

LX0-104/102-400 Exam Questions

1. Which bash shell configuration files contain parameters that are applied system-wide? (Choose two.)
 - a. /etc/bash.bashrc
 - b. ~/.profile
 - c. ~/.bashrc
 - d. /etc/profile
 - e. /etc/environment

2. You've logged in to your Linux system through the GNOME graphical desktop environment. You've opened a terminal session within GNOME to complete several command-line tasks. Which bash configuration files were used to configure the bash environment within the shell session? (Choose two.)
 - a. /etc/profile
 - b. ~/.profile
 - c. /etc/bashrc
 - d. ~/.bashrc
 - e. ~/.bash_profile

3. In your user's home directory are four hidden bash shell configuration files: ~/.bash_profile, ~/.bash_login, ~/.bashrc, and ~/.profile. Which file will be used by default for bash login shells?
 - a. ~/.bash_profile
 - b. ~/.bash_login

- c. `~/profile`
 - d. `~/bashrc`
4. You want to create a new alias on your system named `ldir` that will run the `ls -al` command when executed. Which command will do this?
- a. `alias --create ldir "ls -al"`
 - b. `alias -new ldir="ls -al"`
 - c. `alias ldir ls -al`
 - d. `alias ldir="ls -al"`
5. Which locale variable is used to define the currency format used in your location?
- a. `LC_MESSAGES`
 - b. `LC_MONETARY`
 - c. `LC_CURRENCY`
 - d. `LC_MEASUREMENT`
6. Which locale environment variable has the highest degree of precedence on a Linux system?
- a. `LC_ALL`
 - b. `LC_MEASUREMENT`
 - c. `LANG`
 - d. `LANGUAGE`

7. Which of the following terms refers to the clock that runs via software within the Linux kernel?
- a. Hardware clock
 - b. Time server
 - c. System clock
 - d. Local time
8. Where are time zone settings stored? (Choose two.)
- a. /etc/sysconfig/services
 - b. /etc/timezone
 - c. /etc/sysconfig/clock
 - d. /etc/systemclock
 - e. /etc/environment
9. Which environment variable specifies a Linux system's time zone?
- a. TZ
 - b. TIME
 - c. TIME_ZONE
 - d. CLOCK
10. Which configuration files are used to store your X server configuration settings? (Choose two.)
- a. /etc/X11/XF86Config
 - b. /etc/sysconfig/windowmanager

- c. `/etc/sysconfig/displaymanager`
 - d. `/etc/X11/xorg.conf`
 - e. `/etc/X11/xinit`
11. Which section of the `/etc/X11/xorg.conf` file is used to specify global X server options?
- a. Files
 - b. Module
 - c. Modes
 - d. ServerFlags
12. The `ServerLayout` section within the `/etc/X11/xorg.conf` file ties together two other types of sections found within the file. What are they? (Choose two.)
- a. Screen
 - b. Modes
 - c. Device
 - d. Monitor
 - e. InputDevice
13. Which environment variable specifies which display manager is loaded by default when the X environment is initially loaded?
- a. `XAUTHORITY`
 - b. `DISPLAY`
 - c. `WINDOWMANAGER`

d. DISPLAYMANAGER

14. Your Linux distribution uses the LightDM display manager with the Unity greeter.

Currently users must select from a list of available usernames to log in. You need to reconfigure the Unity greeter such that users can manually enter a username to log in. Which directive should you include in the LightDM configuration to do this?

- a. allow-guest=true
- b. greeter-show-manual-login=true
- c. greeter-hide-users=false
- d. greeter-hide-users=true

15. Your Linux distribution currently uses the LightDM display manager with the Unity greeter. You want to reconfigure it to use the KDE greeter. Which parameter must you change in the LightDM configuration to do this?

- a. user-session
- b. greeter-session
- c. allow-guest
- d. greeter-show-manual-login

16. Which accessibility setting allows users to lock modifier keys such as Ctrl and Shift?

- a. RepeatKeys
- b. ToggleKeys
- c. SlowKeys
- d. StickyKeys

17. Which mouse accessibility setting allows you to send a mouse click whenever the mouse pointer stops moving for a specified amount of time?

- a. Simulated secondary click
- b. Dwell click
- c. Mouse gestures
- d. Delay keys

18. When you are using local authentication on a Linux system, which file contains the passwords for your user accounts?

- a. /etc/passwd
- b. /etc/passwords
- c. /etc/gshadow
- d. /etc/shadow

19. Consider the following entry from the /etc/passwd file:

ksanders:x:1001:100:Kimberly Sanders:/home/ksanders:/bin/bash

What user ID (UID) has been assigned to this user account?

- a. ksanders
- b. 1001
- c. 100
- d. Kimberly Sanders

20. Consider the following entry from the `/etc/shadow` file:

```
ksanders:$2a$05$KL1DbTBqpSEMiL.2FoI3ue4bdyR.eL6GMKs7MU6.nZI5SCC7/RE  
US:15043:1:60:7:5::
```

In how many days will this account be disabled after the user's password has expired?

- a. One day
- b. Seven days
- c. Five days
- d. Null value (never)

21. Where is the UID number range that can be assigned to new user accounts defined?

- a. `/etc/login.defs`
- b. `/etc/default/useradd`
- c. `/etc/skel`
- d. `/etc/passwd`

22. You need to create a new user account for a user named George Sanders on your Linux system. You want to specify a user name of `gsanders`, a full name of George Sanders, a default shell of `/bin/bash`, and that a home directory be created. Which command will do this?

