

LPI 101 Study Guide -

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The purpose of this guide is to suggest a study plan to prepare for the LPI 101 Exam.

Multiple resources have been evaluated and suggested readings are listed on a per-objective basis, with the most effective resources preceded by an asterisk (*). Suggested items for quick review before the exam are also included as a REVIEW item under each objective. Comprehensive review of all of the listed resources should be adequate for those new to this material to prepare for the exam.

The payoff is to those preparing for the exam to focus on the material rather spending time locating the best resources to study from.

The main sources outlined in this document are as follows:

Hands-On Labs:

Linux+ Guide to Linux Certification, Jason W. Eckert and M. John Schitka, Course Technology (Thomson), 2003

Study Material:

LPI Linux Certification in a Nutshell - First Edition, Jeffrey Dean, O'Reilly Media Inc., 2001

LPIC Certification Bible, Angie Nash and Jason Nash, Hungry Minds, 2001

The first edition of the LPIC Certification in a Nutshell book, although ordered for the previous versions of the exam, is the best resource on all topics with the exception of X windows. In the case of my exam, the scope of the highlighter's indexes was appropriate for the level of the exam.

Resources for X are outlined in the objectives below. As none of the cited materials cover the KDE/KDM environment comprehensively enough for the exam, so it is important that candidates reference the internet and man pages to supplement.

Happy Testing!

Topic 101: Hardware & Architecture

- **1.101.1 Configure Fundamental BIOS Settings**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 1

Description: Candidates should be able to configure fundamental system hardware by making the correct settings in the system BIOS. This objective includes a proper understanding of BIOS configuration issues such as the use of LBA on IDE hard disks larger than 1024 cylinders, enabling or disabling integrated peripherals, as well as configuring systems with (or without) external peripherals such as keyboards. It also includes the correct setting for IRQ, DMA and I/O addresses for all BIOS administrated ports and settings for error handling.

Key files, terms, and utilities include:

```
/proc/ioports  
/proc/interrupts  
/proc/dma  
/proc/pci
```

Resources:

*Nutshell: pgs 258-264

Bible: Chapter 1: BIOS Settings, Resolve Conflicts & Configure PnP Hardware

REVIEW: Nutshell: Exam 102 Highlighter's Index pg. 490

- **1.101.3 Configure Modem and Sound cards**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 1

Description: Ensure devices meet compatibility requirements (particularly that the modem is NOT a win-modem), verify that both the modem and sound card are using unique and correct IRQ's, I/O, and DMA addresses, if the sound card is PnP install and run **sndconfig** and **isapnp**, configure modem for outbound dial-up, configure modem for outbound PPP | SLIP | CSLIP connection, set serial port for 115.2 Kbps

Resources:

*Nutshell: pgs 267-269, 414-423

Bible: Chapter 1: Sound Cards, Chapter 15: Configuring PPP

REVIEW: Nutshell: Exam 102 Highlighter's Index pg. 491, 504

1.101.4 Setup SCSI Devices

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 1

Description: Candidates should be able to configure SCSI devices using the SCSI BIOS as well as the necessary Linux tools. They also should be able to differentiate between the various types of SCSI. This objective includes manipulating the SCSI BIOS to detect used and available SCSI IDs and setting the correct ID number for different devices especially the boot device. It also includes managing the settings in the computer's BIOS to determine the desired boot sequence if both SCSI and IDE drives are used.

Key files, terms, and utilities include:

SCSI ID
/proc/scsi/
scsi_info

Resources:

*Nutshell: pgs 264-267

Bible: Chapter 1 - Hard Disk Controller Requirements

REVIEW: Nutshell: Exam 102 Highlighter's Index pg. 490, SCSI types listed in corresponding section of the text.

- **1.101.5 Setup different PC expansion cards**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 3

Description: Candidates should be able to configure various cards for the various expansion slots. They should know the differences between ISA and PCI cards with respect to configuration issues. This objective includes the correct settings of IRQs, DMAs and I/O Ports of the cards, especially to avoid conflicts between devices. It also includes using **isapnp** if the card is an ISA PnP device.

