



A REPORT OF
“Open-Source Software Laboratory”
Code: 5IT452

B: Beginner (B)

Submitted by

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DEPARTMENT OF INFORMATION TECHNOLOGY
WALCHAND COLLEGE OF ENGINEERING, SANGLI
(An Autonomous Institute)

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CERTIFICATE



This is to certify that the report entitled "**Open-Source Software Laboratory (OSS Lab) 5IT452**" submitted by **MR. ONKAR NARSINGRAO PANCHARE (2019BTEIT00077)** and **MR. SUMIT SUNIL KOUNDANYA (2019BTEIT00023)** is a record of student's own work carried out by him during the academic year 2022-2023, as per the curriculum/syllabus laid down for OSS lab at Final year B. Tech IT Sem-I. He has carried out experiments/FOSS tools hands-on on 13 assignments under B: Beginner category successfully.

Dr. A. J. Umbarkar
(Course Teacher)

Declaration

I, the undersigned, hereby declare that the BTech report entitled “Open-Source Software Laboratory (OSS Lab) 5IT452” submitted by me to OSS Lab report at Final year BTech IT Sem-I, is my original/experimented/experience work. I further declare that, to the best of my knowledge and belief, this report has not been previously submitted or copied by me.

I declare that this report reflects my thoughts about the subject in my own words. I have sufficiently cited and referenced the original sources, referred, or considered in this work. I have not misinterpreted, fabricated, or falsified any idea/data/fact/source in this my submission. I understand that any violation of the above will be cause for disciplinary action by the course teacher/institute.

(Sign)

(Sign)

Date: 18-11-2022

Mr. Sumit Koundanya Mr. Onkar Panchare

Place: WCE Sangli

Acknowledgement

I feel immense pleasure in submitting the report entitled “Open-Source Software Laboratory (OSS Lab) 5IT452”. I am thankful to our guide Dr. A. J. Umbarkar for their valuable guidance and kind help during implementing the OSS Lab.

Acknowledged By,

(Sign)

(Sign)

Mr, Sumit Koundanya

Mr. Onkar N. Panchare

5IT452: Open-Source Software Lab

(E: Expert) Final Assignment List

- 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)

Student asks to study at least two Linux Distros, with their comparisons and installation on Virtual Box OR Installation Linux on Live USB pen drive.
[https://fedoraproject.org/wiki/How_to_create_and_use_Live_USB]

In Journal, they should write information of that distros, such as-

- i. Various versions of that distros with code name
- ii. Default desktop GUI
- iii. Main purpose of that
- iv. Package management of that distros
- v. List of Default Packages
- vi. Screenshots of that distros
- vii. Compare '/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 beginner) and why?
- xii. Explorer any top 10 commands of that distro on command prompt.
- xiii. Make the Official Repositories of **Fedora/CentOS** on docker store (<https://hub.docker.com/>) and experiment for above.

References-

- 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/>

2. Use of Open-Source tools for Project Management.
(Sonar, Targetprocess, Redbooth, Pivotal Tracker, OrangeScrum etc.: Any One)
(Submission by Individual [I])

Objective: To install and demonstrate the use of various open-source software's that used in day today life of software engineer

Outcome: (PO: k, l)

Students should experiment at last two project management tools / software's, and they have to use for their project/FOSS project/mini project.

In journal, they have to write information about that tool such as:-

- i. Purpose behind that tool.
- ii. Various versions of those tools.
- iii. Installation and Configuration of that tool.
- iv. How to use that tool.

References-

- i. <https://bitnami.com/stacks>
- ii. Sphinx for all lab/college documentation by the students.
- iii. <http://www.sonarqube.org/>
- iv. Wikipedia List Of Software's:-
<http://en.wikipedia.org/wiki/List-of-free-and-open-source-software-packages>
- v. Open Source Software Mega List -
<http://www.datamation.com/open-source/open-source-software-the-mega-list.html>
- vi. https://fedoraproject.org/wiki/Education_Spin (This has lots of relevant packages)
- vii. <http://www.methodsandtools.com/tools/targetprocess.php>
- viii. <https://blog.capterra.com/free-open-source-project-management-software/>
- ix. <http://www.targetprocess.com/>
- x. <https://www.pivotaltracker.com/features/>
- xi. <https://redbooth.com/features>

3. Use of Bug Tracking

(Phabricator, Youtrack, Mantis, Futuramo, etc.: Any One)

(Submission by Individual [I])

Objective: To install and demonstrate the use of various open source software's that used in day to day life of software engineering.

Outcome: (PO: k, l)

Students have to experiment at last two bug tracking tools / software's and they have to use for their project/FOSS project/mini project.

In journal, they have to write information about that tool such as:-

- i. Purpose behind that tool.
- ii. Various versions of that tool.
- iii. Installation and Configuration of that tool
- iv. How to use that tool.
- v. Make the Official Repositories of any one above **Bug Tracking** on docker store (<https://hub.docker.com/>) and experiment.

References-

- i. <https://bitnami.com/stacks>
- ii. http://en.wikipedia.org/wiki/List_of_free_and_open-source_software_packages

4. Use of Version Control System.
(Mercurial (hg), Bazaar, Monotone, etc: Any One).

(Submission by Individual and Group [I and G])

Objective: To use the online and offline Version Control System in Open Source/for their project work.

Outcome: lifelong learning (PO: b, c, k, l)

Students should experiment any two **Version Control System** and use the tool for their project/FOSS project/mini project/ etc.

Sample code developments example of **Version Control System** on both Windows and Linux clients/server.

Make the Official Repositories of any one **Version Control System** on docker store (<https://hub.docker.com/>) and experiment.

In Journal, They have to write Basic Information about **Version Control System**, commands, their working, diagrams, differences, pros and cons, developments history, etc .

Reference:-

- i. <https://try.github.io/levels/1/challenges/1>
- ii. <https://github.com/princeton-8/princeton-8.github.io>
- iii. http://wiki.openhatch.org/Open_Source_Comes_to_Campus/Practicing_Git/Students
- iv. GIT Official Documentation:- <http://git-scm.com/documentation>
- v. SVN Official Documentation:- <http://svnbook.red-bean.com/en/1.7/index.html>
- vi. Perforce Helix is a commercial, proprietary revision control system developed by Perforce Software
- vii. <https://www.smashingmagazine.com/2008/09/the-top-7-open-source-version-control-systems/>
- viii. <http://wiki.bazaar.canonical.com/WindowsDownloads>

5. Installation and Use of CMS software's.

(Joomla, Mahara, Xoops, DokuWiki, etc.: Any One) OR (Social Networking open source: Diaspora or other: Any One)

(Submission by Individual [I])

Objective: To comprehend the use of Content Management System and their Use for personal website/dept CMS.

Outcome: Self learning (PO: b, I, j, k, l)

Students have to study at least experiment one **CMS** and one **Wiki**. Use **Wiki** for giving the information to class student to perform FOSS assignments. Use **CMS** for giving the creating your personal website/blog or FOSS course website/blog.

In Journal, They have to write,

- i. Administration of CMS/wiki.
- ii. How to Use.
- iii. Installation on Linux Platform.
- iv. Screenshots.
- v. Make the Official Repositories of any one **CMS/Wiki** on docker store (<https://hub.docker.com/>) and experiment.

References:-

- i. www.wordpress.com
- ii. Drupal Tutorials:- <http://drupal.org/documentation/customization/tutorials>
- iii. Moodle Tutorials:- http://docs.moodle.org/22/en/Moodle_video_tutorials
- iv. <https://bitnami.com>

**6. Comprehend the Open Source Software Development for any one Linux distro. (Topic 3rd in Syllabus) (Fedora/CentOS, etc :Any One)
(Submission by Individual or Group [I or G])**

Objective: To comprehend the open source software development.

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

In this student have to study open source software development process of **any one above Linux distro**.

Get the details following information like –Name of community, website, Mailing List, wiki, version control, bug tracking and documentation of the particular distro to comprehend.

Sample of Ubuntu Development:-

- i. Development Communities:- <http://www.ubuntu.com/community/>
- ii. Mailing List:- <https://lists.ubuntu.com/>
- iii. IRC channels:- <https://wiki.ubuntu.com/IRC/ChannelList>
- iv. Ubuntu Wiki:- <https://wiki.ubuntu.com/>
- v. Ubuntu Version Control:- <https://code.launchpad.net/ubuntu>
- vi. Ubuntu Bug Tracking:- <https://bugs.launchpad.net/ubuntu>
- vii. Ubuntu Localization :- <https://translations.launchpad.net/ubuntu>
- viii. Ubuntu Documentation:- <https://help.ubuntu.com/community>

Sample of Fedora

- I. <https://getfedora.org/>
- Ii. <https://fedoraproject.org/wiki/IRC>
- Iii. <https://fedoraproject.org/wiki/>
- Iv.<https://fedoraproject.org/wiki/Packaging:Versioning> /
<https://fedoraproject.org/wiki/Infrastructure/VersionControl>
- V. <https://fedoraproject.org/wiki/Bugzilla>
- Vi. <https://fedoraproject.org/wiki/Category:Localization>
- Vii. <https://docs.fedoraproject.org/en-US/index.html>

7. Compilation of Linux Kernel selected above.

(Fedora/CentOS, etc: Any One)

(Submission by Individual or Group [I or G])

Objective: To demonstrate how to compile Linux Kernel.

Outcome: Self learning (PO: k, l)

In this student have to do the compilation any one mentioned above Linux distro Linux Kernel on their system/VMware/Virtual box or pen drive or docker container.

Reference:-

i. Installation Of Linux Kernel on Fedora:-

<http://www.howopensource.com/2011/08/how-to-install-compile-linux-kernel-3-0-in-fedora-15-and-14/>

Or/and

ii. https://fedoraproject.org/wiki/Building_a_custom_kernel

iii. Latest kernel installation on Fedora and Cent OS:-

<http://www.tecmint.com/kernel-3-5-released-install-compile-in-redhat-centos-and-fedora/>

iv. <http://tldp.org/guides.html>

v. Installation Of Linux Kernel on Ubuntu:-

Latest kernel installation on :-

<http://www.backtracklinux.org/forums/showthread.php?t=49347>

Installation of Linux Kernel on Suse:-<https://en.opensuse.org/Kernel>

In Journal you have to write the step by step process of compilation.

8. Create of RPM or DEB packages (Any One) (Submission by Individual [I])

Objective: To Create package for any above Linux distros.

Outcome: (PO: b, I, j, k, l)

Students have to study RPM or DEB package building for their C, C++ or JAVA Codes(any one programming languages codes). They must build an rpm or debian package and install it through package manager such as YUM or APT-GET

Reference:-

- i. Build Simple rpm package:- http://rhce.dposs.org/index.php?title=Build_a_simple_RPM_that_packages_a_single_file
- ii. Fedora rpm doc:- http://fedoraproject.org/wiki/How_to_create_an_RPM_package
- iii. Simple DEB package for your C code:-
<http://linuxconfig.org/easy-way-to-create-a-debian-package-and-local-package-repository>
- iv. Simple DEB build guide:-
<http://askubuntu.com/questions/90764/how-do-i-create-a-deb-package-for-a-single-python-script>
- v. Deb Package Build YouTube:- <http://www.youtube.com/watch?v=nhoRyd2CEVs>
In Journal you have to write the package building process.

9. Install and demonstrate of Server based services and their Uses. (web server apache or tomcat or IIS, NFS,NIS: Any One)

(Submission by Individual [I])

Objective: To know server installations and Configurations on Linux Platform

Outcome: (PO: b, I, j, k, l)

Students are asked to install and configure at least 2 servers, such as FTP, HTTP server (web server), TELNET, NFS, NIS etc. All configurations must be done on Linux Platform

In Journal, they have to write installations, Configurations and Screenshots of server on which they worked.

Make the Official Repositories of any one above **server** on docker store (<https://hub.docker.com/>) and experiment.

References:-

- i. Server World:- <http://www.server-world.info/en/>
- ii. Yolinux :- <http://www.yolinux.com/>
- iii. GUI based tool for server configuration Webmin
<http://www.webmin.com/index.html>

10. Development of new Open Source Software or contribution to existing Open Source Software.

(Any small application other than Music Player or Calculator or Text Editor in java/python/perl/c/cpp/etc: Any One or New open source development).

(Submission by Individual or Group [I or G])

Objective: To contribute/introduce the open source software by understanding the GPL Licensing.

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

- a. Develop simple software for basic needs such as Calculator, editor etc.
Use following:-
 - i. Language:- C/C++, Python, Perl, PHP, Java, .net
 - ii. Version Control :- GIT or SVN
 - iii. Package Building:- debian or rpm
 - iv. Translation:- Marathi or Hindi
 - v. Documentation:- Use Mallard for your Help
- b. Make the Official login on online repositories of open source projects with valid login by individual and ask group too. Take any above suitable open project from online open source project and add feature/option/GUI/remove error/modules/etc.

- c. Appreciation mail may be received from main developer/introducer if your contribution is quality and remarkable.

References:-

- i. <http://teachingopensource.org/start-contributing-using-open-source-software/>
- ii. <https://www.fossology.org/get-started>
- iii. <http://foss2serve.org/index.php/Category:Projects>
- iv. http://www.hfoss.org/index.php/project_gallery
- v. GIT version control Tutorial:- <http://git-scm.com/documentation>
- vi. SVN :- <http://michael-zamir.blogspot.in/2012/01 svn-tutorial.html>
- vii. Translation
:-<http://www.tuxamito.com/joomla/index.php/es/component/content/article/60-gettext-tutorial>
- viii. Using Malarad:- <http://projectmallard.org/about/learn/tenminutes.html>
- ix. http://www.hfoss.org/index.php/project_gallery
- x. <http://www.shlomifish.org/philosophy/computers/open-source/how-to-start-contributing/tos-document.html>

In Journal you have to write the process in Brief.

11. Docker container : An open source software development platform (any two) (Submission by Individual or Group [I or G])

Objective: To understand and use the docker virtualization as OSS.

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

- a) With the help of Docker/Container show the any one above Linux distros selected.
(in assignment 1.)
- b) 1. Create image/container of any FOSS tool and upload on Docker Hub.
2. Pull images/containers from docker-hub: <https://hub.docker.com/>
- c) (FOSS tool bug tracking tool, Project management tool, Version control system, CMS, python, java language running/compilation support, etc. and follow respective tool assignment)
- d) Contribute/Introduce the docker/container to make the resource management easy and lighter.
- e) Create IPC between two OS container. *** for TY UOS***
- f) With the help of Docker-compose deploy the ‘Wordpress’ and ‘Mysql’ container and access the front end of ‘Wordpress’
- g) Docker image:

- A. Create a simple Hello-world python flask application and create the docker image of that Flask application.
 - B. Run the docker container from recently created image and run that docker container to 5000 port of host system.
- h) Create the ‘nginx’ container from ‘nginx’ image. And create the load balancing so that if we go to the address of ‘nginx’ it can redirect it to the above created applications (Flask and Wordpress).

Note. Docker has to be installed first, to carry out docker based experiments. Prefer the Linux OS to do this assignment.

References:-

- i. <https://www.docker.com/>
- ii. <https://opensource.com/resources/what-docker>
- iii. <https://mobyproject.org/>
- iv. <https://labs.play-with-docker.com/>

Extra Resources docker/container learning:

1. play with docker
<http://labs.play-with-docker.com/>
2. docker curriculum on github
<https://docker-curriculum.com/>
3. awesome-docker on github
<https://github.com/veggiemonk/awesome-docker>
4. docker cheatsheet
https://www.docker.com/sites/default/files/Docker_CheatSheet_08.09.2016_0.pdf
<https://github.com/wsargent/docker-cheat-sheet>
5. basics of docker pdf used in workshop
<ftp://10.10.13.13/Basics%20of%20Docker.pdf>

12. Find python kernel code and compile it or use any python library for any application.

(Submission by Individual or Group [I])

Objective: To use the python open source ready module for application development.

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

Example:

1. A Python library to write a table in various formats: CSV / Elasticsearch / HTML / JavaScript / JSON / Jupyter Notebo...
2. Python Driver for ArangoDB, a NoSQL graph database
3. A fast image processing library with low memory needs.
4. Any work on Concurrency and Parallelism

Libraries for concurrent and parallel execution.

- [eventlet](#) - Asynchronous framework with WSGI support.
- [gevent](#) - A coroutine-based Python networking library that uses [greenlet](#).
- [multiprocessing](#) - (Python standard library) Process-based "threading" interface.
- [threading](#) - (Python standard library) Higher-level threading interface.
- [Tomorrow](#) - Magic decorator syntax for asynchronous code.
- [uvloop](#) - Ultra fast implementation of asyncio event loop on top of libuv.

Profiler

- [line_profiler](#) - Line-by-line profiling.
- [memory_profiler](#) - Monitor Memory usage of Python code.
- [profiling](#) - An interactive Python profiler.
- [vprof](#) - Visual Python profiler.

Game Development : *Awesome game development libraries.*

- [Cocos2d](#) - cocos2d is a framework for building 2D games, demos, and other graphical/interactive applications. It is based on pyglet.
- [Panda3D](#) - 3D game engine developed by Disney and maintained by Carnegie Mellon's Entertainment Technology Center. Written in C++, completely wrapped in Python.
- [Pygame](#) - Pygame is a set of Python modules designed for writing games.
- [PyOgre](#) - Python bindings for the Ogre 3D render engine, can be used for games, simulations, anything 3D.

- [PyOpenGL](#) - Python ctypes bindings for OpenGL and its related APIs.
- [PySDL2](#) - A ctypes based wrapper for the SDL2 library.
- [RenPy](#) - A Visual Novel engine.

Ref: <https://github.com/vinta/awesome-python>

13. Agile s/w engineering by using Tuleap, review board and gitea (tools of agile setup)

<https://www.tuleap.org/> 1. Read and register for online use. (B and I)

- Offline use, setup Tuleap, review board and gitea setup on docker container?(E)
- Share your tool details setup, usage, videos link etc in assignment write-up. Take small final year project in this environment as case study for demonstration.
- This assignment is introduced in year 19-20 first time.

14. Learn Open source programming language GO (Compulsory for E)

- Write 3 suitable programs using GO language.
- Compare GO language with functional and procedural languages.
- Enlist the features of GO language
- Commands and compiler, debuggers of GO.
- Applications of GO language
- Put programs (with statements) in write-up with compilation steps details and upload.

15. Bonus Assignments.

15.1 Create a poster by individual for a foss tool, using dia online drawing tool. (for 2 additional bonus mark in ise) Use Flowchart Maker & Online Diagram Software: <https://www.draw.io/>

Uses of tool, Describe working diagrams/steps, information of commands, etc. in poster. Give links of good ref site/videos.

Exported SVG file format and Upload this entire folder one zipped file on schoology.

15.2 Emac editor experience for coding, documentation, indentation, foss std/Google std coding in languages (1 mark bonus)

Experiment Emac editor on Linux/ windows for coding, documentation, indentation, foss std/Google std coding in languages like c,cpp, python, java, latex, etc.

In word file upload

1. Give detail/steps of emac editor installation and packages of coding, documentation, indentation, foss std/Google standard d coding.
2. Explain you experience of coding with Emac editor.
3. Compare Emac with eclipse IDE.
4. Give important link/ reference /videos of Emac editor.

15.3 FOSS HacktoberFest Pull requests can be made in any GitHub-hosted repositories/projects (Optional to assignment 10)

This is Optional assignment to assignment 10. Do any one at least.

Visit for this site before start and reads first page carefully.

Every year October is FOSS month.... hence this is FOSS contribution initiatives.

<https://hacktoberfest.digitalocean.com/>

Steps.

1. Create account on above link.
2. Make 4 valid Pull Requests on Github between 1st -31st October.
3. Post the screenshot of your Hacktoberfest profile and screenshot of Github Profile on Schoology. (In write-up of this assignment)
4. Give details of all 4 Pull Requests in write-up.
5. Also attach the screenshot of email in write-up.

15.4 (Extra ISE bonus)Sugar is an activity-focused, free/libre open-source software learning platform for children.

<https://sugarlabs.org/>

Sugar is an activity-focused, free/libre open-source software learning platform for children. Collaboration, reflection, and discovery are integrated directly into the user interface. Through Sugar's clarity of design, children and teachers have the opportunity to use computers on their own terms. Students can reshape, reinvent, and reapply both software and content into powerful learning activities. Sugar's focus on sharing, criticism, and exploration is grounded in the culture of free software (FOSS)

15.5 Create Video any one FOSS tool liked by you (bonus 1 mark)

Upload Video on you tube and give YouTube link here

15.6 Discussion on all assignments (active involvement with technical content will bonus 1 mark in ise) Put the good url/website pdf link, how to do, video links here for other help on assignments. (active involvement with technical content will bonus 1 mark in ise)

Note:-

- i. All assignments first need to write in word soft form as per format of word (attached with assignment list). Finally, at the end of all assignments, merge all assignments in the form of journal using word Template format or latex template (is given on schoology). Final well formatted (English checked/plagiarism checked /reference/ page no/ etc) journal expected at the end of course for getting journal marks.
- ii. Submit all assignments to **schoology.com** on time as per instructions.
- iii. See ISE plan for marks allotments.

Course Objectives:

- 1) To Configure the Open-Source Software.
- 2) To contribute/ develop software (system) for open-source environment.
- 3) To use FOSS for Software Engineering.

