MIT450

Linux2

Review Test2

This file is intended for review purposes only, covering lessons from Lesson 6 to Lesson 11. While it offers practice questions, the questions on the test may not be identical. Use this review file to help you prepare, but be aware that the content on the test will be based on the concepts discussed throughout these lessons, assignments, and labs, and some questions may vary in form or detail.

1. **log in to the MariaDB server as root, enter:**

```
sudo mysql -u root -p
```

2. **Create a new database named MIT450, type:**

```
CREATE DATABASE MIT450;
```

3. **Switch to the MIT450 database using:**

```
USE MIT450;
```

4. **Create a new user admin with password admin, run:**

```
CREATE USER 'admin'@'localhost' IDENTIFIED BY 'admin';
```

5. **Grant the user admin full access to all databases with the ability to grant permissions to others:**

```
GRANT ALL PRIVILEGES ON *.* TO 'admin'@'localhost' WITH GRANT OPTION;
```

6. **Reload privilege tables after granting access, execute:**

```
FLUSH PRIVILEGES;
```

7. **View all privileges granted to the user admin:**

```
SHOW GRANTS FOR 'admin'@'localhost';
```

8. **Exit the MySQL or MariaDB session:**

```
EXIT;
```

9. **Log in as `admin` on `localhost`:**

```
mariadb -u admin -p -h localhost
```

10. **Alternatively, log in with:**

```
sudo mysql -u admin -p
```

11. **To confirm you're logged in as the correct user, run:**

```
SELECT USER();
```

12. **Select the `MIT450` database:**

```
USE MIT450;
```

13. **Create a table `students` with auto-incremented primary key `student_id` and two required name fields:**

```
CREATE TABLE students (
  student_id INT AUTO_INCREMENT PRIMARY KEY,
  first_name VARCHAR(50) NOT NULL,
  last_name VARCHAR(50) NOT NULL
);
```

14. **Create a table `courses` linked to `students` via a foreign key:**

```
CREATE TABLE courses (
  course_id INT AUTO_INCREMENT PRIMARY KEY,
  course_name VARCHAR(100) NOT NULL,
  student_id INT,
  FOREIGN KEY (student_id) REFERENCES students(student_id)
);
```

15. **Display all tables in the selected database:**

```
SHOW TABLES;
```

16. **How do you ensure the MariaDB service starts at boot?**
```
 sudo systemctl enable mariadb
```

17. What is the command to log in to the MariaDB shell as root?

```
mysql -u root -p
```

18. How do you create a osabri user in MariaDB?

```
CREATE USER 'osabri'@'localhost' IDENTIFIED BY 'password';
```

19. What is the SQL command to create the wwwprod database?
```
 CREATE DATABASE wwwprod;
```

20. How do you grant full privileges on wwwprod to a user?
```
 GRANT ALL PRIVILEGES ON wwwprod.* TO 'osabri'@'localhost';
```

21. How do you check a user's privileges in MariaDB?
```
SHOW GRANTS FOR 'osabri'@'localhost';
```

22. What privileges should be granted to all users for read-only access to datawarehouse?

```
 GRANT SELECT ON datawarehouse.* TO 'osabri'@'localhost';
```

23. What privilege is needed to allow a user to view and update data?
```
GRANT SELECT, UPDATE ON datawarehouse.* TO 'osabri'@'localhost';
```

24. What command is used to create a MariaDB user that can connect from any IP address?
```
CREATE USER 'employee_user'@'%' IDENTIFIED BY 'SecurePass123';
```

26. What does the '%' symbol signify in the user creation command?
It allows the user to connect from **any IP address**.

