

“Open Source Software Laboratory”

Code: 4IT475

Submitted by

Mr. Adwait Samak (2020BTEIT00021)

Email: adwait.samak@walchandsangli.ac.in

Mobile: 7757091299



DEPARTMENT OF INFORMATION TECHNOLOGY

WALCHAND COLLEGE OF ENGINEERING, SANGLI
(An Autonomous Institute)

2023-2024

**1. Demonstration of Linux Distributions OS's and their purpose with comparisons.
(Fedora/CentOS/any other/etc.: Any One)**

(Submission by Individual [I])

Objective: To install and demonstrate Various Linux Distributions and their Purpose/comparison/differences.

Outcome: Self-learning/lifelong learning (PO: b, k, l)

A student asks to study at least two Linux Distros, with their comparisons and installation on Virtual Box OR Installation Linux on a Live USB pen drive.

[https://fedoraproject.org/wiki/How_to_create_and_use_Live_USB]

In Journal, they have to write the information of that distro, such as:-

- i. Various versions of that distro with the code name
- ii. Default desktop GUI
- iii. The main purpose of that
- iv. Package management of that distro
- v. List of Default Packages
- vi. Screenshots of that distros
- vii. Compare the '/etc' hierarchy
- viii. Compare package managers
- ix. Pros/cons of both distros
- x. Which one is better for development and why?
- xi. Which one is easy to use (for beginners) and why?
- xii. Explore any top 10 commands of that distro on the command prompt.
- xiii. Make the Official Repositories of Fedora/CentOS on the docker store (<https://hub.docker.com/>) and experiment with the above.

Reference:-

- i. List of Linux Distros:- <http://distrowatch.com/>
- ii. For installation on Virtual Box:-
<https://help.ubuntu.com/community/ListOfOpenSourcePrograms>
- iii. <http://www.psychocats.net/ubuntu/virtualbox>
- iv. <https://help.ubuntu.com/>

Title- Demonstration of Linux Distributions (distros) and their purpose with comparisons.

Operating system- Fedora

Various versions of a fedora with the code name

Version ^[1]	Release ^[1]
1 (Yarrow)	2003-11-06
2 (Tettnang)	2004-05-18
3 (Heidelberg)	2004-11-08
4 (Stentz)	2005-06-13
5 (Bordeaux)	2006-03-20
6 (Zod)	2006-10-24
7 (Moonshine)	2007-05-31
8 (Werewolf)	2007-11-08
9 (Sulphur)	2008-05-13
10 (Cambridge)	2008-11-25
11 (Leonidas)	2009-06-09
12 (Constantine)	2009-11-17

13 (Goddard)	2010-05-25
14 (Laughlin)	2010-11-02
15 (Lovelock)	2011-05-24
16 (Verne)	2011-11-08
17 (Beefy Miracle)	2012-05-29
18 (Spherical Cow)	2013-01-15
19 (Schrödinger's Cat)	2013-07-02
20 (Heisenbug)	2013-12-17
21 ^[5]	2014-12-09
22	2015-05-26
23	2015-11-03
24	2016-06-21
25	2016-11-22
26	2017-07-11
27	2017-11-14

28	2018-05-01
29	2018-10-30
30	2019-05-07
31	2019-10-29
32	2020-04-28
33	2020-10-27
34	2021-04-27
35	2021-11-02 ^[6]
36	2022-05-10 ^[8]
37	2022-11-15 ^[10]
38	2023-04-18 ^[12]
39	2023-10-17 ^[14]

Default desktop GUI of Fedora

The default desktop environment of Fedora is **GNOME**, but if you prefer an alternative desktop environment such as KDE Plasma Desktop or Xfce, you can download a spin for your preferred