Percentage of Objective achieved by students:

Objective No.	Not achieved	40% achieved	70% achieved	100% achieved
1				
2				
3				

Course Learning Outcomes:

1. Exercise the FOSS in software development
2. Analyze the economics of FOSS
3. Create new FOSS or Contribute to existing FOSS

Percentage of Outcome achieved by students:

Objective No.	Not achieved	40% achieved	70% achieved	100% achieved
1				
2				
3				

(Sign)

(Sign)

Program Outcomes:

- a. **Engineering Knowledge:** Apply the knowledge of mathematics, engineering run and computational science to the solution of engineering problems.
- b. **Problem Analysis:** Identify, formulate. Interpret and analyze the complex engineering problems leading to substantiated conclusions
- c. **Design/Development of Solutions:** Design systems, components or processes to meet desired needs within realistic constraints such as economic, environmental, societal and ethical considerations.
- d. **Conduct investigations of Complex Problems:** Use research based knowledge and methods including design of experiments, analysis, interpretation and synthesis of information to provide valid conclusions.
- e. **Modern Tool Usage:** Select and apply appropriate techniques, engineering skills and modem IT tools to prototype the model of complex engineering activities.
- f. **The Engineer and Society:** Apply contextual knowledge pertaining social, secure. Legal and cultural issues with consequent responsibilities relevant to IT.
- g. **Environment and Sustainability:** Understand the impact of the professional engineering solutions in social, environmental and the global contexts, demonstrating the knowledge of and the need for sustainable development.
- h. **Ethics:** Apply ethical principles and commit to the professional ethics with responsibilities and norms of the engineering practices.
- i. **Individual and Team Work:** Work effectively as an individual as well as a member or a leader in diverse teams for multidisciplinary settings.
- j. **Communication:** Communicate effectively with the engineering community and with society at a large, such as, being able to comprehend and write reports and design documentation to make effective presentations.
- k. **Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply those to original work or contemporary issues, as a member or land a leader in a team or an entrepreneur to manage projects in multidisciplinary environments.
- l. **Life-long Learning:** Recognize the need and prepare to engage independent and

in lifelong learning.

PO Mapping with Tutorial List

Assignment No \ PO	(a)	(b)	I	(d)	I	(f)	(g)	(h)	(i)	(j)	(k)	(l)
1												
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(Sign)

(Sign)

Mr, Sumit Koundanya

Mr. Onkar N. Panchare

Course Learning outcomes:

CO	After the completion of the course the student should be able to	Bloom's cognitive	
		Level	Descriptor
CO1	Exercise the FOSS tools in software development.	3	Applying
CO2	Analyze the economics of FOSS.	4	Analysing
CO3	Create new FOSS or contribute to existing FOSS in FOSS environment.	6	Creating

CLO mapping with assignment list

Sr.	Assignment	BIE	% Copy	Mapping	category
1	Demonstration of Linux Distributions OS's and their purpose with comparisons.	E	5%	CO1	Application
2	Use of Open-Source tools for Project Management.	E	1%	CO2	Application
3	Use of Bug Tracking	E	1%	CO1	Knowledge
4	Use of version control system	E	0%	CO2	Application
5	Installation and Use of CMS software	E	5%	CO1	Application
6	Comprehend the open-source software development for any one Linux Distro	E	1%	CO3	Synthesis Design
7	Compilation of Linux kernel	E	1%	CO3	Synthesis
8	Creation of RPM or DEB packages	E	0%	CO2	Application
9	Install and demonstrate server based services and their uses	E	5%	CO2	Application

10	Development of new Open Source Software or contribution to existing Open Source Software.	E	1%	CO2	Application
11	Docker container: An open source software development platform	E	1%	CO2	Application
12	Find python kernel code and compile it or use any python library for any application.	E	0%	CO3	Application
13	<u>Agile</u> s/w engineering by using Tuleap, review board and gitea (tools of agile setup)	E	5%	CO1	Synthesis Design
14	Learn Open source programming language GO	E	1%	CO2	Knowledge
15	Bonus Assignments.	E	1%	CO2	Creating

Rubrics Used:

1. Quiz Objective
2. Class Questioning.
3. Quiz Subjective
4. Open Book Test
5. Assignment
6. Program
7. Seminar
8. Mini project
9. PPT
10. Demo Simulator
11. ISE1/ISE2/ESE
12. Videos

13. Posters

14. Presentations

Rubrics mapping with assignment list:

Assi. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1														
2														
3														
4														
5														
6														
7														
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9														
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11														
12														
13														
14														
15														
16														
17														
18														

Self-Evaluation by Student:

Name of student	Exam no.	Email ID	Roll no.	Sign
Sumit Koundanya	2019BTEIT00023	Sumit.koundanya @walchandsangli. ac.in	23	
Onkar Panchare	2019BTEIT00077	onkar.panchare@ walchandsangli.ac .in	77	

Assignment 1

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

Operating system- Fedora

Various versions of fedora with code name

- Fedora Linux 19 (Schrödinger's Cat)
- Fedora Linux 20 (Heisenbug)
- Fedora Linux 21 (Twenty-One)
- The current release is Fedora 36, which was released on 10 May 2022.

Default desktop GUI of Fedora

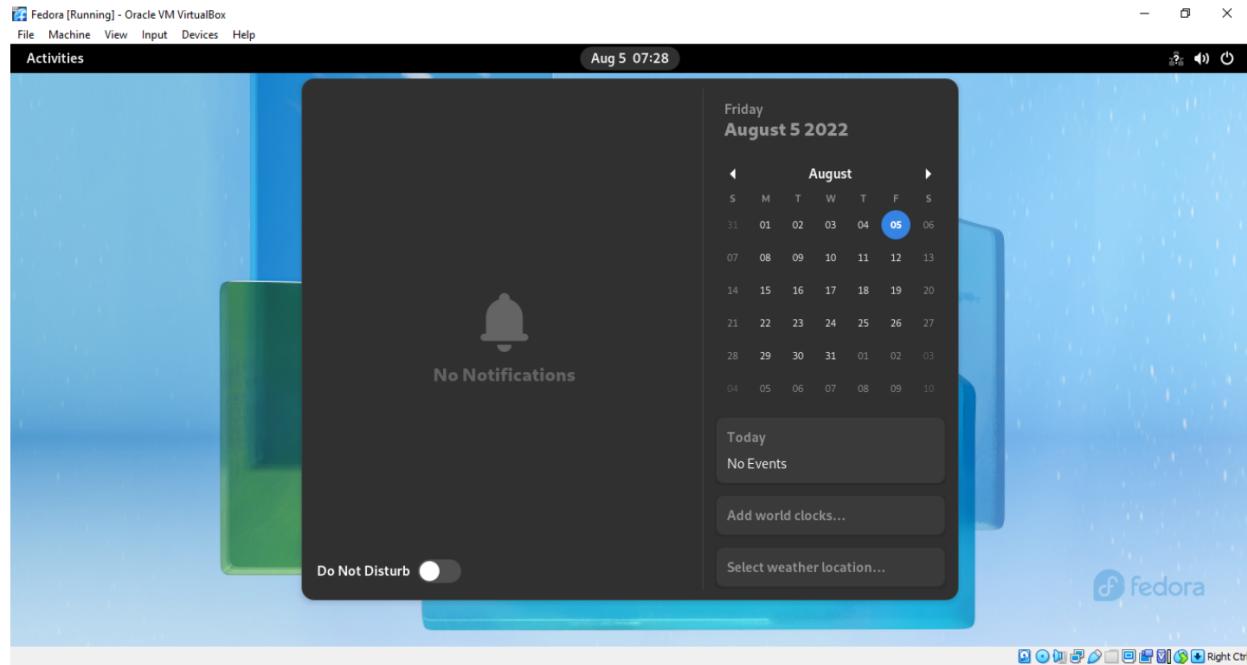
The default desktop environment of Fedora is **GNOME**, but if you prefer an alternative desktop environment such as KDE Plasma Desktop or Xfce, you can download a spin for your preferred desktop environment and use that to install Fedora, pre-configured for the desktop environment of your choice.

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 pf RHEL	dnf is used in RHEL, Fedora, CentOS, and other derivatives pf 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-

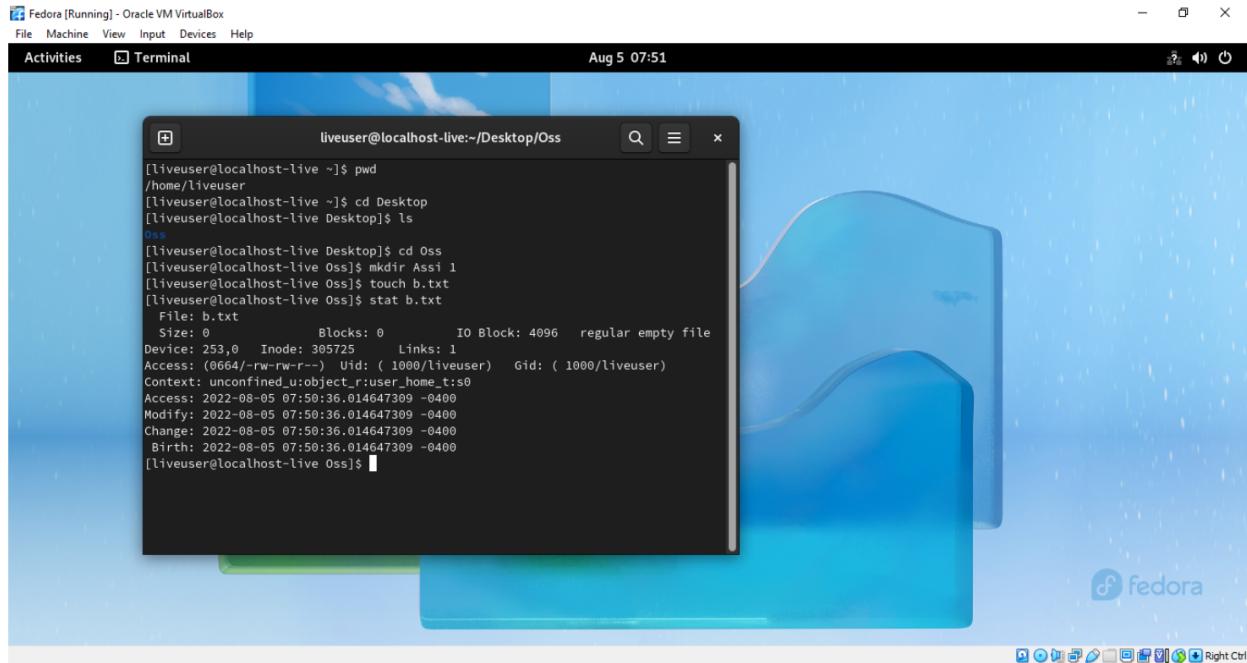
1. It requires a long time to set up.
2. It requires additional software tools for the server.
3. It does not provide any standard model for multi-file objects.
4. Fedora has its own server, so we can't work on another server in real-time.

Which one is better for development and why?

Fedora is geared towards 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 focusing. This operating system is available in five different editions, Fedora workstation, Fedora server, fedora coreOS, Fedora IoT, Fedora Silverblue each of which serves a specific role. These features makes it better for development and programmers

Command prompt on Fedora-



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 - Good 1. Demonstration of Linux Distros (1) WhatsApp List of debian packages w +

gist.github.com/ringanta/4671061

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

[Raw](#)

debain-tom_punch-ami-307b0262	1	The number of packages is 173
ii adduser	3.112+nmu2	add and remove users and groups
ii apt	0.8.10.3	Advanced front-end for dpkg
ii apt-utils	0.8.10.3	APT utility programs
ii aptitude	0.6.3-3.2	terminal-based package manager (terminal interface only)
ii base-files	6.0squeeze1	Debian base system miscellaneous files
ii base-passwd	3.6.22	Debian base system master password and group files
ii bash	4.1-3	The GNU Bourne Again Shell
ii bsdmainutils	8.0.13	collection of more utilities from FreeBSD
ii bsduutils	1:2.17.2-0	Basic utilities from 4.4BSD-Lite
ii busybox	1:1.17.1-8	Tiny utilities for small and embedded systems
ii ca-certificates	20990814+nmu2	Common CA certificates
ii coreutils	8.5-1	GNU core utilities
ii cpio	2.11-4	GNU cpio -- a program to manage archives of files
ii cron	3.0pl1-116	process scheduling daemon
ii curl	7.21.0-1	Get a file from an HTTP, HTTPS or FTP server
ii dash	0.5.5.1-7.4	POSIX-compliant shell
ii debconf	1.5.36.1	Debian configuration management system
ii debconf-i18n	1.5.36.1	full internationalization support for debconf
ii debian-archive-keyring	2010.08.28	GnuPG archive keys of the Debian archive
ii debianutils	3.4	Miscellaneous utilities specific to Debian
ii dhcpcd	1:3.2.3-5	DHCP client for automatically configuring IPv4 network
ii diffutils	1:3.0-1	File comparison utilities
ii dmidecode	2.9-1.2	Dump Desktop Management Interface data
ii dsetup	2:1.02.48-5	The Linux Kernel Device Mapper userspace library
ii dpkg	1.15.8.10	Debian package management system
ii e2fslibs	1.41-12-2	ext2/ext3/ext4 file system libraries
ii e2fsprogs	1.41-12-2	ext2/ext3/ext4 file system utilities
ii file	5.04-5	Determines file type using "magic" numbers
ii findutils	4.4.2-1+b1	utilities for finding files--find, xargs
ii firmware-linux-free	2.6.32-31	Binary firmware for various drivers in the Linux kernel
ii gcc-4.4-base	4.4.5-8	The GNU Compiler Collection (base package)
ii gettext-base	0.18.1.1-3	GNU Internationalization utilities for the base system

Activities Brave Web Browser ▾ Aug 6 2:30 PM

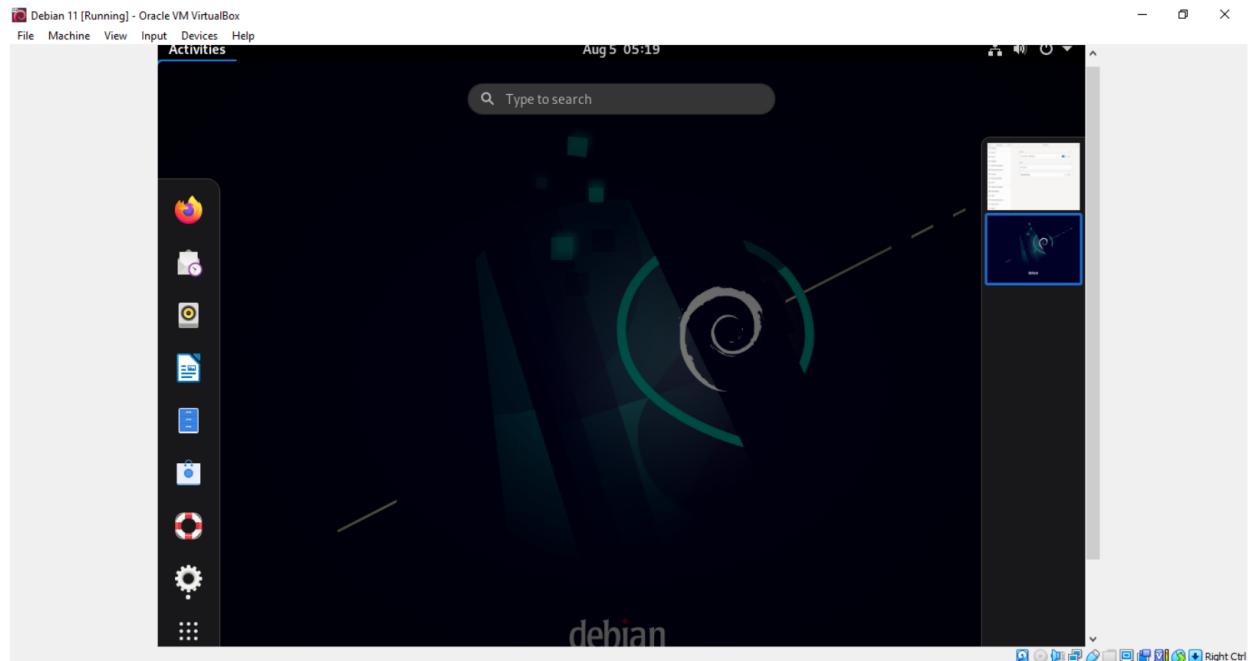
OSS Assi 1 linux distros - Good 1. Demonstration of Linux Distros (1) WhatsApp List of debian packages w +

gist.github.com/ringanta/4671061

debain-tom_punch-ami-307b0262	34	gettext-base	0.18.1.1-3	GNU Internationalization utilities for the base system
ii gnupg	35	gnupg	1.4.10-4	GNU privacy guard - a free PGP replacement
ii gpgv	36	gpgv	1.4.10-4	GNU privacy guard - signature verification tool
ii grep	37	grep	2.6.3-3	GNU grep, egrep and fgrep
ii groff-base	38	groff-base	1.20.1-10	GNU troff text-formatting system (base system component)
ii grub	39	grub	0.97-64	GRand Unified Bootloader (dummy package)
ii grub-common	40	grub-common	1.98+20100804-14	GRand Unified Bootloader, version 2 (common files)
ii grub-pc	41	grub-pc	1.98+20100804-14	GRand Unified Bootloader, version 2 (PC/BIOS version)
ii gzip	42	gzip	1.3.12-9	GNU compression utilities
ii hostname	43	hostname	3.04	utility to set/show the host name or domain name
ii ifupdown	44	ifupdown	0.6.10	high level tools to configure network interfaces
ii info	45	info	4.13a.dfsq.1-6	Standalone GNU Info documentation browser
ii initramfs-tools	46	initramfs-tools	0.98-8	tools for generating an initramfs
ii initscripts	47	initscripts	2.88dsf-13.1	scripts for initializing and shutting down the system
ii inserv	48	inserv	1.14.0-2	Tool to organize boot sequence using LSB init.d script
ii install-info	49	install-info	4.13a.dfsq.1-6	Manage installed documentation in info format
ii iproute	50	iproute	20100519-3	networking and traffic control tools
ii iptables	51	iptables	1.4.6-3	administration tools for packet filtering and NAT
ii iputils-ping	52	iputils-ping	3:20100418-3	Tools to test the reachability of network hosts
ii klibc-utils	53	klibc-utils	1.5.20-1	small utilities built with klibc for early boot
ii less	54	less	436-1	pager program similar to more
ii libacl1	55	libacl1	2.2.49-4	Access control list shared library
ii libattr1	56	libattr1	1:2.4.44-2	Extended attribute shared library
ii libblkid1	57	libblkid1	2.17.2-9	Block device id library
ii libboost-iostreams1.42.0	58	libboost-iostreams1.42.0	1.42.0-4	Boost.Iostreams Library
ii libbsds	59	libbsds	0.2.0-1	utility functions from BSD systems - shared library
ii libbz2-1.0	60	libbz2-1.0	1.0.9-6	high-quality block-sorting file compressor library - runtime
ii libc-bin	61	libc-bin	2.11.2-10	Embedded GNU C Library: Binaries
ii libc6	62	libc6	2.11.2-10	Embedded GNU C Library: Shared libraries
ii libcomerr2	63	libcomerr2	1.41-12-2	common error description library
ii libcurl3	64	libcurl3	7.21.0-1	Multi-protocol file transfer library (OpenSSL)
ii libdwight3	65	libdwight3	0.5.16-3	high-level terminal interface library for C++ (runtime)
ii libdb4.8	66	libdb4.8	4.8.30-2	Berkeley v4.8 Database Libraries [runtime]
ii libdevmapper1.02.1	67	libdevmapper1.02.1	2:1.02.48-5	The Linux Kernel Device Mapper userspace library
ii libedit2	68	libedit2	2.11-20080614-2	BSD editline and history libraries
ii libepkt1	69	libepkt1	1.0.4	High-level library for managing Debian package information
ii libfreetype6	70	libfreetype6	2.4.2-2.1	Freetype 2 font engine, shared library files
ii libgcc1	71	libgcc1	1:4.4.5-8	GCC support library
ii libgcc_s1	72	libgcc_s1	1:4.4.5-3	GPLC Compiler Library - runtime library

107	ii	libtbsn1-3	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-wrapi18n-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	libuuid	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	libxmuu1	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+bi1	maintain and query an index of a directory tree
129	ii	login	1:4.1.4.2+svn3283-2+squeeze1	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	1.68-23	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 key
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-

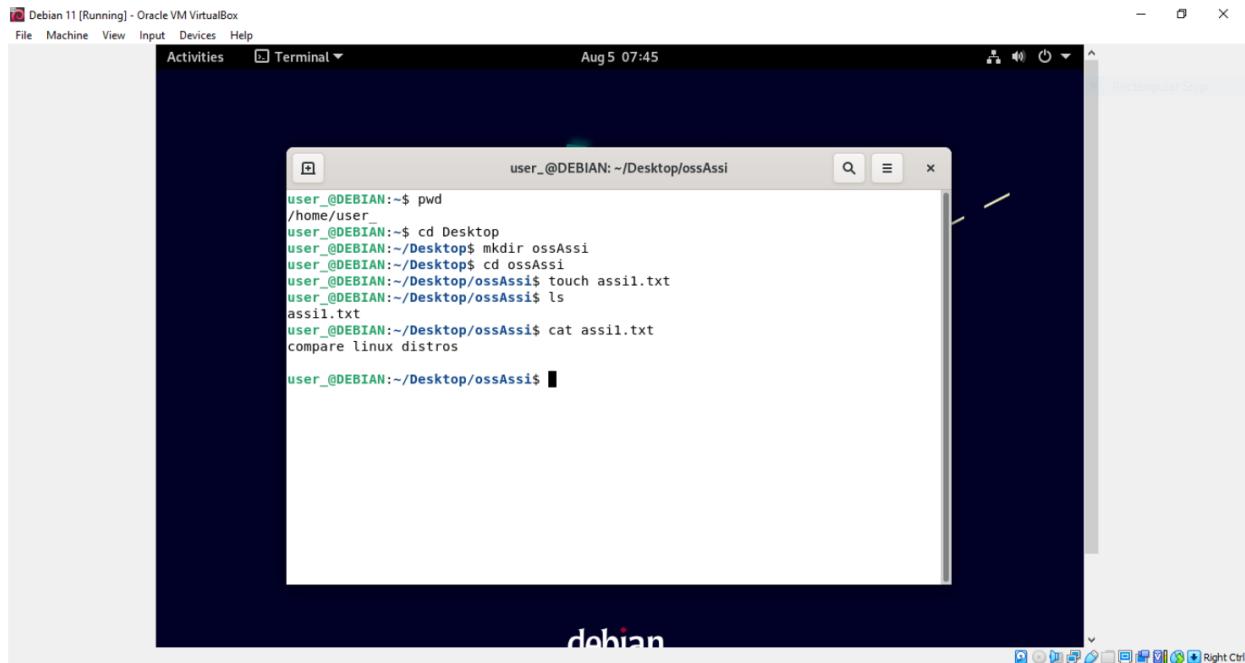
1. A conservative operating system
2. Issues with the established GNU Principles

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-



Conclusion-

Installation of various linux distros and studied their desktop environment, and applications

Reference-

<https://fedoraproject.org/wiki/Packagemanagementsystem>
<https://www.debian.org/releases/stable/installmanual>

Assignment 2

Title- Use of project management tools for project management.