- a. `useradd -c "George Sanders" -m -s "/bin/bash" gsanders`
- b. `useradd -c "George Sanders" -m -s "/bin/bash" -u gsanders`
- c. `usermod -c "George Sanders" -m -s "/bin/bash" gsanders`
- d. `useradd -c "George Sanders" -s "/bin/bash" gsanders`

23. The asanders user has recently married and changed her last name to Ebbert. Which command can be used to update her user account with her new last name?

- a. `usermod -l asanders -c "Amber Ebbert" aebbert`
- b. `usermod -l aebbert -c "Amber Ebbert" -u asanders`
- c. `usermod -l aebbert -c "Amber Ebbert" asanders`
- d. `usermod -c "Amber Ebbert" asanders`

24. Where is the GID number range that can be assigned to new groups defined?

- a. `/etc/login.defs`
- b. `/etc/default/useradd`
- c. `/etc/skel`
- d. `/etc/default/groupadd`

25. You need to add the aebbert user to the dbusers group. Which commands can be used to do this? (Choose two.)

- a. `useradd -g dbusers aebbert`
- b. `usermod aebbert -aG dbusers`
- c. `groupadd -A "aebbert" dbusers`
- d. `groupmod -A "aebbert" dbusers`

26. You need to run the updatedb command two hours in the future. Which commands will do this? (Choose two.)

- a. `at now + 2 hours`
- b. `at updatedb -t +120m`

- c. at now + 120 minutes
 - d. at now + 2 hours updatedb
27. Which at command can be used to view a listing of pending at jobs?
- a. at -l
 - b. atq
 - c. atrm
 - d. at -listjobs
28. You need to run the tar command to back up the /home directory using the tar -cvf /media/usb/backup.tar /home command every day of every month, except Sundays, at 11:05 p.m. Which crontab entry will accomplish this?
- a. 5 11 * * 1-6 /bin/tar -cvf /media/usb/backup.tar /home
 - b. 5 23 * * * /bin/tar -cvf /media/usb/backup.tar /home
 - c. 5 23 * * 1-6 /bin/tar -cvf /media/usb/backup.tar /home
 - d. 11 5 * * 0-5 /bin/tar -cvf /media/usb/backup.tar /home
29. Which file is used to restrict which users are allowed to create crontab files on your Linux system? (Choose two.)
- a. /etc/cron.deny
 - b. /etc/cronusers.deny
 - c. /etc/hosts.deny
 - d. /etc/cron.allow
 - e. /etc/hosts.allow

- f. `/etc/cronusers.allow`
30. You are logged in to your Linux system as the `tuxuser` and need to set up a cron job. Which command can be used to edit `tux`'s crontab file?
- a. `crontab -e`
 - b. `crontab -l`
 - c. `crontab -r`
 - d. `crontab -i`
 - e. `vi /var/spool/cron/tabs/tux`
31. You're writing a script that will require the end user to enter the name of his or her supervisor. Which of the following lines will input the user's response into a variable named `SUP`?
- a. `read SUP`
 - b. `input SUP`
 - c. `prompt SUP`
 - d. `query SUP`
32. You've just created a new script in your home directory named `runme.sh`. When you try to run your script while in your home directory using the `./runme.sh` command from the shell prompt, you see the following error:
- ```
bash: ./runme.sh: Permission denied
```
- Which resolution will fix this issue?
- a. Copy the file to the `~/bin` directory.
  - b. Add your home directory to the `PATH` environment variable.

- c. Enter `chmod u+x runme.sh` at the shell prompt.
  - d. Change the she-bang line of the script to `#!/bin/sh`.
33. You need to assign a numeric value to a variable named NUM1 in a script so that you can perform mathematical operations on it. Which line can you add to your script to do this?
- a. `declare -i NUM1`
  - b. `type NUM1 integer`
  - c. `declare -r NUM1`
  - d. `declare -f NUM1`
34. You need to write an if/then/else statement in a script that will test to see if a file named `/var/opt/mydb/mydb` exists and has the write permission assigned for the user running the script. Which statement will do this?
- a. `if test -e /var/opt/mydb/mydb; then...`
  - b. `if test -w /var/opt/mydb/mydb; then...`
  - c. `if test -f /var/opt/mydb/mydb; then...`
  - d. `if test -x /var/opt/mydb/mydb; then...`
35. You need to implement a for loop in a script. You want to use the `seq` command to generate a sequence of numbers that starts at 1, increments by 1, and stops at 100. Which statements will do this? (Choose two.)
- a. `for i in `seq 1 5 100``
  - b. `for i in `seq 100``
  - c. `for i in `seq 1 1 100``

d. `for i in `seq 1-100``

36. Which script structure executes over and over until a specified condition is no longer true?

- a. For loop
- b. Case
- c. While loop
- d. Until loop

37. Which protocols operate at the Network layer of the OSI model? (Choose two.)

- a. IP
- b. TCP
- c. UDP
- d. ICMP
- e. HTTP

38. Which port is used by the FTP protocol for its control connection?

- a. 20
- b. 21
- c. 25
- d. 110
- e. 137

39. Which IP addresses are private (sometimes called “reserved”) addresses? (Choose two.)

- a. 11.23.5.254
- b. 172.17.8.1
- c. 10.254.254.1
- d. 192.169.1.10
- e. 137.65.5.5

40. Consider the following IP address: 172.17.8.10/22. Which subnet mask is assigned to this address?

- a. 255.255.252.0
- b. 255.255.0.0
- c. 255.255.255.0
- d. 255.255.255.252

41. You need to assign the eth0 interface an IP address of 172.17.8.1 with a subnet mask of 255.255.0.0 and a broadcast address of 172.17.255.255. Which command will do this?