Key files, terms, and utilities include:

```
/proc/dma
/proc/interrupts
/proc/ioports
/proc/pci
pnpdump (8)
isapnp (8)
lspci (8)
```

Resources:

*Nutshell: pgs 258-264

Bible: Chapter 1 - BIOS Resolve Conflicts & Configure PnP Hardware

REVIEW: Nutshell: pgs 258-264

- **1.101.6 Configure Communication Devices**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 1

Description: Candidates should be able to install and configure different internal and external communication devices like modems, ISDN adapters, and DSL switches. This objective includes verification of compatibility requirements (especially important if that modem is a winmodem), necessary hardware settings for internal devices (IRQs, DMAs, I/O ports), and loading and configuring suitable device drivers. It also includes communication device and interface configuration requirements, such as the right serial port for 115.2 Kbps, and the correct modem settings for outbound PPP connection (s).

Key files, terms, and utilities include:

```
/proc/dma
/proc/interrupts
/proc/ioports
setserial (8)
```

Resources:

*Nutshell: pgs 414-423

Bible: Chapter 15 - Configure PPP Devices

REVIEW: Nutshell: Exam 102 Highlighter's Index pg. 504

1.101.7 Configure USB devices

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 1

Description: Candidates should be able to activate USB support, use and configure different USB devices. This objective includes the correct selection of the USB chipset and the corresponding module. It also includes the knowledge of the basic architecture of the layer model of USB as well as the different modules used in the different layers.

Key files, terms, and utilities include:

lspci (8)
usb-uhci.o
usb-ohci.o
/etc/usbmgr/
usbmodules
/etc/hotplug

Resources:

Man pages / Internet Search

REVIEW: Man pages / Internet Search

Topic 102: Linux Installation & Package Management

- **1.102.1 Design hard disk layout**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 5

Description: Candidates should be able to design a disk partitioning scheme for a Linux system. This objective includes allocating filesystems or swap space to separate partitions or disks, and tailor-

ing the design to the intended use of the system. It also includes placing /boot on a partition that conforms with the BIOS' requirements for booting.

Key files, terms, and utilities include:

```
/ (root) filesystem
/var filesystem
/home filesystem
swap space
mount points
partitions
cylinder 1024
```

Resources:

*Nutshell: pgs 74, 271-274

Bible: Chapter 1 - Partitioning Schemes

REVIEW: Nutshell: Exam 102 Highlighter's Index pg. 492

- **1.102.2 Install a boot manager**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 1

Description: Candidate should be able to select, install, and configure a boot manager. This objective includes providing alternative boot locations and backup boot options (for example, using a boot floppy).

Key files, terms, and utilities include:

```
/etc/lilo.conf
/boot/grub/grub.conf
lilo
grub-install
MBR
superblock
first stage boot loader
```

Resources:

*Nutshell: pgs 274-277 (lilo)

Bible: Chapter 8 - Using LILO, Troubleshooting the boot

Linux+: 415-419 (GRUB)

REVIEW: Nutshell: Exam 102 Highlighter's Index pg. 492

Linux+: 415-419 (GRUB)

- **1.102.3 Make and install programs from source**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 5

Description: Candidates should be able to build and install an executable program from source. This objective includes being able to unpack a file of sources. Candidates should be able to make simple customizations to the Makefile, for example changing paths or adding extra include directories.

Key files, *terms*, and utilities include:

**gunzip
gzip
bzip2
tar
configure
make**

Resources:

*Nutshell: pgs 277-284

Bible: Chapter 3 - Installing Software from Source Code

REVIEW: Nutshell: Exam 102 Highlighter's Index pg. 492

- **1.102.4 Manage shared libraries**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 3

Description: Candidates should be able to determine the shared libraries that executable programs depend on and install them when necessary. Candidates should be able to state where system libraries are kept.

Key files, terms, and utilities include:

ldd
ldconfig
/etc/ld.so.conf
LD_LIBRARY_PATH

Resources:

*Nutshell: pgs 284-287

Bible: Chapter 3 - Managing Shared Libraries

REVIEW: Nutshell: Exam 102 Highlighter's Index pg. 492-493

Nutshell: pg. 285 (ldd)

- **1.102.5 Use Debian package management**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 8

Description: Candidates should be able to perform package management skills using the Debian package manager. This objective includes being able to use command-line and interactive tools to install, upgrade, or uninstall packages, as well as find packages containing specific files or software (such packages might or might not be installed). This objective also includes being able to obtain package information like version, content, dependencies, package integrity and installation status (whether or not the package is installed).

