



**SLIATE**

**SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION**

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

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**Higher National Diploma in Information Technology**  
**Second Year, Second Semester Examination – 2018**  
**HNDIT2402 Free and Open Source Systems Scheme**

Instructions for Candidates:

Answer four (4) questions including question 01

No. of questions : 5

No. of pages : 9

Time : 2 hours

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**Question 1**

**I. Select the most appropriate answer**

1. Who started GNU Project?
  - a) Linus Torvalds
  - b) **Richard Stallman**
  - c) Eric.S.Raymond
  - d) MIT
2. An example of Closed-source freeware is
  - a) Mysql
  - b) Microsoft office package
  - c) **Skype**
  - d) Ubuntu
3. Which of the following is not a method for installing centos in your system
  - a) Using virtual box
  - b) Using single boot
  - c) Using duel boot
  - d) **Using Vim**
4. Which statement about the Linux shell is not correct?
  - a) The original and most powerful Linux user interface
  - b) An interface between the user and the kernel.
  - c) Text-based command-line interpreter.
  - d) **csh is the default Linux shell.**
5. What is the bash shell key combination for Logging out of the current shell session?
  - a) Ctrl + a
  - b) Ctrl + b
  - c) Ctrl + c
  - d) **Ctrl + d**
6. What is the Linux command to see memory and swap usage?
  - a) pwd
  - b) **free**
  - c) cpuinfo
  - d) du
7. Which command is used to change ownership of files and directories?
  - a) **chown**
  - b) chgrp
  - c) chmod
  - d) setowner

8. Which of the following is not a text editor in Linux?
- a) vi
  - b) gvim
  - c) vim
  - d) svi
9. What is the correct directory which stores configuration files and software packages in Linux?
- a) /home
  - b) /var
  - c) /etc
  - d) /lib
10. What should be used to automatically configure IP addresses of the host computers?
- a) DNS
  - b) SNMP
  - c) SMTP
  - d) DHCP

(2x10=20 marks)

**II. State whether the following sentences are true or false**

- a) Sendmail is the default MTA on the RedHat Linux distribution (.....)**T**
- b) Reciprocal Free licenses allow subsequent users to use, modify, and redistribute the code with source code (.....)**T**
- c) Top command provides most cpu-intensive task on the system. (.....)**T**
- d) By using **:w <enter key>** command quits the vi without making any changes in file(.....)**F**
- e) Default shell is set in the /etc/passwd file .(.....)**T**

(5 marks)

**(Total 25 marks)**

## Question 02

- I. Define the term Open Source Software (2 marks)

*Open-source software is computer software with **its source code made available** and licensed with a license in which the copyright holder provides the rights to study, change and distribute the software at no cost to anyone and for any purpose.*

- II. Briefly explain FOSS business model (4 marks)

*Selling the FOSS for low cost*

*Providing the FOSS total free and selling services*

*Dual-licensing*

*FOSS is total free and proprietary extensions*

*Donations to developers*

***Any four points need to explain. Each point allocate 1 mark***

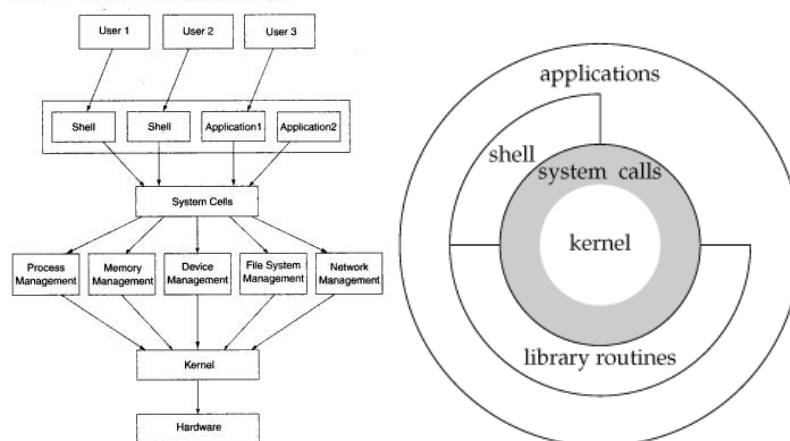
- III. Compare and contrast copyleft with copyleft (4 marks)

*Copyrights exist in order to protect authors of documentation or software from unauthorized copying or selling of their work. A copyright infers that only with the author's permission may such activities take place.*

*A Copyleft, on the other hand, provides a method for software or documentation to be modified, and distributed back to the community, provided it remains Libre.*

- IV. Discuss Linux architecture using a diagram (6 marks)

FIGURE 1-1 Architecture of Linux Operating System



***Any diagram give 3 marks***

- Kernel Hub of the operating system

Shell

- The original and most powerful Linux user interface

- An interface between the user and the kernel.  
text-based command-line interpreter  
System call
- system call is how a program requests a service from an operating system's kernel.