Objective: To install, use and demonstrate the project management tool that is used in day today life of software engineer.

About SLACK-

Slack is one of the software/web-based software popular among businesses for its unique and business-oriented features. Every day around the world, about **10+ million** users log in to Slack to communicate with colleagues, making the platform an indisputable leader in communications technology.

Features-

1. Project Friendly Structure

The first step is to set up project and team for entire company to communicate in. Each team has number of channels which are building blocks of the slack. They represent stream of communication which revolve around the same topic.

2. Integrating other tools

You can integrate the tools such as Zoom meetings, Google drive, Git-hub etc. in your slack team so the team members do not need to go anywhere but to come to slack. Slack provides shortcut command feature to perform operations on those apps, such as */zoom meeting [title]* will start zoom meeting automatically with the title provided in the square brackets.

3. Easy and automated reminders

Slack bot has a feature called reminder which can be activated using */remind* command and it will remind the user the task at the time provided.

4. Task list management

Slack can integrate with tools like *Wunderlist* and *Todoist*. These integrations let you add items to your task list right from a Slack channel. The tasks can even be assigned priorities using which the user can perform function based on priority

5. Easy note making

In order to avoid redundancy in the working and set workflow correctly, slack provides feature of making notes which are only displayed to the user who has made it and not to the team members.

6. Custom shortcuts and commands

Slack provides a set of custom predefined set of commands which provides better user experience, for example,

/archive – Archives the current channel

/collapse – collapse all inline images and messages of current channel

7. Audio and video calls

The project members need not to shift to skype or zoom or MS teams. You can hangout up to 15 people at a time on audio or video

8. Useful Bots

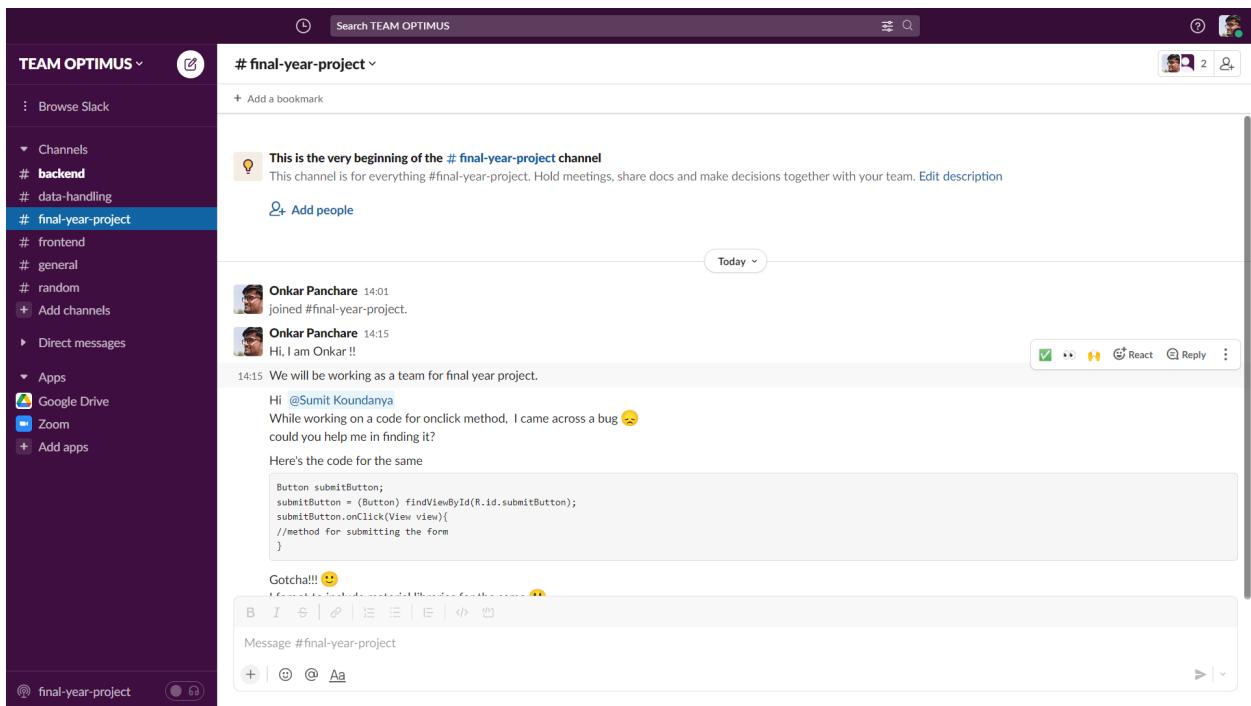
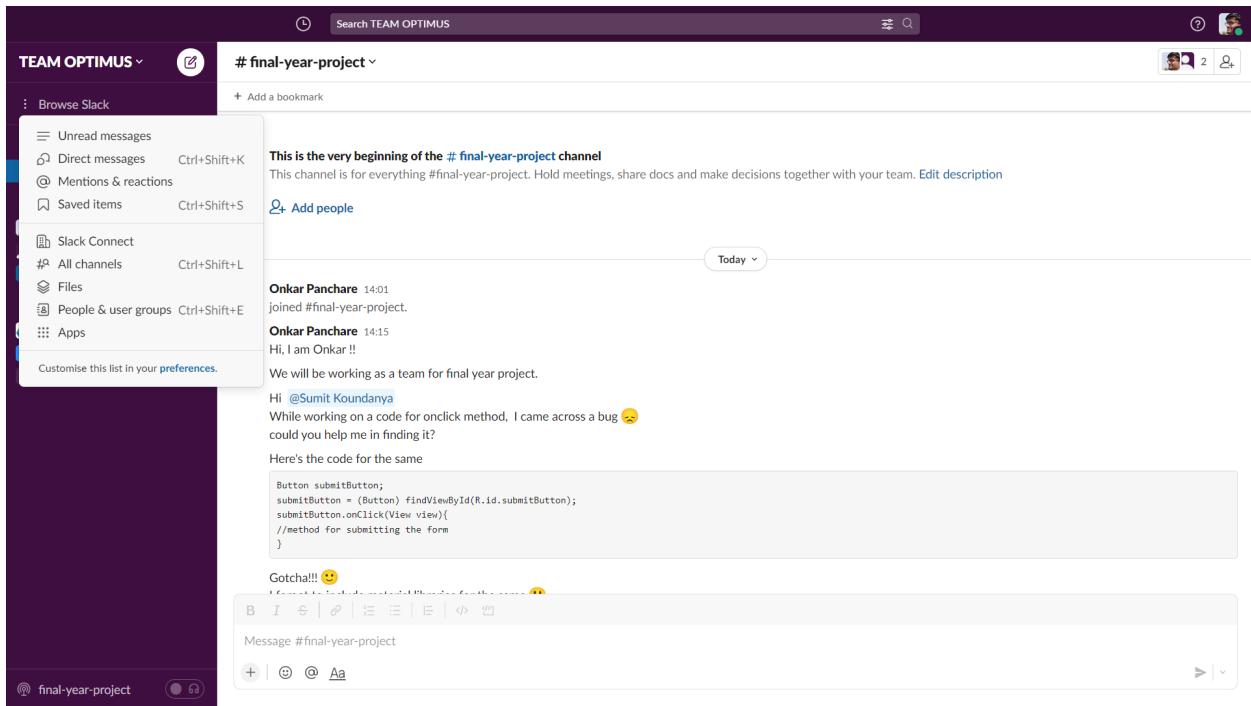
Beside integrating apps slack also hosts bots. For example,

slack bot helps in making notes and reminders

Dig bot delivers interesting websites and news to slack channel

Paper bot organizes all of the links you post into a single handy website

Screenshots:



The screenshot shows two screenshots of the Slack interface side-by-side.

Left Screenshot: This is a view of the **#final-year-project** channel. The sidebar on the left shows the team structure and various channels like **#backend**, **#data-handling**, and **#final-year-project**. The main pane displays a message from **Onkar Panchare** at 14:01 stating "joined #final-year-project". Onkar then messages @Sumit Koundanya at 14:15, asking for help with a bug he found while working on an onclick method. He includes some code snippets. The message ends with "Gotcha!!!" followed by a smiley face emoji.

Right Screenshot: This is a view of the **Zoom** app integration. The sidebar shows the **Zoom** app is active. The main pane shows a message from the **Zoom APP** at 14:31 welcoming @Onkar Panchare and providing commands for starting meetings, joining meetings, and making phone calls. It also shows a message from **Zoom APP** at 14:32 indicating a passcode has been generated for a meeting. A call card for a meeting started by **[daily discussion]** is shown, with a **Join** button.

The screenshot shows the Slack App Directory interface. On the left, there's a sidebar with team channels like '# backend', '# data-handling', etc., and sections for 'Direct messages' and 'Apps'. The main area has a search bar at the top with the placeholder 'Search TEAM OPTIMUS'. Below it, a section titled 'Connect your tools' explains how Slack integrates with other apps. It includes a 'Learn more about apps' button and a 'Install Google Calendar' button. A search bar says 'Search by name or category (e.g. productivity, sales)'. Under 'Recommended apps', there are cards for Trello, Google Calendar, Twitter, Simple Poll, Standup.ly Bot, Jira Cloud, Outlook Calendar, OneDrive and SharePoint, Polly, Dropbox, Slack for Gmail, and Asana. Each card has an 'Add' button.

This screenshot shows the 'Preferences' modal window over the Slack App Directory. The modal is titled 'Notifications' and contains settings for desktop notifications, message notifications, and mobile device notifications. It also includes sections for 'Privacy and visibility' and 'My keywords'. The background shows recommended apps like Webex Meetings, Box File Picker, Standups, Surveys & Polls, and Slack for Outlook, each with an 'Add' button. The top navigation bar has 'App Directory' and a search bar.

About ASANA-

Asana is similar to other task and [project management](#) software which allow teams to organize, collaborate, plan, and execute tasks. It acts as a perfect companion to overcome chaos and meet deadlines. It is a web-based task management and collaboration tool which eliminates the email mess and brings all tasks together. Teams can use Asana to keep track of all tasks, collaborate with other team members, exchange related files, and more.

Features-

1. Multiple project views

With Asana, users can view projects and manage tasks in several different ways, including Kanban boards, lists, calendars, portfolios, workloads, and timelines. Other project management tools on the market only offer one or two views, so it's great to see that Asana gives you every option you'd ever need. Each team member can manage tasks in a way that works best for them, enabling them to be as productive as possible. Switching between views also gives project managers a big-picture perspective on where the project stands. And you can even create customizable project dashboards that update in real-time. You can customize them as you'd like to see the most important information at a glance.

2. Project management automation

Asana makes it super easy to automate processes, repetitive tasks, and workflows that cross over into your other business tools. Setting up custom rules, triggers, and actions is easier than ever thanks to Asana's graphical workflow builder. You can use it to set up basic automations, like cascading due dates, assigning a task to the next person in the flow, checking a box, or alerting your team in Slack when a project is done, to even the most complex workflows that span dozens of users, tools, and tasks. Automating processes helps ensure things get done the right way while eliminating repetitive tasks to free up time for more important activities.

3. Team collaboration

Most of the project management tools we've tried don't offer enough collaboration tools, causing us to look elsewhere for software to fill in the gaps. However, Asana is one of the few that can act as a single source of

truth for file sharing PDFs, JPGs, Google docs, team communication, group communication, and more. Users can assign tasks to team members, create task dependencies, assign priorities, set due dates, adjust due dates, and chat back and forth (all within a single card so everything's centralized in one place). With calendar view, teams can plan around each others' schedules and stay up to date on any new changes or progress without needing to email back and forth. All project discussions and to-do lists are managed directly in Asana as well. If that's not enough, the software even integrates with email apps and third-party messaging tools, depending on how your team prefers to communicate.

4. Agile and Scrum support

If you're a fan of agile project management, you'll be glad to hear that Asana is flexible enough to support the philosophy. From sprint planning, bug tracking, product launches, work requests, roadmaps, feedback, and tracking task iterations, you get everything you need to match how you do work rather than the other way around. Countless PM tools on the market are too rigid and simply won't work, but Asana is great rather you prefer Kanban, Agile, Scrum, or something in between. To help you out, Asana even created a glossary to help you match the terms Asana uses to standard Agile vocabulary along with an entire guide to help you set up your Agile projects within the platform.

5. Versatility-

Asana is a flexible and adaptable project management software that works for many different management methodologies, business sizes, and industries. Furthermore, it's a great choice for marketing, sales, product development, operations, human resources, IT, finance, and more. It's an excellent tool if you plan to use it across multiple departments and to facilitate multi-departmental collaboration because it's flexible enough for hundreds of different use cases. From event planners managing thousands of attendees to marketing teams managing dozens of campaigns across different channels and sales teams tracking leads through the pipeline, it's versatile enough to work for just about everyone.

6. Powerful integration-

Asana integrates with over 100 popular third-party apps like Slack, Dropbox, Google Drive, Zapier, Tableau, Zoom, and Salesforce. These integrations can really help extend the functionality of Asana. For

example, your team can instantly be notified via Slack whenever a task or project is updated in Asana. It's worth noting that some advanced integrations, like Salesforce and Tableau, are not available with every plan.

Screenshots-

The image displays two screenshots of the Asana web application interface.

Top Screenshot (Home Page):

- Left Sidebar:** Home, My Tasks, Inbox, Reporting, Portfolios, Goals, My Workspace (trial), Invite teammates, Help & getting started.
- Header:** Trial: 30 days left, Add billing info.
- My Priorities:** Upcoming, Overdue, Completed (selected). Task: Complete the splash screen activity.
- Projects:** Recents, Create Project, Final Year Project (3 tasks due soon), Onkar Panchare: Starting ... (Private).
- Tasks I've assigned:** Upcoming, Overdue, Completed. A section to Assign tasks to colleagues with a "Assign a task" button.
- People:** Frequent collaborators, sumit.koundanya@walc..., See updates from your team, Keep work on track, Assign task, Invite teammates.

Bottom Screenshot (My Tasks Page):

- Left Sidebar:** Home, My Tasks (selected), Inbox, Reporting, Portfolios, Goals, My Workspace (trial), Invite teammates, Help & getting started.
- Header:** Trial: 30 days left, Add billing info.
- Task List:**
 - + Add task
 - Task name: Complete the splash screen activity
 - Recently assigned: Complete the authentication part
 - Do today: Add task...
 - Do next week
 - Do later
 - + Add section
- Header Buttons:** Share, Search, +, All tasks, Sort, Customize.

Messages I've sent ▾
3 messages

Message name: Final Year Project
Private to collaborators and members of projects and teams.

This Portfolio of work is on track! (OP)
This project is kicked off! (OP)
Hi I am Onkar and we as a team will be working ... (OP)

Hi I am Onkar and we as a team will be working ...

Started 11 minutes ago by @Onkar Panchare

Onkar Panchare 11 minutes ago
Hi I am Onkar and we as a team will be working on the final year project.
Best wishes!!

Compose

Collaborators: OP [User] +

Reporting > My Dashboard

Completed tasks: 1 (1 Filter)

Incomplete tasks: 15 (1 Filter)

Overdue tasks: 0 (1 Filter)

Total tasks: 16 (No Filters)

Incomplete tasks by project:

Project	Task Count
Onkar Pa...	10
Final Year...	2

Tasks by completion status this month:

Status	Count
Upcoming	16
Unscheduled	0
Completed	0

Upcoming tasks by assignee this week:

Projects by project status:

References-

1. <https://blog.hubstaff.com/slack-project-management-2/>
2. <https://www.simplilearn.com/tutorials/asana-tutorial/what-is-asana-project-management-tool>

Assignment 3

Title- Use of Bug Tracking

Problem Statement- To install and demonstrate the use of various open-source software's that are used in day to day life of software engineering.

Objectives- Students have to study at last 3 various open source tools/softwares that they uses and their day to day life, with their installation and configuration on their system

Theory- MantisBT is a web based bug tracking system that was first made available to the public in November 2000. Over time it has matured and gained a lot of popularity, and now it has become one of the most popular open-source bug/issue tracking systems. MantisBT is developed in PHP, with support for multiple database backends including MySQL, MS SQL and PostgreSQL.

MantisBT, as a PHP script, can run on any operating system that is supported by PHP and has support for one of the DBMSes that are supported. MantisBT is known to run fine on Windows, Linux, macOS and a variety of Unix operating systems.

MantisBT is available in several Linux distributions including: Debian, Ubuntu, Fedora, Gentoo, Frugalware and others.

Features Of Mantis-

- Project, sub-project, and category support.
- User-based security.
- Advanced search tools.
- Reporting and graphing.
- E-mail and RSS feed support.
- Customizable issue pages and workflow.
- Revision control integration.
- Document management.

System Requirements

Server Hardware Requirements

MantisBT has modest hardware requirements. It requires a computer that is able to run the server software

1. Server type- The server can be a shared public web server or a dedicated co-located box.
2. CPU and Memory- As for any web application, you should size your server based on the traffic on the site.
3. Disk- The application code is less than 50 MB. The amount of disk space required for the database will vary depending on the RDBMS and the volume of data, the main driving factor being the expected number and size of attachments.

Server Software Requirements

All of the required software is free for commercial and non-commercial use (open source). Please refer to the table in Section 2.2.2.1, “Versions compatibility table” for minimum and recommended versions.

1. Operating System- MantisBT runs on Windows, macOS, Linux, Solaris, the BSDs, and just about anything that supports the required server software.
2. Web Server- MantisBT is mainly tested with Microsoft IIS and Apache. However, it is expected to work with any recent web server software.
3. File Extensions: MantisBT uses only .php files. If your web server is configured for other extensions (e.g. .PHP3, .PHTML) then you will have to request the administrator to add support for .PHP files. This should be a trivial modification. Further details can be found in the PHP documentation
4. PHP- The web server must support PHP. It can be installed as CGI or any other integration technology.
5. PHP extensions- MantisBT is designed to work in as many environments as possible. Hence the required extensions are minimal and many of them are optional affecting only one feature.
6. Mandatory extensions- The extension for the RDBMS being used (mysqli, pgsql, oci8, sqlsrv)mbstring – Required for Unicode (UTF-8) support. Date, hash, json, pcrc, Reflection, session – Required to run MantisBT in general.
7. Optional extensions
 - a. Curl – required for the Twitter integration feature

- b. GD – required for the captcha feature
- c. Fileinfo – required for file attachments and most of the plugins. Without this extension, file attachment previews and downloads do not work as MantisBT won't be able to send the Content-Type header to a browser requesting an attachment.
- d. LDAP – required for LDAP or Active Directory authentication (see Section 8.2, “LDAP and Microsoft Active Directory”).
- e. zlib – required to enable output compression

Installation Requirements

MantisBT is highly customizable through the web interface and configuration files. Configuration options can be set globally as well as customized for a specific project or user (except for options listed in `$g_global_settings`).

Configuration options can be set in `config_inc.php` and in the database (using the various managed pages). Values stored in the database take precedence over values defined in `config_inc.php`.

To determine which value to use, MantisBT follows the list below, sequentially searching for the specified configuration option until a match is found.

- database: current user, current project
- database: current user, all projects
- database: all users, current project
- database: all users, all projects
- `config_inc.php`
- `config_defaults_inc.php`

Base Database settings

These settings are required for the system to work, and are typically set when installing MantisBT. They should be provided to you by your system administrator or your hosting company.

`$g_hostname`

Host name or connection string for Database server. The default value is localhost. For MySql, this should be hostname or hostname:port (e.g. localhost:3306).

\$g_db_username

User name to use for connecting to the database. The user needs to have read/write access to the MantisBT database. The default user name is “root”.

\$g_db_password

Password for the specified user name. The default password is empty.

\$g_database_name

Name of database that contains MantisBT tables. The default name is ‘bugtracker’.

\$g_db_type

The supported database types- MySQL, PostgreSQL, MySQL Server, Oracle

How to Use Install Tool

- The script checks basic parameters for the web server
- Provide required information for the installation
- database type
- database server hostname
- user and password
- Required privileges: SELECT, INSERT, UPDATE, and DELETE
- high-privileged database account
- Additional privileges required: INDEX, CREATE, ALTER, and DROP
- If this account is not specified, the database user will be used.
- Click the Install/Upgrade Database button
- The script creates the database and tables.
- The default Administrator user account is created at this stage, to allow the initial login and setup of MantisBT.
- The script attempts to write a basic config_inc.php file to define the database connection parameters.
- This operation may fail if the web server’s user account does not have write permissions to the directory (which is recommended for obvious security reasons). In this case, you will have to manually create the file and copy/paste the contents from the page.
- The script perform post installation checks on the system.
- Review and correct any errors.

