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Final Exam

CIS 68C1

Fall 2002

Instructions

- Write your name on your Scantron, and on a separate blank sheet of paper for short answers.
- For **Multiple Choice** questions, **circle** the **single** correct answer on the Scantron sheet.
- For **Short Answer** questions, write your answers on a separate sheet. Be as specific and clear as possible. Partial credit will be given for good and reasonable attempts.
- If you are unclear about something, raise your hand.
- Any form of cheating will result in an automatic F in the course.

Hints for Success

- Use your knowledge of the fundamentals, and draw conclusions from there.
- Read each problem carefully!
- Try to determine the skills or knowledge a question is attempting to assess.
- Decide if a general answer or specific answer is the best choice.
- There is no penalty for incorrect answers.

Multiple Choice (2 points each)

1. SCSI supports how many devices per controller:
 - a. 2
 - b. 4
 - c. 8
 - d. 32

2. The Linux **insmod** command:
 - a. loads static device drivers
 - b. resolves dependencies
 - c. loads and initializes dynamic kernel modules
 - d. calls modprobe

3. An instantiation of a program is :
 - a. an error
 - b. a process
 - c. an application, utility, or command
 - d. an administrative decision communicated to users

4. Which command is likely to increase the amount of time PID 2349 receives?
 - a. nice +20 2349
 - b. renice +20 2349
 - c. nice -20 2349
 - d. renice -20 2349

5. A daemon process:
 - a. has no controlling terminal
 - b. runs continuously in the background until shutdown
 - c. all of the above
 - d. none of the above

6. With a **umask** of 011, the permissions for newly created files will be:
 - a. 777
 - b. 766
 - c. 655
 - d. 666

7. The terms **selector**, **facility**, and **priority** are all part which subsystem?
 - a. cron
 - b. dump & restore
 - c. lpd
 - d. syslog

8. A zombied process:
 - a. is the state of all processes immediately after they exit()
 - b. is caused by a child process detaching from the controlling terminal
 - c. occurs when a parent process does not perform a wait() on its children
 - d. both (a) and (c)
 - e. all of the above

9. A process may ignore which of the following signals?
 - a. KILL, TERM, STOP, QUIT
 - b. TERM, TSTP, QUIT, INT
 - c. TERM, STOP, QUIT, INT
 - d. KILL, TSTP, QUIT, INT
 - e. any of the above

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10. Which of the following best describes the number of copies of the **lpd** process that will run on a system
 - a. depends on page description language (PDL)
 - b. depends on printer type and physical connection
 - c. one
 - d. one for each printer
 - e. **one, plus one for each printer spool**

11. The standard UNIX command that configures a network interface is:
 - a. ifup
 - b. **ifconfig**
 - c. ipconfig
 - d. ipstat
 - e. none of the above

12. An alternate super block would be used by which program?
 - a. mkfs
 - b. **fsck**
 - c. mount
 - d. both (b) and (c)
 - e. all of the above

13. Which of the following most efficiently distributes files such as the **/etc/passwd** file to any number of machines?
 - a. ftp
 - b. rcp
 - c. rdist
 - d. **rsync**
 - e. rcopy

14. A signal is best described as?
 - a. a sign from the Almighty
 - b. a text message sent from one process to another process
 - c. a numeric message passed directly from one process to another process
 - d. **a message delivered by the kernel to a process to perform some signal specific action**

15. The line below is most likely from which file?

```
50 4 1 * * root logrotate
```

 - a. /etc/syslog.conf
 - b. /usr/sbin/crond
 - c. /var/log/cron.log
 - d. /var/spool/cron/root
 - e. **none of the above**

16. Which of the following best describes the possible states in which a process can exist?
 - a. running scared, waiting for Guffman, stopped for traffic, walking zombie
 - b. runnable, stopped, waiting
 - c. runnable, blocked, expiring
 - d. running, waiting, stopped, de-allocated
 - e. **runnable, sleeping, stopped, zombie**

17. The kill files from which of the following directories are used when going from init level 3 to init level 1?
 - a. **/etc/rc.d/rc1.d**
 - b. /etc/rc.d/rc2.d
 - c. /etc/rc.d/rc3.d
 - d. all of the above
 - e. none of the above

