Sri Lanka Institute of Information Technology

B.Sc. Special Honours Degree
in
Information Technology
(Specialized in Computer Systems and Network Engineering)

Final Examination
Year 2, Semester II (2018)
Regular Intake

IE2060 – Computer Systems Administration

Duration: 2 Hours

October 2018

Instructions to candidates:

- This paper is preceded by a **10**-minutes reading period. The supervisor will indicate when answering may commence.
- This paper has **3** questions with a total of 100 marks.
- Answer all the questions in the booklet given.
- This paper contains **6** pages including the cover page.

Question 1 (45 marks)

You have been appointed as the new systems administrator of a startup company named, NetCom in which uses Linux operating systems in all network nodes. Answer the following questions referring the network architecture diagram of the company given in Fig 2.1.

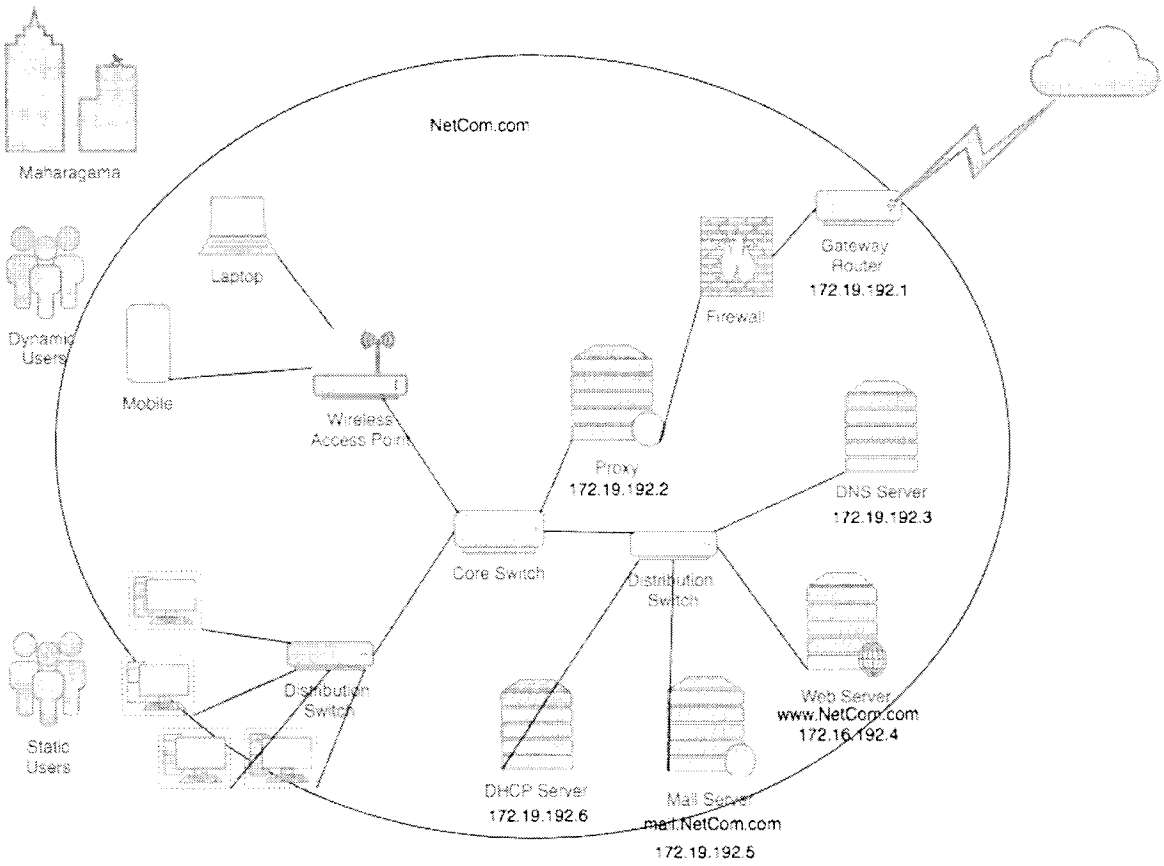

Figure 2.1 Network Architecture

A. What is the network address and the subnetmask of the NetCom.com domain? (2 marks)

B. Suggest a DHCP scope for the network, considering the network objects illustrated in fig 2.1. (3 marks)

C. DHCP server is configured inside the network with the IP address 172.16.192.6. **Write the step by step process** how a new Laptop (DHCP client), **obtains network configuration information from the DHCP server**. (10 marks)

You should;

- *Clearly indicate the message types that are being exchanged in the process.*
- *Clearly indicate the source IP address and the destination IP address of each message generated.*

D. The network administrator of *NetCom* needs to configure the **Local DNS Server** with a **forward lookup zone** and a **reverse lookup zone** for the following.