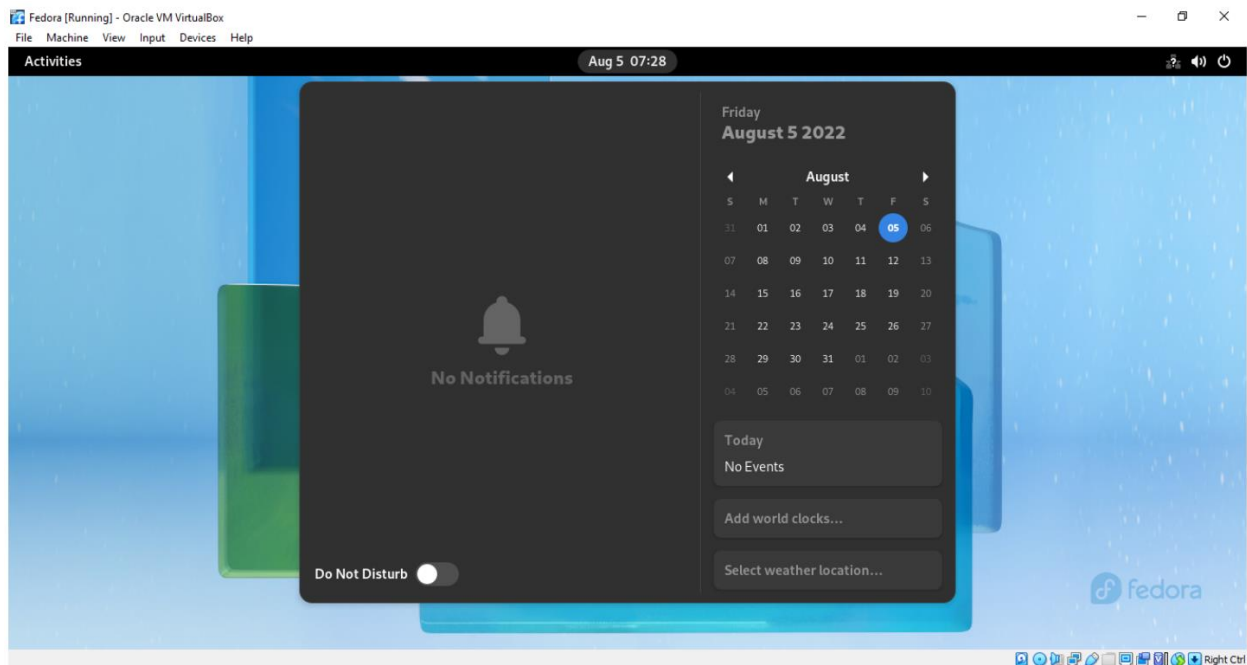
desktop environment and use that to install Fedora, pre-configured for the desktop environment of your choice.

Main purpose of Fedora

It is sponsored by Red Hat. It is designed as a secure operating system for the general-purpose. Fedora operating system offers a suite of virus protection, system tools, office productivity services, media playback, and other desktop application.

Package management of Fedora

DNF is a software package manager that installs, updates, and removes packages on Fedora and is the successor to YUM (Yellow-Dog Updater Modified). DNF makes it easy to maintain packages by automatically checking for dependencies and determines the actions required to install packages. This method eliminates the need to manually install or update the package, and its dependencies, using the rpm command. DNF is now the default software package management tool in Fedora.



Compare package managers

DNF	APT
Dandified Yum	Advanced Package Tool
works with .rpm package format	works with .deb package format
dnf is the front-end of RPM	apt is the front end of DPKG

dnf updates the repo lists automatically	apt update gets all information from configured source
dnf is used in RHEL, Fedora, CentOS, and other derivatives of RHEL	dnf is used in RHEL, Fedora, CentOS, and other derivatives of RHEL apt is used in Debian and all its derivatives like Ubuntu, Knoppix, etc.
can download and install from URLs directly	cannot download and install from URLs directly, it needs .deb packages
doesn't support one-click installs	supports one-click install
dnf remove <software name>	Apt remove <software name>
dnf upgrade	apt upgrade
dnf was first introduced in Fedora in the year 2013	first stable version of apt was released in the year 2014

Pros/cons of fedora

Advantages of Fedora OS-

1. Fedora OS is a very reliable and stable operating system.
2. It enhances the security in this operating system.
3. It offers many graphical tools.
4. This operating system updates automatically.
5. This OS supports many file formats.
6. It also offers many education softwares.
7. It supports a large community.
8. It provides unique security features

