Laboratory Manual

LINUX LAB

For

FY MCA Students


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FORWARD

It is my great pleasure to present this laboratory manual for First year MCA students for the subject of LINUX LAB keeping in view the coverage required for the concepts of Linux Operating System related to Installation of Linux operating system, basic concept of linux, commands & utilities, editors, Shell script, installation of applications, backup, etc.

As a student, many of you may be wondering with some of the questions in your mind regarding the subject and exactly what has been tried is to answer through this manual.

As you may be aware that MGM has already been awarded with ISO 9001-2000 certification and it is our endure to technically equip our students taking the advantage of the procedural aspects of ISO 9001-2000 Certification.

Faculty members are also advised that covering these aspects in initial stage itself, will greatly relived them in future as much of the load will be taken care by the enthusiasm energies of the students once they are conceptually clear.

Dr. Sudhir Deshmukh
Principal
LABORATORY MANUAL CONTENTS

This manual is intended for the First year students of MCA branch in the subject of LINUX LAB. This manual typically contains practical/Lab Sessions related LINUX LAB covering various aspects related the subject to enhanced understanding.

Although, as per the syllabus, We have made the efforts to cover various aspects of LINUX LAB.

Students are advised to thoroughly go through this manual rather than only topics mentioned in the syllabus as practical aspects are the key to understanding and conceptual visualization of theoretical aspects covered in the books.

Good Luck for your Enjoyable Laboratory Sessions

N. R. Yadav
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**DO's and Don'ts in Laboratory:**

1. Do not handle any equipment before reading the instructions/Instruction manuals

2. Read carefully the power ratings of the equipment before it is switched on whether Ratings 230 V/50 Hz or 115V/60 Hz. For Indian equipments, the power ratings are Normally 230V/50Hz. If You have equipment with 115/60 Hz ratings, do not insert Power plug, as our normal supply is 230V/50 Hz, which will damage the equipment.

3. Observe type of sockets of equipment power to avoid mechanical damage

4. Do not forcefully place connectors to avoid the damage

5. Strictly observe the instructions given by the teacher/Lab Instructor

**Instruction for Laboratory Teachers:**

1. Submission related to whatever lab work has been completed should be done during the next lab session. The immediate arrangements for printouts related to submission on the day of practical assignments.

2. Students should be taught for taking the printouts under the observation of lab teacher.

3. The promptness of submission should be encouraged by way of marking and evaluation patterns that will benefit the sincere students.
Assignments List:-

1. Introduction to LINUX Operating System.

2. Installation of LINUX Operating System (Red Hat-5).

3. Study of general purpose utilities commands.

4. Study of user & session management commands.

5. Study of file system navigation commands, text processing tools, communication commands.


7. Study of Shell Script.

8. Execute C & C++ programs in Linux.


Assignment – 1

(Practical Time: 2 Hours)

Aim - : Introduction to LINUX Operating System.

- Introduction to Linux Operating System.
- Fundamental Architecture of Linux.
- Feathers of Linux Operating System.
- Linux File Systems.
- Difference between Linux & Windows

Assignment – 2

Aim - : Installation of LINUX Operating System (Red Hat-5).

Installation Steps

- Place the kernel file in user/scr/kernel directory.

- If kernel is in bz2 format, execute the following command.
  
gunzip2.linux-2.2x.tar.bz2

  If kernel is in gzip format then execute the following command.
  
gunzip.linux-2.2x.tar.gz

- You should have file name linux-22x.tar.

- Before executing tar file, you should be aware that kernel will install itself in the linux directory. If we have a source code from the older kernel installed. The problem is here that the linux directory probably is host directory at all it is a symbolic link to another directory containing symbolic link to another directory containing the older kernel source.

  In this case we must remove the symbolic tar.

  tar –xvf linux -2.2.x.tar

  mv linux 2.2.x

  ln –s linux -2.2.x linux
The above command creates symbolic link from linux to linux -2.2.x. The kernel source code is now installed. To make source that everything is successful, issue the following command.

`ls -al`

If we installed 2.2.16 linux version we see something similar to this:

- `drwxr-xr-x`
- `drwxr-xr-x`
- `rwxrwxwx`
- `drwxy-xy-x`
- `-rwxr-xr-x`

- Finish with the Installation.

**Assignment – 3**

**Aim - :** Study of general purpose utilities commands.

1 cal Command –

```
# cal
```

2 script Command –

```
# script <file name>
```

3 echo Command –

```
# echo <write message>
```

4 printf Command –

```
# printf <write message>
```

5 bc Command –

```
# bc
```

6 who Command –

```
# who
```
7 whoami Command –
   # whoami

8 tty Command –
   # tty

9 uname Command –
   # uname

10 clear Command –
   # clear

11 ls Command –
   # ls <options>
      -l : list the file in long format.
      -t : list in order of last modification time.
      -a : list all entries, including hidden file.
      -d : list the directory file instead of contents.
      -u : list in order of last access file.
      -I : prints the inode number of file.

Assignment – 4

Aim : Study of user & session management commands.

1 useradd Command –
   # useradd <option> <user name>
      -u : this creates user with unique identification numbers.
      -d : this sets the home directory of the user.
      -s : this sets login shell of user.
-g: it used to indicate users group.