Key files, terms, and utilities include:

unpack
configure

```
/etc/dpkg/dpkg.cfg
/var/lib/dpkg/*
/etc/apt/apt.conf
/etc/apt/sources.list
dpkg
dselect
dpkg-reconfigure
apt-get
alien
```

** N/A for RPM version of the exam. **

- **1.102.6 Use Red Hat Package Manager (RPM)**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 8

Description: Candidates should be able to perform package management under Linux distributions that use RPMs for package distribution. This objective includes being able to install, re-install, upgrade, and remove packages, as well as obtain status and version information on packages. This objective also includes obtaining package information such as version, status, dependencies, integrity, and signatures. Candidates should be able to determine what files a package provides, as well as find which package a specific file comes from.

Key files, terms, and utilities include:

```
/etc/rpmrc
/usr/lib/rpm/*
rpm
grep
```

Resources:

*Nutshell: pgs 293-299

*Bible: Chapter 3 - Red Hat Package Manager

REVIEW: Both items above

Topic: 103 GNU & Unix Commands

- **1.103.1 Work on the command line**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 5

Description: Candidates should be able to Interact with shells and commands using the command line. This includes typing valid commands and command sequences, defining, referencing and exporting environment variables, using command history and editing facilities, invoking commands in the path and outside the path, using command substitution, applying commands recursively through a directory tree and using **man** to find out about commands.

Key files, terms, and utilities include:

```
.  
bash  
echo  
env  
exec  
export  
man  
pwd  
set  
unset  
~/.bash_history  
~/.profile
```

Resources:

*Nutshell: pgs 10-19

**Bible: Chapter 2 - Understanding Shells, Using the command line, Using the history file, Environmental Variables and Settings

man pages (set, unset, env)

REVIEW: Nutshell: Exam 101 Highlighter's Index pg. 227-228

- **1.103.2 Process text streams using filters**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 6

Description: Candidates should be able to apply filters to text streams. Tasks include sending text files and output streams through text utility filters to modify the output, and using standard UNIX commands found in the GNU textutils package.

Key files, terms, and utilities include:

cat
cut
expand
fmt
head
join
nl
od
paste
pr
sed
sort
split
tac
tail
tr
unexpand
uniq
wc

Resources:

*Nutshell: pgs 19-33

*Bible: Chapter 4 - Modifying text with filters

REVIEW: Nutshell: Exam 101 Highlighter's Index pg. 228-229

- **1.103.3 Perform basic file management**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 3

Description: Candidates should be able to use the basic UNIX commands to copy, move, and remove files and directories. Tasks include advanced file management operations such as copying

multiple files recursively, removing directories recursively, and moving files that meet a wildcard pattern. This includes using simple and advanced wildcard specifications to refer to files, as well as using **find** to locate and act on files based on type, size, or time.

Key files, terms, and utilities include:

cp
find
mkdir
mv
ls
rm
rmdir
touch
file globbing

Resources:

*Nutshell: pgs 33-40

Bible: Chapter 6 - Managing Files

REVIEW: Nutshell: Exam 101 Highlighter's Index pg. 229-230

- **1.103.4 Use streams, pipes, and redirects**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 5

Description: Candidates should be able to redirect streams and connect them in order to efficiently process textual data. Tasks include redirecting standard input, standard output, and standard error, piping the output of one command to the input of another command, using the output of one command as arguments to another command and sending output to both stdout and a file.

Key files, terms, and utilities include:

tee
xargs
<
<<
>
>>
|
, `

Resources:

*Nutshell: pgs 41-45

Bible: Chapter 4 - Working with Input/Output

REVIEW: Nutshell: Exam 101 Highlighter's Index pg. 230-231

- **1.103.5 Create, monitor, and kill processes**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 5

Description: Candidates should be able to manage processes. This includes knowing how to run jobs in the foreground and background, bring a job from the background to the foreground and vice versa, start a process that will run without being connected to a terminal and signal a program to continue running after logout. Tasks also include monitoring active processes, selecting and sorting processes for display, sending signals to processes, killing processes and identifying and killing X applications that did not terminate after the X session closed.

