

ECE 331

Homework 3

See course web site for due date

Place your typed homework answers in vim. Print single sided with your name using a **mono space font**. No need to restate questions. Fully investigating questions is required for a higher grade. Please use the kernel coding style for all code. Please use your RPi for developing answers. Although code should be written and run on a RPi, it should run on ANY POSIX compliant OS. As always, all code shall be comment, conform to the Linux Kernel Coding Style, and error conditions shall be checked and appropriately handled.

1. Using your RPi, give **ALL** the commands to successfully prepare the Linux kernel for building external modules by
 - a) Fully update to the latest packages.
 - b) Then, in /usr/src, get the kernel from the git repository
<https://github.com/raspberrypi/linux.git>. **Caution BIG and SLOW.**
 - c) **Check out the revision just prior to changing to the next kernel version for the currently running version.**
 - d) Append the kernel version string to the directory name created by git.
 - e) Build the kernel
 - make mrproper
 - modprobe configs
 - Gunzip and save the contents of the file /proc/config.gz to .config in root directory of the linux kernel source tree that was just cloned from git.
 - Create a link to the existing file /boot/Module7.symvers to Module.symvers in root directory of the linux kernel source tree that was just cloned from git.
 - make modules_prepare
 - f) Create a link in the currently running kernel's modules directory (subdirectory within /lib/modules) to the renamed directory created by git. Name the link build.
 - g) Create a link in the currently running kernel's modules directory (subdirectory within /lib/modules) to build. Name the link source.
2. Write a perl style regular expression that matches a C style floating point number. Refer to the ANSI C standard (n1570 from 2011 [C11]) is just fine) for a valid floating point number. Exclude (no need to consider) hexadecimal floating point representation.
 - a) Give the minimum match.
 - b) Include your regular expression as your answer for this part.
3. Write a C program that accepts the regular expression written in question 2. Text input is read from stdin and if a line contains a match, print the entire matching line to stdout. Use regcomp() and regexec() to check for matches.

For your answer, include the source.

4. Use automation to thoroughly test your code from question 3.

For your answer, include the source for all scripts and list all commands.

5. Give the shortest command that determines the number of packages available and installed that contain a digit in their package name.

6. Determine and give the shortest ERE that matches the numbers 0 through 100.
7. Determine and give a concise ERE that matches the command line option `-Wselector` in the `gcc` man page. The ERE that is given should take you right to the explanation of the meaning of the flag.