***Explanation of these three points 1 mark for each give three marks***

V. Write three examples for closed source freeware (3 marks)

- Skype
- Adobe reader
- Free Studio
- Skype
- AVG Antivirus Free
- Free Download Manager
- Microsoft.NET Framework
- Google Chrome

*Any three or any correct three software give 1 mark for each*

VI. Write short notes on following topics (6 marks)

a) GNU project

*In 1984 by Richard Stallman*

*A project to develop a complete operating system*

*Give computer users freedom and control in their use of their computers*

*GNU Project Outcome*

- a. Unix Like OS
- b. Developed essential utilities
  - i. Editor
  - ii. Compilers
  - iii. Debugger

*Unix-like computer operating system*

*Developed by the GNU Project.*

*Initiated by Richard Stallman in 1983*

*But no stable release of GNU yet*

***Any correct 3 points give 1 mark each***

b) Linux Disadvantages

- May not compatible with other software
- Most are not reliable

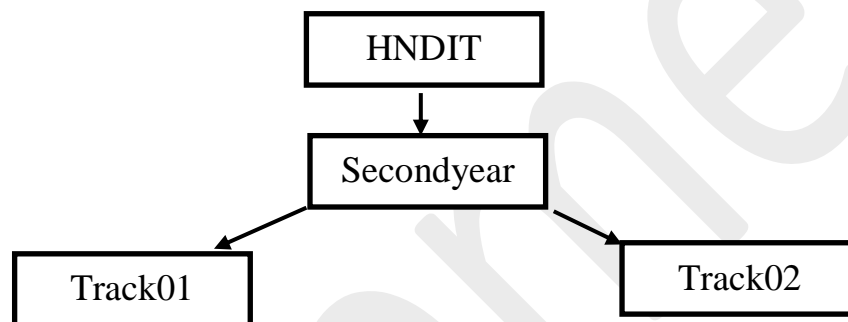
- No support exists for open source software
- No guarantee of updates
- Lac of business applications
- Interoperability with proprietary systems

**Any correct three points give 1 mark for each**

**(Total 25 marks)**

Question 03

- I. Write down Linux commands by considering the following folder structure. Assumed you have opened the terminal and now you are in your home directory



- a) Create the above directory structure. (4 marks)

```

mkdir HNDIT
cd HNDIT
mkdir Secondyear
cd secondyear
mkdir Track01 Track02
  
```

2 marks

1 mark

- b) Create a file called “developer.txt” in Track01 directory. (2 marks)

```

touch developer.txt
vi developer.txt
  
```

**Any Correct answer 2 marks**

- c) Open “developer.txt” using Vi editor, insert your name and save the file.(2 marks)

```

Vi developer.txt
Press I,I to go to insert mode
Type your name
Press Esc key and type :wq to save and quit from Vi
  
```

- d) Copy “developer.txt” into Track02 directory. (2 marks)

```

cp fullpath of Track2 and file name
cp developer.txt home/HNDIT/secondyear/Track2
  
```

- e) Delete the Track01 folder. (2 marks)

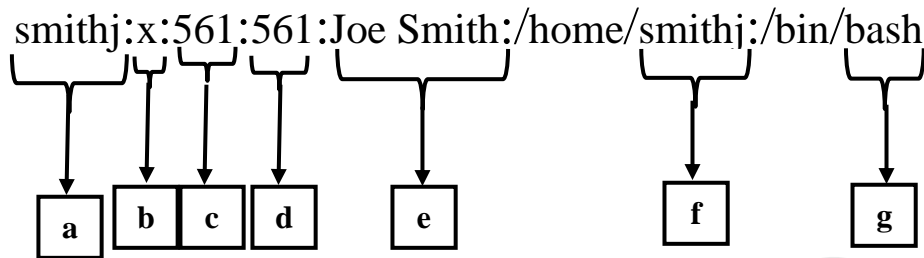
```

rm -r Track1
  
```

- f) Rename “developer.txt” into “newdeveloper.txt” (2 marks)

mv developer.txt newdeveloper.txt

- II. Following figure displays the format of etc/passwd file. Identify **a-g**. (6 marks)



- a. Username
- b. An "x" in the password field. Passwords are stored in the ``/etc/shadow" file.
- c. Numeric user id.
- d. Numeric group id.
- e. Full name of user.
- f. User's home directory.
- g. User's "shell account".

**One point give 1 mark**

- III. Write down appropriate commands in Linux for the following (assume that you are in root account)

IV.