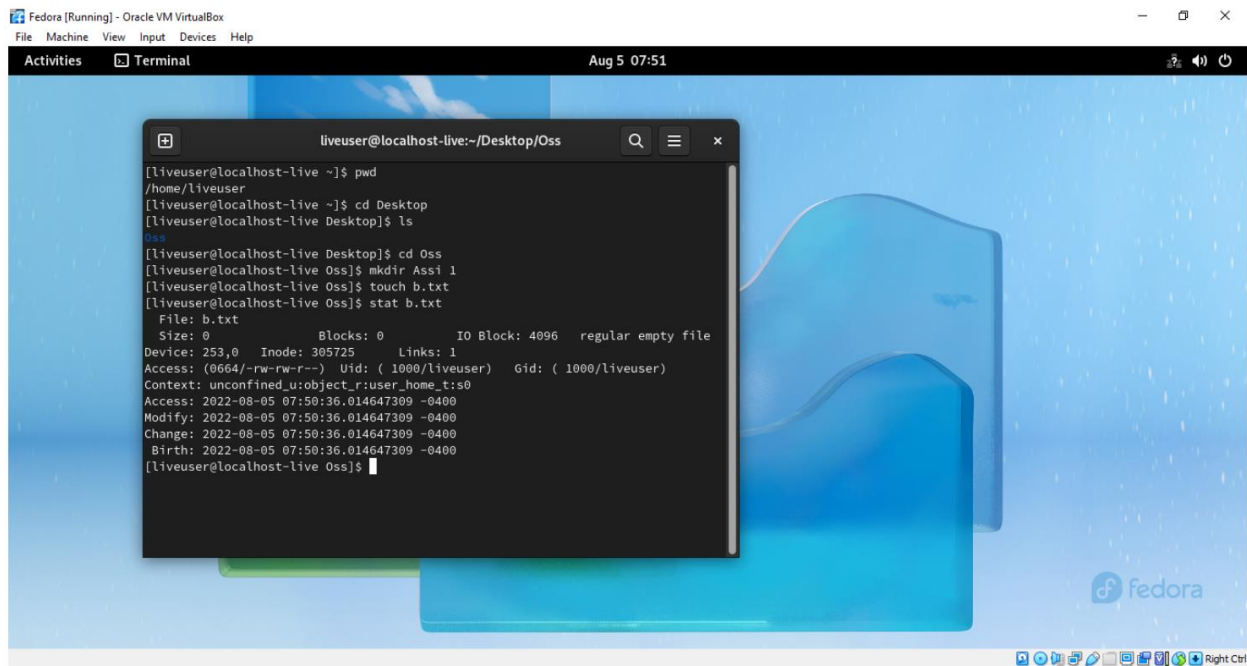
Disadvantages of Fedora OS-

1. It requires a long time to set up.
2. It requires additional software tools for the server.
3. It does not provide any standard model for multi-file objects.
4. Fedora has its own server, so we can't work on another server in real time.

Which one is better for development and why?

Fedora is geared toward developers and system administrators. fedora is smart auto-configs and various updated packages; that's why it is the best Linux distro for programmers. Majorly its focuses on the new technology integration, innovation, and focus. This operating system is available in five different editions, Fedora workstation, Fedora server, Fedora core OS, Fedora IoT, Fedora Silverblue each of which serves a specific role. These features makes it better for development and programmers

Command prompt on Fedora-



The screenshot shows a Fedora [Running] window in Oracle VM VirtualBox. The terminal window is titled 'liveuser@localhost-live: ~/Desktop/Oss' and displays the following commands and output:

```
[liveuser@localhost-live ~]$ pwd
/home/liveuser
[liveuser@localhost-live ~]$ cd Desktop
[liveuser@localhost-live Desktop]$ ls
Oss
[liveuser@localhost-live Desktop]$ cd Oss
[liveuser@localhost-live Oss]$ mkdir Assi 1
[liveuser@localhost-live Oss]$ touch b.txt
[liveuser@localhost-live Oss]$ stat b.txt
  File: b.txt
  Size: 0          Blocks: 0          IO Block: 4096   regular empty file
Device: 253,0    Inode: 305725     Links: 1
Access: (0664/-rw-rw-r--)  Uid: ( 1000/liveuser)   Gid: ( 1000/liveuser)
Context: unconfined_u:object_r:user_home_t:s0
Access: 2022-08-05 07:50:36.014647309 -0400
Modify: 2022-08-05 07:50:36.014647309 -0400
Change: 2022-08-05 07:50:36.014647309 -0400
Birth: 2022-08-05 07:50:36.014647309 -0400
[liveuser@localhost-live Oss]$
```