How to Use Mantis Bug Tracker?

Step 1: Navigate to the Manage Projects sections by clicking on the Manage tab present on the left panel of the screen.

The screenshot shows the Mantis Bug Tracker dashboard. On the left sidebar, there is a 'Manage' button highlighted with a red box and an arrow pointing to it from the text above. The main navigation bar at the top includes 'Manage Users', 'Manage Projects' (which is highlighted with a red box and has an arrow pointing to it), 'Manage Tags', 'Manage Custom Fields', 'Manage Plugins', 'Manage Configuration', 'Plan', 'Backup', and 'Billing'. Below the navigation bar, there are two sections: 'Projects' and 'Global Categories'. The 'Projects' section contains a table with two rows: 'Demo-Project' (status: release, enabled: yes, view status: public, description: This project is for writing article) and 'MyProject' (status: stable, enabled: yes, view status: public). The 'Global Categories' section shows a table with columns 'Category', 'Assign To', and 'Actions'.

Step 2: Add the Project details by clicking on the Create project button. In the Project details, fill the following fields:

The screenshot shows the 'Add Project' form. The top navigation bar includes 'Manage Users', 'Manage Projects' (highlighted with a red box and an arrow pointing to it from the text above), 'Manage Tags', 'Manage Custom Fields', 'Manage Plugins', 'Manage Configuration', 'Plan', 'Backup', and 'Billing'. The form itself has several fields: 'Project Name' (Demo-1), 'Status' (development), 'Inherit Global Categories' (checked), 'View Status' (public), and 'Description' (This is for demo testing of web application). At the bottom of the form is an 'Add Project' button. A note 'Adding all the project details' is placed near the bottom right of the form area. A small red asterisk with the text '* required' is located in the bottom right corner of the description field.

Step 3: After entering all the project details, click on the Add Project button present at the bottom to complete the project creation. We can see the above newly added project under the Manage -> Manage Projects section.

Projects

Create New Project

Name ▲	Status	Enabled	View Status	Description
Demo-1	development	✓	public	This is for demo testing of web application
Demo-Project	release	✓	public	This project is for writing article
MyProject	stable	✓	public	

View Issues Manage Users Manage Projects Manage Tags Manage Custom Fields Manage Plugins Manage Configuration Plan Backup Billing

All A B C D E F G H I J K L M N O P Q R S T U V W X Y Z 0 1 2 3 4 5 6 7 8 9 Unused New

Manage Accounts 3

Create New Account Hide Inactive Show Disabled Username, Real Name or E-mail Apply Filter

Username	Real Name	E-mail	Access Level	Enabled	Protected	Date Created	Last Visit
administrator	Yashi Goyal	[REDACTED]	administrator	✓		2019-09-25 14:55	2019-09-25 19:32
Asif	Asif	xyz@gmail.com	reporter	✓		2019-09-25 19:20	2019-09-25 19:20
full access	Rishabh		reporter			2019-09-25 15:25	2019-09-25 15:25



Login

Enter password for 'administrator'

Keep me logged in

Login

[Forgot your password?](#)

View Issue Details

ID	Project	Category	View Status	Date Submitted	Last Update
0000002	Demo-1	[All Projects] development	public	2019-09-25 21:53	2019-09-25 21:53
Reporter	administrator	Assigned To	ananyaa		
Priority	urgent	Severity	major		
Status	assigned	Resolution	open		
Summary	0000002: Application crashes on clicking the Users tab				
Description	Steps to Reproduce: 1. Login to application with valid credentials. 2. Navigate to Home -> Users Actual Output: On clicking the Users tab, application is crashing				
Tags	No tags attached.				
Attach Tags	(Separate by ',')				
Release Version	12				
<input type="button" value="Edit"/> <input type="button" value="Assign To"/> <input type="button" value="Myself"/> <input type="button" value="Change Status To: new"/> <input type="button" value="Monitor"/> <input type="button" value="Stick"/> <input type="button" value="Clone"/> <input type="button" value="Close"/> <input type="button" value="Move"/> <input type="button" value="Delete"/>					

Step 4: Now, more details can be added to the above-created issue, like changing the status. Consider a case in which the tester mistakenly reported an issue that is a duplicate of the already present issue; he/she can mark Close or Delete whatever they feel like according to the situation.

View Issue Details

ID	Project	Category	View Status	Date Submitted	Last Update
0000002	Demo-1	[All Projects] development	public	2019-09-25 21:53	2019-09-25 21:53
Reporter	administrator	Assigned To	ananyaa		
Priority	urgent	Severity	major		
Status	assigned	Resolution	open		
Summary	0000002: Application crashes on clicking the Users tab				
Description	Steps to Reproduce: 1. Login to application with valid credentials. 2. Navigate to Home -> Users Actual Output: On clicking the Users tab, application is crashing				
Tags	No tags attached.				
Attach Tags	(Separate by ',')				
Release Version	12				
<input type="button" value="Edit"/> <input type="button" value="Assign To"/> <input type="button" value="Myself"/> <input type="button" value="Change Status To: new"/> <input type="button" value="Monitor"/> <input type="button" value="Stick"/> <input type="button" value="Clone"/> <input type="button" value="Close"/> <input type="button" value="Move"/> <input type="button" value="Delete"/>					

Step 5: ‘Add Note’ section is also displayed to the user if the reporter or the assigned person wants to add something regarding the above issue

Add Note

View Status		<input type="checkbox"/> private
Note	<div style="border: 1px solid #ccc; height: 100px; width: 100%;"></div>	

Step 6: ‘Issue History’ section is displayed in order to check the history of the above issue. It shows every single detail of the task which is done by any of the people on the issue.

Issue History

Date Modified	Username	Field	Change
2019-09-25 21:53	administrator	New Issue	
2019-09-25 21:53	administrator	Status	new => assigned
2019-09-25 21:53	administrator	Assigned To	>> ananyaa

Step 7: All the created issue by a particular user is displayed on the timeline of the user with all the details, User can view the timeline by clicking on the ‘My View’ tab.

The screenshot shows the MantisBT web interface. On the left, there's a sidebar with tabs for 'Assigned to Me (Unresolved)', 'Unassigned', 'Reported by Me', 'Resolved', 'Recently Modified (30 Days)', and 'Monitored by Me'. The 'Reported by Me' tab is selected, showing one issue (ID 0000002) with the summary: 'Application crashes on clicking the Users tab [All Projects] development - 2019-09-25 21:53'. On the right, a 'Timeline' window is open, showing two entries: 'administrator assigned issue 0000002 to ananya' at 2019-09-25 21:53 and 'administrator created issue 0000002' at the same time. Below these windows is a detailed 'View Issue Details' table for issue ID 0017896.

View Issue Details		Jump to Notes	[Wiki]	[>>]	[Issue History]	[Print]
ID	Project	Category	View Status	Date Submitted	Last Update	
0017896	mantisbt	security	public	2014-11-18 02:52	2014-11-18 03:32	
Reporter	jamesguru					
Assigned To						
Priority	immediate	Severity	crash	Reproducibility	always	
Status	new	Resolution	open			
Platform	JAVA	OS	Windows	OS Version	7	
Product Version	1.1.0					
Target Version		Fixed in Version				
Summary	0017896: Due to security reasons, part of your code are blocked:					
Description	Unable to import any-type of library,due to security reason					
Steps To Reproduce	Library should import and the content related to library should execute					
Tags	No tags attached.					

Various versions of MantisBT

MantisBT 2.25.5

Security and maintenance release fixing vulnerabilities with SVG files attachments (CVE-2022-33910), which are now disabled by default; instances with a custom \$g_disallowed_files should add svg to the list. Support for PHP 5.6 has been restored, fixing the regression introduced in 2.25.4.

MantisBT 2.25.4

Maintenance release fixing a couple of regressions introduced in 2.25.3, loading a JavaScript library from CDN and initializing the path on PHP 5.6.

MantisBT 2.25.3

This security and maintenance release fixes vulnerabilities in CSV Export (CVE2021-43257) and Plugins management pages (CVE-2022-26144), as well as in bundled libraries guzzlehttp/psr7 (CVE-2022-24775) and moment.js (CVE-2022- 24785). It also addresses several PHP 8.1 compatibility issues.

Compare Tools

JIRA Vs Mantis

JIRA is the tracker for teams planning & building great products. Millions choose JIRA to capture & organize issues, assign work, & follow team activity.

Whereas,

MantisBT is an open source, bug and issue tracking software written in PHP, and under GNU protocol, facilitating the collaboration of team members and clients

	Buggit	Bugzilla	Bugtrack	Roundup	Mantis	IMS	Bugs Online
Platform	Windows 2000/XP	Linux (Fedora) ^F	Windows 2000	Linux (Fedora) ^F	Linux (Fedora) ^F	Linux (Fedora) ^F	Windows
Database	MS access	Mysql ^F	SQL server 2000	Mysql ^F	Mysql ^F	Mysql ^F	MS Access
Server (if any)		Apache ^F	IIS 5.0	Apache ^F	Apache ^F	Apache ^F	IIS 5.0
Other SW		Perl modules ^F		Python ^F	Php ^F	Php/zend optimizer ^F	
Effort to install	low	high	high	med	high	Med	med
Effort to learn and use	low	med	low	high	med	med	med
Ability to export data	Export from MSAccess	Export using PhpMyAdmin	Export from SQL Server 2000	Cannot export data	Export using PhpMyAdmin	Export using PhpMyAdmin	Export from MSAccess

Conclusion

Learned how to install and demonstrate the use of various open source software's like bug tracking tools (Phabricator, mantis, etc.) that used in day to day life of software engineering.

Reference

1. <https://www.mantisbt.org/>
2. https://www.mantisbt.org/bugs/my_view_page.php

Assignment 4

Title- Use of version control system

Objective- To use/experiment the online and offline version control system for foss project work

Outcome- lifelong learning

About Git-

Git is a free and open-source distributed version control system designed to handle everything from small to very large projects with speed and efficiency.

Git is used to track changes in the open-source code, enabling multiple developers to work together on non-linear development



Creator- Linus Torvalds created Git in 2005 for the development of the Linux kernel

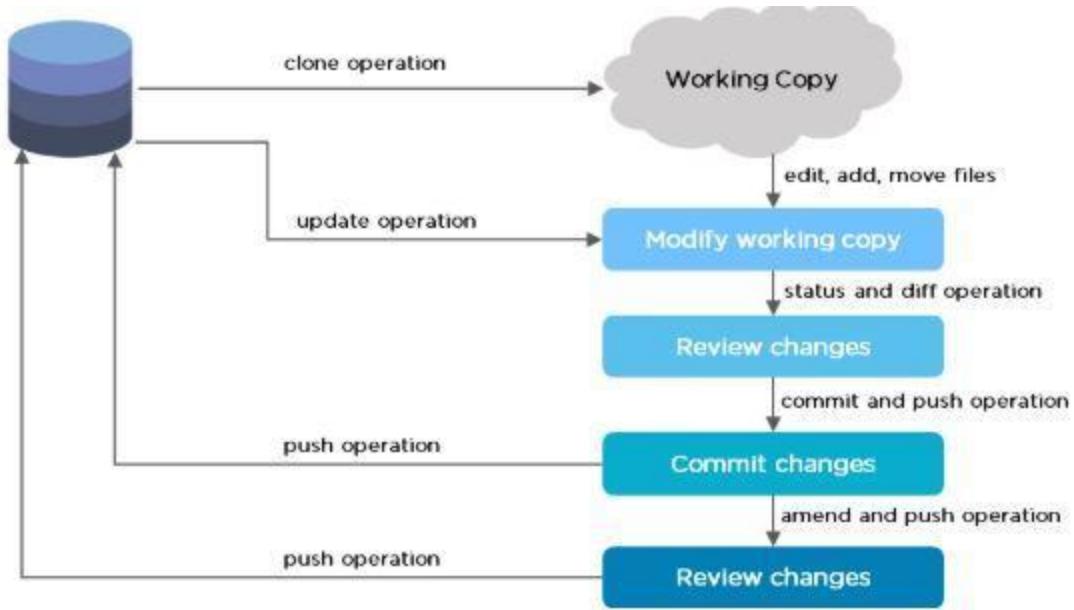
Installation-

Open the terminal and write the command **sudo apt-get install git** for Linux based machines and for windows download the file from Git's official website and run it

Features of Git-

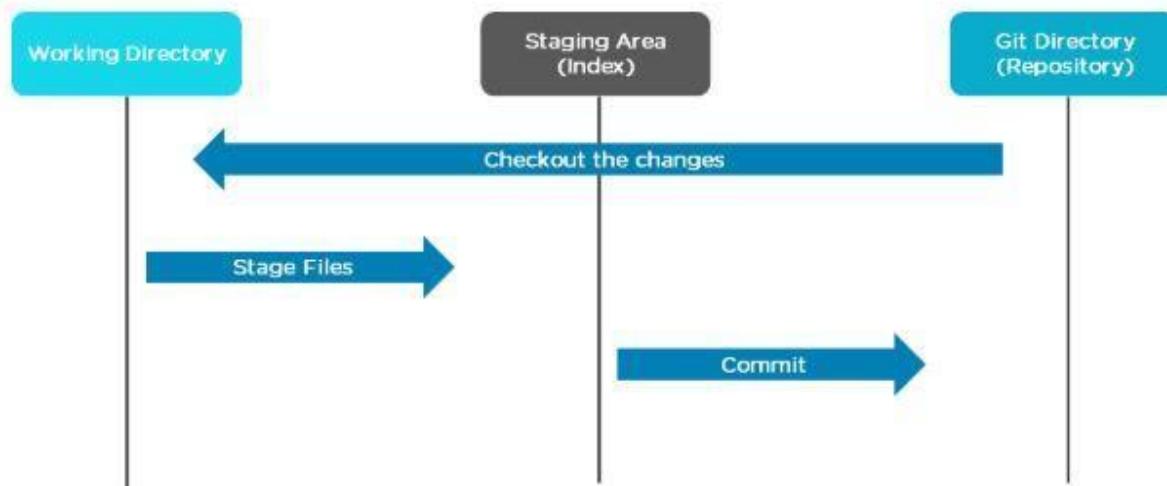
- Tracks history
- Free and open source
- Supports non-linear development
- Creates backups
- Scalable
- Supports collaboration
- Branching is easier
- Distributed development

Git workflow-



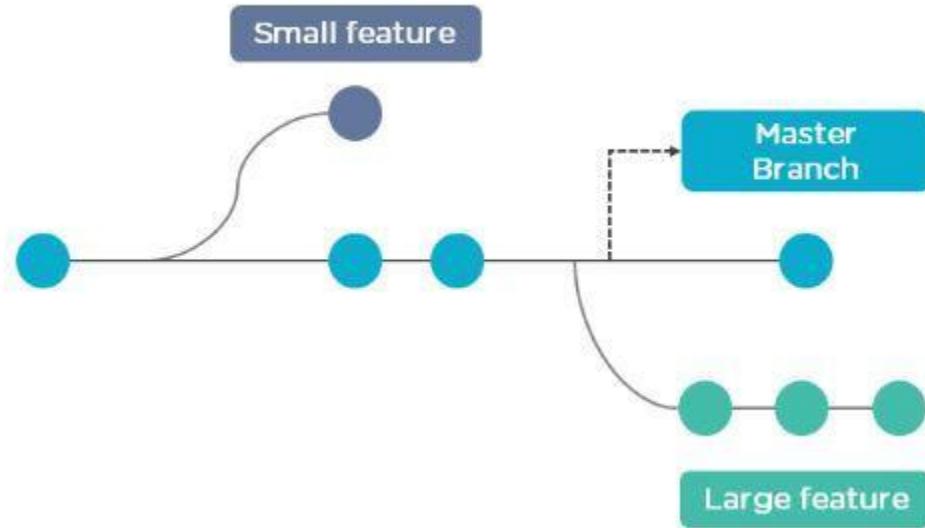
The Git workflow is divided into three states:

- Working directory – Modify files in your working directory
- Staging area (Index) – Stage the files and add snapshots of them to your staging area
- Git directory (Repository) – Perform a commit that stores the snapshots permanently to your Git directory. Checkout any existing version, make changes, stage them and commit.



Branch in Git-

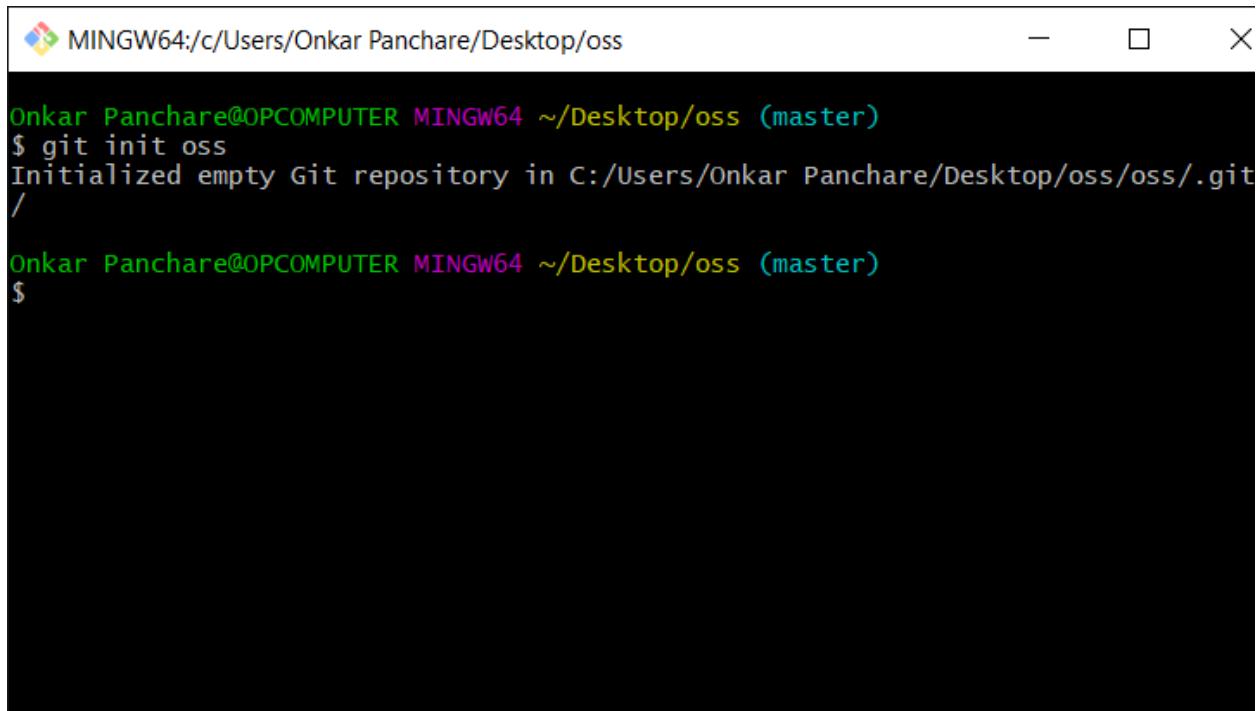
Branch in Git is used to keep your changes until they are ready. You can do your work on a branch while the main branch (master) remains stable. After you are done with your work, you can merge it with the main office.



The above diagram shows there is a master branch. There are two separate branches called “small feature” and “large feature.” Once you are finished working with the two separate branches, you can merge them and create a master branch.

Some commands in Git-

Create Repositories- creates new git repository



The screenshot shows a terminal window titled "MINGW64:/c/Users/Onkar Panchare/Desktop/oss". The command \$ git init oss is entered, followed by the output indicating that an empty Git repository was initialized in the specified directory. The terminal prompt then changes to \$.

```
Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss (master)
$ git init oss
Initialized empty Git repository in C:/Users/Onkar Panchare/Desktop/oss/oss/.git/
/
Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss (master)
$
```

Check git status- Gives status of working directory and staged area

```
MINGW64:/c/Users/Onkar Panchare/Desktop/oss/oss
$ cd oss

Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss/oss (master)
$ git status
On branch master

No commits yet

nothing to commit (create/copy files and use "git add" to track)

Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss/oss (master)
$ git status
On branch master

No commits yet

Untracked files:
  (use "git add <file>..." to include in what will be committed)
    first.txt

nothing added to commit but untracked files present (use "git add" to track)
```

Git add command- Adds untracked files to the staged area

```
MINGW64:/c/Users/Onkar Panchare/Desktop/oss/oss
first.txt

nothing added to commit but untracked files present (use "git add" to track)

Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss/oss (master)
$ git add first
fatal: pathspec 'first' did not match any files

Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss/oss (master)
$ git add first.txt

Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss/oss (master)
$ git status
On branch master

No commits yet

Changes to be committed:
  (use "git rm --cached <file>..." to unstage)
    new file:   first.txt
```


Git status- Commits the changes to the version control

```
MINGW64:/c/Users/Onkar Panchare/Desktop/oss/oss
Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss/oss (master)
$ git status
On branch master

No commits yet

Changes to be committed:
(use "git rm --cached <file>..." to unstage)
  new file:  first.txt

Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss/oss (master)
$ git commit
[master (root-commit) fe5abba] first.txt added
 1 file changed, 1 insertion(+)
 create mode 100644 first.txt

Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss/oss (master)
$ git status
On branch master
nothing to commit, working tree clean
```

Git restore- discards the change in working directory and restores earlier changes as on the last commit

```
MINGW64:/c/Users/Onkar Panchare/Desktop/oss/oss
Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss/oss (master)
$ git status
On branch master
nothing to commit, working tree clean

Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss/oss (master)
$ git status
On branch master
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
    (use "git restore <file>..." to discard changes in working directory)
      modified:  first.txt

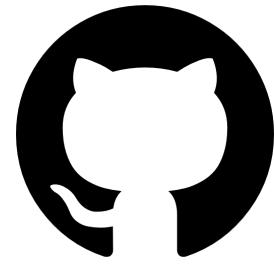
Untracked files:
  (use "git add <file>..." to include in what will be committed)
    second.txt

no changes added to commit (use "git add" and/or "git commit -a")

Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss/oss (master)
$ git restore first.txt
```

Git-hub – At a high level, GitHub is a website and cloud-based service that helps developers store and manage their code, as well as track and control changes to their code.