27. How do you create a MariaDB user that is restricted to connect only from the local IP 127.0.0.1?
```
CREATE USER 'admin'@'127.0.0.1' IDENTIFIED BY 'admin';
```

28. How do you grant all privileges on the company_db database to a remote user with the ability to grant others?
```
GRANT ALL PRIVILEGES ON company_db.* TO 'employee_user'@'%' WITH
GRANT OPTION;
```

29. How would you grant access on company_db only from IP 127.0.0.1?

```
GRANT ALL PRIVILEGES ON company_db.* TO 'admin'@'127.0.0.1' WITH
GRANT OPTION;
```

30. What command is used to log in to MySQL as a specific user with a password prompt?
```
mysql -u osabri -p
```

31. Provide the command to log in as the root user using sudo.
```
sudo mysql -u root -p
```

32. What is the output of the following SQL command inside the MariaDB shell:

```
SHOW DATABASES;
```

It lists **all available databases** the logged-in user has access to.

33. How do you log in as user osabri with the password omar1234 in one line without being prompted?
```
mysql -u osabri -p"omar1234"
```

34. Which command connects to a remote MySQL server hosted at php.scweb.ca on port 3306 using user osabri and password omar1234?

```
mysql -u osabri -p"omar1234" --host=php.scweb.ca --port=3306
```

35. What is DNS?

```
It maps domain names to IP addresses.
```

36. Why is DNS used?

```
To make it easier for humans to remember domain names instead of
IPs.
```

37. What is an A Record?

```
Maps a domain to an IPv4 address.
```

38. What does AAAA Record do?

```
Maps a domain to an IPv6 address.
```

39. What is a CNAME Record?

Alias for one domain to another.

40. What is an MX Record?

Specifies mail servers for a domain.

41. What does an NS Record do?

Identifies authoritative DNS servers.

42. What is a PTR Record?

Used for reverse DNS lookup.

43. What is a TXT Record?

Stores human-readable text, like SPF or DKIM.

44. What is an SOA Record?

Contains metadata about a DNS zone.

45. What is DNS recursion?

Process where a DNS server queries multiple servers for an answer.

46. What does a DNS resolver do?

Resolves domain names to IP addresses.

47. What is a primary DNS server?

Holds the master copy of zone data.

48. What is a secondary DNS server?

Backup DNS server for redundancy.

49. What is a root DNS server?

The top-level server that directs DNS queries.

50. What is a domain zone?

A domain or IP range managed by DNS.

51. What is a bind server?

```
A popular DNS server for Linux.
```

52. What is BIND9?

```
A version of the BIND DNS software.
```

53. What command checks DNS configuration?

```
named-checkconf
```

54. What is the command to query DNS records?

```
Dig
```

55. What command checks the DNS resolution for google.com?

```
nslookup google.com
```

56. How to check the IP address of google.com using dig?

```
dig google.com
```

57. How to check if a DNS server is reachable for google.com?

```
dig @8.8.8.8 google.com
```

58. How do you ensure that the DNS server starts at system startup?

```
sudo systemctl enable bind9
```

59. What command is used to check the syntax of the Bind9 configuration file?

```
named-checkconf /etc/bind/named.conf
```

60. How do you create a new zone file for your domain "sabrico.com"?

```
sudo nano /etc/bind/db.sabrico.com
```

61. How would you create an A record for the name server ns.sabrico.com with the IP address 192.168.1.111 in the DNS zone file?

```
ns.sabrico.com. IN A 192.168.1.111
```

62. How do you add an A record 192.168.1.111 for a DNS server sabrico.com?

```
`    @   IN   A   192.168.1.111
```

63. To install Apache2, PHP, libapache2-mod-php, php-mysql, and curl, use the command sudo apt install _____.

```
apache2 php libapache2-mod-php php-mysql curl
```

64. To create a basic HTML file in the subdomain folder, the file should be named _____.

```
index.html
```

65. To enable the SSL module for Apache, use the command _____.

```
a2enmod ssl
```

66. **To activate a site blog.example.com after creating a virtual host file, use the command a2ensite _____.**

```
blog.example.com.conf
```

67.   After configuring the firewall, reload it using the command _____.

```
firewall-cmd –reload
```

68.   To view the list of currently active and loaded modules in the Apache server, use the command _____.

```
sudo apachectl -M
```

69.   To disable the SSL module in Apache, which command would you use?

```
sudo a2dismod ssl
```

70. What command lists the available modules in the /etc/apache2/mods-available directory?

```
ls /etc/apache2/mods-available
```