Commands for Fedora

1. `dnfdragora`: A graphical frontend for DNF, the package manager on Fedora. It provides a user-friendly way to manage software packages.
2. `dnf system-upgrade`: This command is used to perform system upgrades on Fedora. It's specifically designed for upgrading from one Fedora release to the next.
3. `rpm-ostree`: This is a command-line utility for managing OSTree-based system images, which is a technology used in Fedora Silverblue and CoreOS. It's primarily used for atomic system updates.
4. `firewalld`: Fedora uses `firewalld` as a firewall management tool. You can use commands like `firewall-cmd` to interact with the firewall settings.
5. `journalctl`: A command for querying and displaying logs from the `systemd` journal. It's the primary way to access system logs on Fedora.
6. `dnf repoquery`: This command allows you to query information about packages in your configured repositories. Useful for finding details about packages.
7. `dnf list updates`: This command lists available updates for your installed packages.
8. `dnf history`: Used for viewing and managing the package transaction history. You can undo or redo transactions.
9. `fedpkg`: A tool used to interact with the Fedora packaging system. It's used by Fedora contributors to build and maintain packages for the distribution.
10. `beesu`: A graphical frontend for the `su` command, used to run GUI applications with superuser privileges. It's more user-friendly for GUI applications than plain `sudo`.

Operating system- Debian

Various versions of Debian-

- Debian 1.1 (Buzz)
- Debian 1.2 (Rex)
- Debian 1.3 (Bo)
- Debian 2.0 (Hamm)
- Debian 2.1 (Slink)
- Debian 2.2 (Potato)
- Debian 3.0 (Woody)
- Debian 3.1 (Sarge)
- Debian 4.0 (Etch)
- Debian 5.0 (Lenny)
- Debian 6.0 (Squeeze)
- Debian 7 (Wheezy)
- Debian 8 (Jessie)
- Debian 9 (Stretch)
- Debian 10 (Buster)
- Debian 11 (Bullseye)
- Debian 12 (Bookworm)

Default desktop GUI of Debian-

The default desktop environment of Debian is **GNOME**, but if you prefer an alternative desktop environment such as KDE Plasma Desktop or Xfce, you can download a spin for your preferred desktop environment and use that to install Fedora, pre-configured for the desktop environment of your choice

Main purpose of Debian

The creation of Debian was sponsored by the FSF's GNU project for one year (November 1994 to November 1995). Debian was meant to be carefully and conscientiously put together, and to be maintained and supported with similar care. It started as a small, tightly-knit group of Free

Software hackers, and gradually grew to become a large, well-organized community of developers and users

Package management of Debian

The Apt (Advanced Package Tool) package management system is a set of tools to download, install, remove, upgrade, configure, and manage Debian packages, and therefore all software installed on a Debian system

List of default packages in Debian

Activities Brave Web Browser Aug 6 2:29 PM

OSS Assi 1 linux distros - Google 1. Demonstration of Linux Dis (1) WhatsApp List of debian packages w/ x +