- a. `ifconfig eth0 172.17.8.1 mask 255.255.0.0 bcast 172.17.255.255`
- b. `ifconfig 172.17.8.1 netmask 255.255.0.0 broadcast 172.17.255.255`
- c. `ifconfig eth0 172.17.8.1 subnetmask 255.255.0.0 bcast 172.17.255.255`
- d. `ifconfig eth0 172.17.8.1 netmask 255.255.0.0 broadcast 172.17.255.255`

42. Which directive in `/etc/sysconfig/network/ifcfg-eth0` is used to specify whether the interface is configured with static IP address information or with dynamic IP address information from a DHCP server?
- a. STARTMODE
  - b. BOOTPROTO
  - c. IPADDR
  - d. USERCONTROL
43. One of your Linux workstations has been configured with an incorrect default gateway router address. Which file do you need to edit to correct this?
- a. `/etc/sysconfig/network/routes`
  - b. `/etc/sysconfig/network/ifcfg-eth0`
  - c. `/etc/hostname`
  - d. `/etc/resolv.conf`
44. For security reasons, you want your Linux system to always try to resolve hostnames using your DNS server before trying to resolve them using the `/etc/hosts` file. Which file can you use to configure the name resolver order?
- a. `/etc/resolv.conf`
  - b. `/etc/sysconfig/network/ifcfg-eth0`
  - c. `/etc/nsswitch.conf`
  - d. `/etc/sysconfig/services`
45. Which `netstat` command can be used to view performance statistics about the network interfaces in your Linux system?

- a. netstat -l
  - b. netstat -i
  - c. netstat -r
  - d. netstat -s
46. Which directives in the /etc/cups/cupsd.conf file must be enabled to share your local printers with other CUPS-compatible systems on the network? (Choose two.)
- a. DefaultPolicy
  - b. BrowseAddress
  - c. Listen
  - d. Policy
  - e. Browsing
47. Which term refers to gradual time adjustments made by the NTP daemon to your system clock when the time difference between your local system and the NTP time provider is less than 128 milliseconds?
- a. Stepping
  - b. Slewing
  - c. Drift
  - d. Jitter
48. You've just added a new e-mail alias to the /etc/aliases file for use with the postfix MTA on your Linux system. Which command do you now need to run to apply the change to the file?

- a. newaliases
  - b. postfix –reload
  - c. postfix –newaliases
  - d. postfix –D
  - e. updatealiases
49. You are working with data in a MySQL database table named customers. The fields in this table are first, last, street, city, state, zip, and phone. You want to retrieve records with a value of 83401 in the zip field. Which SQL command will do this?
- a. UPDATE customers WHERE zip='83401'
  - b. SELECT zip='83401' FROM customers;
  - c. SELECT \* FROM customers WHERE zip='83401';
  - d. SELECT \* FROM customers;
  - e. VIEW \* FROM customers WHERE zip='83401';
50. The /etc/sudoers file on your Linux system is configured by default such that users must supply the root password when using sudo. You want to change this such that they only must supply their own password to use sudo. Which directives in the /etc/sudoers file must be commented out to do this? (Choose two.)
- a. Defaults env\_keep
  - b. root ALL=(ALL) ALL
  - c. Defaults env\_reset
  - d. Defaults targetpw
  - e. ALL ALL=(ALL) ALL



51. You need to use the `chage` command to specify a minimum password age of five days, a maximum password age of 60 days, and five warning days for the `tux` user.

Which command uses the correct syntax to do this?

- a. `chage -m 5 -M 5 -W 60 tux`
- b. `chage -m 60 -M 5 -W 5 tux`
- c. `chage tux -m 5 -M 60 -W 5`
- d. `chage -m 5 -M 60 -W 5 tux`

52. The existence of which file prevents everyone except for root from logging in?

- a. `/etc/nologin`
- b. `/etc/pam.d/login`
- c. `/lib/security/pam_nologin.so`
- d. `/usr/bin/rlogin`

53. Which command will search for files on your Linux system that have SUID permissions set?

- a. `find / -type f -perm -g=s -ls`
- b. `find / -type f -perm -u=s -ls`
- c. `find / -type f -perm -u=rwx -ls`
- d. `find / -type f -perm -g=rwx -ls`
- e. `find / -type f -perm -o=rwx -ls`

54. Which commands will perform a scan for open TCP ports on the local system?

(Choose two.)

- a. `nmap -sT localhost`
- b. `netstat -l`
- c. `nmap -sU localhost`
- d. `netstat -i`
- e. `netstat -r`

55. Which syslog facility can be used to capture log messages from an application you develop yourself?

- a. `user`
- b. `authpriv`
- c. `daemon`
- d. `local1`

56. Which directive in a given service's xinetd configuration file specifies whether or not xinetd is allowed to start the daemon when requested?