71.   **How would you enable a site called example.com.conf in Apache?**

```
sudo a2ensite example.com.conf
```

72.   **What command do you use to enable the PHP module in Apache?**
```
sudo a2enmod php
```

73.   **What is the web server that needs to be restarted after making changes to PHP settings?**

```
Apache
```

74.   **What command is used to map a URL path (e.g., /robots.txt) to a specific file location (e.g., /var/www/html/common/robots.txt) in Apache configuration?**

```
Alias /robots.txt /var/www/html/common/robots.txt
```

75.   **What are the names of the Apache logs that you can monitor in real-time to check for access and error details?**

`access.log` and `error.log`

76. **Create the following folders and make sure they are owned by the user used by the Apache** service:

`/var/wordpress/wp-content/uploads`

`/var/wordpress/wp-content/cache`

- Create an entry in `/etc/hosts` for `wordpress.sabrico.com` to point to `127.0.0.1`.
- Test your WordPress site using the lynx browser by typing:

```
lynx wordpress.sabrico.com
```

Ans:

```
sudo mkdir -p /var/wordpress/wp-content/uploads
```

```
sudo mkdir -p /var/wordpress/wp-content/cache
```

```
sudo chown -R www-data:www-data
/var/wordpress/wp-content/uploads

sudo chown -R www-data:www-data
/var/wordpress/wp-content/cache

sudo nano /etc/hosts

127.0.0.1 wordpress.sabrico.com

lynx wordpress.sabrico.com
```

77. **How do you create an SFTP user with /sbin/nologin as the shell?**
    ```
    sudo useradd -m -s /sbin/nologin sftpuser
    ```

```
sudo passwd sftpuser
```

78. **How do you prevent security threats by changing the ownership of the SFTP user's home directory?**

```
sudo chown root:sftpuser /home/sftpuser
```

```
sudo chmod 750 /home/sftpuser
```

79. **How do you create the required directories for SFTP and modify the permissions so the user can write to them?**

```
sudo mkdir /home/sftpuser/in /home/sftpuser/out
/home/sftpuser/archive
sudo chown sftpuser:sftpuser /home/sftpuser/in
/home/sftpuser/out /home/sftpuser/archive
sudo chmod 700 /home/sftpuser/in /home/sftpuser/out
/home/sftpuser/archive
```

80. **You need to copy a file named test.txt from your local Windows machine to the /home/osabri/ directory on the remote server sabrico.com using PSCP. What command should you run in the Windows command prompt?**

```
pscp -P 22 C:/test.txt osabri@sabrico.com:/home/osabri/
```

81.   You need to copy the .bashrc file from the /home/osabri/ directory on the remote server sabrico.com to a local directory on your Windows machine. What command should you run in the Windows command prompt?

```
pscp -P 22 osabri@sabrico.com:/home/osabri/.bashrc
C:/path/to/local/directory/
```

82.   You need to generate an SSH key pair on your Windows machine. What command should you run in the command prompt to generate the SSH key?

```
ssh-keygen
```

83.   You need to add the public SSH key from your local machine to the authorized_keys file on your remote server. What command should you run on the remote server to append the contents of the public key file to ~/.ssh/authorized_keys?

```
cat /path/to/id_rsa.pub >> ~/.ssh/authorized_keys
```

84.   You need to set up a dynamic SOCKS proxy using SSH on your local machine, which should connect to the remote server sabrico.com. What command should you run to create the SOCKS proxy on port 1080?

85.   You want to set up a Chroot Jail for SFTP users, restricting them to a specific directory and enhancing security. What steps and configurations would you need to take to achieve this? Include creating the necessary directories, setting permissions, and modifying the SSH configuration.

```
sudo mkdir -p /home/user1
sudo chown root:root /home/user1
sudo chmod 755 /home/user1

sudo nano /etc/ssh/sshd_config


Match User user1
    ChrootDirectory /home/user1
    ForceCommand internal-sftp  # Forces user to use SFTP
only
    AllowTcpForwarding no  # Prevents port forwarding
    X11Forwarding no  # Prevent GUI forwarding
```

```
sudo mkdir -p /home/user1/uploads
sudo chown user1:user1 /home/user1/uploads  # Give user1
ownership
sudo chmod 755 /home/user1/uploads  # Allow user1 to write
here


sudo systemctl restart sshd


Match Group sftpusers
    ForceCommand internal-sftp
    ChrootDirectory %h  # Uses the user's home directory
dynamically
    AllowTcpForwarding no
```

86. What is the difference between symmetric and asymmetric encryption, and how are they used in securing data transmission?