gist.github.com/ringanta/4671061

List of debian packages which are installed by default on ami-307b0262

debiana-tom_punch-ami-307b0262 Raw

```
1 The number of packages is 173
2
3 ii adduser 3.112+nmu2 add and remove users and groups
4 ii apt 0.8.10.3 Advanced front-end for dpkg
5 ii apt-utils 0.8.10.3 APT utility programs
6 ii aptitude 0.6.3-3.2 terminal-based package manager (terminal interface only)
7 ii base-files 6.0squeeze1 Debian base system miscellaneous files
8 ii base-passwd 3.5.22 Debian base system master password and group files
9 ii bash 4.1-3 The GNU Bourne Again Shell
10 ii bsdmaintils 8.0.13 collection of more utilities from FreeBSD
11 ii bsduutils 1:2.17.2-9 Basic utilities from 4.4BSD-Lite
12 ii busybox 1:1.17.1-8 Tiny utilities for small and embedded systems
13 ii ca-certificates 20090814+nmu2 Common CA certificates
14 ii coreutils 8.5-1 GNU core utilities
15 ii cpio 2.11-4 GNU cpio -- a program to manage archives of files
16 ii cron 3.0pl1-116 process scheduling daemon
17 ii curl 7.21.0-1 Get a file from an HTTP, HTTPS or FTP server
18 ii dash 0.5.5.1-7.4 POSIX-compliant shell
19 ii debconf 1.5.36.1 Debian configuration management system
20 ii debconf-i18n 1.5.36.1 full internationalization support for debconf
21 ii debian-archive-keyring 2010.08.28 GnuPG archive keys of the Debian archive
22 ii debianutils 3.4 Miscellaneous utilities specific to Debian
23 ii dhcpcd 1:3.2.3-5 DHCP client for automatically configuring IPv4 networks
24 ii diffutils 1:3.0-1 File comparison utilities
25 ii dmidecode 2.9-1.2 Dump Desktop Management Interface data
26 ii dmsetup 2:1.02.48-5 The Linux Kernel Device Mapper userspace library
27 ii dpkg 1.15.8.10 Debian package management system
28 ii e2fslibs 1.41.12-2 ext2/ext3/ext4 file system libraries
29 ii e2fsprogs 1.41.12-2 ext2/ext3/ext4 file system utilities
30 ii file 5.04-5 Determines file type using "magic" numbers
31 ii findutils 4.4.2-1+b1 utilities for finding files--find, xargs
32 ii firmware-linux-free 2.6.32-31 Binary firmware for various drivers in the Linux kernel
33 ii gcc-4.4-base 4.4.5-8 The GNU Compiler Collection (base package)
34 ii gettext-base 0.18.1.1-3 GNU Internationalization utilities for the base system
```

Activities Brave Web Browser Aug 6 2:30 PM

OSS Assi 1 linux distros - Google 1. Demonstration of Linux Dis (1) WhatsApp List of debian packages w

gist.github.com/ringanta/4671061

34	ii	gettext-base	0.18.1.1-3	GNU Internationalization utilities for the base system
35	ii	gnupg	1.4.10-4	GNU privacy guard - a free PGP replacement
36	ii	gpgv	1.4.10-4	GNU privacy guard - signature verification tool
37	ii	grep	2.6.3-3	GNU grep, egrep and fgrep
38	ii	groff-base	1.20.1-10	GNU troff text-formatting system (base system component)
39	ii	grub	0.97-64	GRand Unified Bootloader (dummy package)
40	ii	grub-common	1.98+20100804-14	GRand Unified Bootloader, version 2 (common files)
41	ii	grub-pc	1.98+20100804-14	GRand Unified Bootloader, version 2 (PC/BIOS version)
42	ii	gzip	1.3.12-9	GNU compression utilities
43	ii	hostname	3.04	utility to set/show the host name or domain name
44	ii	ifupdown	0.6.10	high level tools to configure network interfaces
45	ii	info	4.13a.dfsg.1-6	Standalone GNU Info documentation browser
46	ii	initramfs-tools	0.98.8	tools for generating an initramfs
47	ii	initscripts	2.88dsf-13.1	scripts for initializing and shutting down the system
48	ii	insserv	1.14.0-2	Tool to organize boot sequence using LSB init.d script
49	ii	install-info	4.13a.dfsg.1-6	Manage installed documentation in info format
50	ii	iproute	20100519-3	networking and traffic control tools
51	ii	iptables	1.4.8-3	administration tools for packet filtering and NAT
52	ii	iputils-ping	3:20100418-3	Tools to test the reachability of network hosts
53	ii	klibc-utils	1.5.20-1	small utilities built with klibc for early boot
54	ii	less	436-1	pager program similar to more
55	ii	libacl1	2.2.49-4	Access control list shared library
56	ii	libattr1	1:2.4.44-2	Extended attribute shared library
57	ii	libblkid1	2.17.2-9	block device id library
58	ii	libboost-iostreams1.42.0	1.42.0-4	Boost.Iostreams Library
59	ii	libbsd0	0.2.0-1	utility functions from BSD systems - shared library
60	ii	libbz2-1.0	1.0.5-6	high-quality block-sorting file compressor library - runtime
61	ii	libc-bin	2.11.2-10	Embedded GNU C Library: Binaries
62	ii	libc6	2.11.2-10	Embedded GNU C Library: Shared libraries
63	ii	libcomerr2	1.41.12-2	common error description library
64	ii	libcurl3	7.21.0-1	Multi-protocol file transfer library (OpenSSL)
65	ii	libcwidget3	0.5.16-3	high-level terminal interface library for C++ (runtime)
66	ii	libdb4.8	4.8.30-2	Berkeley v4.8 Database Libraries [runtime]
67	ii	libdevmapper1.02.1	2:1.02.48-5	The Linux Kernel Device Mapper userspace library
68	ii	libedit2	2.11-20080614-2	BSD editline and history libraries
69	ii	libept1	1.0.4	High-level library for managing Debian package information
70	ii	libfontconfig1	2.4.2-2.1	FreeType 2 font engine, shared library files
71	ii	libgcc1	1:4.4.5-8	GCC support library
72	ii	libgcs1	1.4.5-2	LCG Crypto library - runtime library