2 groupadd Command –
   # groupadd <options> <group name>

3 userdel Command –
   # userdel <user name>

4 groupdel Command –
   # groupdel <group name>

5 passwd Command –
   # passwd <option> <user name>
      -d : delete the password for particular user.
      -l : lock the user account.
      -u : unlock the user account.

6 chown Command –
   # chown <file/directory name>

7 chgrp Command –
   # chgrp <file/directory name>

8 su (Super User) Command –
   # su <option> <user name>
      -l : login for the new user.
      -c : execute command in the new shell and then exit immediately.

9 chmod Command –
   # chmod <option> <filename>
      -u : User    -g : Group    -o : Other
      r : Read     w : Write     x : Execute
Assignment – 5

Aim - : Study of file system navigation commands, text processing tools, communication commands.

1 cat Command –
   # cat > <file name>  
   ------write file text------
   ---------------------------------
   Ctrl+z  

2 file Command –
   # file <file name>  

3 wc Command –
   # wc <options> <file name>
   -l : prints number of lines along with file name.
   -w : prints number of words along with file name.
   -c : prints number of characters along with file name.

4 cp Command –
   # cp <source file name> <destination file name>  

5 rm Command –
   # rm <file name>  

6 mv Command –
   # mv <file name>  

7 more Command –
   # more <file name>  

8 head Command –
   # head <file name>  

Assignment – 6

Aim - : Study of VI editor.

**VI editor** is the default file editor in most of the Linux machines. It is having great capabilities to edit a file with in few key strokes. Lets start with some general information and then move on to some good things what vi editor can do for you while editing a file.

1. Vi stands for visual.
2. Vi have its variants like vim which stands for Vi IMproved, VimX11for gui and winvi for MS windows.
3. Vi is the most popular editor and next most popular editor is gedit.
4. Some other editors which will do the work of editing files are neno, pico, gedit, emacs, vim, joe, nedit, ed etc.

In vi editors there are three basic modes

1. Command mode
2. Input mode
3. Ex mode or last line mode

**In vi we used following commands**

- i – insert text to left of curser.
- I – insert text at beginning of line.
- a – append text to right of curser.
- A – append text at the end of line.
A Shell is unique multi-faceted program. It is command interpreter and a programming language rolled into one. A shell script is a group of commands in a single file. Shell provides features that enable it to be used as a programming language. The feature includes programming logical and conditional operators, command substitution, escape mechanism and position parameters. A set of commands to be performed repeatedly is executed using a batch file in MS-DOS shell script are similar to batch file shell script in Linux.

**Creation of Shell script:**

A set of commands to be performed can be entered into file by using any editor.
**Execution of Shell Script:**

A shell script can be executed using two methods

1. ‘sh filename’ at # or $ prompt.
2. To grant the execution permission and type file name at # or $ prompt.

   Eg. sh abc.sh

There are three types of shell variables

- User Define Variables
- Environment/Predefine Variables
- Local Variables

**Programming Constructs:**

1) if……then……else:
   
   if condition
   then
   commands
   else
   commands
   fi

2) for loop:
   
   for(( variable; in value; increment/decrement))
   do
   commands
   done

3) while loop:
   
   while commands
   do
command list

done

4) case construct:

case variable in
choice 1) command;;
choice 2) command;;
......
......
*) command
esac

Assignment – 8

Aim - : Execute C & C++ programs in Linux.

To execute C program in linux operating system we use the gcc compiler. Write this program in any editor. For compilation of this program use gcc keyword. So we use following command.

# gcc program name.c

To execute C++ program in linux operating system we use the g++ compiler. Write this program in any editor. For compilation of this program use g++ keyword. So we use following command.

# g++ program name.c++

We run both C & C++ program we use following command.

# ./a.out

Execute any one C & C++ program in Linux.
Assignment – 9

Aim - : Installation using RPM/YUM server.

RPM Server:

The RPM package manager directly generally simplifies the distribution installation, up gradation and removal of software on Red Hat enterprise Linux System.

The RPM system consists of the local database are the RPM executable and RPM package files. The local database is maintain in \var\div\rpm\n
The database store information about installed packages such as file attributes and packages pre request and administration namely if ever modifies the database directly but instead users the RPM command.

Software to be installed using RPM is distributed throw RPM package file which are essentially compressed archives of file associated dependency information and instruction.

Package files are named using the following format.

name.version.release.architecture.rpm

In contrast to package management some other platforms the RPM design does not provide interactive configuration of software as part of package lode process.

RPM can perform configuration actions part of the installation but there are scripts not interactive it is common for packages to install with reasonable default configuration applied or applying.

On the other hand some software installed in an un configured state

Parameters of RPM

-i : install RPM file
-u : upgrade RPM file
-e : erase package
-f : fetch RPM file
Assignment – 10

Aim - : Back up using TAR command.

Tape archive command (tar) has been in existence before the emergence of cpio command today it not only create archive on tapes but supports floppies as well.

Tar accepts directory on the command line –c key option it uses to copy file to the backup file. The verbose option (-v) shows the progress of the backup.

    # tar –cvf /dev/rdsk/file1.tar /home/demofile

Following commands are used with the tar command.

- c : create a new archive
- t : extract file from archive
- l : list content of archive
- r : append file at the end of tar file
- f (device) : used path name device as name of device instead of the default
- v : verbose option list file in the option
- w : conforms from the user action to be taken
- z : compress or uncompress with gzip files.
- i : compress or uncompress with bzip files.

To delete file from existing tar file

    # tar –f file1.tar –delete f3