PRINT Name: _____ **LAB Section:** ▢▢▢

Test Version: 521   **One-Answer Multiple Choice**   **156 Questions**

☞ Read **all** the words of these instructions and **both** sides (back and front) of all pages.
☞ Use your full, unabbreviated name on the mark-sense form. Do not abbreviate your name.
☞ Put the three-digit **Test Version** above into **NO. OF QUESTIONS** and **NO. OF STUDENTS**
☞ Fill in the bubbles with pencil only, no pen. Enter your NAME, Test Version, and answers.
☞ Manage your time. Answer questions you know, first. One Answer per question.

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1. In a shell **case** structure, the **case** segment that will GLOB match the text **x**, **y**, or **z**, is coded as
   a. **x,y,z)**   b. **x|y|z)**   c. **x:y:z)**
   d. **x\y\z)**   e. **x/y/z)**

2. What is the output (if any) of this **bash** shell program fragment? (There are blanks between all the letters in the word list section of the **for** loop.)
   ```
   str=''
   for x in  l i n u x  r o c k s  ; do
       str="$x$str"
   done
   echo "$str"
   ```
   a. **xxxxxxxxxx**   b. **l i n u x r o c k s**
   c. **skcorxunil**   d. **l**
   e. **linux**

3. If **a=1** and **b=1**, which command sequence correctly compares the two numbers as equal and prints **OK**?
   a. **if [$a==$b] ; then echo OK ; fi**
   b. **if [$a -eq $b] ; then echo OK ; fi**
   c. **if test a -eq b ; then echo OK ; fi**
   d. **if (a == b) ; then echo OK ; fi**
   e. **if [a = b] ; then echo OK ; fi**

4. Which of the following commands would you use to start the **ntpd** daemon, if you had just installed it and if it were not already running?
   a. **service ntpd start**   b. **kill -9 ntpd**
   c. **chkconfig ntpd on**   d. **go ntpd**
   e. **ntpd service on**

5. If **foo** is a directory that contains only the file **bar** and **/dir1** is an empty directory, what is in **/dir1** after running the following command?
   ```
   rsync -avH foo/. /dir1
   ```
   a. **foo**   b. **dir1**   c. **bar**
   d. a symlink to foo   e. nothing

6. If **x=5** and **y=5**, which command sequence correctly compares the two numbers as equal and prints **OK**?
   a. **if test x -eq y ; then echo OK ; fi**
   b. **if [x = y] ; then echo OK ; fi**
   c. **if test $x -eq $y ; then echo OK ; fi**
   d. **if (x == y) ; then echo OK ; fi**
   e. **if [$x==$y] ; then echo OK ; fi**

7. Of the following directories, which would you expect to contain the most system administration commands that require **root** privileges?
   a. **/usr/bin**   b. **/usr/local/bin**
   c. **/usr/sbin**   d. **/sys/admin/bin**
   e. **/bin**

8. If the current directory contains files **abc**, **bbc**, **cbc**, and **bbc** contains just the line **dbd**, what is the output of the following command: **grep "bb*" bbc**
   a. **cbc**   b. **dbd**   c. **bbc**
   d. an error message   e. no output

9. Fill in the blanks. The **chroot** program takes a(n) _____ which will be the ____ for a shell or a command.
   a. command, argument   b. option, input
   c. directory, argument   d. input, option
   e. argument, ROOT directory

10. What would the following command do: **at 8pm**
    a. list the user's **cron** jobs that will run at 8pm
    b. run the user's **crontab** jobs once at 8pm
    c. run the user's **crontab** jobs every day at 8pm
    d. issue an error message
    e. read commands from stdin

11. If you have a file **mytasks** of commands in **crontab** format, you could submit that file to be your live **crontab** file by running which of the following commands?
    a. **crontab -l mytasks**   b. **crontab < mytasks**
    c. **crontab -r mytasks**   d. **crontab -e mytasks**
    e. **echo mytasks | crond**

12. Which of the following commands on a Unix/Linux system displays a list of processes running on the system?
    a. **listtop**   b. **top**   c. **toplist**
    d. **pstop**   e. **psls**

13. What is the output on your screen of this command line:
    ```
    echo foo | sed 's/foo/BAR/'
    ```
    a. **bar**   b. **BAR**
    c. no output on screen   d. **foo**
    e. **FOO**

14. What is the output of the following sequence of **bash** commands:
    echo 'Good-day World' | sed -e 's/^/99/g'
    a. **99Good-day 99World**   *b.* **99ood-day World**
    c. **Good-day World**   *d.* **99Good-day World**
    e. **99ood-day 99orld**

15. If **foo** is a directory that contains only the file **bar** and **/dir1** is an empty directory, what is in **/dir1** after running the following command?
    rsync -avH foo/ /dir1
    a. nothing   *b.* **foo**   *c.* **dir1**
    d. a symlink to foo   *e.* **bar**

16. What would be the output of the following command line:
    echo a b c | awk '{print $NF}'
    a. no output   *b.* **c**   *c.* **3**
    d. **a b c**   *e.* **$NF**

17. Which line below passes three *separate* arguments to the **sort** command when placed inside a shell script named **foo** invoked by the command line:
    ./foo 111 222 333
    a. **sort "$*"**   *b.* **sort "$@"**
    c. **sort "$#"**   *d.* **sort "$1 $2 $3"**
    e. **sort "$? $? $?"**

18. To see a list of disk partitions that the kernel has detected, you could look at the contents of which file?
    a. **/etc/partitions**   *b.* **/dev/partitions**
    c. **/lib/partitions**   *d.* **/dev/sda**
    e. **/proc/partitions**