Key files, terms, and utilities include:

&
bg
fg
jobs
kill
nohup
ps
top

Resources:

*Nutshell: pgs 45-46

Bible: Chapter 2 - Managing Processes

REVIEW: Nutshell: Exam 101 Highlighter's Index pg. 231-232

1.103.6 Modify process execution priorities

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 3

Description: Candidates should be able to manage process execution priorities. Tasks include running a program with higher or lower priority, determining the priority of a process and changing the priority of a running process.

Key files, terms, and utilities include:

nice
ps
renice
top

Resources:

*Nutshell: pgs 56-59

Bible: Chapter 2 - Modifying Process Priorities

REVIEW: Nutshell: Exam 101 Highlighter's Index pg. 232-233

- **1.103.7 Search text files using regular expressions**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 3

Description: Candidates should be able to manipulate files and text data using regular expressions. This objective includes creating simple regular expressions containing several notational elements. It also includes using regular expression tools to perform searches through a filesystem or file content.

Key files, terms, and utilities include:

grep
regexp
sed

Resources:

*Nutshell: pgs 59-69

Bible: Chapter 4 - Modifying Text with Filters, Enhancing Searches with Regular Expressions

REVIEW: Nutshell: Exam 101 Highlighter's Index pg. 233-234

- **1.103.8 Perform basic file editing operations using vi**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 1

Description: Candidates should be able to edit text files using **vi**. This objective includes vi navigation, basic vi modes, inserting, editing, deleting, copying, and finding text.

Key files, terms, and utilities include:

vi
/, ?
h, j, k, l
G, H, L
i, c, d, dd, p, o, a
ZZ, :w!, :q!, :e!
:!

Resources:

*Nutshell: pgs 321-324

Bible: Chapter 14 - Using vi

REVIEW: Nutshell: Exam 102 Highlighter's Index pg. 494-495

Topic 104: Devices, Linux Filesystems, Filesystem Hierarchy Standard

- **1.104.1 Create partitions and filesystems**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 3

Description: Candidates should be able to configure disk partitions and then create filesystems on media such as hard disks. This objective includes using various **mkfs** commands to set up partitions to various filesystems, including ext2, ext3, reiserfs, vfat, and xfs.

Key files, terms, and utilities include:

fdisk
mkfs

Resources:

*Nutshell: pgs 71-82

Bible: Chapter 5 - Creating Partitions and File Systems

REVIEW: Nutshell: 101 Highligher's Index pg. 234

Nutshell: pgs. 71-82

- **1.104.2 Maintain the integrity of filesystems**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 3

Description: Candidates should be able to verify the integrity of filesystems, monitor free space and inodes, and repair simple filesystem problems. This objective includes the commands required to maintain a standard filesystem, as well as the extra data associated with a *journaling* filesystem.

Key files, terms, and utilities include:

du
df
fsck

e2fsck
mke2fs
debugfs
dumpe2fs
tune2fs

Resources:

*Nutshell: pgs 82-89

Bible: Chapter 5 - Checking the File System

Linux+: 272-278, 87 (journaling)

REVIEW: Nutshell: pgs. 82-89

1.104.3 Control mounting and unmounting filesystems

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 3

Description: Candidates should be able to configure the mounting of a filesystem. This objective includes the ability to manually mount and unmount filesystems, configure filesystem mounting on boot-up, and configure user mountable removeable filesystems such as tape drives, floppies, and CDs.

Key files, terms, and utilities include:

`/etc/fstab`
mount
umount

Resources:

*Nutshell: pgs 89-95

Bible: Chapter 5 - Mounting and Unmounting the File System

REVIEW: Nutshell: Exam 101 Highlighter's Index pgs. 235-236

Nutshell: pgs. 92-93 (mount options)

- **1.104.4 Managing disk quota**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 3

Description: Candidates should be able to manage disk quotas for users. This objective includes setting up a disk quota for a filesystem, editing, checking, and generating user quota reports.

Key files, terms, and utilities include:

quota
edquota
repquota
quotaon

Resources:

*Nutshell: pgs 95-104

Bible: Chapter 6 - Managing Quotas

REVIEW: Nutshell: Exam 101 Highlighter's Index pgs. 236-237

- **1.104.5 Use file permissions to control access to files**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 5

Description: Candidates should be able to control file access through permissions. This objective includes access permissions on regular and special files as well as directories. Also included are access modes such as *suid*, *sgid*, and the *sticky bit*, the use of the group field to grant file access to workgroups, the *immutable flag*, and the default file creation mode.

