

Name: _____

Student ID: _____

Score : _____ / 50

1. (11 points) In last lecture, we learned about kernel compile and ctags. Following is unordered list of the steps we took to compile and mount a new file system. Number them in right order. Not all items are not necessarily required.

- 11 mount -t FSNAME /dev/sdb1 /YOUR/DIR
- 2 decompress the tar.gz file
- 9 download file system make tool
- 1 download the kernel from www.kernel.org
- 4 enable module compile
- 3 download necessary tools
- 7 bulld the file system
- 8 fdisk /dev/sdb
- 5 compile the kernel
- 10 mkfs /dev/sdb1
- 6 modify the file system

2. (10 points) What is the difference between kernel compile and kernel module compile? How do we load the module to the system?

Solution: kernel compile means downloading the kernel source code and compiling it. Usually it takes a lot of time. If you are a kernel developer, and you have to build a small component of a system, then you can compile in units of a module. It is much small in size, so completes faster. We use `rmmod` and `insmod` to load the modules.

3. (5 points) Alice opened a file with `vi`, and made some changes to the file, let's say 'foo'. However, Alice failed to save the file using `:w`. It shows E45: 'readonly' option is set (add ! to override). If you are to help Alice save all the changes, what are the steps to do so?

Solution: First open a new file using `:sp newfile`. Move back to 'foo' and copy all the changes (`^w` to change the window, `:NUM1,NUM2y` to copy). paste the copied text (`^w`, `p`). Finally, save the result using `:w`.

4. (5 points) What is Ctags?

Solution: Ctags is a programming tool that generates an index (or tag) file of names found in source and header files of various programming languages.

5. (5 points) Alice downloaded a `tar` file and `untared` the file using `sudo`. Everytime Alice wants to operate of the downloaded files Alice has to use `sudo`. It seems very tedious. Does Alice have to always type in `sudo` before a command? What is the solution for Alice to type less?

Solution: `chown USERNAME untared files` change the user of the files

6. (6 points) What is the resolution for following time data structures?

- `useconds` `struct timeval`
- `nanoseconds` `struct timespec`
- `seconds` `time_t` data type

7. (8 points) Following is the user list of a system. Explain what each field represents and how the two users different from each other.

```
root:x:0:0:root:/root:/bin/bash
nobody:x:65534:65534:Nobody:/home:/dev/null
```

Solution: (1) user name (2) password-hidden as shadow password (3) numerical user id (4) numerical group id (5) comment field (6) initial working directory (7) user access class

root can login to `/root` directory and uses `/bin/bash` as the shell. nobody on the other hand, cannot log in because the login shell is set `/dev/null`