Home screen-



A screenshot of a web browser displaying the GitHub homepage. The interface includes a header with the GitHub logo and navigation links for Gmail, YouTube, and Maps. On the left, there's a sidebar for 'Recent Repositories' and 'Recent activity'. The main content area shows several repository cards: 'sumitk-15 forked sumitk-15/Zerocoders-HackX from onkarp/Zerocoders-HackX' (17 days ago), 'Sachin-0-1 created a repository Sachin-0-1/Alzheimer-Disease-Detection' (on 22 Jun), 'learnee-tech created 2 repositories' (on 30 May), and 'ETS-Android1 forked ETS-Android1/Bloodoor from onkarp/Bloodoor' (on 28 May). To the right, there's a 'Latest changes' sidebar listing four recent events. A 'ProTip!' message at the bottom encourages users to follow and watch repositories.

Connecting with remote repository-

```
MINGW64:/c/Users/Onkar Panchare/Desktop/oss/oss
commit 4611a3bc8ba544ac7168c5b865741222496324a7 (HEAD)
Author: onkarnp <opanchare123@gmail.com>
Date:   Sun Aug 21 15:20:45 2022 +0530

    first file modified and second file added

Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss/oss ((4611a3b...))
$ git checkout 09fb051755aded8f798c6d5a6c817411790e0da5
Previous HEAD position was 4611a3b first file modified and second file added
HEAD is now at 09fb051 some type of commit

Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss/oss ((09fb051...))
$ git status
HEAD detached at 09fb051
nothing to commit, working tree clean

Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss/oss ((09fb051...))
$ git config --global user.username onkarnp

Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss/oss ((09fb051...))
$ git remote add origin https://github.com/onkarnp/oss.git
```

Pushing to remote repository-

```
MINGW64:/c/Users/Onkar Panchare/Desktop/oss/oss
commit 4611a3bc8ba544ac7168c5b865741222496324a7 (HEAD)
Author: onkarnp <opanchare123@gmail.com>
Date:   Sun Aug 21 15:20:45 2022 +0530

    first file modified and second file added

Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss/oss ((4611a3b...))
$ git checkout 09fb051755aded8f798c6d5a6c817411790e0da5
Previous HEAD position was 4611a3b first file modified and second file added
HEAD is now at 09fb051 some type of commit

Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss/oss ((09fb051...))
$ git status
HEAD detached at 09fb051
nothing to commit, working tree clean

Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss/oss ((09fb051...))
$ git config --global user.username onkarnp

Onkar Panchare@OPCOMPUTER MINGW64 ~/Desktop/oss/oss ((09fb051...))
$ git remote add origin https://github.com/onkarnp/oss.git
```

Check if the changes has been updated to git-hub repository-

The screenshot shows a GitHub repository page for 'onkarp/oss'. The 'Code' tab is selected, and the 'master' branch is chosen. The commit history for August 21, 2022, is displayed. There are five commits:

- some type of commit by onkarp committed 1 hour ago (commit 09fb051)
- last commit by onkarp committed 1 hour ago (commit f23eabb)
- last commit by onkarp committed 1 hour ago (commit 5ebf8ad)
- first file modified and second file added by onkarp committed 1 hour ago (commit 4611a3b)
- first.txt added by onkarp committed 1 hour ago (commit fe5abba)

At the bottom of the commit list, there are 'Newer' and 'Older' buttons.

Conclusion-

1. Studied Git and GitHub version control system and working mechanism
2. Compared Git with other code management systems

References-

1. <https://en.wikipedia.org/wiki/Git>
2. <http://git-scm.com/documentation>
3. <https://www.git-tower.com/blog/git-cheat-sheet/>

Assignment 5

Title- Installation and Use of CMS software (Joomla)

Objective- To comprehend the use of Content Management System and their Use for personal website/dept CMS.

Outcome- Self learning (PO: b, I, j, k, l)

Theory-

A content management system (CMS) manages the creation and modification of digital content. It typically supports multiple users in a collaborative environment. CMS features vary widely. Most CMSs include Web-based publishing, format management, history editing and version control, indexing, search, and retrieval. By their nature, content management systems support the separation of content and presentation.

A web content management system (WCM or WCMS) is a CMS designed to support the management of the content of Web pages. Most popular CMSs are also WCMSs. Web content includes text and embedded graphics, photos, video, audio, maps, and program code (e.g., for applications) that displays content or interacts with the user.

Joomla! Is a free and open-source content management system (CMS) for publishing web content, developed by Open Source Matters, Inc. It is built on a model-view-controller web application framework that can be used independently of the CMS.

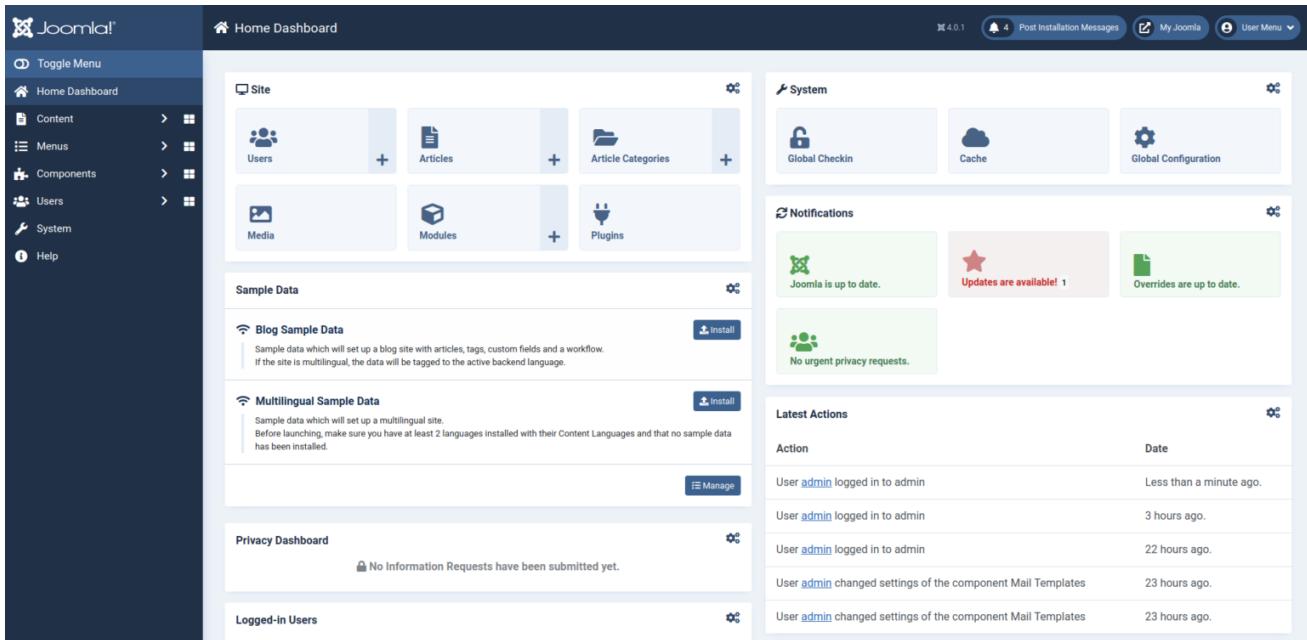
Joomla! Is written in PHP, uses object-oriented programming (OOP) techniques (since version 1.5) and software design patterns, stores data in a MySQL, MS SQL (since version 2.5), or PostgreSQL (since version 3.0) database, and includes features such as page caching, RSS feeds, printable versions of pages, news flashes, blogs, search, and support for language internationalization.

Joomla

History-

Joomla is based on Mambo CMS which was developed by an Australian company in 2001 and initially released on August 17, 2005. The official version of Joomla 1.0 was released on September 22, 2005.

Features-



- User Manager – It allows managing the user information such as permission to edit, access, publish, create or delete the user, change the password and languages. The main part of the user manager is Authentication.
- Content Manager – It allows managing the content using WYSIWYG editor to create or edit the content in a very simple way.
- Banner Manager – It is used to add or edit the banners on the website.
- Template Manager – It manages the designs that are used on the website. The templates can be implemented without changing the content structure within a few seconds.
- Media Manager – It is the tool for managing the media files and folder in which you can easily upload, organize and manage your media files into your article editor tool.
- Contact Manager – It allows to add contacts, managing the contact information of the particular users.
- Web Link Manager – The link resource is provided for user of the site and can be sorted into categories.
- Search – It allows users to search the appropriate information on the site. You can use smart indexing, advanced search options, auto suggest searches to make Joomla search best.

- Menu Manager – It allows to create menus and menu items and can be managed subsequently. You can put menu in any style and in multiple places.
- RSS – It stands for Really Simple syndication which helps your site contents and RSS files to be automatically updated.

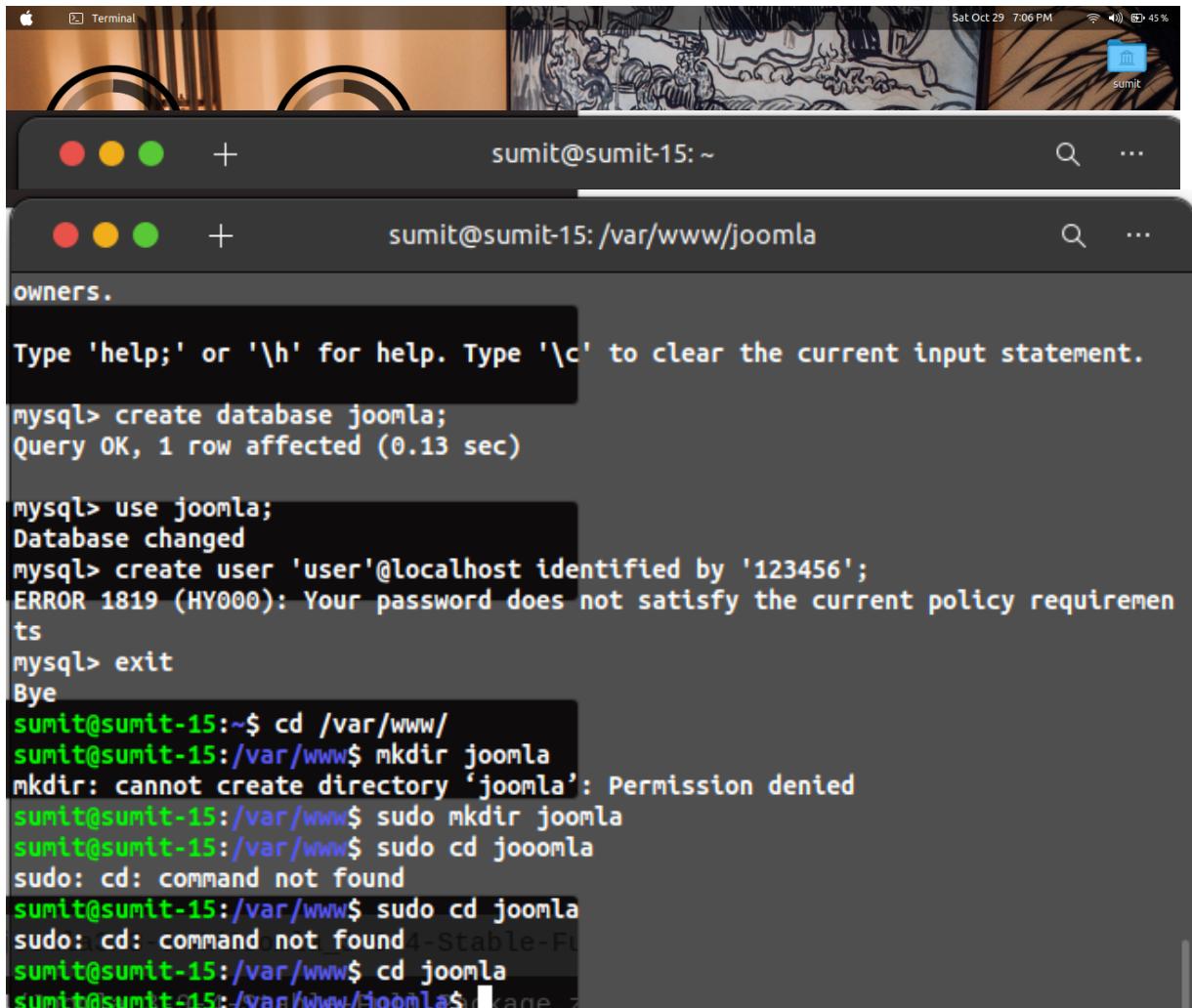
Advantages

- It is an open-source platform and available for free.
- Joomla is designed to be easy to install and set up even if you're not an advanced user. Since Joomla is so easy to use, as a web designer or developer, you can quickly build sites for your clients. With minimal instructions to the clients, clients can easily manage their sites on their own.
- It is very easy to edit the content as it uses WYSIWYG editor (What You See Is What You Get is a user interface that allows the user to directly manipulate the layout of the document without having a layout command).
- It ensures the safety of data content and doesn't allow anyone to edit the data.
- By default, Joomla is compatible with all browsers.
- The templates are very flexible to use.
- Media files can be uploaded easily in the article editor tool.
- Provides easy menu creation tool.

Disadvantages

- It gives compatibility problem while installing several modules, extensions and plugins simultaneously.
- Plugins and modules are not free in Joomla.
- Development is too difficult to handle when you want to change the layout.
- Joomla is not much SEO (Search Engine Optimization) friendly.
- It makes website heavy to load and run.

Installation



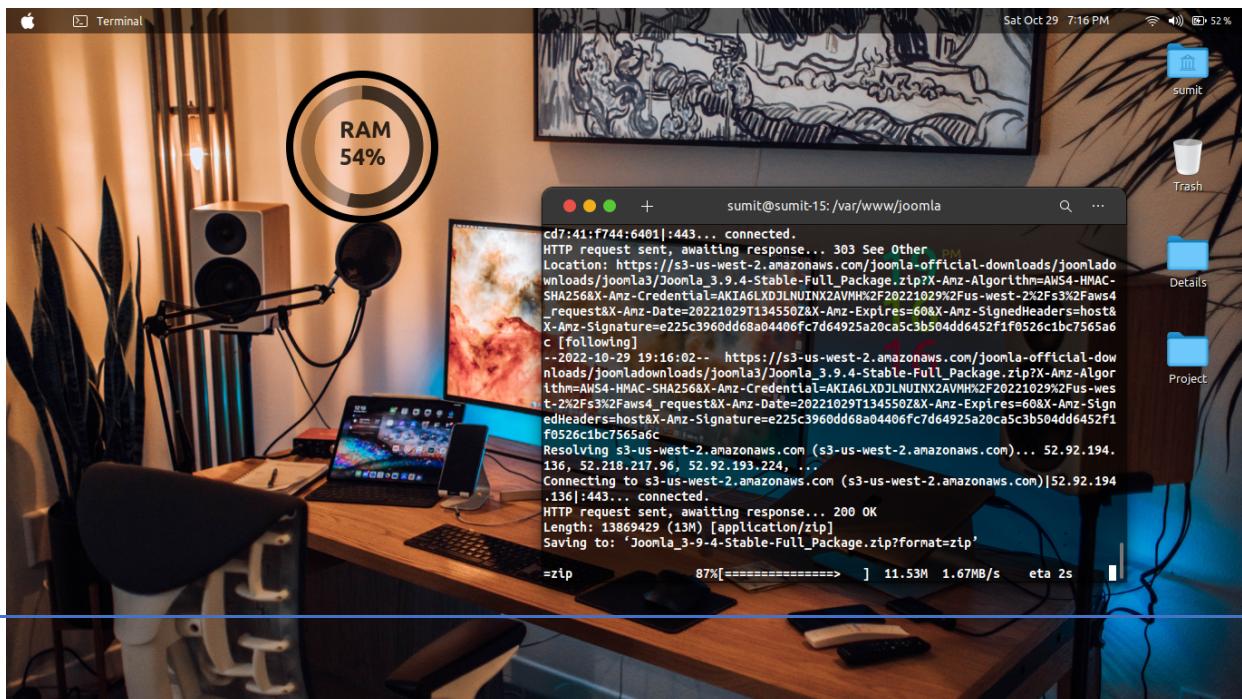
```
sumit@sumit-15:~ 
sumit@sumit-15:/var/www/joomla

owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> create database joomla;
Query OK, 1 row affected (0.13 sec)

mysql> use joomla;
Database changed
mysql> create user 'user'@localhost identified by '123456';
ERROR 1819 (HY000): Your password does not satisfy the current policy requirements
mysql> exit
Bye
sumit@sumit-15:~$ cd /var/www/
sumit@sumit-15:/var/www$ mkdir joomla
mkdir: cannot create directory 'joomla': Permission denied
sumit@sumit-15:/var/www$ sudo mkdir joomla
sumit@sumit-15:/var/www$ sudo cd joomla
sudo: cd: command not found
sumit@sumit-15:/var/www$ sudo cd joomla
sudo: cd: command not found
4-Stable-F
sumit@sumit-15:/var/www$ cd joomla
sumit@sumit-15:/var/www/joomla$
```



```
cd7:41:f744:6401|:443... connected.
HTTP request sent, awaiting response... 303 See Other
Location: https://s3-us-west-2.amazonaws.com/joomla-official-downloads/joomla
wDownloads/joomla3/Joomla_3.9.4-Stable-Full_Package.zip?X-Amz-Algori
tith=AWS4-HMAC-SHA256&X-Amz-Credential=AKIA6LXDJLNUINX2VWHx2F20221029%2Fus-west-2%2F5%2Faws4
_request&X-Amz-Date=20221029T134550Z&X-Amz-Expires=608X-Amz-SignedHeaders=host&
X-Amz-Signature=e225c3960dd68a04406Fc7d64925a20ca5c3b504dd6452f1f0526c1bc7565a6
c [following]
--2022-10-29 19:16:02-- https://s3-us-west-2.amazonaws.com/joomla-official-dow
nloads/joomladownloads/joomla3/Joomla_3.9.4-Stable_Full_Package.zip?X-Amz-Algor
ithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIA6LXDJLNUINX2VWHx2F20221029%2Fus-wes
t-2%2F5%2Faws4_request&X-Amz-Date=20221029T134550Z&X-Amz-Expires=608X-Amz-Sign
edHeaders=host&X-Amz-Signature=e225c3960dd68a04406Fc7d64925a20ca5c3b504dd6452f1
f0526c1bc7565a6c
Resolving s3-us-west-2.amazonaws.com (s3-us-west-2.amazonaws.com)... 52.92.194.
136, 52.218.217.96, 52.92.193.224, ...
Connecting to s3-us-west-2.amazonaws.com (s3-us-west-2.amazonaws.com)|52.92.194
.136|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 13869429 (13M) [application/zip]
Saving to: Joomla_3-9-4-Stable-Full_Package.zip?format=zip'

=zip          87%[=====>] 11.53M  1.67MB/s eta 2s
```



A screenshot of a Firefox browser window. The title bar says "Firefox Web Browser" and the address bar shows "Joomla! Web Installer" and "www.linu...help1.com/installation/index.php#". The main content is the Joomla! logo and the text "Joomla! is free software released under the GNU General Public License." Below this, a green box says "Congratulations! Joomla! is now installed." A yellow box contains the message "PLEASE REMEMBER TO COMPLETELY REMOVE THE INSTALLATION FOLDER. You will not be able to proceed beyond this point until the 'installation' folder has been removed. This is a security feature of Joomla!" with a button labeled "Installation folder removed". At the bottom, there are tabs for "Site" and "Administration" (which is selected), and a login form for "Administration Login Details" with fields for "Email" (123@example.com) and "Username" (admin).

Real World Examples of What Joomla Can Create?

- Corporate web sites or portals
- Corporate intranets and extranets
- Online magazines, newspapers, and publications
- E-commerce and online reservations
- Government applications
- Small business web sites
- Non-profit and organizational web sites
- Community-based portals
- School and religious web sites
- Personal or family homepages

Conclusion:

We learned installation of Joomla and explored its features and working

References:

<https://docs.joomla.org/References>

<https://en.wikipedia.org/wiki/Joomla>

Assignment 6

Objective- To comprehend open-source software development.

1. Development Community of ubuntu

There are many ways you can participate in the Ubuntu community. Just find the right level or interests that works for you.

- The [Ubuntu Forums](#) are a huge and fast-moving online forum for user chat and problem solving.
- The [Ubuntu Community Hub](#) is where contributors shape ideas through open discussions.
- Share technical know-how with others by answering questions on [Ask Ubuntu](#), powered by StackExchange.
- Join [Ubuntu LoCo](#) ('local community team') and meet like-minded people.

2. Website-

Official website of ubuntu : <https://ubuntu.com/>

3. Mailing List

Below is a listing of all the public mailing lists on lists.ubuntu.com. Click on a list name to get more information about the list, or to subscribe, unsubscribe, and change the preferences on your subscription.