19. Inside a bash shell script, which of the following would expand to one word containing all of the arguments that were passed to the script?
    a. **"$@"**   *b.* **"$*"**   *c.* **"$0"**   *d.* **"$#"**   *e.* **"$?"**

20. Which of the following commands would you use configure the **httpd** daemon to not run in runlevels **2**,**3**,**4**, and **5**?
    a. **chkconfig httpd off**
    b. **service httpd off**
    c. **httpd run 16**
    d. **runlevel httpd off**
    e. **httpd --levels 2345 off**

21. Which command sequence correctly searches for **foo** and then prints the date if it is found inside the file **bar**?
    a. **if test foo bar ; then date ; fi**
    b. **if grep <bar foo ; then date ; fi**
    c. **if [grep foo bar] ; then date ; fi**
    d. **if [test foo bar] ; then date ; fi**
    e. **if test foo = bar ; then date ; fi**

22. A shell script named **bar** is executed as follows:
    ./bar a "b c" 'a '
    Inside the script is the line: **head "$*"**
    How many arguments are passed to the **head** command inside the script?
    a. **3**   *b.* **2**   *c.* **4**   *d.* **5**   *e.* **1**

23. Which of the following is an argument to the **kill** command?
    a. Effective Group ID   *b.* Process ID
    c. CPU identifier   *d.* Root Process ID
    e. Effective User ID

24. What would be the output of the following command line:
    echo a b c d | awk '{print $2}'
    a. **b**   *b.* no output   *c.* **c d**
    d. **$2**   *e.* **a b**

25. If a shell script **myscript.sh** is called this way:
    ./myscript.sh a b c
    and the first line inside the script below the script header is
    echo "$#$1"; shift
    what is the output of that line?
    a. **3b**   *b.* **4c**   *c.* **2b**   *d.* **3a**   *e.* **2a**

26. Which of the following commands would be used to add the user **myuser** to the group **wheel**?
    a. **groupmod -a myuser wheel**
    b. **groupadd -a wheel myuser**
    c. **gpasswd -a myuser wheel**
    d. **useradd myuser wheel**
    e. **usrgrp myuser wheel**

27. If the file **foo** in the current directory contains just the line **dbd**, what is the output of the following command: **grep '[[:alpha:]]' foo**
    a. **123**   *b.* no output   *c.* **foo**
    d. **dbd**   *e.* an error message

28. In an argument to **rsync** or **scp** a colon would come immediately after a
    a. remote host   *b.* local file   *c.* relative pathname
    d. local host   *e.* remote file

29. Which of the following **PATH** statements makes the most sense?
    a. **PATH=/bin:/usr/bin:/etc**
    b. **PATH=/bin/sh:/usr/bin:/etc:/bin**
    c. **PATH=/bin/ls:/etc:/usr/bin**
    d. **PATH=/bin:/usr/bin:/etc/passwd**
    e. **PATH=/bin:/bin/cat:/usr/bin**

30. Which of the following invocations of **command.sh** would you least likely see inside a shell script that doesn't use **cd**?
    a. **bin/command.sh**   b. **/root/bin/command.sh**
    c. **/usr/bin/command.sh**   d. **/bin/command.sh**
    e. **command.sh**

31. To send a **SIGTERM** signal to a process with process ID *PID*, which of the following commands would you use?
    a. **kill -SIGTERM** *PID*   b. **send -SIGTERM** *PID*
    c. **send** *PID* **SIGTERM** d. **signal -SIGTERM** *PID*
    e. **kill** *PID* **SIGTERM**

32. Which of the following commands could be used to force the user **user001** to change their password the next time they log in?
    a. **chage -0 user001**   b. **passwd -d 0 user001**
    c. **chage user001**   d. **chage -d 0 user001**
    e. **passwd -x 0 user001**

33. If **browser=lynx** then which one of the following **case** patterns will match this statement: **case "$browser" in**
    a. **l?n?) echo yes ;;**
    b. **@) echo yes ;;**
    c. **(*ynx   echo yes ;;**
    d. **?lynx?) echo yes ;;**
    e. **[lynx] | [LYNX]) echo yes ;;**

34. In a shell script, if **read onevar twovar**
    is executed, and the user enters **a b c d**
    then what will **onevar** and **twovar** contain, respectively?
    a. "**a**" and "**b c d**"   b. "**a b c d**" and nothing
    c. "**a b**" and **c d**"   d. nothing and "**a b c d**"
    e. "**a b c**" and **d**"

35. " Fill in the blanks. To perform critical filesystem operations, you should use at least the safety of _____ mode, but even safer would be _____ mode.
    a. single-user, multi-user   b. rescue, power-off
    c. "Live CD", multi-user   d. single-user, "Live CD"
    e. runlevel, "Live CD"

36. What command will show the amount of free disk space in a partition?
    a. **find**   b. **df**   c. **ls**
    d. **fdisk**   e. **mount**

37. What would be the output of the following command line:
    echo a b | awk '{print $2}'
    a. **a b**   b. **$2**   c. **a**
    d. no output   e. **b**

38. Which of the following commands could be used to create a group named **wheel**?
    a. **newgrp wheel**   b. **gpasswd -a wheel**
    c. **gshadow -a wheel**   d. **groupadd wheel**
    e. **gpasswd -c wheel**

39. Select the correct **bash** shell order of command line processing:
    a. quotes, variables, redirection, globs
    b. quotes, redirection, variables, globs
    c. quotes, globs, variables, redirection
    d. quotes, variables, globs, redirection
    e. redirection, quotes, globs, variables