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18. Which of the following are all part of the BSD printing service?
- a. lpsched, lpd, lpr, lp
 - b. lpr, lpd, printtool
 - c. **lpr, lpd, /etc/printcap**
 - d. lpr, lprm, lpd, /etc/print.conf
19. The maximum number of logical partitions for IDE hard disks is:
- a. 4
 - b. 3 plus one extended partition
 - c. **depends on OS, but is large enough to accommodate practically all needs**
 - d. both (a) and (b)
20. The last field of /etc/fstab is used by:
- a. mount
 - b. **fsck**
 - c. login
 - d. automount
 - e. both (a) and (d)

21. From which file would you find the line below?

```
ftp:*:12027:0:999999:7:::
```

- a. /etc/passwd
 - b. **/etc/shadow**
 - c. /etc/ftppass
 - d. /etc/group
 - e. none of the above
22. Minor numbers determine:
- a. device type
 - b. special driver modes
 - c. unit number
 - d. **both (b) and (c)**
 - e. all of the above
23. Which command below will boot Linux into single user mode:
- a. lilo
 - b. init 1
 - c. linux
 - d. boot: linux single
 - e. **linux single**

24. What command below:

```
#chown -R joeuser /home/joeuser/*
```

- a. causes a security breach
 - b. changes all files under joeuser's home directory to be owned by joeuser
 - c. both of the above
 - d. **none of the above**
25. If the file /etc/cron.allow contains a single user name sally and /etc/cron.deny is empty, then:
- a. user sally is allowed to run the crontab command
 - b. **only user sally can run the crontab command**
 - c. all users except sally are allowed to add new crontabs files
 - d. allows user sally to manage cron queues
 - e. none of the above

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26. To configure a remote **lpr** printer, which file must be configured on your system:
- a. /etc/print.conf
 - b. /etc/printcap
 - c. /etc/termcap
 - d. /etc/printers

27. The file shown below was created by which command?

```
crw-rw----  1 root  root      14, 4 Aug 31 2002  audio
```

- a. mkdir
 - b. mknod
 - c. touch
 - d. vi
 - e. unable to determine from the given data
28. The statement "*reliably violates file permissions at a distance*" best refers to
- a. NFS
 - b. rcp
 - c. dump
 - d. Samba
 - e. rdist
29. The partial output below is from **ps -ef**. Which command would terminate the *runaway* process?

```
UID      PID PPID  C  STIME TTY          TIME CMD
sam      532  530  0   11:56 tty1        00:01:23 /home/smith/runaway -9
```

- a. kill -9 530
 - b. kill -TERM 532
 - c. kill -9 runaway
 - d. kill -15 -1
 - e. kill -9 532
30. An irreparably corrupt **ext2** filesystem requires running:
- a. newfs
 - b. mkfs
 - c. fsck
 - d. fdisk
 - e. none of the above
31. The logger program:
- a. is used by the forest industry
 - b. rotates system log files
 - c. is a syslog component
 - d. starts up klogd, the kernel logging daemon
32. A **dump** of level 5 includes all new or modified files since:
- a. the previous dump of level 0
 - b. any dump level 4, 3, 2, 1, or 0
 - c. any previous dump level less than 5
 - d. any previous dump level 6, 7, 8, or 9
 - e. none of the above
33. UID and EUID are usually set to the same value, but are different for:
- a. an su process
 - b. a non-login shell process
 - c. a setuid process
 - d. a getty process

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34. The **.rhosts** file:
- is a considerable security problem and should generally not be used
 - is used by rdist
 - is used by ssh
 - must not be readable by group/others to be useable
 - all of the above**
35. The **init** process is directly responsible for starting up:
- all programs
 - all of the programs in the `/etc/rc.d/rcN.d` directory (where *N* is the runlevel)
 - all daemons programs
 - the programs listed in `/etc/inittab`**
 - none of the above
36. After restoring an entire filesystem with **restore**, an immediate level 9 dump archive will then contain:
- all new or modified files since the restore
 - all modified files since the restore
 - no files
 - all files on the filesystem**
 - none of the above
37. The line below:
- ```
*.crit *
```
- sends critical messages to the system log file
  - sends critical or higher priority messages to all users logged in**
  - ignores critical messages
  - performs the default action for critical messages
38. In the Linux installation process, which step immediately precedes installing software:
- the anaconda installer runs
  - mini-linux is booted
  - post-package installation occurs
  - hard disk is prepared**
  - none of the above
39. The term **localhost** is:
- the IP address 127.0.0.1
  - the loopback interface
  - the hostname corresponding to the loopback interface IP address of 127.0.0.1**
  - all of the above
40. The following are essential for configuring an IP interface to send packets:
- IP address, network mask
  - IP address, network mask, broadcast address**
  - IP address, network mask, broadcast address, nameserver address
  - IP address, network mask, broadcast address, gateway address
  - IP address, network mask, broadcast address, gateway address, nameserver address