These are some of the categories in mailing list Categories

- a. [Ubuntu Announcements](#)
- b. [Community Support](#)
- c. [Announcement Lists](#)
- d. [Development Lists](#)
- e. [Quality Assurance and Related Lists](#)
- f. [Bug Lists](#)
- g. [Package Upload and Automatic Notification Lists](#)
- h. [Ubuntu Worldwide LoCo Teams](#)
- i. [Localization Lists](#)
- j. [Other Ubuntu Projects and Groups](#)
- k. [Bazaar-related Lists](#)
- l. [Storm Lists](#)
- m. [Discontinued \(Historical\) Lists](#)

4. IRC channels

The following is a list of the existing channels, a brief description, and the channels contact. The contact person mentioned in this list is the contact person for channel issues. For general support questions, please ask your question in the appropriate channel-

Channel lists

The following is a list of the existing channels, a brief description, and the channels contact. The contact person mentioned in this list is the contact person for channel issues. For general support questions, please ask your question in the appropriate channel:

Ubuntu support channels

Channel	Description	Contact person(s)	Web chat
#ubuntu	Ubuntu help channel	IRC Council	Webchat
#ubuntu-next	Help channel for development versions	IRC Council	Webchat
#kubuntu	Kubuntu help channel	rikmills	Webchat
#lubuntu	Lubuntu help channel	Lubuntu Team	Webchat
#ubuntustudio	Ubuntu Studio help channel	eickmeyer	Webchat
#xubuntu	Xubuntu help channel	Xubuntu Team	Webchat

Ubuntu channels for discussion

Channel	Description	Contact person(s)	Web chat
#ubuntu-discuss	Non-Support Ubuntu discussion channel	IRC Council	Webchat
#ubuntu-offtopic	Community related non-support discussion	IRC Council	Webchat
#kubuntu-offtopic	Community related non-support discussion	RikMills	Webchat
#lubuntu-offtopic	Community related non-support discussion	Lubuntu Team	Webchat
#xubuntu-offtopic	Community related non-support discussion	Xubuntu Team	Webchat
#ubuntuforums	Ubuntu Forums: Forum Community chat	ForumCouncil	Webchat

Ubuntu team channels

Channel	Description	Contact person(s)
#lubuntu-devel	Lubuntu development coordination	Lubuntu Team
#snappy	Snappy and Ubuntu Core	
#xubuntu-devel	Xubuntu development coordination	Xubuntu Team
#ubuntu-security	Ubuntu Security team and discussions	Ubuntu Security Team
#ubuntu-meeting	Ubuntu meetings are held here	IRC Council
#ubuntu-ops	Ubuntu IRC operators for the main channels	IRC Council
#ubuntu-irc	Ubuntu IRC operators for affiliated and international channels	IRC Council
#ubuntu-news	Ubuntu News	Ubuntu News Team

Local Ubuntu channels

Channel	Description	Contact person(s)	Web chat
#ubuntu-bd	Bangladesh	bavelsayekat, zaki	Webchat
#ubuntu-de	Germany	ubuntu-de IRC Operatoren	Webchat
#ubuntu-de-offtopic	Germany	ubuntu-de IRC Operatoren	Webchat
#ubuntu-es	Spanish speakers	Ubuntu ES IRC Team	Webchat
#ubuntu-es-cafe			
#ubuntu-fi			
#kubuntu-fi	Finland	Mirv	Webchat
#ubuntu-it			
#ubuntu-it+1			
#ubuntu-it-chat			
#ubuntu-it-groups			
#ubuntu-it-forum			
#ubuntu-it-web			
#ubuntu-it-ops			
#ubuntu-us-ma	United States/Massachusetts	leftyfb	Webchat
#ubuntu-se	Sweden	Nafallo	Webchat
#ubuntu-za	South Africa	superfly	Webchat
#lubuntu-es	Lubuntu help channel (Espa�ol)	Lubuntu Team	Webchat
#lubuntu-pt	Lubuntu help channel (em Portugu�s)	Lubuntu Team	Webchat
#lubuntu-it	Lubuntu help channel (in Italiano)	Lubuntu Team	Webchat
#lubuntu-ru	Lubuntu help channel (no-рѹсскa)	Lubuntu Team	Webchat
#lubuntu-jp	Lubuntu help channel (日本語で)	Lubuntu Team	Webchat
#lubuntu-fr	Lubuntu help channel (en Fran�ais)	Lubuntu Team	Webchat
#lubuntu-cn	Lubuntu help channel (用中文 (表達))	Lubuntu Team	Webchat
#lubuntu-arabic	Lubuntu help channel (بالعربية (اعرب))	Lubuntu Team	Webchat

5. Ubuntu Wiki-

The screenshot shows the Ubuntu Wiki homepage. At the top, there's a navigation bar with links for 'ubuntu® wiki', 'Search', and other site navigation. Below the header, there's a main content area titled 'Home'. It features several sections with icons: 'Home' (Ubuntu logo), 'About Ubuntu' (person icon), 'Community' (people icon); 'Get Involved' (handshake icon), 'Teams' (team icon); and 'Weekly Newsletter' (newspaper icon), 'Release Information' (document icon). A 'Get Involved' section explains how to contribute, mentioning the Ubuntu Code of Conduct. A 'Teams' section lists various community teams with their responsibilities and meeting details. A 'LoCoTeams' section is for local development teams. A 'Governance and Membership' section discusses rules and governing bodies. A 'Community Links' section provides external links.

6. Releases

Released (Current & Stable)	Version	Release schedule	Support date
Xenial Xerus	16.04 LTS	April 21, 2016	Supported until April 2021
Bionic Beaver	18.04 LTS	April 26, 2018	Supported until April 2023
Focal Fossa	20.04 LTS	April 23, 2020	Supported until April 2025
Hirsute Hippo	21.04 LTS	April 22, 2021	Supported until January 2022
Impish Indri	21.10	October 14, 2021	Supported until July 2022
Jammy Jellyfish	22.04 LTS	April 21, 2022	Supported until July 2027

7. Ubuntu Bug Tracking-

How to report bugs

Ubuntu uses Launchpad to keep track of bugs and their fixes. This page will guide you through the steps required to file a good and detailed report.

Create a Launchpad account

If you don't already have one- you need to create a Launchpad account. This will allow you to file new bugs and comment on existing ones.

Determine if the bug is really a bug

You should not file a bug if you are-

- **Requesting new software-** You should follow the guidelines at <https://wiki.ubuntu.com/UbuntuDevelopment/NewPackages>
- **Requesting support-** There are a multitude of ways you can get help using Ubuntu, such as the Launchpad answer tracker, the Ask Ubuntu site, the Ubuntu forums, the #ubuntu channel on the <https://help.ubuntu.com/community/InternetRelayChat> server, and the ubuntu-users mailing list.
- **Discussing features, existing policy, proposing features, or ideas-** This belongs to the ubuntu-devel-discuss mailing list.
- **Filing a bug against a package not provided by the default, supported Ubuntu repositories-** This is due to how it wasn't confirmed by Ubuntu Developers for your release. Problems that unsupported software have caused are upgrade issues, and the program or operating system not functioning correctly. Typically, what isn't supported is software from a PPA (Personal Package Archive), 3rd party packages, self-compiled software, etc. For more on supported Ubuntu repositories, please see here. If you are using unsupported software, it is best to contact the maintainers directly. Instructions are generally available on the program maintainer's web site.

8. Ubuntu Documentation- [Link to Ubuntu Desktop Guide](#)

Assignment 7

Title- Compilation of Linux Kernel

Problem Statement- Compilation of Linux Kernel. (Debian or Ubuntu)

Objectives- To demonstrate how to compile Linux Kernel.

Theory-

What is a Kernel?

A kernel is a piece of software, that controls the hardware and does some basic functions like file management. Every operating system has one. The Linux kernel is an open source; meaning you can view, modify and publish its source code.

Configuring Grub

Grub should have enough timeout so that we can choose another kernel if kernel installation fails.

To change the grub timeout, open the grub config file in nano as root by giving the below command in terminal.

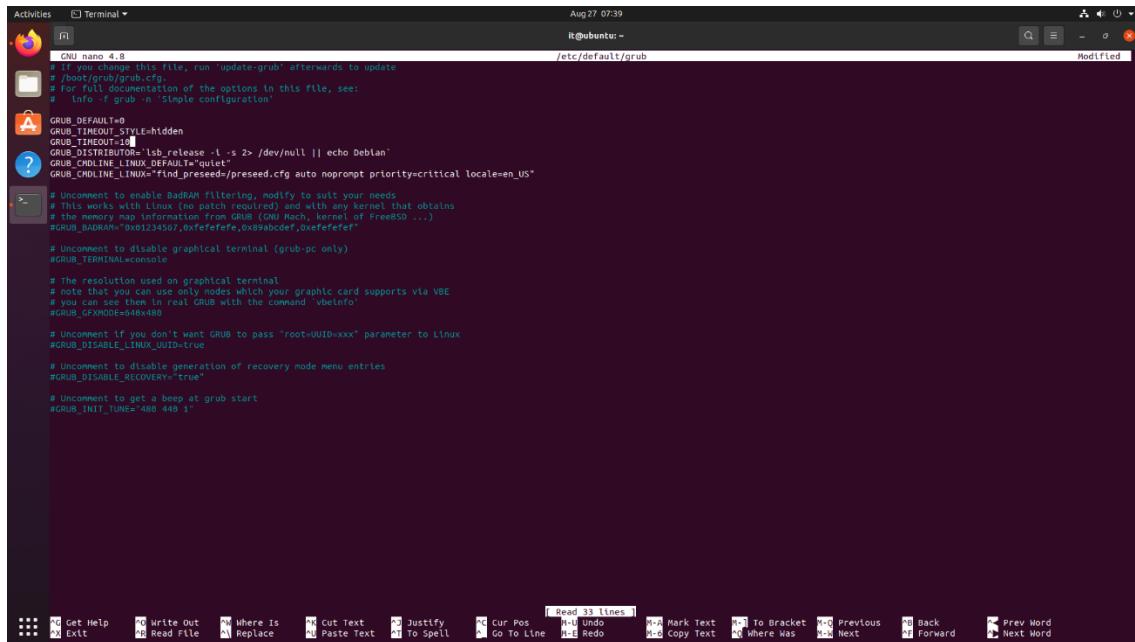
```
Sudo nano /etc/default/grub
```

Comment these lines, by inserting “#” at the beginning of the lines. After commenting, the lines should look like as below.

```
# GRUB_HIDDEN_TIMEOUT=0  
# GRUB_HIDDEN_TIMEOUT_QUIET=true
```

“**GRUB_TIMEOUT**” property should not be commented. To increase the grub timeout to 10 seconds, change this line as below.

GRUB_TIMEOUT=10

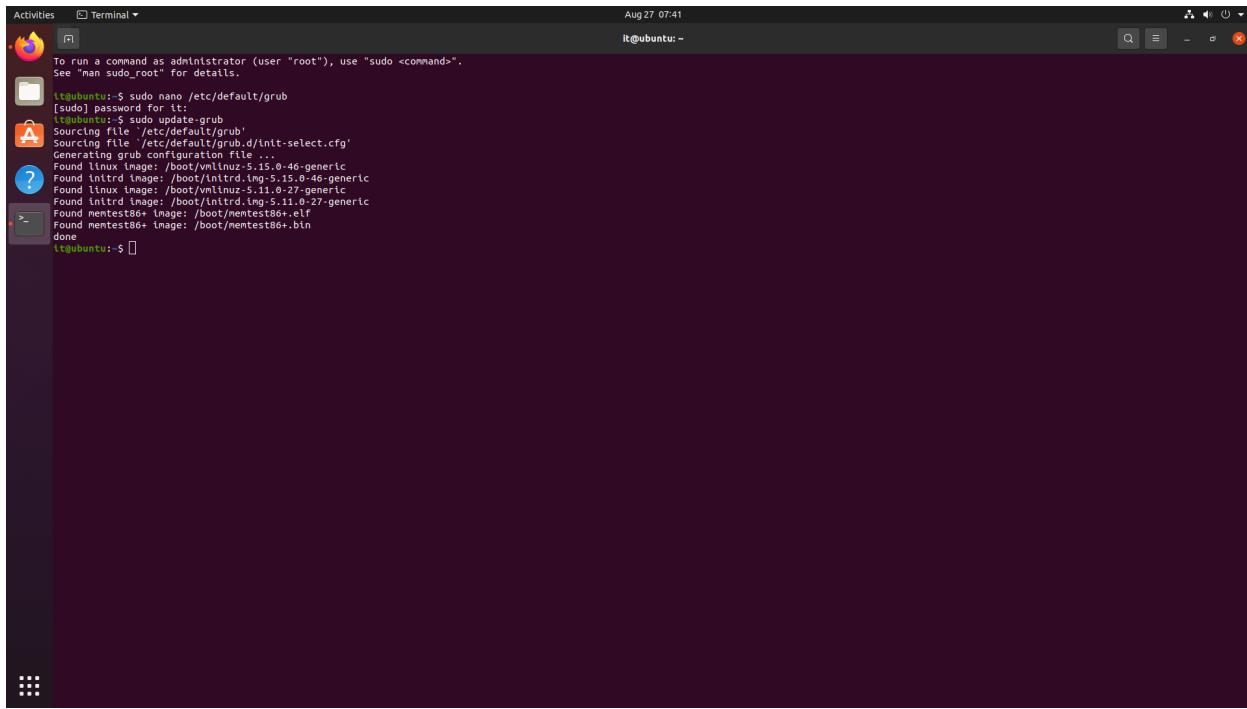


```
GRUB_TIMEOUT=10
```

Press (Ctrl+O) to save the file and then press (Ctrl+X) to exit out of nano.

As the changes has been made to GRUB config, it is needed to update our grub by giving the below command.

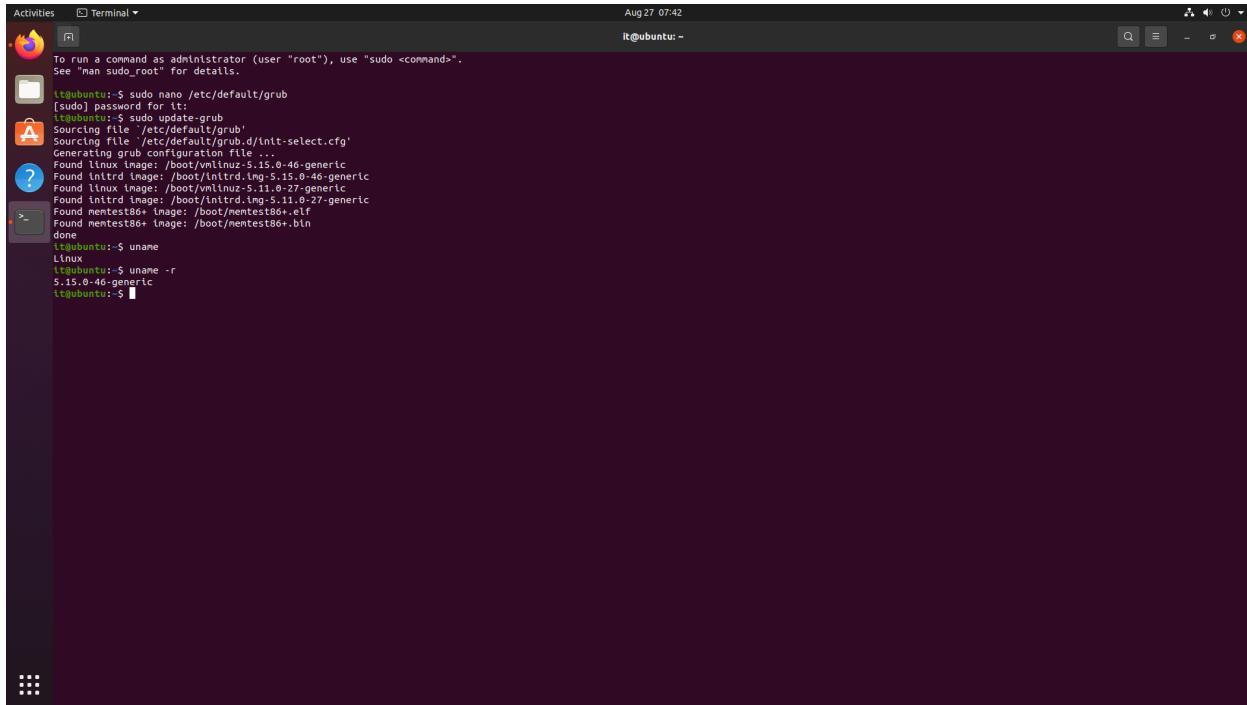
Sudo update-grub



A screenshot of a Ubuntu desktop environment. On the left is a dock with icons for Dash, Home, Activities, Terminal, and others. A central window shows a terminal session:

```
Activities Terminal ▾ Aug 27 07:41
tt@ubuntu:~$ To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
tt@ubuntu:~$ sudo nano /etc/default/grub
[sudo] password for tt:
tt@ubuntu:~$ sudo update-grub
Sourcing file '/etc/default/grub'
Sourcing file '/etc/default/grub.d/init-select.cfg'
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-5.15.0-46-generic
Found initrd image: /boot/initrd.img-5.15.0-46-generic
Found linux image: /boot/vmlinuz-5.11.0-27-generic
Found initrd image: /boot/initrd.img-5.11.0-27-generic
Found memtest86+ image: /boot/memtest86+.elf
Found memtest86+ image: /boot/memtest86+.bin
done
tt@ubuntu:~$
```

Check Current Kernel Version



A screenshot of a Ubuntu desktop environment. On the left is a dock with icons for Dash, Home, Activities, Terminal, and others. A central window shows a terminal session:

```
Activities Terminal ▾ Aug 27 07:42
tt@ubuntu:~$ To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
tt@ubuntu:~$ sudo nano /etc/default/grub
[sudo] password for tt:
tt@ubuntu:~$ sudo update-grub
Sourcing file '/etc/default/grub'
Sourcing file '/etc/default/grub.d/init-select.cfg'
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-5.15.0-46-generic
Found initrd image: /boot/initrd.img-5.15.0-46-generic
Found linux image: /boot/vmlinuz-5.11.0-27-generic
Found initrd image: /boot/initrd.img-5.11.0-27-generic
Found memtest86+ image: /boot/memtest86+.elf
Found memtest86+ image: /boot/memtest86+.bin
done
tt@ubuntu:~$ uname
Linux
tt@ubuntu:~$ uname -r
5.15.0-46-generic
tt@ubuntu:~$
```

Downloading the kernel source code-

Download the stable Linux kernel source code by visiting the website [Kernel.org](https://www.kernel.org).

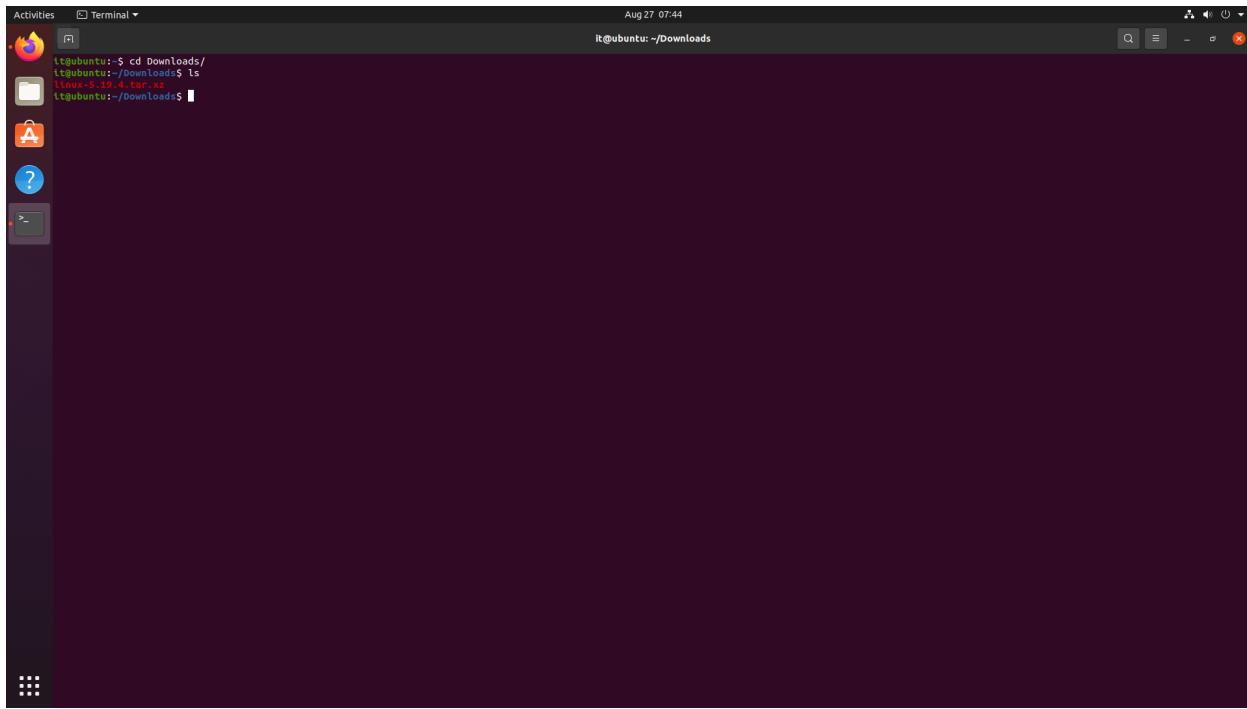
The screenshot shows the homepage of The Linux Kernel Archives. At the top, there's a navigation bar with links for About, Contact us, FAQ, Releases, Signatures, and Site news. To the right of the navigation is a small image of Tux, the Linux mascot. Below the navigation, there's a section for "Protocol" and "Location" with links for HTTP, GIT, and RSYNC. A prominent yellow box on the right displays the "Latest Release" as "5.19.4" with a downward arrow icon. Below this, there's a table of kernel versions with their release dates and download links. At the bottom left, there's a "Other resources" section with links to Git Trees, Patchwork, Mirrors, Documentation, Wikis, and Linux.com. At the bottom right, there's a "Social" section with links to the Site Atom feed, Releases Atom Feed, and Kernel Planet.

mainline:	6.0-rc2	2022-08-22	[tarball]	[patch]	[inc. patch]	[view diff]	[browse]		
stable:	5.19.4	2022-08-25	[tarball]	[pgp]	[patch]	[inc. patch]	[view diff]	[browse]	[changelog]
stable:	5.18.19 [EOL]	2022-08-21	[tarball]	[pgp]	[patch]	[inc. patch]	[view diff]	[browse]	[changelog]
longterm:	5.15.63	2022-08-25	[tarball]	[pgp]	[patch]	[inc. patch]	[view diff]	[browse]	[changelog]
longterm:	5.10.138	2022-08-25	[tarball]	[pgp]	[patch]	[inc. patch]	[view diff]	[browse]	[changelog]
longterm:	5.4.211	2022-08-25	[tarball]	[pgp]	[patch]	[inc. patch]	[view diff]	[browse]	[changelog]
longterm:	4.19.256	2022-08-25	[tarball]	[pgp]	[patch]	[inc. patch]	[view diff]	[browse]	[changelog]
longterm:	4.14.291	2022-08-25	[tarball]	[pgp]	[patch]	[inc. patch]	[view diff]	[browse]	[changelog]
longterm:	4.9.326	2022-08-25	[tarball]	[pgp]	[patch]	[inc. patch]	[view diff]	[browse]	[changelog]
linux-next:	next-20220826	2022-08-26						[browse]	

Once you have chosen the kernel version that you want to download. Click on the link that says “[tarball]”. Now the download should start and hopefully you will be downloading a file that ends with either “.tar.gz” or “.tar.xz”.