40. To find out whether the **ntpd** service was running, you could use which of the following commands?
    a. **chkconfig ntpd on**   b. **ntpd --check**
    c. **service ntpd status**   d. **chkservice ntpd**
    e. **service chkconfig ntpd**

41. When you create a user and their home directory with **useradd** by default the home directory will contain copies of files from which directory?
    a. **/etc/default**   b. **/etc/login.defs**
    c. **/etc/profile**   d. **/etc/sysconfig/default**
    e. **/etc/skel**

42. If variable **x** might contain nothing (a null value - defined but empty), which command sequence correctly tests for this and prints **OK**?
    a. **if ["$x" = ""] ; then echo OK ; fi**
    b. **if [$x -eq ""] ; then echo OK ; fi**
    c. **if [$x -eq :] ; then echo OK ; fi**
    d. **if [''$x'' = ''''] ; then echo OK ; fi**
    e. **if ["$x" = *] ; then echo OK ; fi**

43. Which command on a Unix/Linux system would you use to run a command **somecommand** at a less urgent scheduling priority to let other processes with a more urgent scheduling priority run first?
    a. **somecommand nice**   b. **nice -somecommand 10**
    c. **somecommand -nice -10**   d. **somecommand -nice**
    e. **nice somecommand**

44. If **a=1** and **b=1**, which command sequence correctly compares the two numbers as equal and prints **OK**?
    a. **if [a -eq b] ; then echo OK ; fi**
    b. **if [$a==$b] ; then echo OK ; fi**
    c. **if test $b -eq $a ; then echo OK ; fi**
    d. **if test a == b ; then echo OK ; fi**
    e. **if [b = a] ; then echo OK ; fi**

45. Which of the following invocations of **command** would you least likely see inside a shell script that doesn't use **cd**?
    a. **/root/bin/command**   *b.* **./command**
    c. **command**   *d.* **/bin/command**
    e. **"$HOME"/bin/command**

46. Which of the following commands would result in an error?
    a. **[a != 4]**   *b.* **[a = 4]**   *c.* **[a -eq 4]**
    d. **[3 = 4]**   *e.* **[3 -eq 4]**

47. Which of the following **mount** options is *not* one of the set of **defaults**?
    a. **auto**   *b.* **bind**   *c.* **suid**   *d.* **dev**   *e.* **rw**

48. When you create a user and their home directory with **useradd** by default the home directory will contain copies of files from which directory?
    a. **/etc/sysconfig/skel**   *b.* **/etc/skel**
    c. **/etc/default/skel**   *d.* **/etc/profile/skel**
    e. **/etc/login.defs**

49. Given the following shell script statement,
    if ["a" = "b"] ; then echo SAME ; fi
    which of the following statements is true?
    a. "**SAME**" would be printed
    b. an "invalid number" error would result
    c. "**[**" is passed four arguments
    d. "**[**" is part of all "**if**" statements
    e. "**fi**" would cause a "command not found" error

50. In response to the following command line: **read   var1   var2   var3**
    which user keyboard input line below will assign the text **three** to the shell variable named **var3**?
    a. **one   two   three**
    b. **var1=one   var2=two   var3=three**
    c. **one,two,three**
    d. **one:two:three**
    e. **$var1="one" $var2="two" $var3="three"**

51. Which **fdisk** internal command letter displays the list of all partitions?
    a. **L**   *b.* **f**   *c.* **q**   *d.* **p**   *e.* **l**

52. Given the following command line: **read   xx   yy   zz**
    which user keyboard input line below will assign the text **22** to the shell variable named **yy**?
    a. **xx=11   yy=22   zz=33**   *b.* **11,22,33**
    c. **11:22:33**   *d.* **11   22   33**
    e. **11;22;33**

53. In a shell script, which of the following would result in in the expansion of the positional parameter representing the first argument without processing any special characters inside the expansion?
    a. **"$1"**   *b.* **"\$1"**   *c.* **'$1'**
    d. **\$1**   *e.* **$1**

54. Which of the following commands could be used to create a new user named **user001**, with full name "User One" ?
    a. **usermod -c "User One" user001**
    b. **newuser user001 -c "User One"**
    c. **newuser -c "User One" user001**
    d. **useradd -c "User One" user001**
    e. **passwd -c "User One" user001**

55. Which line below passes three *separate* arguments to the **cat** command when placed inside a shell script named **foo** invoked by the command line:
    ./foo   one   two   three
    a. **cat "$1 $2 $3"**   *b.* **cat "$? $? $?"**
    c. **cat "$*"**   *d.* **cat "$#"**
    e. **cat "$@"**

56. If a shell script named **foo** contains the line:
    if ["$1" = '$2'] ; then echo SAME ; fi
    then which of the following command lines will produce **SAME** as output?
    a. **./foo "bar" 'bar'**   *b.* **./foo '$2' bar**
    c. **./foo "$1" '$2'**   *d.* **./foo bar bar**
    e. **./foo $2 $2**

57. What command would you use to list your **at** job numbers?
    a. **at -q**   *b.* **at -c**   *c.* **atq**
    d. **at -v**   *e.* **at -m**

58. A **-H** option to **rsync** would cause it to
    a. not overwrite newer files   *b.* preserve hard links
    c. preserve timestamps   *d.* work verbosely
    e. overwrite newer files