**Short Answer**

41. What is a broadcast address?

A broadcast address is an IP address where the host part of the address is all ones. It is used to address all hosts on a network.

42. What are the disadvantages of statically linked kernel modules?

Statically linked kernel drivers 1) increase the size of the kernel (perhaps needlessly), 2) increase security issues (more code means more changes for bugs to be exploited), 3) require rebuilding the kernel to update a kernel driver, and 4) cannot accept parameters in the same way that LKM's can.

43. Describe and explain syslog (such that someone else would understand it).

Syslog is a general logging mechanism that has three parts: a programmer's library for submitting log messages programmatically, a logging daemon (syslogd), and a logger utility to submit log messages via command line. Syslog allows routing of messages to various destinations such as TTYs, files, or across the network to other syslog daemons. Syslog allows has a fixed category and prioritization scheme called a selector, which is the combination of a facility and a priority.

44. List and explain the fields in each entry of /etc/fstab.

The fields in the /etc/fstab are:

device: device where the filesystem resides

mount point: where the filesystem will be mounted

filesystem type: indicates which filesystem is present on the device

options: mount options, passed to mount(2) system call

dump frequency: used by dump(8) command to determine how often to dump the filesystem

fsck pass: the relative priority of when the filesystem should be checked relative to others during reboot

45. Carefully examine the commands and output below. The commands are run as root to change the owner of the file
- xxx**
- from user
- sam**
- to user
- sally**
- . There are no errors in the commands! After the
- chown**
- command, the owner of
- xxx**
- it is still owned by user
- sam**
- . Why did this occur?

```
ls -l
-rw-r--r-- 1 sam project 0 Dec 10 10:35 xxx
chown sam xxx
echo $?
0
ls -l
-rw-r--r-- 1 sam project 0 Dec 10 10:35 xxx
```

Although it appears that the command has failed, the problem states there are no errors during execution.

Additionally, chown's status is 0 upon completion, which means success. The command has indeed succeeded, and this result is caused by having two users in the /etc/passwd file with the same UID. We can surmise that user Sam and user Sally have the same UID, and that the ls command only looks for one match in /etc/passwd when translating the UID into a user name.

46. In order to mount a filesystem, the
- mount**
- command requires both a device and a mount-point. Why does the command below succeed even though
- mount**
- is only given one, the device?

```
#mount /dev/floppy0
```

Users are able to specify only one of the parameters (filesystem or device) when there is an entry in /etc/fstab that matches the one specified. The mount command uses a matching entry from /etc/fstab when only one parameter is specified. In the case above, there must be an entry for /dev/floppy0 in /etc/fstab – otherwise, the command will fail.

47. What is the difference between
- modprobe**
- and
- insmod**
- ?

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Both load dynamically loadable kernel modules, but modprobe resolves and loads all dependent modules. Insmmod only loads a specifically specified module.

48. Explain class A, B, and C addresses.

Class A, Class B, and Class C addresses are all IP address classes (pre CIDR addresses) that specify how the network and host parts of an IP address are determined. Class A provides 8 bits for the network part, Class B provides 16 bits, and Class C provides 24 bits. These class specifications imply a maximum number of networks and hosts allowable.

49. Write one syntactically correct entry from the password file, and label the fields.

```
student:*:5004:100:Joe Student:/home/student:/bin/sh
```

User : Password : UID : GID : GECOS Info : Home Directory : Login Shell

50. What are the basic steps required to manually add a new user account?

- Add entries in /etc/passwd (and /etc/shadow if used)
- Add user to /etc/group (creating new group if needed)
- Set the user's passwd with the passwd command
- Create home directory for user that matches that specified in /etc/passwd
- Copy/create any template or site-wide dot files for the user
- Chown / chgrp home directory and all files contained in the directory to the user's UID/GID as specified in /etc/passwd.