After the downloading has been completed, run the below command to extract the downloaded file.

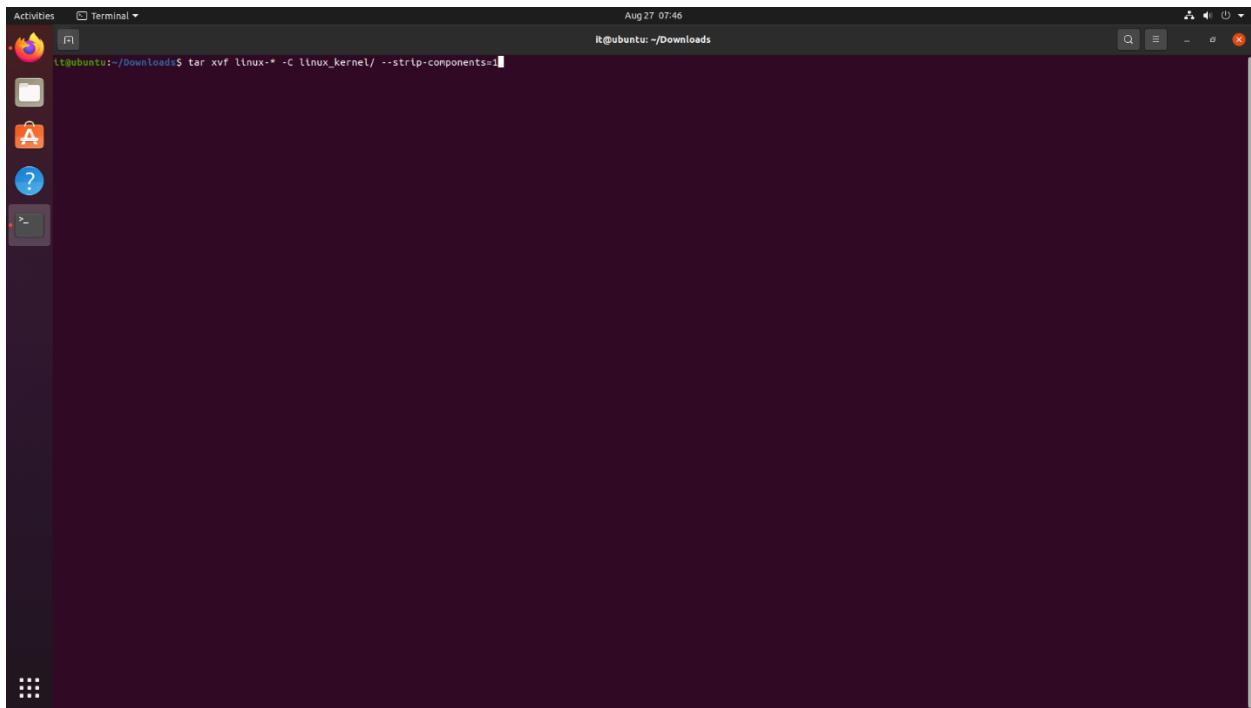
Note: While extracting if you don't want want the terminal to output filenames you can replace the “xvf” in the below command with “xf”. By doing that; the extraction will be a bit faster.



A screenshot of a Ubuntu desktop environment. On the left is a dock with icons for Dash, Home, Applications, and Help. A terminal window is open in the center, showing the command line:

```
it@ubuntu:~$ cd Downloads/  
it@ubuntu:~/Downloads$ ls  
linux-5.19.4.tar.xz  
it@ubuntu:~/Downloads$
```

```
mkdir "linux_kernel"  
tar xvf linux-* -C linux_kernel/ --strip-components=1
```

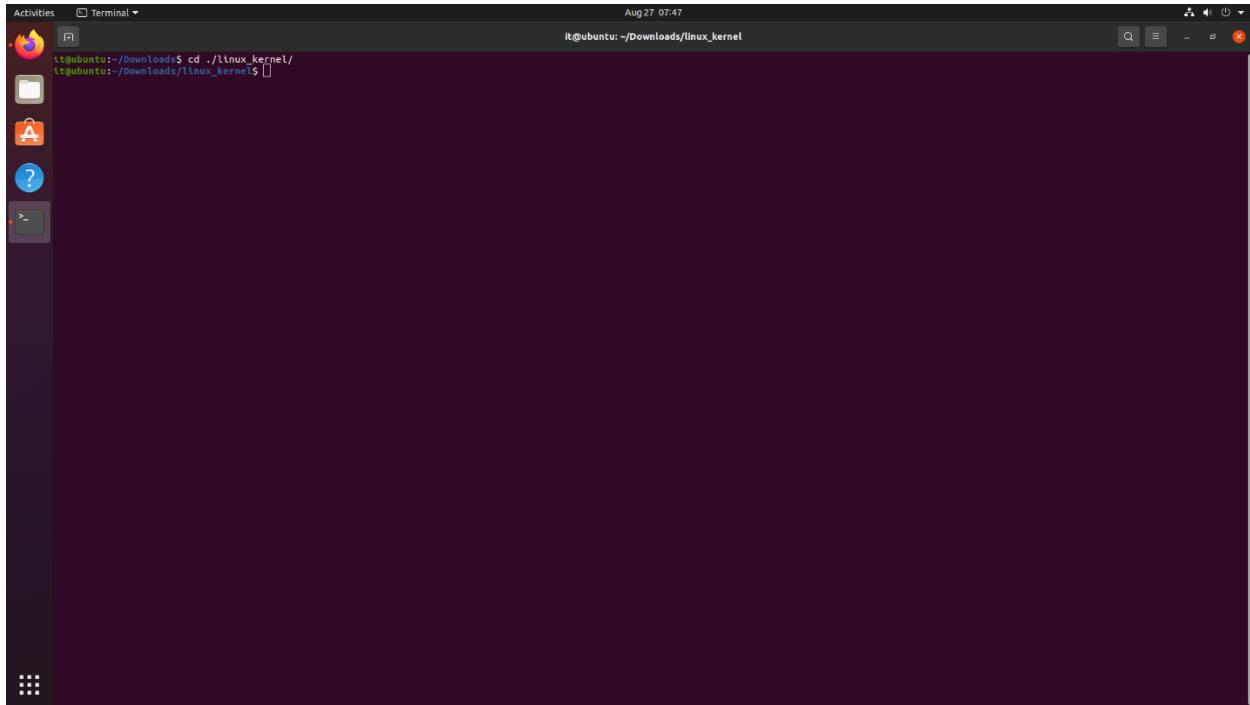


A screenshot of a Ubuntu desktop environment. On the left is a dock with icons for Dash, Home, Applications, and Help. A terminal window is open in the center, showing the command line:

```
it@ubuntu:~/Downloads$ tar xvf linux-* -C linux_kernel/ --strip-components=1
```

And then, change into the extracted directory by running the command:

```
cd ./linux_kernel/
```



Configuring The Downloaded Kernel

Before we can compile our downloaded kernel source, we need to have our configuration file in place. The configuration file tells the compiler what features, drivers, filesystems etc. to include. It is very hard to fire up a text editor and edit the configuration file manually because; there are thousands of options and modules. So, we have two ways to create the config file:

1. Use the config file that came with your distribution or,
2. Generate a new config file based on the currently connected devices to your computer.

Note: Use the config file that came with your distribution, if you frequently connect new hardware to your Linux machine.

The config file that came with your distro already has around 4000 different kernel modules and drivers for supporting different hardware you may connect to your machine. In-case you generate a new config file and try to connect new devices, you will need to re-create the config file and then re-compile the kernel.

Note: The kernel compilation time with the config file from your distro will take much longer and will result in a heavier kernel.

3. Use The Configuration File That Came With Your Distro

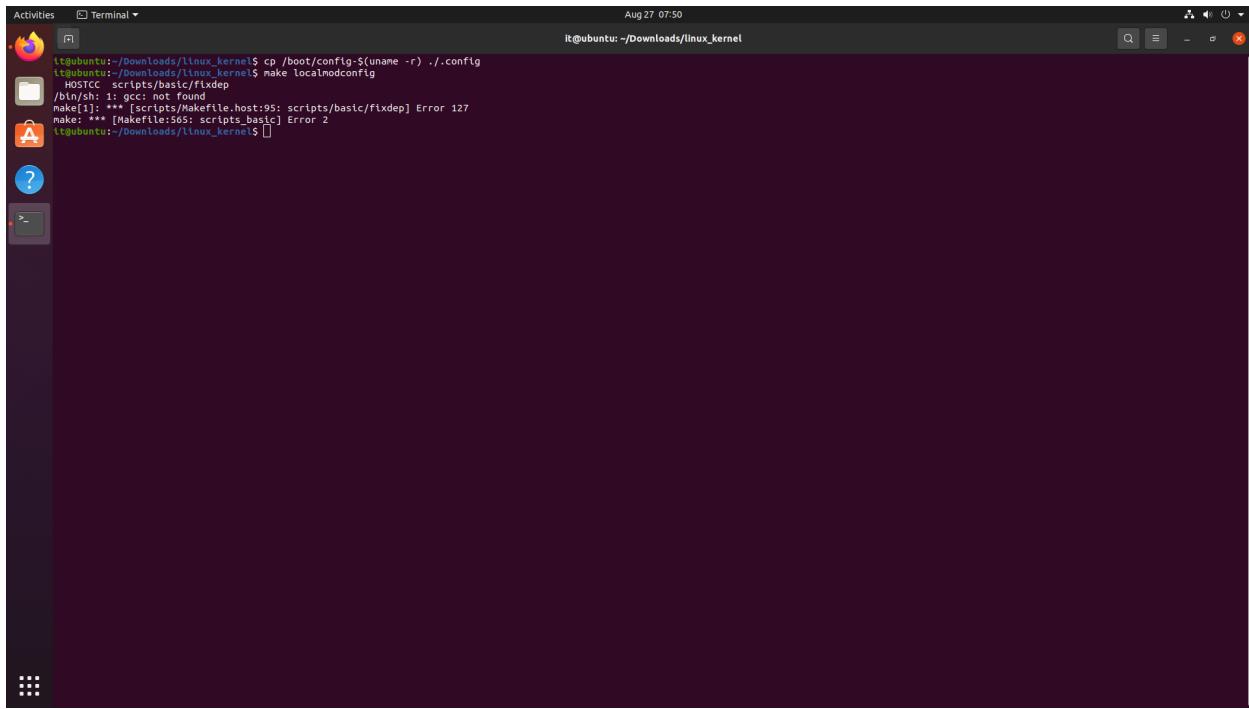
In this tutorial, I will use the config file that came with my Ubuntu Linux. To copy the config file from your distro, enter the following command:

```
cp /boot/config-$(uname -r) ./config
```

4. Generate A Configuration File Based On Connected Devices

If you want to use the second method, which will generate the config file based on the currently connected devices and on your hardware configuration, enter the following command.

```
Make localmodconfig
```

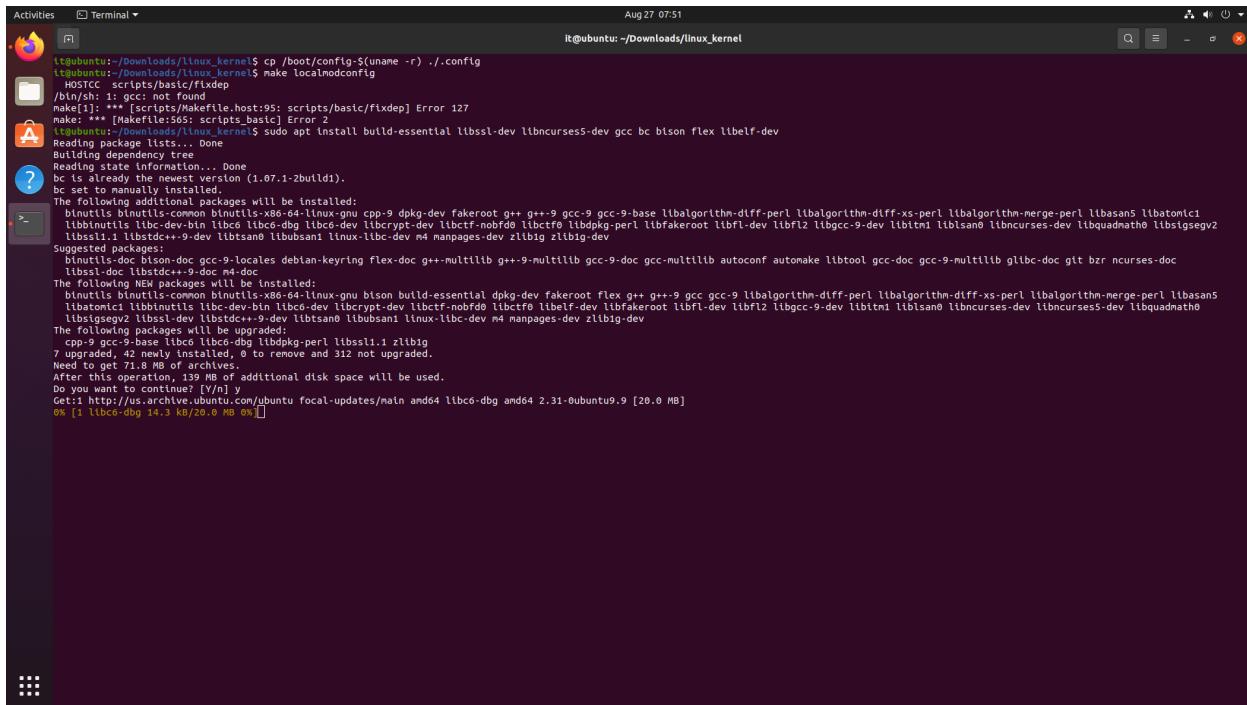
A screenshot of an Ubuntu desktop environment. On the left is a dock with icons for Dash, Home, Activities, Terminal, and others. A terminal window is open in the center, showing command-line output. The terminal window title bar says "Terminal" and the date "Aug 27 07:50". The terminal content shows a user attempting to build a Linux kernel. The commands entered are: "cp /boot/config-\$(uname -r) ./.config", "HOSTCC scripts/basic/ffixdep", and "make localmodconfig". The output shows errors related to "gcc" not being found and a makefile error. The terminal prompt ends with a closing bracket and a question mark.

You will be asked some questions weather to include some new features that the kernel provides. Press the enter key until all the questions are over otherwise. If you know what you are doing; you can take time to answer each question.

Setting Up The Environment

Run the below command to install all the required dependency packages, for a successful compilation.

```
Sudo apt install build-essential libssl-dev libncurses5-dev gcc bc bison flex  
libelf-dev
```



A screenshot of a terminal window titled "Terminal" in the Activities overview. The window shows a command-line session on an Ubuntu system. The user is navigating through a directory named "linux_kernel" and running several commands to build the kernel. The commands include "cp /boot/config-\$(uname -r) ./config", "HOSTCC scripts/basic/ffixdep", "make[1]: 1: gcc: not found", "make[1]: *** [Makefile] Error 127", "make[1]: *** [Makefile] Error 2", "sudo apt install build-essential libssl-dev libncurses5-dev gcc bc bison flex libelf-dev", and "apt-get update". The terminal also displays dependency trees, package lists, and upgrade information for various packages like binutils, gcc, and libelf-dev. A progress bar at the bottom indicates a download of "libc6-dbg" from "http://us.archive.ubuntu.com/ubuntu focal-updates/main amd64 libc6-dbg amd64 2.31-0ubuntu9.9 [20.0 MB]".

Note: The dependencies may change over time. Also, the names of some packages defer from distribution to distribution, so please use other websites like StackOverflow to troubleshoot any compilation problems.

Before we start the compilation process, ensure screensaver and auto-sleep are disabled, as they would interrupt the compilation process.

Compiling The Linux Kernel

Now, that everything is set-up, let's compile the Linux kernel. As the compilation process will take a long time, it is your choice to run the compilation process under a single core or split the job to all the available cores in your processor.

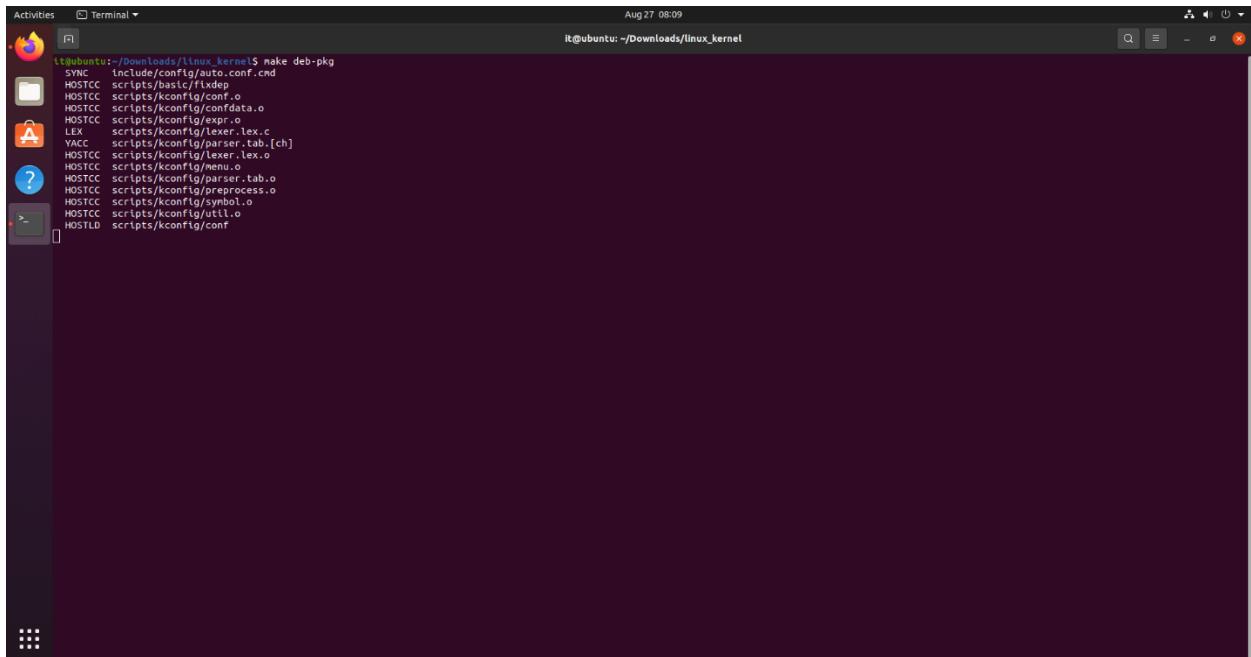
To start the compilation process; run the below command in the terminal after replacing the “[x]” with the number of cores your processor has.

```
Make -j[x] deb-pkg
```

Note: Running the compilation process using single core is recommended, though it takes more time, the compilation will result in good quality. Using more than one core takes less compilation time but, compilation quality may decrease.

To start the compilation process, using one core, run the below command in terminal.

Make deb-pkg



```
it@ubuntu:~/Downloads/linux_kernel$ make deb-pkg
SYNC include/config/auto.conf.cmd
HOSTCC scripts/basic/fixdep
HOSTCC scripts/kconfig/conf.o
HOSTCC scripts/kconfig/confdata.o
HOSTCC scripts/kconfig/experimental
HOSTCC scripts/kconfig/parser.lex.c
YACC scripts/kconfig/parser.tab.[ch]
HOSTCC scripts/kconfig/lexer.lex.o
HOSTCC scripts/kconfig/menu.o
HOSTCC scripts/kconfig/parser.tab.o
HOSTCC scripts/kconfig/preprocess.o
HOSTCC scripts/kconfig/conftool.o
HOSTCC scripts/kconfig/util.o
HOSTLD scripts/kconfig/conftool
```

Keep pressing enter key for all the the prompts asking to enable new features. Depending upon your computer's horsepower; compilation process may take anywhere from minutes to days. Do not interrupt the compilation process, otherwise you will have to start from the beginning.

Installing The Compiled Kernel

Once the compilation process has been completed successfully without any errors, you will find some deb packages in the parent directory. Now you can distribute

these deb packages as a compiled kernel. I recommend you to first try installing on a virtual machine and test the kernel and see if everything works fine.

After ensuring the compiled deb packages work as expected, you can install them by running the following command.

```
Cd ../  
sudo dpkg -I linux-*.deb
```

The installation will take a few minutes. Finally reboot your Linux machine and enjoy your new kernel.

Conclusion

Compiling a kernel is not so easy and only developers who are into that kind of stuff do it. There are different forums that help you in-case there is any problem. To get a better idea, please watch this video.