59. Which of the following commands could be used to disable password authentication for the user, **user001**?
    a. **passwd_disable user001**   *b.* **passwd -x user001**
    c. **passwd -d user001**   *d.* **passwd -l user001**
    e. **gpasswd user001**

60. What command line modifies and moves (in one command line) the home directory **foo** to **bar** for the existing user **vader**?
   a. `usermod -d -m /home/vader bar`
   b. `usermod -m -d /home/foo /home/bar`
   c. `usermod -dm /home/bar vader`
   d. `usermod -d -m /home/bar vader`
   e. `usermod -m -d /home/bar vader`

61. Which of the following, as first line of a shell script, would mean that when the script is run as a command, **/bin/sh** will be run with the **-u** option to process the script.
   a. `#/bin/sh -u`   b. `#!/bin/sh -u`   c. `!#/bin/sh -u`
   d. `!/bin/sh -u`   e. `!!/bin/sh -u`

62. Which of the following options for **bash** or **sh** might useful for debugging a shell script?
   a. `-z`   b. `-c`   c. `-r`   d. `-x`   e. `-l`

63. What would be the output of the following command line:
   ```
   echo a b c d | awk '{print $NF}'
   ```
   a. `4`   b. `$NF`   c. `d`
   d. no output   e. `a b c d`

64. Which line below is most likely to be the beginning of an error message?
   a. `echo 2>&1 "... "`   b. `echo 1>&2 "... "`
   c. `echo 1<&2 "... "`   d. `echo 2<$1 "... "`
   e. `echo 2>$1 "... "`

65. Which of the following commands could be used to bring a system into single user mode?
   a. `shutdown now`   b. `telinit 6`
   c. `shutdown -h now`   d. `telinit 0`
   e. `init 0`

66. In the **/etc/suoders** file, what word goes in front of **ALL=(ALL) ALL** to allow members of the group **wheel** to run commands as **root**?
   a. `sudoers`   b. `%wheel`   c. `wheel`
   d. `%sudoers`   e. `#wheel`

67. Which of the following would result in a "true" exit status?
   a. `[ '00' = "0" ]`   b. `[ 00 = 0 ]`
   c. `[ '00' -eq "0" ]`   d. `[ '00' != "00" ]`
   e. `[ '00' -ne "0" ]`

68. Which of the following commands would you use configure the **ntpd** daemon to run in runlevels **2**,**3**,**4**, and **5**?
   a. `runlevel ntpd 2345`   b. `service ntpd 2345`
   c. `ntpd run 2345`   d. `ntpd --levels 2345`
   e. `chkconfig ntpd on`

69. Which of the following commands on a Unix/Linux system displays the processes running on the system?
   a. `psls`   b. `pstop`   c. `toplist`
   d. `listtop`   e. `pstree`

70. If variable **a** might contain nothing (a null value - defined but empty), which command sequence correctly tests for this and prints the date?
   a. `if [ '''' = ''$a'' ] ; then date ; fi`
   b. `if test "" = "$a" ; then date ; fi`
   c. `if test "" -eq $a ; then date ; fi`
   d. `if [ "$a" = * ] ; then date ; fi`
   e. `if [ $a = /dev/null ] ; then date ; fi`

71. Which of the following commands could be used to create a group named **common**?
   a. `gpasswd -a common`   b. `gshadow -a common`
   c. `gpasswd -c common`   d. `groupadd common`
   e. `newgrp common`

72. Which arguments to **mount -o bind** could cause problematic behavior in recursive commands such as `rm -rf`
   a. `/home/user/private /public`
   b. `/var /var/local/dir`
   c. `/var1 /var`
   d. `/home /var/home`
   e. `/var/home /home`

73. Which of the following **PATH** statements makes the most sense?
   a. `PATH=/bin/ls:/etc:/usr/bin`
   b. `PATH=/usr:/bin::/usr/bin:/etc`
   c. `PATH=/bin:/usr/bin:/etc/passwd`
   d. `PATH=/bin/sh:/usr/bin:/etc:/bin`
   e. `PATH=/bin:/bin:/cat:/usr/bin`

74. If the file **foo** in the current directory contains just the line **dbd**, what is the output of the following command: `grep '[b1]' foo`
   a. `no output`   b. `foo`   c. an error message
   d. `dbd`   e. `123`

75. If a script named **bar** contains a loop that starts: `for i do` and the script is executed using this command line:
   ```
   ./bar a ' b d ' e f " g h " a
   ```
   how many times will the loop iterate?
   a. 7 iterations   b. 1 iteration   c. 6 iterations
   d. 8 iterations   e. 9 iterations

76. To resume a stopped process in the background using Job Control, where *N* is the job number of the process and *PID* is its process ID, you would type
    a. **fg** *PID*   *b.* **fg** **%***PID*   *c.* **bg** **%***N*
    d. **bg** **%***PID*   *e.* **fg** *N*

77. Inside a bash shell script, which of the following would expand to the number of arguments passed to the script?
    a. **"$0"**   *b.* **"$@"**   *c.* **"$#"**   *d.* **"$?"**   *e.* **"$*"**

78. If **archive.tgz** is a compressed tar archive, which command could you run to produce a listing of its contents without extracting it?
    a. **tar tzvf archive.tgz**   *b.* **tar tzvf archive**
    c. **tar tgz archive.tgz**   *d.* **tar xzvf archive.tgz**
    e. **tar tgz archive**

79. Which of the following could you use as options for the **tar** command to extract a gzip-compressed archive?
    a. **-czf**   *b.* **ezf**   *c.* **-tgz**   *d.* **egf**   *e.* **xzf**

80. To resume a stopped process as a foreground job, using Job Control, where *N* is the job number of the process and *PID* is its process ID, you would type
    a. **bg** *N*   *b.* **fg** **%***PID*   *c.* **bg** **%***PID*
    d. **fg** **%***N*   *e.* **bg** *PID*

81. Which of these statements is true?
    a. To indicate End-of-File (no more input) to a program, type **[CONTROL]-[D]**.
    b. To interrupt a Unix process from the keyboard, type **[CONTROL]-[D]**.
    c. To erase an entire line of typing, type **[ALT]-[DELETE]**.
    d. The **file** command creates a new, empty file in the current directory
    e. Command **apropos** is an exact synonym for command **man**.