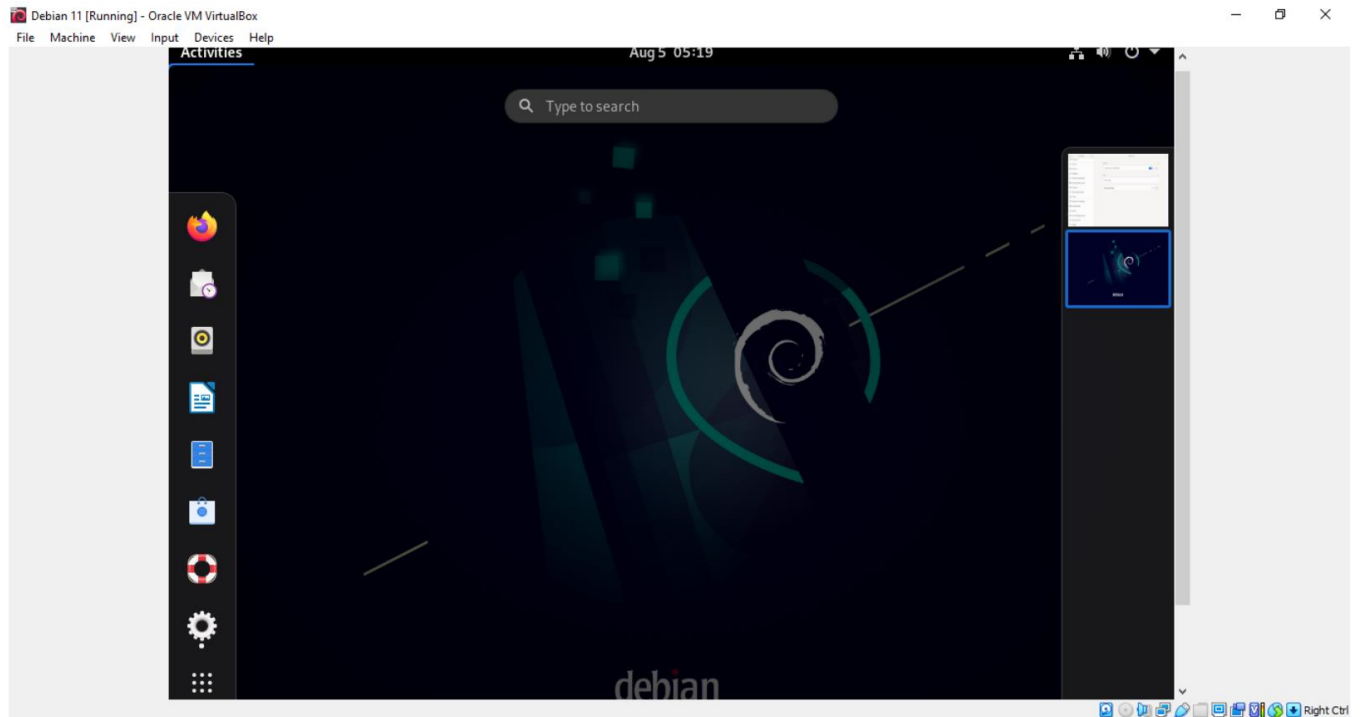
Activities Brave Web Browser Aug 6 2:30 PM