Symmetric Encryption: In symmetric encryption, the same key is used for both encryption and decryption. This means both the sender and the receiver must have the same secret key, which must be kept confidential. It is faster and more efficient for encrypting large amounts of data, but the challenge lies in securely exchanging the key.

Asymmetric Encryption: Asymmetric encryption uses a pair of keys: a public key for encryption and a private key for decryption. The public key can be shared openly, while the private key is kept secret. This method is commonly used for secure communications, such as in SSH or SSL/TLS protocols, where the public key encrypts data, and only the private key can decrypt it.

87. What is the difference between a public key and a private key in SSH authentication, and how are they used to establish a secure connection between a client and a server?

Public Key: The public key is shared and can be distributed to anyone, including the server. It is used to encrypt data or verify the authenticity of a signature.

Private Key: The private key is kept secret and stored securely on the client machine. It is used to decrypt data that was encrypted with the corresponding public key or to create a signature for authentication.

88.   What is the difference between SFTP and SCP?

SFTP (Secure File Transfer Protocol) is used for securely transferring files over SSH, providing interactive file management with commands like put, get, and ls.

SCP (Secure Copy) is used for securely copying files between remote hosts, operating similarly to the cp command.

89.   Write the SCP command to copy the file hello.txt from the home directory of the remote server php.scweb.ca to the /tmp/ directory on your local system

scp root@php.scweb.ca:~/hello.txt /tmp/

90.   Write the SFTP command to list local files while connected to a remote server and view the contents of the /tmp/ directory.

lls /tmp/

91.   Write the SFTP command to upload a file from your local home directory to a remote server's /tmp/ directory.

put ~/filename /tmp/

92.   Write the SFTP command to download the file file.txt from the /tmp/ directory on a remote server to your local home directory.

93. **Write a script that takes two arguments: a username and a password. The script should:**

- **Create the user with /sbin/nologin as the shell.**
- **Set the password for the user.**
- **Use the correct commands to create the user and set the password.**

```
useradd -m -s /sbin/nologin $1

echo "$1:$2" | chpasswd
```

94. **In the script, how should you configure the home directory of the created user for FTP to prevent security threats and ensure proper permissions?**

- **Set the ownership of the home directory to root and the group ownership to the username.**
- **Change group permissions to allow read and execute only.**

```
chown root:$1 /home/$1
chmod 750 /home/$1
```

95. **The script should create three directories in the user's home directory. These directories are for different purposes (e.g., to drop off files, pick up files, store history).**

- **What are the names of these directories?**
- **What permissions should be set to allow the user to write to them?**

- `in` (for dropping off files)
- `out` (for picking up files)
- `archive` (for storing history)

```
mkdir /home/$1/in /home/$1/out /home/$1/archive
chmod 755 /home/$1/in /home/$1/out /home/$1/archive
chown $1:$1 /home/$1/in /home/$1/out /home/$1/archive
```

96. **In Active mode FTP, the client opens a random port for the data channel, while the server listens on port 21.**
    F
97. **FTP always uses port 21 for both the command and data channels.**
    F

98.   **FTPS is recommended over plain FTP.**

T

99.   **SFTP is generally preferred over FTPS, but some organizations still use FTPS.**

T

100.   **In Active FTP, who initiates the connection for data transfer?**

Server

101.   **Why is Passive FTP recommended over Active FTP?**

To avoid firewall and NAT issues, as the client initiates the data connection.

102.   **What file lists users that are blocked from using FTP in vsftpd?**

/etc/ftpusers

103.   **Where is the vsftpd configuration file located?**

/etc/vsftpd.conf.