82. To find out whether the **httpd** service was running, you could use which of the following commands?
    a. **chkconfig httpd on**
    b. **service chkconfig httpd**
    c. **chkconfig httpd status**
    d. **chkservice httpd**
    e. **service httpd status**

83. Which of the following commands would you use to install the **httpd** software package apache (and its dependencies) on your CentOS virtual machine?
    a. **yum install httpd**   *b.* **pkginst httpd**
    c. **install pkg httpd**   *d.* **pkg -i httpd**
    e. **yum -i httpd**

84. What is the output of the following sequence of **bash** commands:
    ```
    echo '$foo' | sed -e 's/$/bar/'
    ```
    a. **barfoobar**   *b.* **$foobar**
    c. **bar$foo**   *d.* **barfoo**
    e. no output on screen

85. Given the following command line: **read one two three** which user keyboard input line below will assign the text **bb** to the shell variable named **two**?
    a. **aa:bb:cc**
    b. **aa;bb;cc**
    c. **aa,bb,cc**
    d. **one=aa two=bb three=cc**
    e. **aa bb cc**

86. If **guru=linus** then which one of the following **case** patterns will match this statement: **case "$guru" in**
    a. **"linu?") echo yes ;;**
    b. ***) echo yes ;;**
    c. **lin?) echo yes ;;**
    d. **[linus] | [LINUS]) echo yes ;;**
    e. **(*nus echo yes ;;**

87. Which command sequence correctly searches for the **string** and then prints **OK** if it is found inside the password file?
    a. **if test string /etc/passwd ; then echo OK ; fi**
    b. **if grep string /etc/passwd ; then echo OK ; fi**
    c. **if [test string /etc/passwd] ; then echo OK ; fi**
    d. **if [grep string /etc/passwd] ; then echo OK ; fi**
    e. **if test string = /etc/passwd ; then echo OK ; fi**

88. Which of the following commands would you use to resize an **ext4** file system to consume the remaining free space on its volume?
    a. **resize2fs**   *b.* **fsck.ext4**   *c.* **fsck**
    d. **mkfs.ext4**   *e.* **mkfs**

89. If a shell script named **foo** contains the line:
    ```
    if [ '$3' = "$2" ] ; then echo SAME ; fi
    ```
    then which of the following command lines will always produce **SAME** as output?
    a. **./foo $1 $2 $3**   *b.* **./foo 1 '$3' 2**
    c. **./foo $1 '$2' $3**   *d.* **./foo $3 "$2" $1**
    e. **./foo '$1' "$3" $2**

90. What is the output on your screen of this command line:
    ```
    echo hi | sed -e 's/HI/HO/'
    ```
    a. **ho**   *b.* **HI**
    c. no output on screen   *d.* **HO**
    e. **hi**

91. In a shell script, which of the following will cause the script to print **enter:** and read what the user types into the variable **input**?
    a. **read >enter: <input**   *b.* **read "enter:" input**
    c. **read input "enter:"**   *d.* **read -p "enter:" input**
    e. **read >enter: input<**

92. If `guru=linus` then which one of the following `case` patterns will match this statement: `case "$guru" in`
    a. `guru ) echo yes ;;`
    b. `"linu?" ) echo yes ;;`
    c. `[linus] | [LINUS] ) echo yes ;;`
    d. `l?nus ) echo yes ;;`
    e. `lin? ) echo yes ;;`

93. A shell script named `foo` is executed as follows: `./foo 1 2 "3 4" 5`
    Inside the script is the line: `echo "$3"`
    What is the output on your screen from this line?
    a. `$3`   *b.* `2 3 4`   *c.* `1 2 3`
    d. `3 4`   *e.* `"3`

94. A `crontab` entry of `5 6 * * * /bin/somecommand`
    would run `somecommand` when and how often?
    a. at 6:05am every business day
    b. at 6:05am every day
    c. at 5:06am every day
    d. at 12:05am every business day and Saturday
    e. at 5:06am every business day

95. What is the output of the following sequence of `bash` commands:
    `    echo '$rich' | sed -e 's/$/bar/g'`
    a. `barrichbar`   *b.* `$richbar`
    c. `barrich`   *d.* `bar$rich`
    e. no output on screen

96. Which of the following commands would be used to add the user `user001` to the group `common`?
    a. `usrgrp user001 common`
    b. `groupadd -a common user001`
    c. `gpasswd -a user001 common`
    d. `groupmod -a user001 common`
    e. `useradd user001 common`

97. Which of the following would best describe the ordering of levels in Logical Volume Management (LVM), from bottom to top?
    a. logical volume, physical volume, file system, volume group
    b. physical volume, volume group, logical volume, file system
    c. volume group, logical volume, physical volume, file system
    d. physical volume, logical volume, file system, volume group
    e. volume group, physical volume, file system, logical volume