- a) Create a new user as fossuser with the home also as fossuser. (2 marks)  
`useradd -m -d /home/fossuser fossuser`
- b) Assign password as fosspasswd to fossuser (1 marks)  
`passwd fosspasswd`
- c) Add fossuser to the existing group called fossstudents (2 marks)  
`usermod -a -G fossstudents fossuser`

**(Total 25 marks)**

Question 04

- I. What is the purpose of using cron in Linux based Operating system? (2 marks)  
*cron is a unix, solaris utility that allows tasks to be automatically run in the background at regular intervals by the cron daemon.*
- II. List down four (04) examples for daemon (4 marks)  
 inetd, httpd, sshd, dhcpd, squid any four 1\*4=4 marks
- III. Name two file compression commands in Linux (2 marks)  
*Tar*  
*gzip*
- IV. What is the differences between following two commands (4 marks)  
 a) `tar tvf my-archive.tar`  
*This lists all the files in the archive, but does not extract them*  
 b) `tar xvf my-archive.tar`  
*To extract the contents of a Linux tar archive*  
**2 marks for each**
- V. Briefly explain the attributes used in file and directory permissions (3 marks)  
*There are 10 attributes.*  
*First attribute explain the file or directory types.*  
*Next three attributes for owners and their permissions.*  
*Then group attributes explain group permissions.*  
*Last three attributed display the guest permissions.*  
*(Each answers 1 marks, 04 marks)*
- VI. Consider the file named “atiinfor.txt” with the following file permission attributes.  
**- r W - r - - r - -**  
 Write down Linux commands to do the following tasks.
- a) View the file permission. (2 marks)  
`Ls -l atiinfor.txt`
- b) Add the execute permission to user category. (2 marks)  
`chmod g+x atiinfor.txt`
- c) Add the write permission to other category. (2 marks)  
`chmod o+w atiinfor.txt`
- d) Remove read permission from group category. (2 marks)  
`chmog g-r atiinfor.txt`
- e) Change the ownership to new user david. (2 marks)  
`chown david atiinfor.txt`

**(Total 25 marks)**

#### Question 05

- I. Name two types of open source web servers. (2 marks)

Apache HTTP server  
NGINX  
Apache Tomcat Lighttpd

II. What are the features of samba server?

*Samba is an extremely usefull networking tool for anyone who has both Windows and Unix systems on his network. Running on a Unix system, it allows Windows to share files and printers on the Unix host, and it also allows Unix users to access resources shared by Windows systems.* (4 marks)

III. What are the benefits you can get by implementing a proxy server in your computer network?

*To perform NAT functions. A proxy server can process and execute commands on behalf of clients that have private IP addresses.*

*To allow Internet access to be controlled having a centralized point of access allows for a great deal of control over the use of the Internet.*

*Significantly improves performance: Performance is improved particularly in environments such as a universities, schools, companies, etc., where there is a great likelihood that more than one user might retrieve the same page.*

*Reduces demands on Internet connections: Because there are fewer requests to the Internet when a caching proxy server is in use, there is a reduced demand on the Internet connection. In some cases, this results in a general speed improvement*

**Any 2 points,4 marks**

(4 marks)

IV. Briefly explain following mail server services (4 marks)

Postfix

*Postfix is a free and open-source mail transfer agent (MTA) that routes and delivers electronic mail*

**2 marks**

Dovecot

*As an IMAP and POP3 server, Dovecot provides a way for Mail User Agents (MUAs) to access their mail. So when a user's MUA contacts the mail server, the software which answers that request is an IMAP or POP3 server.*

**2 marks**

V. What are the differences between IMAP(internet message access protocol) and POP (post office protocol) (4 marks)

*IMAP, unlike POP, specifically allows multiple clients simultaneously connected to the same mailbox, different clients accessing the same mailbox at the same or different times can detect state changes made by other clients.*

*POP is suitable if you have no need to check your email in multiple locations. If you only ever check your UCL email on your computer at work, for example, then POP is fine for this purpose.*

**2 marks for each**

VI.



- a) Briefly explain the functionality of DHCP server (3 marks)  
*DHCP (Dynamic Host Configuration Protocol) is a network service that enables clients to obtain network settings (IP Address, Subnet Mask, Default Gateway, DNS Server, Hostname and Domain) automatically from a central server*
- b) Write down linux command to install DHCP server (2 marks)  
Yum install DHCP or  
apt-get install isc-dhcp-server
- c) Write the name of DHCP server configuration file (2 marks)  
dhcpd give **only 1 mark**  
dhcpd.conf **give 2 marks**

**(Total 25 marks)**