Key files, terms, and utilities include:

chmod
umask
chattr

Resources:

*Nutshell: pgs 104-114

Bible: Chapter 6 - Working With Permissions

Linux+: 210-219 (SUID, SGID and sticky bit)

man pages for chattr

REVIEW: Nutshell: Exam 101 Highlighter's Index pg. 238

Linux+: 210-219 (SUID, SGID and sticky bit)

man chattr

- **1.104.6 Manage file ownership**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 1

Description: Candidates should be able to control user and group ownership of files. This objective includes the ability to change the user and group owner of a file as well as the default group owner for new files.

Key files, terms, and utilities include:

chmod

chown

chgrp

Resources:

*Nutshell: pgs 114-116

Bible: Chapter 6 - Working With Permissions

REVIEW: Nutshell: Exam 101 Highlighter's Index pg. 238

- **1.104.7 Create and change hard and symbolic links**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 1

Description: Candidates should be able to create and manage hard and symbolic *links* to a file. This objective includes the ability to create and identify links, copy files through links, and use linked files to support system administration tasks.

Key files, terms, and utilities include:

ln

Resources:

*Nutshell: pgs 116-122

Bible: Chapter 6 - Creating File Links

REVIEW: Nutshell: Exam 101 Highlighter's Index pg. 238-239

- **1.104.8 Find system files and place files in the correct location**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 5

Description: Candidates should be thoroughly familiar with the *Filesystem Hierarchy Standard*, including typical file locations and directory classifications. This objective includes the ability to find files and commands on a Linux system.

Key files, terms, and utilities include:

find

locate

slocate

updatedb

whereis

which

/etc/updatedb.conf

Resources:

*Nutshell: pgs 122-133

Bible: Chapter 6 - Locating Files

REVIEW: Nutshell: Exam 101 Highlighter's Index pg. 239-240

Topic 110: The X Window System

- **1.110.1 Install & Configure XFree86**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 5

Description: Candidate should be able to configure and install X and an X font server. This objective includes verifying that the video card and monitor are supported by an X server, as well as customizing and tuning X for the videocard and monitor. It also includes installing an X font server, installing fonts, and configuring X to use the font server (may require a manual edit of /etc/X11/XF86Config in the "Files" section).

Key files, terms, and utilities include:

XF86Setup
xf86config
xvidtune
/etc/X11/XF86Config
.Xresources

Resources:

*Nutshell: pgs 367-79

Bible: Chapter 9 - Installing X, Versions of XFree86, Configuring X

REVIEW: Nutshell: Exam 102 Highlighter's Index pg. 499

- **1.110.2 Setup a display manager**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 3

Description: Candidate should be able setup and customize a Display manager. This objective includes turning the display manager on or off and changing the display manager greeting. This objective includes changing default bitplanes for the display manager. It also includes configuring display managers for use by X-stations. This objective covers the display managers XDM (X Display Manger), GDM (Gnome Display Manager) and KDM (KDE Display Manager).

Key files, terms, and utilities include:

```
/etc/inittab  
/etc/X11/xdm/*  
/etc/X11/kdm/*  
/etc/X11/gdm/*
```

Resources:

*Nutshell: pgs 380-383 (xdm only)

Bible: Chapter 9 - Starting X, Running X & Clients Remotely (xdm only)

** Suggest finding alternative sources to supplement GDM and KDM **

REVIEW: Nutshell: Exam 102 Highlighter's Index pg. 499

GNOME and KDE Sources on Web

- **1.110.4 Install & Customize a Window Manager Environment**

Modified: 2003-March-17

Maintainer: [Kara Pritchard](#)

Weight: 5

Description: Candidate should be able to customize a system-wide desktop environment and/or window manager, to demonstrate an understanding of customization procedures for window manager menus and/or desktop panel menus. This objective includes selecting and configuring the desired x-terminal (xterm, rxvt, aterm etc.), verifying and resolving library dependency issues for X applications, exporting X-display to a client workstation.

Key files, terms, and utilities include:

```
.xinitrc  
.Xdefaults  
xhost  
DISPLAY environment variable
```

Resources:

Resources:

*Bible: Chapter 9 - Using X, Running X & Clients Remotely

REVIEW: *Bible: Chapter 9 - Using X, Running X & Clients Remotely