98. If a script named `bar` contains a loop that starts:
    `    for i in "$@" ; do`
    and the script is executed using this command line:
    `    ./bar 0 ' 1 2 ' 3 4 " 5 6 "`
    how many times will the loop iterate?
    a. 6 iterations   *b.* 7 iterations   *c.* 1 iteration
    d. 8 iterations   *e.* 5 iterations

99. If the current directory contains files `abc`, `bbc`, `cbc`, and `bbc` contains just the line `dbd`, what is the output of the following command: `grep 'bb*' bbc`
    a. `dbd`   *b.* an error message   *c.* `bbc`
    d. no output   *e.* `cbc`

100. In a shell script, which of the following will cause the script to stop and wait until the user enters something at the keyboard?
    a. `<myvar`   *b.* `read <<myvar`   *c.* `read myvar`
    d. `myvar=read`   *e.* `<read`

101. What is the correct syntax to redirect both standard output and standard error into the same output file?
    a. `ls -l 2>&1 >foo`   *b.* `ls -l 2>$1 >foo`
    c. `ls -l >foo 2>$1`   *d.* `ls -l >foo 2>&1`
    e. `ls -l >foo 2>foo`

102. In a shell script, which of the following would result in in the expansion of the positional parameter representing the third argument without processing any special characters inside the expansion?
    a. `"\$3"`   *b.* `$3`   *c.* `\$3`
    d. `"$3"`   *e.* `'$3'`

103. If a shell script `myscript.sh` is called this way:
    `    ./myscript.sh a b c`
    and the first line inside the script below the script header is
    `    shift; echo "$#$1"`
    what is the output of that line?
    a. `2a`   *b.* `2b`   *c.* `3a`   *d.* `4c`   *e.* `3b`

104. Which of the following `mount` options is one of the set of `defaults`?
    a. `remount`   *b.* `user`   *c.* `noauto`
    d. `rw`   *e.* `bind`

105. What command would you use to see the command that `at` job number `2` will run?
    a. `at -l 2`   *b.* `at -v 2`   *c.* `at -m 2`
    d. `at -c 2`   *e.* `atq 2`

106. A shell script named **bar** is executed as follows:
     ./bar "a b" "c d e" f
     Inside the script is the line: **echo "$2"**
     What is the output on your screen from this line?
     a. **$2**   *b.* **b"**   *c.* **b**
     d. **c d e**   *e.* **a b**

107. A **crontab** entry of **0 6 * * * /sbin/somescript**
     would run **somescript** when and how often?
     a. at 12:06am every day
     b. at 12:06am every business day
     c. at 6:00am every day
     d. at 12:06am every business day and Saturday
     e. at 6:00am every business day

108. In the **/etc/suoders** file, what word goes in front of **ALL=(ALL) ALL** to
     allow the user **admin** to run commands as **root**?
     a. **%admin**   *b.* **wheel**   *c.* **#admin**
     d. **admin**   *e.* **sudoers**

109. Which of the following is not an attribute of a Unix/Linux process:
     a. Effective Group ID   *b.* CPU identifier
     c. Effective User ID   *d.* Parent Process ID
     e. Process ID

110. What would be the output of the following command line:
     echo a b | awk '{print NF}'
     a. **NF**   *b.* no output   *c.* **b**
     d. **a b**   *e.* **2**

111. Which of the following programs uses file globbing expressions rather than regular
     expressions for matching:
     a. **vi**   *b.* **sed**   *c.* **awk**   *d.* **find**   *e.* **grep**

112. Which of the following is a proper way to change the **/etc/sudoers** file?
     a. **vim /etc/sudoers**   *b.* **echo > /etc/sudoers**
     c. **vi /etc/sudoers**   *d.* **visudo**
     e. **nano /etc/sudoers**

113. If a shell script named **foo** contains the line:
     if ['$3' = "$2"] ; then echo SAME ; fi
     then which of the following command lines will always produce **SAME** as output?
     a. **./foo 2 '$3' 1**   *b.* **./foo '$1' "$3" $2**
     c. **./foo $1 '$2' $3**   *d.* **./foo $1 $2 $3**
     e. **./foo $3 "$2" $1**

114. If a script named **bar** contains a loop that starts:
     for i in "$*" ; do
     and the script is executed using this command line:
     ./bar 0 ' 1 2 ' 3 4 " 5 6 "
     how many times will the loop iterate?
     a. 8 iterations   *b.* 6 iterations   *c.* 1 iteration
     d. 7 iterations   *e.* 5 iterations

115. If you have a shell script named **myscript** that should run daily as **root** which
     command would you be more likely to run?
     a. **cp myscript /etc/cron.daily**
     b. **crontab < myscript**
     c. **crontab -e myscript**
     d. **crontab -l myscript**
     e. **cp myscript /var/spool/cron**

116. Which line below puts the count of the number of lines in the password file into the
     variable **count**?
     a. **count=$(awk -F: /etc/passwd | wc -l)**
     b. **count=$(wc -l /etc/passwd | awk "print $1")**
     c. **count=$(cat -c /etc/passwd)**
     d. **count=$(wc /etc/passwd | awk echo $1)**
     e. **count=$(wc -l </etc/passwd)**

117. What command would you use to see the command that **at** job number **4** will run?
     a. **at -v 4**   *b.* **atq 4**   *c.* **at -c 4**
     d. **at -m 4**   *e.* **at -l 4**

118. If a script named **bar** contains a loop that starts:
     for i in "$@" ; do
     and the script is executed using this command line:
     ./bar a ' b d ' e f " g h " a
     how many times will the loop iterate?
     a. 6 iterations   *b.* 8 iterations   *c.* 7 iterations
     d. 1 iteration   *e.* 9 iterations