OSS Assi 1 linux distros - Google 1. Demonstration of Linux Dis (1) WhatsApp List of debian packages w

gist.github.com/ringanta/4671061

107	ii	libtasn1-3	2.7-1	Manage ASN.1 structures (runtime)
108	ii	libtext-charwidth-perl	0.04-6	get display widths of characters on the terminal
109	ii	libtext-iconv-perl	1.7-2	converts between character sets in Perl
110	ii	libtext-wrap18n-perl	0.06-7	internationalized substitute of Text::Wrap
111	ii	libudev0	164-3	libudev shared library
112	ii	libusb-0.1-4	2:0.1.12-16	userspace USB programming library
113	ii	libuuid-perl	0.02-4	Perl extension for using UUID interfaces as defined in
114	ii	libuuid1	2.17.2-9	Universally Unique ID library
115	ii	libwrap0	7.6.q-19	Wietse Venema's TCP wrappers library
116	ii	libx11-6	2:1.3.3-4	X11 client-side library
117	ii	libx11-data	2:1.3.3-4	X11 client-side library
118	ii	libxapian22	1.2.3-2	Search engine library
119	ii	libxau6	1:1.0.6-1	X11 authorisation library
120	ii	libxcb1	1.6-1	X C Binding
121	ii	libxdmcp6	1:1.0.3-2	X11 Display Manager Control Protocol library
122	ii	libxext6	2:1.1.2-1	X11 miscellaneous extension library
123	ii	libxmu1	2:1.0.5-2	X11 miscellaneous micro-utility library
124	ii	linux-base	2.6.32-31	Linux image base package
125	ii	linux-image-2.6.32-5-xen-amd64	2.6.32-31	Linux 2.6.32 for 64-bit PCs, Xen dom0 support
126	ii	linux-image-xen-amd64	2.6.32+29	Linux for 64-bit PCs (meta-package), Xen dom0 support
127	ii	locales	2.11.2-10	Embedded GNU C Library: National Language (locale) data
128	ii	locate	4.4.2-1+b1	maintain and query an index of a directory tree
129	ii	login	1:4.1.4.2+svn3283-2+squeezel	system login tools
130	ii	logrotate	3.7.8-6	Log rotation utility
131	ii	lsb-base	3.2-23.2squeeze1	Linux Standard Base 3.2 init script functionality
132	ii	man-db	2.5.7-8	on-line manual pager
133	ii	manpages	3.27-1	Manual pages about using a GNU/Linux system
134	ii	mawk	1.3.3-15	a pattern scanning and text processing language
135	ii	module-init-tools	3.12-1	tools for managing Linux kernel modules
136	ii	mount	2.17.2-9	Tools for mounting and manipulating filesystems
137	ii	nano	2.2.4-1	small, friendly text editor inspired by Pico
138	ii	ncurses-base	5.7+20100313-5	basic terminal type definitions
139	ii	ncurses-bin	5.7+20100313-5	terminal-related programs and man pages
140	ii	net-tools	1.60-23	The NET-3 networking toolkit
141	ii	netbase	4.45	Basic TCP/IP networking system
142	ii	netcat-traditional	1.10-38	TCP/IP swiss army knife
143	ii	openssh-blacklist	0.4.1	list of default blacklisted OpenSSH RSA and DSA keys
144	ii	openssh-blacklist-extra	0.4.1	list of non-default blacklisted OpenSSH RSA and DSA keys
145	ii	openssh-client	1:5.5p1-6	secure shell (SSH) client - for secure access to remote

Screenshots of Debian



Pros/cons of Debian

Advantages-

1. Free and Open Source
2. An established linux versions
3. Supports different system architectures
4. Availability of free and proprietary software
5. Specific desktop and server use cases