- NS record for the name server in the network
- MX record for the mail server in the network
- A record for the web server in the network

Duplicate the two partially created lookup zone files (Figure 2.2 and Figure 2.3) to your answer booklet and complete the DNS entries as needed. (10 Marks)

```
forward.NetCom.com
-------------------------------------------------------------------
    $TTL 86400
    @  IN    SOA   dnsServer.NetCom.com. root. NetCom.com. (
    <<IT Number>>       ;Serial
    <<Birth Year>>            ;Refresh
    1800          ;Retry
    604800        ;Expire
    86400         ) ;Minimum TTL


    //DNS connection mapping entry
    //web server mapping entry
    //mail server mapping entry
```

Figure 2.2

```
reverse.NetCom.com
$TTL 86400
@ IN    SOA   dnsServer.NetCom.com. root.NetCom.com. (
<<IT Number>>      ;Serial
<<Birth Year>>          ;Refresh
1800          ;Retry
604800        ;Expire
86400         ) ;Minimum TTL

//DNS connection mapping entry
//domain pointer mapping entry
//web server pointer mapping entry
//mail server pointer mapping entry
```

Figure 2.3

E. Assume that the DNS server is running in the domain controller of the network and you as the system administrator, run different tasks on the operating system.

i. Write an alias named "`la`" to list the objects inside a directory with color to distinguish types of file. (3 marks)

ii. Write a shell script to automatically create users by providing the user name via command line arguments. (5 marks)

iii. Write a shell script with the use of '`for`' loop, print the number of bytes of all the files inside the users, bin directory. (5 marks)

iv. Modify the `/etc/crontab` file to schedule the script you developed in part (iii). The script should be executed every weekend at 11.59 PM in every month by the root user. (7 marks)

Question 2 (20 marks)

A. Compare and contrast Linux and Unix operating systems. (4 marks)

B. An incomplete diagram of the Linux architecture is given in Fig 2.1 below. Name the components A, B and C. (3 marks)

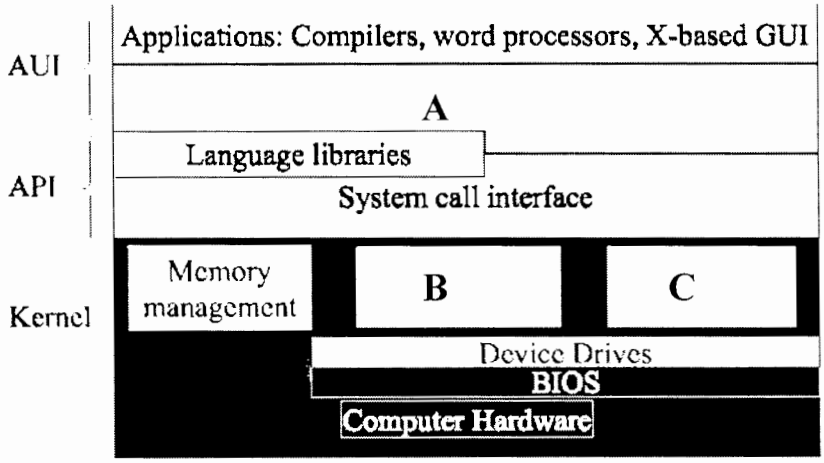

Figure 2.1 – Linux Architecture

C. During Linux installation process one important component is the creation of a SWAP space.

i. Describe the necessity of the swap space. (3 marks)

ii. Mention the difference between the Windows and Linux, swap implementation. (4 marks)

D. Name the usage of the following commands in Linux terminal environment. (1 x 6 marks)

i. `cd/`

ii. `less`

iii. `find`

iv. `grep`

v. `mv`

vi. `pwd`

Question 3 (25 marks)

A. Discuss the user group called "`wheel`". (3 marks)

B. What is the usage of **`sudo`** command in Linux? (2 marks)

C. Why shouldn't a Linux system be turned off with the power button on the computer case? What are the available alternatives? (3 marks)

D. Explain the concept of **run levels** by listing the run levels defined in Linux, and briefly describe each. (7 marks)

E. A new release of the Linux kernel is just released. You as the system administrator of the company network, want to upgrade all the machines in the local lab (*about 50 machines, not all identical*). Based on the given scenario answer the following questions.

   i. What issues should you consider? (3 marks)

   ii. What procedure should you follow? (3 marks)

   iii. What problems might occur, and how would you deal with them? (4 marks)

~ End of the Question Paper ~