119. Which of the following commands could be used to force the user **user001** to
     change their password the next time they log in?
     a. **force -d 0 user001**   *b.* **passwd -d 0 user001**
     c. **gpasswd user001**   *d.* **chage -d 0 user001**
     e. **passwd user001**

120. If a script named **bar** contains a loop that starts:
     for i in "$*" ; do
     and the script is executed using this command line:
     ./bar a ' b d ' e f " g h " a
     how many times will the loop iterate?
     a. 9 iterations   *b.* 7 iterations   *c.* 1 iteration
     d. 8 iterations   *e.* 6 iterations

121. What would the following command do: **at 4pm**
    a. read commands from stdin to be run once at 4pm
    b. run the user's **crontab** jobs every day at 4pm
    c. issue an error message
    d. run the user's **crontab** jobs at 4pm
    e. read commands from stdin to be run every day at 4pm

122. Inside a bash shell script, which of the following would expand to the exit status of the last command?
    a. **"$?"**   b. **"$*"**   c. **"$#"**   d. **"$@"**   e. **"$0"**

123. Which of the following **PATH** statements makes the most sense?
    a. **PATH=/dev/null:/usr/bin:/etc:/bin**
    b. **PATH=/bin:/bin/cat:/usr/bin**
    c. **PATH=/bin:/ls:/etc:/usr/bin**
    d. **PATH=/dev:/bin:/usr/bin:/etc**
    e. **PATH=/bin:/usr/bin:/etc/passwd**

124. Which command on a Unix/Linux system would you use to run a **tar** command at a less urgent scheduling priority to let other processes with a more urgent scheduling priority run first?
    a. **tar -10**   b. **nice**   c. **fg**
    d. **tar -n**   e. **bg**

125. A shell script named **bar** is executed as follows:
    ```
    ./bar a  "b c"  'a '
    ```
    Inside the script is the line: **head $@**
    How many arguments are passed to the **head** command inside the script?
    a. **2**   b. **3**   c. **6**   d. **4**   e. **5**

126. Which of the following options for **bash** or **sh** might useful for debugging a shell script?
    a. **-r**   b. **-v**   c. **-c**   d. **-z**   e. **-l**

127. If the line, **exit 3**
    is executed in a shell script, what is the result?
    a. termination with an exit status of 3
    b. an invalid argument error message
    c. termination with an exit status of 0
    d. the script breaks out of up to 3 levels of loops
    e. termination after sleeping for 3 seconds

128. If a script named **bar** contains a loop that starts: **for i do**
    and the script is executed using this command line:
    ```
    ./bar a ' b d ' e f " g h "
    ```
    how many times will the loop iterate?
    a. 1 iteration   b. 7 iterations   c. 8 iterations
    d. 6 iterations   e. 5 iterations

129. Fill in the blanks. If you try to _____ a filesystem, and the command fails, you might use the _____ command to look for the cause.
    a. **umount, fuser**   b. **fsck, rmdir**
    c. **mkfs, mkdir**   d. **mount, rm**
    e. **mount, mkfs**

130. Inside a bash shell script, which of the following would expand to the name of the script itself?
    a. **"$*"**   b. **"$#"**   c. **"$?"**   d. **"$@"**   e. **"$0"**

131. Which of the following commands would you use to start the **httpd** daemon, if you had just installed it and if it were not already running?
    a. **httpd service on**   b. **chkconfig httpd on**
    c. **service httpd start**   d. **kill -SIGSTART httpd**
    e. **go httpd**

132. Which of the following signals cannot be handled or ignored?
    a. **SIGINT**   b. **SIGKILL**   c. **SIGHUP**
    d. **SIGTERM**   e. **SIGSUSP**

133. The **cron** system can run commands at most every
    a. day   b. second   c. minute
    d. hour   e. millisecond

134. If the current directory contains files **abc**, **bbc**, **cbc**, and **bbc** contains just the line **dbd**, what is the output of the following command: **grep bb* bbc**
    a. **bbc**   b. an error message   c. **dbd**
    d. **cbc**   e. no output

135. What would be the output of the following command line:
    ```
    echo a b c d | awk '{print NF}'
    ```
    a. **NF**   b. **a b c d**   c. no output
    d. **4**   e. **d**

136. Fill in the blanks. If you try to _____ a filesystem, and the command fails, you might use the _____ command to look for the cause.
    a. **mount, mkfs**   b. **fsck, rm**
    c. **umount, mkdir**   d. **mkfs, rmdir**
    e. **mount, fsck**

137. Which of the following commands would allow a properly configured user to type their own password to become **root** with an environment set up as if they had logged in as **root**?
    a. **su**   b. **sudo**   c. **sudo -s**
    d. **su -**   e. **sudo -i**

138. Which command sequence correctly compares the numbers and prints **OK**?
    a. `if [ ! 2 < 1 ] ; then echo OK ; fi`
    b. `if ( 1 let 2 ) ; then echo OK ; fi`
    c. `if [ 2 > 1 ] ; then echo OK ; fi`
    d. `if ( let 2 > 1 ) ; then echo OK ; fi`
    e. `if [ 1 -lt 2 ] ; then echo OK ; fi`

139. Assuming you are not currently **root** and are a **sudoer**, which of the following commands could you use to simulate a full login as **user100** without knowning their password?
    a. `sudo user100`   b. `sudo su - user100`
    c. `su - user100`   d. `su sudo user100`
    e. `sudo - user100`