Disadvantages-

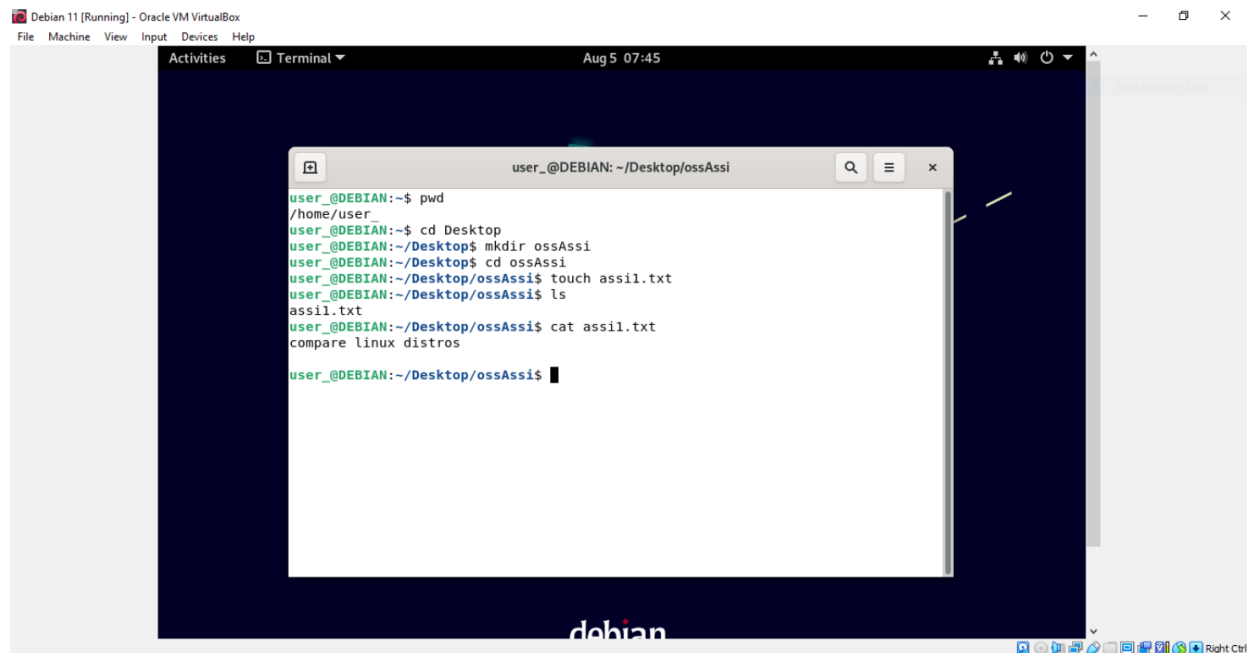
1. A conservative operating system
2. Issues with the established GNU Principles

Which one is easy to use (for beginners) and why?

Fedora is less user-friendly than Debian. The hardware support is not good as Debian. Fedora is stable but not as much as Debian. Fedora includes less than 20000 packages.

Debian has excellent hardware support. Debian is one of the popular distributions available. Debian is the most stable Linux-based operating system. Debian comes with over 60000 packages.

Command prompt on Debian-



```
user_@DEBIAN:~$ pwd
/home/user_
user_@DEBIAN:~$ cd Desktop
user_@DEBIAN:~/Desktop$ mkdir ossAssi
user_@DEBIAN:~/Desktop$ cd ossAssi
user_@DEBIAN:~/Desktop/ossAssi$ touch assil.txt
user_@DEBIAN:~/Desktop/ossAssi$ ls
assil.txt
user_@DEBIAN:~/Desktop/ossAssi$ cat assil.txt
compare linux distros
user_@DEBIAN:~/Desktop/ossAssi$
```

Commands for Debian

1. dpkg: A low-level package management command for working with individual .deb packages.
2. systemctl: Similar to Fedora, used to manage systemd-based services on Debian systems.
3. lsb_release: This command displays information about the Linux distribution and its release.
4. ufw: The Uncomplicated Firewall, a user-friendly interface for managing iptables firewall rules.
5. htop: Similar to top, it's a dynamic process viewer and system monitor, but with a more user-friendly interface.

6. debconf: A system for managing configuration prompts during package installation. It's used to present configuration options in a consistent way across different packages.
7. dselect: An older, but still occasionally used, interactive frontend to package management. It provides a text-based interface for selecting and managing packages.

Conclusion

1. Installation of various Linux versions.
2. Comparison of various distributions have been studied, and their desktop environments and applications had been studied.