104.   **Where are shared folders defined in Samba?**

/etc/samba/smb.conf

105.   **What command is used to restart the Samba services after modifying the configuration?**

sudo systemctl restart smb nmb

106.   **Write a script to create the /homeshare directory and configure it as an NFS share. The script should:**

- **Create a directory named /homeshare.**
- **Create a new user for the share using the useradd and passwd commands.**
- **Create a directory for the user inside /homeshare and change the ownership of this directory to the new user.**

- **Add an entry to /etc/exports for the NFS share with subtree_check enabled and network authorization to IP 127.0.0.1.**
- **Restart the NFS services.**
- **Modify /etc/fstab to ensure the share is mounted at system startup.**
- **Reboot the system.**
- **After the system reboots, simulate file creation and verify that the file has been created successfully on the NFS share.**

```bash
#!/bin/bash

# Step 1: Create the /homeshare directory
echo "Creating /homeshare directory..."
sudo mkdir /homeshare

# Step 2: Create a user for the NFS share
echo "Creating user for NFS share..."
sudo useradd user1
sudo passwd user1

# Step 3: Create a directory for the user inside /homeshare
echo "Creating a user directory under /homeshare..."
sudo mkdir /homeshare/user1

# Step 4: Change the ownership of the user directory
echo "Changing ownership of the directory..."
sudo chown user1:user1 /homeshare/user1

# Step 5: Add the line to /etc/exports for /homeshare with
subtree_check enabled and network authorization to IP 127.0.0.1
echo "Adding NFS export configuration..."
echo "/homeshare 127.0.0.1(rw,sync,subtree_check)" | sudo tee -a
/etc/exports

# Step 6: Restart NFS services to apply changes
echo "Restarting NFS services..."
sudo systemctl restart nfs-server

# Step 7: Edit /etc/fstab to mount /homeshare at system startup
echo "Editing /etc/fstab for NFS share..."
echo "127.0.0.1:/homeshare /mnthome nfs defaults 0 0" | sudo tee
-a /etc/fstab

# Step 8: Reboot the system to apply the mount
```

```
echo "Rebooting the system..."
sudo reboot

# Step 9: Verify that a file created by a user exists on the NFS
share
# After system restart, simulate file creation and verification
by the user
echo "Verifying file creation..."
echo "Test file content" | sudo tee
/homeshare/user1/testfile.txt
sudo cat /homeshare/user1/testfile.txt
```

107.   What SELinux commands are needed to allow Samba access to the /smbshare directory?

```
sudo chcon -t samba_share_t /smbshare
sudo restorecon -v /smbshare
```

108.   What is the difference between smb.service and nmb.service in Samba, and why are both required?

- smb.service is responsible for handling the file-sharing service in Samba, enabling the server to share files and printers with other computers.
- nmb.service is used for network discovery and enables Samba to communicate with older Windows systems using the NetBIOS protocol.

109.   How do you create a shared folder for Samba at /smbshare and give full permissions to everyone?

```
sudo mkdir -p /smbshare
sudo chmod 777 /smbshare
```

110.   How do you test the Samba configuration for syntax errors?
```
Testparm
```

111.   You need to create a new MariaDB user called developer01 with the password dev@2025 who can connect only from the local machine. Write the SQL command you would use:

```
CREATE USER 'developer01'@'localhost' IDENTIFIED BY 'dev@2025';
```

112.   On the websrv01 server, you want the Apache server to listen on both localhost and the server's IP address 10.0.0.5. What should you add to the Apache configuration file?

```
Listen { 127.0.0.1; 10.0.0.5; };
```

113.   On the ftpserver01, you want the FTP service to listen on localhost and the server's IP address 192.168.1.25. What should you add to the FTP configuration file?

```
listen_address=127.0.0.1
listen_address=192.168.1.25
```

114.   You are setting up a zone for the domain example.com on your dns01 server. First, create a new zone configuration file named.conf.zones in /etc/bind/. What command do you use?

```
sudo touch /etc/bind/named.conf.zones
```