140. Which command would appear in your **.bash_profile** file?
    a. `cat .bashrc`   b. `source .bash_profile`
    c. `source ./.bashrc`   d. `.bash_profile source`
    e. `.bashrc source`

141. Which command sequence correctly compares the two numbers and prints **OK**?
    a. `if [ 4 -gt 3 ] ; then echo OK ; fi`
    b. `if ( let 4 > 3 ) ; then echo OK ; fi`
    c. `if [ 4 > 3 ] ; then echo OK ; fi`
    d. `if [ ! 4 <= 3 ] ; then echo OK ; fi`
    e. `if ( ! 4 < 3 ) ; then echo OK ; fi`

142. If variable **mt** might contain nothing (a null value - defined but empty), which command sequence correctly tests for this and prints **OK**?
    a. `if [ "$mt" = "" ] ; then echo OK ; fi`
    b. `if [ "$mt" = * ] ; then echo OK ; fi`
    c. `if [ $mt -eq "" ] ; then echo OK ; fi`
    d. `if [ ''$mt'' = '''' ] ; then echo OK ; fi`
    e. `if [ $mt -eq : ] ; then echo OK ; fi`

143. If a shell script named **foo** contains the line:
    `if [ '$1' = "$2" ] ; then echo SAME ; fi`
    then which of the following command lines will produce **SAME** as output?
    a. `./foo bar 'bar'`   b. `./foo bar '$1'`
    c. `./foo $1 $1`   d. `./foo 1 "$1"`
    e. `./foo 'bar' "bar"`

144. If the file **foo** in the current directory contains just two lines **dbd**, and **123**, what is the output of the following command: `grep '[:alnum]' foo`
    a. `dbd`   b. no output   c. an error message
    d. `123`   e. `foo`

145. Which of these statements is true?
    a. The `ls dir` command looks up the directory argument **dir** in your **$PATH**.
    b. If **/q** is an empty directory, `echo /q/.*` produces an error message.
    c. If **/p** is an empty directory, `ls /p/.*` produces an error message.
    d. Typing `./script` and `bash script` always give identical results.
    e. Either single or double quotes will stop shell GLOB (wildcard) patterns from expanding.

146. If **foo** is a directory that contains only the file **bar** and **/dir1** is an empty directory, what is in **/dir1** after running the following command?
    `rsync -avH foo /dir1`
    a. `dir1`   b. `bar`   c. nothing
    d. a symlink to foo   e. `foo`

147. Which of these statements is true?
    a. you can only make links to files owned by you
    b. you can only remove a file name if the file is writable by you
    c. you can only remove a file name if the file is owned by you
    d. you may be able to rename a file even if you do not own the file
    e. you can change the permissions of any file to which you can write

148. Which of the following commands would you use to install the **fortune** software package (and its dependencies) on your CentOS virtual machine?
    a. `install pkg fortune`   b. `pkginst fortune`
    c. `yum install fortune`   d. `pkg -i fortune`
    e. `yummy fortune`

149. Which of the following **bash PATH** statements makes the most sense?
    a. `PATH=/bin:/usr/bin:/etc`
    b. `PATH=/bin:/bin/cat:/usr/bin`
    c. `PATH=/bin/ls:/etc:/usr/bin`
    d. `PATH=/bin:/usr/bin:/etc/passwd`
    e. `PATH=/bin/sh:/usr/bin:/etc:/bin`

150. In the **/etc/suoders** file, what word goes in front of **ALL=(ALL) ALL** to allow members of the group **admin** to run commands as **root**?
    a. `#admin`   b. `%sudoers`   c. `sudoers`
    d. `admin`   e. `%admin`

151. In a shell **case** structure, the **case** segment that will GLOB match the text **a**, **b**, or **c**, is coded as
    a. `a|b|c )`   b. `a/b/c )`   c. `a\b\c )`
    d. `a,b,c )`   e. `a:b:c )`

152. Inside a bash shell script, which of the following would expand to all of the arguments that were passed to the script, each as a separate word?
    a. `"$#"`   b. `"$0"`   c. `"$*"`   d. `"$?"`   e. `"$@"`

153. Which of the following **PATH** statements makes the most sense?
   a. **PATH=/bin/sh:/usr/bin:/etc:/bin**
   b. **PATH=/bin:/bin/cat:/usr/bin**
   c. **PATH=/etc:/usr/bin:/bin**
   d. **PATH=/bin/ls:/etc:/usr/bin**
   e. **PATH=/bin:/usr/bin:/etc/passwd**

154. Which line below puts the count of the number of lines in the password file into the variable **foo**?
   a. **foo=$(wc /etc/passwd | awk echo $1)**
   b. **foo=$(wc -l </etc/passwd)**
   c. **foo=$(cat -c /etc/passwd)**
   d. **foo=$(awk -F: /etc/passwd | wc -l)**
   e. **foo=$(wc -l /etc/passwd | awk "print $1")**

155. A shell script named **bar** is executed as follows:
   ./bar a "b c" 'a '
   Inside the script is the line: **head "$@"**
   How many arguments are passed to the **head** command inside the script?
   a. **2**   b. **4**   c. **5**   d. **3**   e. **6**

156. Which of the following commands could be used to create a new user named **myuser**, with full name "My User" ?
   a. **newuser myuser -c "My User"**
   b. **newuser -c "My User" myuser**
   c. **useradd -c "My User" myuser**
   d. **usermod -c "My User" myuser**
   e. **passwd -c "My User" myuser**

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