentation on low-level access to Linux network devices, see netdevice.

For documentation on how to get the IP address of a network interface, see Get IP Address in Linux using C program, from includehelp.com.

See also Week 4 of our lecture notes under **Socket Files and IOCTL's** for more sample code.

Test your program with existing network interfaces on your machine and also with the loopback interface **lo**. Compare the results of your program with those given by **ifconfig**. They should be the same.

Assignment Submission:

- Complete all steps, Add all output-screenshot and explanations (if required) to a MS-Word file.
- Add the following declaration at the top of MSWORD file

```
/*************************************************************************
***
* UNX511-Lab3
* I declare that this lab is my own work in accordance with Seneca Academic Policy.
* No part of this assignment has been copied manually or electronically from any other source
* (including web sites) or distributed to other students.
*
* Name: _____ Student ID: _____ Date: _____
*
*
*************************************************************************
**/
```

- Please submit the Source code (zip all .c, .h, and makeFiles)
- Please answer the following two declarations:
    - D1) On a scale from 1 to 5, **How much did you use generative AI to complete this assignment?**
        - where:
        - **1** means you did not use generative AI at all
        - **2** means you used it very minimally
        - **3** means you used it moderately
        - **4** means you used it significantly
        - **5** means you relied on it almost entirely
        - **Your answer :**
    - D2) On a scale from 1 to 5, **How confident are you in your understanding of the generative AI support you utilized in this assignment, and in your ability to explain it if questioned?**
        - where:
        - **1** means "Not confident at all – I do not understand the generative AI support I used and cannot explain it."
        - **2** means "Slightly confident – I understand a little, but I have many uncertainties."
        - **3** means "Moderately confident – I understand the majority of the support, though some parts are unclear."
        - **4** means "Very confident – I understand most of the AI support well and can explain it with minor gaps."
        - **5** means "Extremely confident – I fully understand the generative AI support I used and can clearly explain or justify it if asked."
        - **Your answer :**

Important Note:

- **LATE SUBMISSIONS for labs**. There is a deduction of 10% for Late assignment submissions, and after three days it will grade of zero (0).
- This labs should be submitted along with a video-recording which contains a detailed walkthrough of solution. Without recording, the assignment can get a maximum of 1/3 of the total.
    - Note: In case you are running out of time to record the video, you can submit the assignment (source code + screenshots) by the deadline and submit the video within 24 hours after the deadline.