115.   You are configuring the dns01 server for the domain mysite.com. After creating the zone configuration file with the command sudo touch /etc/bind/named.conf.zones, how should you proceed to configure the DNS server for this domain?

```
zone "mysite.com" {

    type master;

    file "/etc/bind/db.mysite.com";

};
```

116.   You need to create a CNAME record in your domain to point shop.companyxyz.com to shop.ecommerce.com. What should the CNAME record look like?

```
shop.companyxyz.com. IN CNAME shop.ecommerce.com.
```

117.   You want to install PHP and the necessary Apache
   module to run PHP scripts. The command to install PHP and
   the module would be _____.

```
sudo apt install php php-mysql
```

118.   You want to enable Apache to act as a reverse proxy
   for load balancing and security. The first step is to
   enable the necessary modules using the command
   _____.

```
sudo a2enmod proxy proxy_http
```

119.   You are logged into a remote server via SFTP
   (user@remote-server.com). To download a remote file located
   at /remote/path/file.txt to your local directory
   /local/directory/, what command should you use?

```
get /remote/path/file.txt /local/directory/
```

120.   You want to route RDP traffic to the remote server
   server.com (with internal IP 10.13.37.2 and RDP port 3389).
   What is the correct SSH tunneling command to achieve this?

```
ssh -L 54000:10.13.37.2:3389 root@server.com
```

121.   You want to route MySQL traffic to the remote server
   dbserver.com (with internal IP 192.168.2.50 and MySQL port
   3306). What is the correct SSH tunneling command to achieve
   this?

```
ssh -L 3307:192.168.2.50:3306 user@dbserver.com
```

122.   To allow user2 to upload files inside the chroot jail,
   you need to create a writable directory uploads within
   /home/user2. What are the three necessary commands to
   create the directory and assign permissions?

```
sudo mkdir -p /home/user2/uploads
sudo chown user2:user2 /home/user2/uploads
sudo chmod 755 /home/user2/uploads
```

123. **You want to restrict the user user2 to the /home/user2 directory and ensure they can only use SFTP. Which configuration should you add to /etc/ssh/sshd_config?**

```
Match User user2
    ChrootDirectory /home/user2
    ForceCommand internal-sftp
    AllowTcpForwarding no
    X11Forwarding no
```

124. **You need to generate a 4096-bit RSA SSH key for authentication and specify the comment osabri@stclaircollege.ca. What is the correct command to create this key?**

```
ssh-keygen -t rsa -b 4096 -C osabri@stclaircollege.ca
```

125. **What does NFS stand for, and what is its primary use?**
NFS stands for Network File System. It allows computers to access and share files remotely across a network.

126. **What is the purpose of the /etc/exports file in NFS?**
It defines the directories to be shared and specifies which hosts can access them and with what permissions.

127. **What does the rw option in an NFS export mean?**
It allows read and write access to the shared directory.

128. **What is the role of the root_squash option in NFS configuration?**
It prevents the root user on the client from having root access to the NFS share, enhancing security.

129. **Why might a user experience permission issues when accessing an NFS share even if the username matches?**
NFS permissions are based on UID, not usernames. If the UID is different between the client and server, it may cause issues.

130. **Write the command to mount an NFS share located at 172.19.135.73:/shared to the local directory /mount/shared with read-write permissions.**

```
sudo mount -o rw 172.19.135.73:/shared /mount/shared
```

131. **How can you configure an NFS share to mount automatically at boot?**
By adding an entry in `/etc/fstab`.

132. **What is Samba, and what protocol does it implement?**
Samba is an open-source implementation of the SMB (Server Message Block) protocol used for sharing files and printers between Linux/Unix and Windows systems.

133. **Which command installs the necessary Samba packages on a Debian-based system?**
```
sudo apt install samba smbclient samba-common
```

134. **Name the two main Samba services and their roles.**
`smb.service` for file sharing, and `nmb.service` for network discovery.

135. **How do you add a user to Samba?**
```
sudo smbpasswd -a username
```

136. **Where are Samba shares defined?**
In the `/etc/samba/smb.conf` file.