- a. `server_args`
- b. `server`
- c. `disable`
- d. `wait`

57. Which private host keys are used by the sshd daemon during an SSH version 2 session? (Choose two.)

- a. `etc/ssh/ssh_host_rsa_key`
  - b. `/etc/ssh/ssh_host_key`
  - c. `/etc/ssh/ssh_host_dsa_key`
  - d. `/etc/ssh/ssh_host_key.pub`
  - e. `etc/ssh/ssh_host_rsa_key.pub`
58. To harden the `sshd` daemon running on your Linux system, you decide to configure it to listen for SSH requests on a port other than the default of 22. Which directive in your `etc/ssh/sshd_config` file can you use to do this?
- a. `Port`
  - b. `BindAddress`
  - c. `Protocol`
  - d. `Tunnel`
59. You want to redirect the display from the X server on one Linux system to another Linux client system securely through an SSH tunnel. Which directive in the `/etc/ssh_config` file on the X server system do you need to configure to allow this?
- a. `Protocol`
  - b. `LocalCommand`
  - c. `ForwardX11`
  - d. `PasswordAuthentication`
60. To configure public key authentication, you first need to create the public/private key pair on the client system so that you can send the public key to the SSH server. Which commands will do this? (Choose two.)

- a. `ssh-keygen -t rsa`
- b. `ssh-keygen -t dsa`
- c. `ssh-add ~/.ssh/id_rsa`
- d. `ssh-add ~/.ssh/id_dsa`
- e. `ssh-agent bash`

## **Quick Answer Key**

1. A, D
2. C, D
3. A
4. D
5. B
6. A
7. C
8. B, C
9. A
10. A, D
11. D
12. A, E
13. C
14. B
15. B
16. D
17. B
18. D
19. B
20. C
21. A
22. A

- 23. C
- 24. A
- 25. B, D
- 26. A, C
- 27. B
- 28. C
- 29. A, D
- 30. A
- 31. A
- 32. C
- 33. A
- 34. B
- 35. B, C
- 36. C
- 37. A, D
- 38. B
- 39. B, C
- 40. A
- 41. D
- 42. B
- 43. A
- 44. C
- 45. B

46. B, E

47. B

48. A

49. C

50. D, E

51. D

52. A

53. B

54. A, B

55. D

56. C

57. A, C

58. A

59. C

60. A, B

## Answer Explanations

1. A and D are correct. Either `/etc/bash.bashrc` or `/etc/profile` (depending on the type of bash shell) is used to provide default configuration parameters for the bash shell that are applied system-wide.

B, C, and E are incorrect. B and C are incorrect because they contain bash configuration parameters that are unique to the current user. E is incorrect because it contains configuration parameters used by the `pam_env` module.

2. C and D are correct. Because the terminal session is a non-login shell, the `/etc/bashrc` (or `/etc/bash.bashrc`) and `~/.bashrc` files are used to configure the bash shell environment.

A, B, and E are incorrect. Each of these files is used on various distributions to configure the login shell environment. Because the terminal session opened here is a non-login shell, these files are not used.

3. A is correct. By default, when a login shell session is started, bash will search for the `~/.bash_profile`, `~/.bash_login`, or `~/.profile` file, in this order. It uses the first file it finds and ignores all the rest.

B, C, and D are incorrect. By default, when a login shell session is started, bash will search for the `~/.bash_profile`, `~/.bash_login`, or `~/.profile` file, in this order. It uses the first file it finds and ignores all the rest. The `~/.bashrc` file is only used for non-login shells.

4. D is correct. The alias `ldir="ls -al"` command will create a new alias on your system named `ldir` that will run the `ls -al` command when executed.



A, B, and C are incorrect. Each of these answers uses incorrect syntax for the alias command.

5. B is correct. The LC\_MONETARY environment variable defines the currency format used in your location.

A, C, and D are incorrect. The LC\_MESSAGES locale variable configures natural language messages. The LC\_MEASUREMENT locale variable configures the default measurement unit. There is no local environment variable named LC\_CURRENCY defined by default on Linux.

6. A is correct. If the LC\_ALL variable is defined, its value is used and the values assigned to all other LC variables are not checked.

B, C, and D are incorrect. If the LC\_ALL variable is defined, its value is used and the values assigned to all other LC variables are not checked. If LC\_ALL is undefined, then the specific LC variable in question is checked. If the specific LC variable has a value, it is used. If the LC variable in question has a null value, then the LANG environment variable is used. The LANGUAGE local variable only overrides the LC\_MESSAGES variable.

7. C is correct. The system clock runs via software inside the Linux kernel itself. It is driven by an ISA timer interrupt and is measured as the number of seconds since 00:00:00 January 1, 1970 UTC.

A, B, and D are incorrect. The hardware clock is the clock running within the BIOS of your motherboard. A time server is a time provider on the network that systems can synchronize time with. Local time specifies that the hardware clock in a Linux system is set to the local time instead of UTC.

8. B and C are correct. Some distributions (such as Ubuntu) use the `/etc/timezone` file to set the time zone, whereas others (such as openSUSE) use the `/etc/sysconfig/clock` file.

A, D, and E are incorrect. The `/etc/sysconfig/services` file is used to determine how services are restarted after an update. The file in D doesn't exist and is a distracter. The `/etc/environment` file is used by the `pam_env` module.

9. A is correct. The `TZ` environment variable sets the system's time zone. You can change time zones from the shell prompt by setting the value of the `TZ` variable and then exporting it.

B, C, and D are incorrect. These variables don't exist by default on a Linux system and are distracters.

10. A and D are correct. If your distribution uses X.org, then the X server configuration settings are saved in `/etc/X11/xorg.conf`. If your distribution uses XFree86, then the X server configuration settings are saved in `/etc/X11/XF86Config`.

