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103. GNU and UNIX Commands
104. Devices, Linux Filesystems, Filesystem Hierarchy Standard

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106. User Interfaces and Desktops
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108. Essential System Services
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Fundamentals

100. LINUX BASICS AND PHILOSOPHY

100.1 Linux History
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- GNU
- Minix
- Linux Kernel

100.2 Free Software and Open-Source Software
- FSF freedoms
- Open-Source and GPL License
- Difference between Free and Open-Source Software

100.3 Command Line Basics
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100.4 Commands
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100.5 Users and Accounts
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101.1 Determine and configure hardware settings
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- Information Files and Device Files
- Storage Devices

101.2 Boot the system
- BIOS or UEFI
- The Bootloader
- System Initialization
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101.3 Change runlevels / boot targets and shutdown or reboot system
- SysVinit
- systemd
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102. LINUX INSTALLATION AND PACKAGE MANAGEMENT

102.1 Design hard disk layout
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102.2 Install a boot manager
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- Where is the Bootloader?
- The /boot Partition
- GRUB 2
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102.3 Manage shared libraries
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- Shared Object File Naming Conventions
- Configuration of Shared Library Paths
- Searching for the Dependencies of a Particular Executable

102.4 Use Debian package management
- The Debian Package Tool (dpkg)
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102.5 Use RPM and YUM package management
- The RPM Package Manager (rpm)
- YellowDog Updater Modified (YUM)
- DNF
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102.6 Linux as a virtualization guest
- Virtualization Overview
- Types of Virtual Machines
- Working with Virtual Machine Templates
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103. GNU AND UNIX COMMANDS

103.1 Work on the command line
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- Getting Command Information
- Using Your Command History
- Finding Your Environment Variables
- Creating New Environment Variables
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- Quoting to Escape Special Characters

103.2 Process text streams using filters
- A Quick Review on Redirections and Pipes
- Processing Text Streams

103.3 Perform basic file management
- Manipulating Files
- Creating and Deleting Directories
- Recursive Manipulation of Files and Directories
- File Globbing and Wildcards
- Types of Wildcards
- How to Find Files
- Archiving Files

103.4 Use streams, pipes and redirects
- Redirects
- Here Document and Here String
- Pipes
- Command Substitution

103.5 Create, monitor and kill processes
- Job Control
- Process Monitoring
- Features of Terminal Multiplexers

- GNU Screen
- tmux
-

103.6 Modify process execution priorities
- The Linux Scheduler
- Reading Priorities
- Process Niceness

103.7 Search text files using regular expressions
- Bracket Expression
- Quantifiers
- Bounds
- Branches and Back References
- Searching with Regular Expressions
- The Pattern Finder: grep
- The Stream Editor: sed
- Combining grep and sed

103.8 Basic file editing
- Insert Mode
- Normal Mode
- Colon Commands
- Alternative Editors

104. DEVICES, LINUX FILESYSTEMS, FHS

104.1 Create partitions and filesystems
- Understanding MBR and GPT
- Creating File Systems
- Managing Partitions with GNU Parted
- Creating Swap Partitions

104.2 Maintain the integrity of filesystems
- Checking Disk Usage
- Checking for Free Space
- Maintaining ext2, ext3 and ext4 Filesystems

104.3 Control mounting and unmounting of filesystems
- Mounting and Unmounting Filesystems
- Mounting Filesystems on Bootup
- Using UUIDs and Labels
- Mounting Disks with Systemd

104.5 Manage file permissions and ownership
- Querying Information about Files and Directories
- What about Directories?
- Viewing Hidden Files
- Understanding Filetypes

- Understanding Permissions
- Modifying File Permissions
- Modifying File Ownership
- Querying Groups
- Default Permissions
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104.6 Create and change hard and symbolic links

- Understanding Links

104.7 Find system files and place files in the correct location

- The Filesystem Hierarchy Standard
- Finding Files

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105. SHELLS AND SHELL SCRIPTING

105.1 Customize and use the shell environment
- Shell Types: Interactive vs. Non-Interactive and Login vs. Non-Login
- Variables: Assignment and Reference
- Local or Shell Variables
- Global or Environment Variables
- Creating Aliases
- Creating Functions