B, C, and E are incorrect. The `/etc/sysconfig/windowmanager` file is used to specify which window manager (such as GNOME or KDE) your system uses. The `/etc/sysconfig/displaymanager` file specifies which X server your system has implemented. The `/etc/X11/xinit` file is an executable that is run by the `startx` script to initialize an X session from the command prompt.

11. D is correct. The `ServerFlags` section specifies global X server options.

A, B, and C are incorrect. The `Files` section tells the X server where to find the files it needs to do its job, such as font files and input device files. The `Module` section tells the X server to load certain server extension and font rasterizer modules at startup. The `Modes` section defines a video mode the X server may use.

12. A and E are correct. The `ServerLayout` section within the `/etc/X11/xorg.conf` file binds together one or more `Screen` section(s) and one or more `InputDevice` section(s).

B, C, and D are incorrect. The `Modes`, `Device`, and `Monitor` sections are not included within the `ServerLayout` section of the `/etc/X11/xorg.conf` file.

13. C is correct. The `WINDOWMANAGER` environment variable contains the path to the display/window manager your X system will use by default (for example, `/usr/bin/gnome`).

A, B, and D are incorrect. The `XAUTHORITY` environment variable specifies the cookie file used to authorize you to connect to the X server. The `DISPLAY` variable specifies where the output from the X server is sent. The `DISPLAYMANAGER` variable does not exist by default on a Linux system and is a distracter.

14. B is correct. You can configure `LightDM` to allow manual logins. By default, the `Unity` greeter doesn't allow you to manually enter a username when logging in to the system. You can reconfigure `Unity` to allow this by creating the appropriate file in `/etc/lightdm/lightdm.conf.d/` and entering `"greeter-show-manual-login=true"`.

A, C, and D are incorrect. The `allow-guest=true` directive enables guest logins to the system. The `greeter-hide-users` directive is used to hide or show a list of possible user accounts that can be used for authentication.

15. B is correct. You can change which greeter `LightDM` uses by creating the appropriate file in `/etc/lightdm/lightdm.conf.d/` and using `greeter-session=<file_name>` to specify the name of a greeter file (which has a `.desktop` extension) that you want to use in `/usr/share/xgreeters`.

A, C, and D are incorrect. The `user-session` directive changes the default session type used by LightDM. The `allow-guest` directive enables or disables guest logins to the system. The `greeter-show-manual-login` directive allows users to manually specify a user account to use for authentication.

16. D is correct. `StickyKeys` allows users to lock modifier keys such as Ctrl and Shift.

This enables users to complete keyboard tasks with one finger that would normally require two or more fingers.

A, B, and C are incorrect. `RepeatKeys` configures the keyboard to allow the user extra time to release a pressed key before sending multiple keystrokes. `ToggleKeys` sounds an audible alert if either the Caps Lock key or the Num Lock key is on. `SlowKeys` configures the keyboard such that the user must hold a key down for a specified period of time before the keystroke is actually sent.

17. B is correct. The `dwell click` option sends a mouse click whenever the mouse pointer stops moving for a specified amount of time.

A, C, and D are incorrect. The `simulated secondary click` option allows you to send a double-click by holding down the primary mouse button for a specified amount of time. `Mouse gestures` allow you to complete a certain task when you move the mouse in a specific way. `Delay keys` insert a slight delay between keystrokes to prevent the keyboard from sending unintentional keystrokes.

18. D is correct. The `/etc/shadow` file contains passwords for your user accounts.

A, B, and C are incorrect. The `/etc/passwd` file contains your user accounts. The `/etc/passwd` file is not used for local authentication and is a distracter. The `/etc/gshadow` file contains passwords for your groups.

19. B is correct. The third field in each user entry in `/etc/passwd` specifies the user's ID number (UID). In this case, it's 1001.

A, C, and D are incorrect. A is incorrect because it specifies the username. C is incorrect because it specifies the group ID (GID) of user's primary group. D is incorrect because it specifies the user's full name.

20. C is correct. The seventh field in each record in `/etc/shadow` specifies the number of days to wait after a password has expired to disable the account.

A, B, and D are incorrect. A is incorrect because it specifies the minimum number of days (1) required before a password can be changed. B is incorrect because it specifies the number of days prior to password expiration before the user will be warned of the pending expiration. D is incorrect because it is assigned to the eighth field, which specifies the number of days since January 1, 1970, after which the account will be disabled.

21. A is correct. The `/etc/login.defs` file contains values you can use for the GID and UID parameters when creating an account with `useradd`. It also contains defaults for creating passwords in `/etc/shadow`.

B, C, and D are incorrect. The `/etc/default/useradd` file contains defaults used by the `useradd` utility. The `/etc/skel` directory contains default directories and files that are automatically copied to the home directory of newly created users. The `/etc/passwd` file contains user account records.

22. A is correct. The `useradd -c "George Sanders" -m -s "/bin/bash" gsanders` command creates a new user account for a user named George Sanders with a user name of `gsanders`, a full name of George Sanders, a default shell of `/bin/bash`, and a home directory.

B, C, and D are incorrect. B is incorrect because it uses incorrect syntax for the `useradd` command. C is incorrect because it uses an incorrect command (`usermod`). D is incorrect because it omits the `-m` option, which is required to create a home directory.

23. C is correct. The `usermod -l aebbert -c "Amber Ebbert" asanders` command changes the full name and the username of the user account.

A, B, and D are incorrect. A is incorrect because it reverses the old username and new username parameters. B is incorrect because it uses the `-u` option incorrectly (it is used to change the UID assigned to the account). D is incorrect because although it changes the user's full name, it fails to change the user's username.