105.2 Customize or write simple scripts
- Script Structure and Execution
- Variables
- Arithmetic Expressions
- Conditional Execution
- Script Output
- Extended Tests
- Loop Constructs
- A More Elaborate Example

106. USER INTERFACES AND DESKTOPS

106.1 Install and configure X11
- X Window System Architecture
- X Server Configuration
- Wayland

106.2 Graphical Desktops
- X Window System
- Desktop Environment
- Popular Desktop Environments
- Desktop Interoperability
- Non-Local Access
- Guided Exercises
- Explorational Exercises
- Summary
- Answers to Guided Exercises
- Answers to Explorational Exercises

106.3 Accessibility
- Accessibility Settings
- Keyboard and Mouse Assist
- Visual Impairments

107. ADMINISTRATIVE TASKS

107.1 Manage user and group accounts and related system files

- Adding User Accounts
- Modifying User Accounts
- Deleting User Accounts
- Adding, Modifying and Deleting Groups
- The Skeleton Directory
- The /etc/login.defs File
- The passwd Command
- The chage Command
- /etc/passwd
- /etc/group
- /etc/shadow
- /etc/gshadow
- Filter the Password and Group Databases

107.2 Automate system administration tasks by scheduling jobs

- Schedule Jobs with Cron
- User Crontabs
- System Crontabs
- Particular Time Specifications
- Crontab Variables
- Creating User Cron Jobs
- Creating System Cron Jobs
- Configure Access to Job Scheduling
- An Alternative to Cron
- Schedule Jobs with at
- List Scheduled Jobs with atq
- Delete Jobs with atrm
- Configure Access to Job Scheduling
- Time Specifications
- An Alternative to at

107.3 Localisation and internationalisation

- Time Zones
- Daylight Savings Time
- Language and Character Encoding
- Encoding Conversion

108. ESSENTIAL SYSTEM SERVICES

108.1 Maintain system time

- Local Versus Universal Time
- Date
- Hardware Clock
- timedatectl

- Setting Time Zone Without timedatectl
- Setting Date and Time Without timedatectl
- NTP Daemon
- NTP Configuration
- pool.ntp.org
- ntpdate
- ntpq
- chrony

108.2 System logging
- System Logging
- Basics of systemd
- The System Journal: systemd-journald

108.3 Mail Transfer Agent (MTA) basics
- Local and Remote MTA
- Linux MTAs
- The mail Command and Mail User Agents (MUA)
- Delivery Customization

108.4 Manage printers and printing
- The CUPS Service
- Installing a Printer
- Managing Printers
- Submitting Print Jobs
- Managing Print Jobs
- Removing Printers

109. NETWORKING FUNDAMENTALS

109.1 Fundamentals of internet protocols
- IP (Internet Protocol)
- Transmission Control Protocol (TCP)
- User Datagram Protocol (UDP)
- Internet Control Message Protocol (ICMP)
- IPv6

109.2 Persistent network configuration
- The Network Interface
- Interface Names
- Interface Management
- Local and Remote Names
- NetworkManager
- systemd-networkd

109.3 Basic network troubleshooting
- About the ip Command
- Netmask and Routing Review

- Configuring an Interface
- The Routing Table
- Testing Connections With ping
- Tracing Routes
- Finding MTUs With tracepath
- Creating Arbitrary Connections
- Viewing Current Connections and Listeners

109.4 Configure client side DNS
- Name Resolution Process
- DNS Classes
- Name Resolution Tools

110. SECURITY

110.1 Perform security administration tasks
- Checking for Files with the SUID and SGID Set
- Password Management and Aging
- Discovering Open Ports
- Limits on Users Logins, Processes and Memory Usage
- Dealing with Logged in Users
- Basic sudo Configuration and Usage

110.2 Setup host security
- Improve Authentication Security with Shadow Passwords
- How to Use a Superdaemon to Listen for Incoming Network Connections
- Checking Services for Unnecessary Daemons
- TCP Wrappers as Sort of a Simple Firewall

110.3 Securing data with encryption
- Basic OpenSSH Client Configuration and Usage
- The Role of OpenSSH Server Host Keys
- SSH Port Tunnels
- Perform Basic GnuPG Configuration, Usage and Revocation
- Use GPG to Encrypt, Decrypt, Sign and Verify Files