24. A is correct. The default parameters for new group accounts, including the GID number, are contained in the `/etc/login.defs` file.

B, C, and D are incorrect. The `/etc/default/useradd` file contains defaults used by the `useradd` utility. The `/etc/skel` directory contains default directories and files that are automatically copied to the home directory of newly created users. The `/etc/default/groupadd` file isn't used and is a distracter.

25. B and D are correct. The `groupmod -A "aebbert" dbusers` command can be used to add the `aebbert` user account to the `dbusers` group. The `usermod aebbert -aG dbusers` command will accomplish the same thing.

A and C are incorrect. The `useradd` and `groupadd` commands can't be used to add a user to a group.

26. A and C are correct. Both of these commands will configure the command that follows to run two hours in the future.

B and D are incorrect. B is incorrect because it doesn't use correct at command syntax. D is incorrect because it includes the name of the command to run on the at command line, which is not correct.

27. B is correct. The atq command can be used to view a listing of pending at jobs.

A, C, and D are incorrect. The at command can't be used to display pending jobs. The atrm command is used to remove pending jobs.

28. C is correct. This line will run the tar command to back up the /home directory using the tar -cvf /media/usb/backup.tar /home command every day of every month, except Sundays, at 11:05 p.m.

A, B, and D are incorrect. A is incorrect because it runs the tar command at 11:05 a.m. instead of p.m. B is incorrect because it runs the tar command every day of the week. D is incorrect because it runs the cron command every morning at 5:11 a.m., Sunday–Friday.

29. A and D are correct. If /etc/cron.deny exists, then the users in that file are denied the ability to create crontabs. All other users can by default. If /etc/cron.allow exists, then only the users in that file are allowed to create crontabs. All other users are denied by default.

B, C, E, and F are incorrect. B and F are incorrect because they are not used to control cron access and are distracters. C and E are incorrect because they are used by network services to restrict access to specific hosts on the network.

30. A is correct. The crontab -e command will create a new crontab for the user in /var/spool/cron/tabs and open it in the vi text editor.

B, C, D, and E are incorrect. The `crontab -l` command lists the contents of your user's crontab file. The `crontab -r` and `crontab -i` commands delete your user's crontab file. E is incorrect because it opens your user's crontab file directly in the vi text editor, which shouldn't be done.

31. A is correct. The `read` command is used to pause the script and prompt the user to provide some type of input, which is assigned to the specified variable.

B, C, and D are incorrect. The `input`, `prompt`, and `query` commands can't be used to read user input.

32. C is correct. The error shown is caused by not having the execute permission set for the user trying to run the script. Entering `chmod u+x runme.sh` at the shell prompt will allow the user who owns the file to run it.

A, B, and D are incorrect. A and B are incorrect because they resolve path-related problems, which aren't an issue in this scenario. D is incorrect because it changes the command interpreter to the `sh` shell, which isn't necessary in this scenario.

33. A is correct. The `declare -i NUM1` statement specifies that the `NUM1` variable contains integers.

B, C, and D are incorrect. Although declaring a variable is sometimes called "typing" a variable, `type` is not a valid shell command. The `declare -r` statement creates a read-only variable that can't be changed (essentially, it becomes a constant). The `declare -f` statement is used to define a function.

34. B is correct. The `test -w` command checks to see if the specified file exists and if the write permission is granted.



A, C, and D are incorrect. The test `-e` command only checks to see if the specified file exists. The test `-f` command checks to see if the specified file exists and if it is a regular file. The test `-x` command checks to see if the specified file exists and if the execute permission is granted.

35. B and C are correct. If you specify a single value with `seq`, the sequence starts at 1, increments by 1, and ends at the specified value. If you specify three values, the sequence starts at the first value, increments by the second value, and ends at the third value.

A and D are incorrect. A is incorrect because it increments by 5 instead of 1. D is incorrect because it doesn't use the correct syntax for the `seq` command.

36. C is correct. A while loop executes over and over until a specified condition is no longer true.

A, B, and D are incorrect. A for loop executes a specific number of times. A case statement evaluates only once. An until loop runs over and over as long as the condition is false. As soon as the condition is true, it stops.

37. A and D are correct. The IP and ICMP protocols operate at the Network layer of the OSI model.

B, C, and E are incorrect. The TCP and UDP protocols operate one layer up from the IP and ICMP protocols at the Transport layer of the OSI model. The HTTP protocol operates at the highest layer (Application) of the OSI model.

38. B is correct. The FTP protocol uses two ports: one for a control connection (21) and one for data (20).

A, C, D, and E are incorrect. Port 20 is used by the FTP protocol for its data connection. Port 25 is used by the SMTP protocol for transferring mail messages. Port 110 is used by the POP3 protocol to transfer e-mail messages from an MTA to an MUA. Port 137 is used by the SMB protocol via NetBIOS to share files and printers.

39. B and C are correct. The reserved class B range of IP addresses is 172.16.0.0–172.31.255.255, whereas the reserved class A range is 10.0.0.0–10.255.255.255.

A, D, and E are incorrect. Each of these answers contains a public IP address that must be registered if the associated host is connected to a public network.

40. A is correct. The /22 prefix length indicates the first two octets of the subnet mask (16 bits) are populated, plus six additional bits in the third octet.

B, C, and D are incorrect. The prefix length for B would be /16. The prefix length for C would be /24. The prefix length for D would be /30.

41. D is correct. This command will assign the eth0 interface an IP address of 172.17.8.1, with a subnet mask of 255.255.0.0 and a broadcast address of 172.17.255.255.

A, B, and C are incorrect. A and C are incorrect because they don't use the correct parameters for setting the subnet mask and broadcast address. B is incorrect because it omits the network interface being configured.

42. B is correct. The BOOTPROTO parameter can be set to a value of STATIC to use static IP address assignments or to DHCP to configure dynamic IP addressing.

A, C, and D are incorrect. STARTMODE determines whether the interface is started automatically or manually. IPADDR assigns an IP address to the interface but only

works if BOOTPROTO is set to STATIC. USERCONTROL determines whether standard user accounts are allowed to manage the interface.

43. A is correct. All of your routes are configured in the `/etc/sysconfig/network/routes` file.

B, C, and D are incorrect. B is incorrect because it is used to configure IP addressing information but doesn't contain routing information. C is incorrect because it is used to configure the system's hostname. D is incorrect because it is used to configure your name server's IP address.

44. C is correct. You can use the `/etc/nsswitch.conf` (name service switch) file to define the order in which services will be used for name resolution.

A, B, and D are incorrect. A is incorrect because it is used to configure the IP address of the DNS server but doesn't configure the name service order. B is incorrect because it is used to configure IP addressing information but doesn't contain name resolution information. D is incorrect because it is used to configure how services will behave after they are updated.

45. B is correct. The `netstat -i` command can be used to view performance statistics about the network interfaces in your Linux system, including transmit (TX) and receive (RX) statistics.

A, C, and D are incorrect. The `netstat -l` command displays a list of listening sockets on your network interface. The `netstat -r` command displays your routing table. The `netstat -s` command displays summary information for each IP protocol.

46. B and E are correct. The Browsing directive specifies whether or not cupsd will announce its printers using broadcasts on the network. The BrowseAddress directive

specifies the broadcast address cupsd should use to announce its printers. You should set this directive to the broadcast address of your network segment.

A, C, and D are incorrect. The DefaultPolicy directive specifies the default policy to use for IPP operation. The Listen directive specifies a network address and port to listen for connections. The Policy directive specifies IPP operation access control limits.

47. B is correct. If the time difference between the provider and the consumer is small (less than 128 milliseconds), then NTP adjusts the time on the consumer gradually. This is called slewing.

A, C, and D are incorrect. If the time difference between provider and consumer is relatively large, then time adjustments are made quickly on the consumer (stepping). NTP measures and corrects for incidental clock frequency errors (called drift). Jitter is the estimated time difference between the consumer and the provider since the last time poll.

48. A is correct. When done configuring aliases, you must run the newaliases command at the shell prompt as root to enable them.

B, C, D, and E are incorrect. B, C and E are incorrect because they use invalid commands. D is incorrect because it is used to start Postfix in debug mode.

49. C is correct. The `SELECT * FROM customers WHERE zip=83401;` command will retrieve records from the customers table with a value of 83401 in the zip field.

A, B, D, and E are incorrect. Responses A, B, and E are incorrect because they use invalid SQL commands. D is incorrect because it will select all records from the customers table.

50. D and E are correct. These two directives must be commented out in the `/etc/sudoers` file; otherwise, users must know the root password to use `sudo` to run commands as root.

A, B, and C are incorrect. The `Defaults env_keep` and `Defaults env_reset` directives are used to manage environment variables when using `sudo`. The `root ALL=(ALL) ALL` directive is used to define root user privileges.

51. D is correct. The `chage -m 5 -M 60 -W 5 tux` command specifies a minimum password age of five days, a maximum password age of 60 days, and five warning days for the `tux` user.

A, B, and C are incorrect. Each uses incorrect syntax for the `chage` command or for the requirements of the given scenario.

52. A is correct. As long as the `/etc/nologin` file exists, no one but root is allowed to log in. Any text you enter in the file will be displayed if a user does try to log in.

B, C, and D are incorrect. B and C are incorrect because they are part of the `nologin` process. They are used to configure PAM on your Linux system to check for the existence of `/etc/nologin` and deny logins if it is there. D is incorrect because it is used to establish remote login sessions.

53. B is correct. The `find / -type f -perm -u=s -ls` command will search for files on your Linux system that have SUID permissions set.

A, C, D, and E are incorrect. A is incorrect because it searches for files with the SGID permission set. C, D, and E are incorrect because they search for files that have `rwX` permissions set for user, group, and others, respectively.

54. A and B are correct. The `nmap -sT localhost` command will scan for open TCP ports on the local host, whereas the `netstat -l` command will generate a list of listening sockets (open ports) on the local host (both TCP and UDP).

C, D, and E are incorrect. C is incorrect because it scans for open UDP ports. D is incorrect because it generates network interface statistics. E is incorrect because it displays the routing table.

55. D is correct. The `local0`–`local7` facilities can be used to capture log messages from applications you develop yourself.

A, B, and C are incorrect. The `user` facility is used for user-related log messages. The `authpriv` facility is used by all services associated with system security or authorization. The `daemon` facility is used by daemons that do not have their own dedicated facility.

56. C is correct. The `disable` directive specifies whether or not `xinetd` is allowed to start the daemon when requested. If it is set to `yes`, the daemon will not be started when requested.

A, B, and D are incorrect. The `server_args` directive specifies arguments to be sent to the daemon when it's started. The `server` directive specifies the executable to run to launch the service. The `wait` directive defines whether the service is single threaded (`yes`) or multithreaded (`no`).

57. A and C are correct. These files are the private host keys used by the `sshd` daemon during an SSH v2 session.

B, D, and E are incorrect. The file in B is used in SSH v1 sessions. The files in D and E are public key files.

58. A is correct. The Port directive specifies the port on which the sshd daemon will listen for SSH requests.

B, C, and D are incorrect. The BindAddress directive is used to specify the address on the local machine to be used as the source address of the connection. The Protocol directive specifies the protocol versions SSH should support. The Tunnel directive is used to set up forwarding between the SSH client and the SSH server.

59. C is correct. The ForwardX11 directive specifies whether X11 connections will be automatically redirected over a secure channel.

A, B, and D are incorrect. The Protocol directive specifies the protocol versions SSH should support. The LocalCommand directive specifies a command to execute on the local machine after successfully connecting to the server. The PasswordAuthentication directive specifies whether to use password authentication.

60. A and B are correct. You can use either the ssh-keygen -t rsa or the ssh-keygen -t dsa command to create a public/private key pair on your client system so that you can send the appropriate public key to the SSH server.

C, D, and E are incorrect. These commands are used to set the ssh-agent utility to eliminate the need to enter the passphrase every time you establish an SSH connection.

## **Objectives**

1. 105.1 Customize and use the shell environment
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4. 105.1 Customize and use the shell environment
5. 107.3 Localization and internationalization: Configure locale settings and environment variables
6. 107.3 Localization and internationalization: Configure locale settings and environment variables
7. 108.1 Maintain system time: Set the hardware clock to the correct time in UTC
8. 107.3 Localization and internationalization: Configure the correct time zone
9. 107.3 Localization and internationalization: Configure the correct time zone
10. 106.1 Install and configure X11: Basic understanding and knowledge of the X Window configuration file
11. 106.1 Install and configure X11: Basic understanding and knowledge of the X Window configuration file
12. 106.1 Install and configure X11: Basic understanding and knowledge of the X Window configuration file
13. 106.2 Set up a display manager
14. 106.2 Set up a display manager
15. 106.2 Set up a display manager
16. 106.3 Accessibility: Keyboard Accessibility Settings (AccessX)
17. 106.3 Accessibility: Basic knowledge of assistive technology (ATs)



18. 107.1 Manage user and group accounts and related system files: Manage user/group info in password/group databases
19. 107.1 Manage user and group accounts and related system files: Manage user/group info in password/group databases
20. 107.1 Manage user and group accounts and related system files: Manage user/group info in password/group databases
21. 107.1 Manage user and group accounts and related system files: Manage user/group info in password/group databases
22. 107.1 Manage user and group accounts and related system files: Add, modify, and remove users and groups
23. 107.1 Manage user and group accounts and related system files: Add, modify, and remove users and groups
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25. 107.1 Manage user and group accounts and related system files: Add, modify, and remove users and groups
26. 107.2 Automate system administration tasks by scheduling jobs: Manage cron and at jobs
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31. 105.2 Customize or write simple scripts
32. 105.2 Customize or write simple scripts: Manage the location, ownership, execution, and suid-rights of scripts
33. 105.2 Customize or write simple scripts
34. 105.2 Customize or write simple scripts: Test return values for success or failure or other information provided by a command
35. 105.2 Customize or write simple scripts
36. 105.2 Customize or write simple scripts: Use standard sh syntax (loops, tests)
37. 109.1 Fundamentals of Internet protocols: Knowledge about the differences and major features of UDP, TCP, and ICMP
38. 109.1 Fundamentals of Internet protocols: Knowledge about common TCP and UDP ports (20, 21, 22, 23, 25, 53, 80, 110, 123, 139, 143, 161, 162, 389, 443, 465, 514, 636, 993, 995)
39. 109.1 Fundamentals of Internet protocols: Knowledge of the differences between private and public “dotted quad” IP addresses
40. 109.1 Fundamentals of Internet protocols: Demonstrate an understanding of network masks and CIDR notation.
41. 109.2 Basic network configuration: Manually and automatically configure network interfaces
42. 109.2 Basic network configuration: Manually and automatically configure network interfaces
43. 109.3 Basic network troubleshooting: Change, view, or configure the routing table and correct an improperly set default route manually
44. 109.4 Configure client-side DNS: Modify the order in which name resolution is done
45. 109.3 Basic network troubleshooting

- 46. 108.4 Manage printers and printing: Basic CUPS configuration (for local and remote printers)
- 47. 108.1 Maintain system time: Basic NTP configuration
- 48. 108.3 Mail Transfer Agent (MTA) basics: Create e-mail aliases
- 49. 105.3 SQL data management: Use of basic SQL commands
- 50. 110.1 Perform security administration tasks: Basic sudo configuration and usage
- 51. 110.1 Perform security administration tasks: Set or change user passwords and password aging information
- 52. 110.2 Set up host security
- 53. 110.1 Perform security administration tasks: Audit a system to find files with the suid/sgid bit set
- 54. 110.1 Perform security administration tasks: Being able to use nmap and netstat to discover open ports on a system
- 55. 108.2 System logging: Understanding of standard facilities, priorities, and actions
- 56. 110.2 Set up host security
- 57. 110.3 Securing data with encryption: Understand the role of OpenSSH 2 server host keys
- 58. 110.3 Securing data with encryption: Perform basic OpenSSH 2 client configuration and usage
- 59. 110.3 Securing data with encryption: Understand SSH port tunnels (including X11 tunnels)
- 60. 110.3 Securing data with encryption