References

<https://kernel.org/>

<https://linuxhint.com/compile-and-install-kernel-ubuntu/>

Assignment 8

Title- Create of RPM or DEB packages

Objective- To Create package building process in Linux

Theory (Functions of tool /How to Use /Drawbacks)-

A Debian package, or a Debian archive file, contains the executable files, libraries, and documentation associated with a particular suite of program or set of related programs. Normally, a Debian archive file has a filename that ends in .deb.

Debian control file-

Package: hello

Priority: optional

Section: python

Installed-Size: 45

Maintainer: Onkar Panchare, onkar.panchare2000@gmail.com

Architecture: i386

Version: 1.3-16

Depends: libc6 (v= 2.1)

Description: The classic greeting, and a good example The GNU hello program produces a familiar, friendly greeting. It allows nonprogrammers to use a classic computer science tool which would otherwise be unavailable to them. Seriously, though: this is an example of how to do a Debian package. It is the Debian version of the GNU Project's 'hello world' program (which is itself an example for the GNU Project).

What are those fields-

The Package field gives the package name. The Version field gives both the upstream developer's version number. The Architecture field specifies the chip for which this particular binary was compiled. The Depends field gives a list of packages that have to be installed in order to install this package successfully. The Installed-Size indicates how much disk space the installed package will consume. The Section line gives the section where this Debian package is stored at the Debian FTP sites. The Priority indicates how important is this package for installation, so that semi-intelligent software like deselect or aptitude can sort the package into a category of e.g. packages optionally installed. The Maintainer field gives the e-mail address of the person who is currently responsible for maintaining

this package. The Description field gives a brief summary of the package's features.

Steps-

```
#include<iostream>
using namespace std;
int main()
{
    cout<<"Hello World";
    return 0;
}
```

Save the above code as **helloworld.c**. At this point make sure that you have compiler installed on your system by executing:

\$ sudo apt-get install build-essential

Compile and execute your code with a following command:

```
$ g++ helloworld.cc -o helloworld
$ ./helloworld
```

At this point you should have a binary executable called helloworld which prints some string on the screen.

Now that we have program ready in form of executable binary we can package it up into a adiso package. To do that we would use a dpkg-deb tool. But first we need to create a adiso package structure. The only files required in to build a adiso package are:

1. DEBIAN/control
2. custom files to be part of the package (not required)

First create a directory called Calc.

This directory will hold all necessary package files:

\$ mkdir helloworld

Next, create a control file:

```
$ cd helloworld
$ mkdir DEBIAN
```

When ready open up DEBIAN/control file

\$ vi DEBIAN/control

and enter a following information:

Package: helloworld

Version: 1.0

Section: custom

Priority: optional

Architecture: all

Essential: no

Installed-Size: 1024

Maintainer: helloworld.org

Description: Display String.

In root of helloworld directory create a directory which will be used to install helloworld program and copy program into this directory. Best choice for us will be /usr/bin:

\$ mkdir -p /usr/bin/

\$ cp /home/sdk/helloworld /usr/bin/

At this point we are ready to create a adiso package.

\$ cd ..

\$ dpkg-deb –build helloworld

dpkg-deb: building package ‘helloworld’ in ‘helloworld.deb’.

\$ ls

helloworld helloworld.deb

To install file

\$ sudo apt-get install helloworld

Conclusion-

We Built our own adiso package named helloworld which prints “Hello World” over the console

Reference- <http://linuxconfig.org/>

Assignment 9

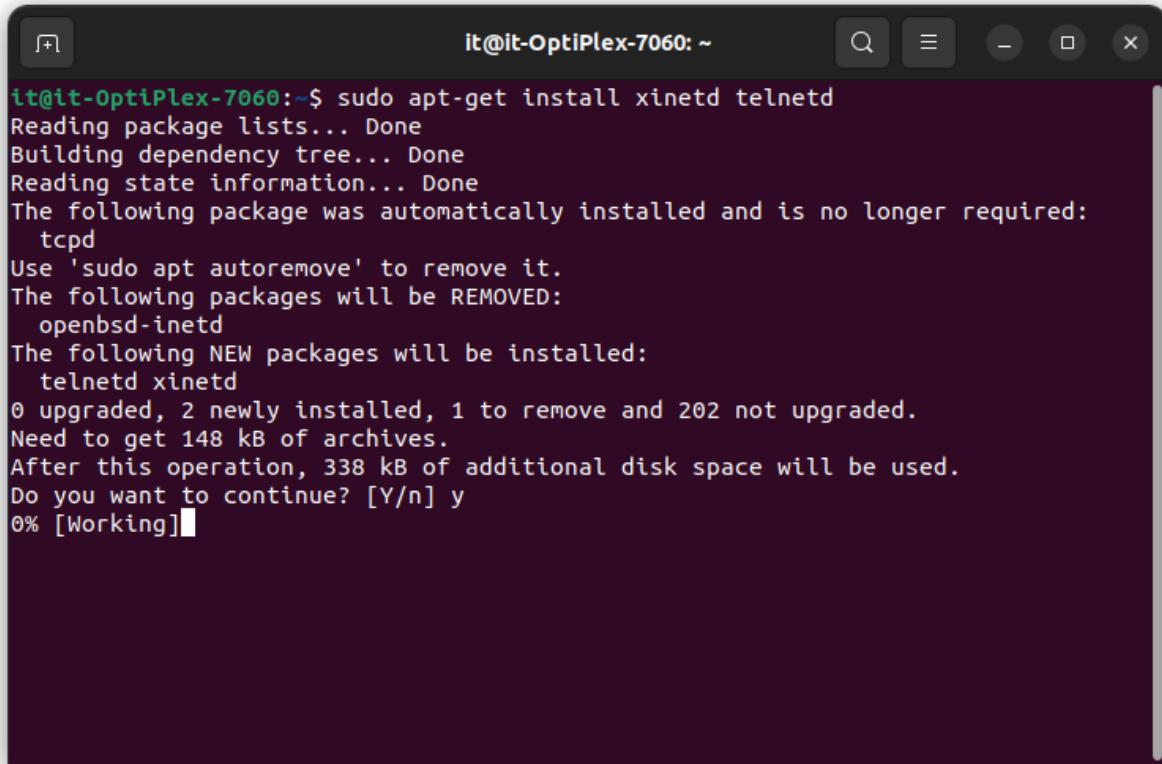
Title- Install and demonstrate Server based services and their uses

Problem statement- To install and demonstrate Server based services (FTP and Telnet)

Objectives- To know server installations and configurations on Linux Platform

❖ **Configuring Telnet Server**

- ❖ Install telnet using the command-
\$ sudo apt-get install xinetd telnetd



it@it-OptiPlex-7060:~\$ sudo apt-get install xinetd telnetd
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following package was automatically installed and is no longer required:
tcpd
Use 'sudo apt autoremove' to remove it.
The following packages will be REMOVED:
openbsd-inetd
The following NEW packages will be installed:
telnetd xinetd
0 upgraded, 2 newly installed, 1 to remove and 202 not upgraded.
Need to get 148 kB of archives.
After this operation, 338 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
0% [Working]

- ❖ Edit */etc/inetd.conf* file with root permission, ass the following line
telnet stream tcp nowait telnetd /usr/sbin/tcp /usr/sbin/in.telnetd

The screenshot shows a desktop environment with a terminal window and a text editor window.

Terminal Window:

```

Building dependency tree... Done
Reading state information... Done
The following package was automatically installed and is no longer req
ured:
  tcpd
Use 'sudo apt autoremove' to remove it.
The following packages will be REMOVED:
  openbsd-inetd
The following NEW packages will be installed:
  telnetd xinetd
0 upgraded, 2 newly installed, 1 to remove and 202 not upgraded.
Need to get 148 kB of archives.
After this operation, 338 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 xinetd
amd64 1:2.3.15.3-1 [108 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 telnetd
amd64 0.17-44build1 [40.7 kB]
Fetched 148 kB in 2s (81.9 kB/s)
(Reading database ... 236998 files and directories currently installed
.)
Removing openbsd-inetd (0.20160825-5) ...
Selecting previously unselected package xinetd.
(Reading database ... 236990 files and directories currently installed
.)
Preparing to unpack .../xinetd_1%3a2.3.15.3-1_amd64.deb ...
Unpacking xinetd (1:2.3.15.3-1) ...
Selecting previously unselected package telnetd.
Preparing to unpack .../telnetd_0.17-44build1_amd64.deb ...
Unpacking telnetd (0.17-44build1) ...
Setting up xinetd (1:2.3.15.3-1) ...
Setting up telnetd (0.17-44build1) ...
Adding user telnetd to group utmp
Note: xinetd currently is not fully supported by update-inetd.
Please consult /usr/share/doc/xinetd/README.Debian and itox(8).
Processing triggers for man-db (2.10.2-1) ...
it@it-OptiPlex-7060:~$ gedit /etc/inetd.conf

```

Text Editor Window:

```

5 #
6 # Lines starting with "#:LABEL:" or "<off>" should not
7 # be changed unless you know what you are doing!
8 #
9 # If you want to disable an entry so it isn't touched during
10 # package updates just comment it out with a single '#' character.
11 #
12 # Packages should modify this file by using update-inetd(8)
13 #
14 # <service_name> <sock_type> <proto> <flags> <user> <server_path>
15 # <args>
16 #:INTERNAL: Internal services
17 #discard stream tcp nowait root internal
18 #discard dgram udp wait root internal
19 #daytime stream tcp nowait root internal
20 #time stream tcp nowait root internal
21
22 #:STANDARD: These are standard services.
23 telnet stream tcp nowait telnetd /usr/sbin/tcpd /
  /usr/sbin/in.telnetd
24
25 #:BSD: Shell, login, exec and talk are BSD protocols.
26
27 #:MAIL: Mail, news and uucp services.
28
29 #:INFO: Info services
30
31 #:BOOT: TFTP service is provided primarily for booting. Most sites
32 # run this only on machines acting as "boot servers."
33
34 #:RPC: RPC based services
35
36 #:HAM-RADIO: amateur-radio services
37
38 #:OTHER: Other services
39

```

❖ Edit `/etc/xinetd.conf` it should look like following-

```

# Simple configuration file for xinetd #
# Some defaults, and include /etc/xinetd.d/
defaults
{
# Please note that you need a log_type line to be able to use log_on_success
# and log_on_failure. The default is the following :
# log_type = SYSLOG daemon info
instances = 60
log_type = SYSLOG authpriv
log_on_success = HOST PID
log_on_failure = HOST
cps = 25 30
}

```

```

# Simple configuration file for xinetd
#
# Some defaults, and include /etc/xinetd.d/
defaults
#
# Please note that you need a log_type line to be able to use
# log_on_success
# and log_on_failure. The default is the following :
# log_type = SYSLOG daemon info
instances = 60
log_type = SYSLOG authpriv
log_on_success = HOST PID
log_on_failure = HOST
cps = 25 30

```

```

it@it-OptiPlex-7060:~$ gedit /etc/xinetd.conf
it@it-OptiPlex-7060:~$ sudo gedit /etc/xinetd.conf

(gedit:9981): dconf-WARNING **: 11:40:56.526: failed to commit changes
to dconf: Failed to execute child process "dbus-launch" (No such file
or directory)

(gedit:9981): dconf-WARNING **: 11:40:56.530: failed to commit changes
to dconf: Failed to execute child process "dbus-launch" (No such file
or directory)

(gedit:9981): dconf-WARNING **: 11:40:56.653: failed to commit changes
to dconf: Failed to execute child process "dbus-launch" (No such file
or directory)

(gedit:9981): dconf-WARNING **: 11:40:56.654: failed to commit changes
to dconf: Failed to execute child process "dbus-launch" (No such file
or directory)

(gedit:9981): dconf-WARNING **: 11:40:56.654: failed to commit changes
to dconf: Failed to execute child process "dbus-launch" (No such file
or directory)

** (gedit:9981): WARNING **: 11:41:03.062: Set document metadata failed
d: Setting attribute metadata::gedit-spell-language not supported

** (gedit:9981): WARNING **: 11:41:03.063: Set document metadata failed
d: Setting attribute metadata::gedit-encoding not supported

```

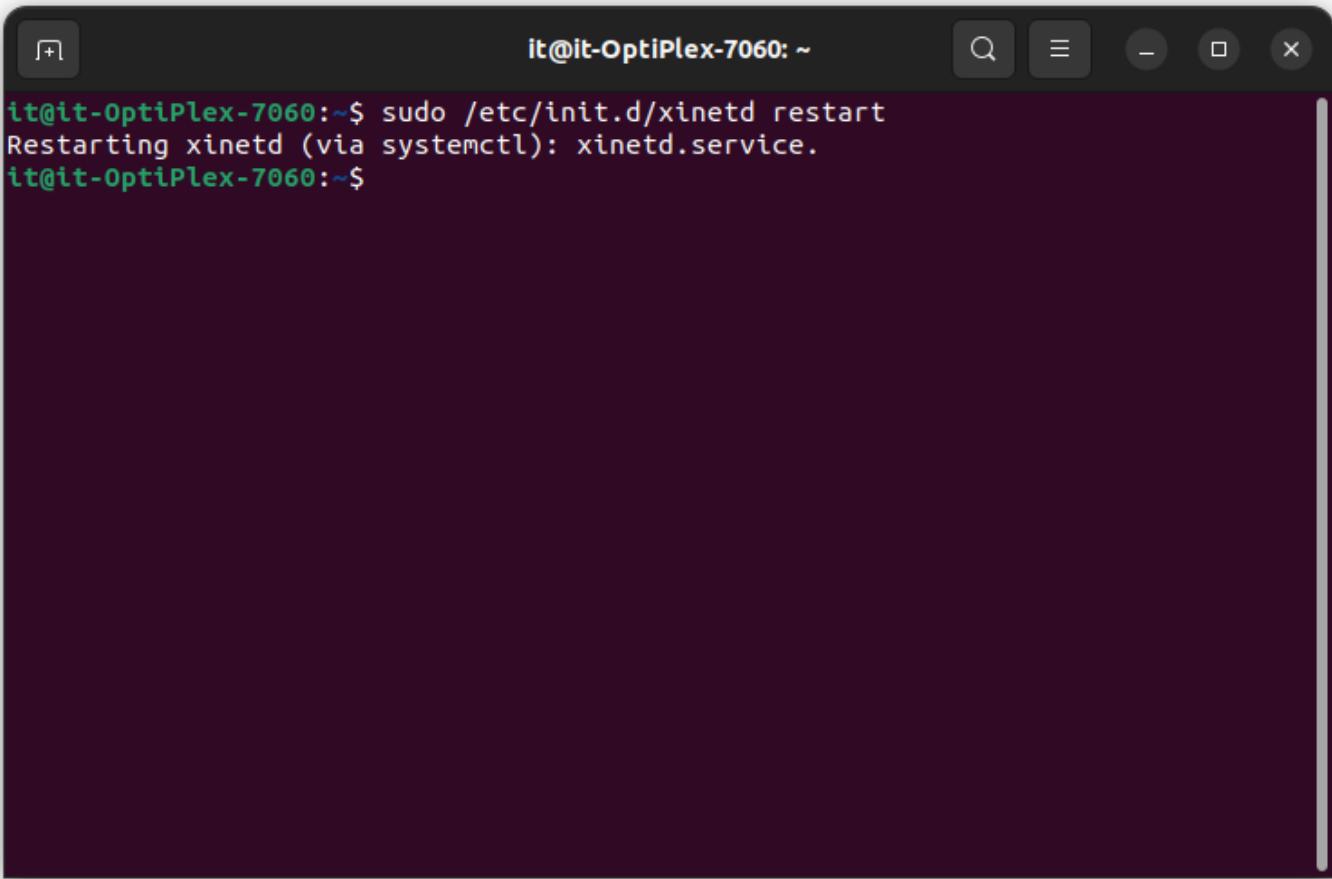
- ❖ You can change telnet port number by editing `/etc/services` with this line – `telnet 23/tcp`
- ❖ If you're not satisfied with default configuration. Edit `etc/xinetd.d/telnet`, add following:

```

# default: on
# description: The telnet server serves telnet sessions; it uses
# unencrypted username/password pairs for authentication.
Service telnet
{
    disable = no
    flags = REUSE
    socket_type = stream
    wait = no
    user = root
    server = /usr/sbin/in.telnetd
    log_on_failure += USERID
}

```

- ❖ Use this command to start telnet server-
`Sudo /etc/init.d/xinetd restart`



it@it-OptiPlex-7060:~\$ sudo /etc/init.d/xinetd restart
Restarting xinetd (via systemctl): xinetd.service.
it@it-OptiPlex-7060:~\$

Install Telnet and connect to server in Ubuntu Linux-

- ❖ Install telnet client
- \$ *sudo apt install telnet*
- ❖ Connect to Telnet server
- \$ *Telnet <ip address>*

```
Activities Terminal Mon Sep 12 11:47:08 AM
pranav-bhosale@pranav-bhosale: $ telnet 10.10.13.188
Trying 10.10.13.188...
Connected to 10.10.13.188.
Escape character is '^]'.
Ubuntu 22.04 LTS
it-OptiPlex-7060 login: it
Password:
Welcome to Ubuntu 22.04 LTS (GNU/Linux 5.15.0-47-generic x86_64)

 * Documentation: https://help.ubuntu.com
 * Management: https://landscape.canonical.com
 * Support: https://ubuntu.com/advantage

1 device has a firmware upgrade available.
Run `fwupdmgmt get-upgrades` for more information.

188 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

14 updates could not be installed automatically. For more details,
see /var/log/unattended-upgrades/unattended-upgrades.log

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

1 device has a firmware upgrade available.
Run `fwupdmgmt get-upgrades` for more information.

it@it-OptiPlex-7060:~$
```

Demonstrate use of Telnet-

- ❖ Check directories in server desktop folder using client terminal (Telnet connection)

```
Activities Terminal Mon Sep 12 11:47:35 AM
pranav-bhosale@pranav-bhosale: $ telnet 10.10.13.188
Trying 10.10.13.188...
Connected to 10.10.13.188.
Escape character is '^]'.
Ubuntu 22.04 LTS
it-OptiPlex-7060 login: it
Password:
Welcome to Ubuntu 22.04 LTS (GNU/Linux 5.15.0-47-generic x86_64)

 * Documentation: https://help.ubuntu.com
 * Management: https://landscape.canonical.com
 * Support: https://ubuntu.com/advantage

1 device has a firmware upgrade available.
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To see these additional updates run: apt list --upgradable

14 updates could not be installed automatically. For more details,
see /var/log/unattended-upgrades/unattended-upgrades.log

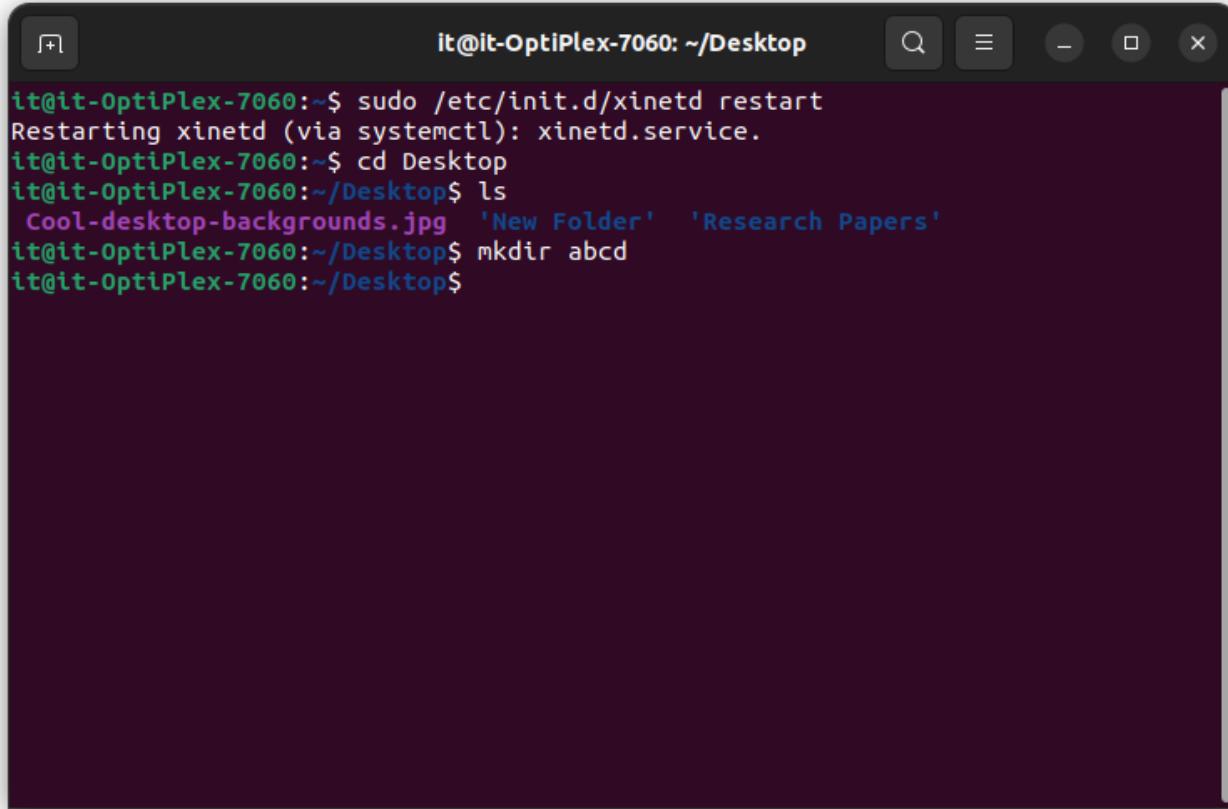
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

1 device has a firmware upgrade available.
Run `fwupdmgmt get-upgrades` for more information.

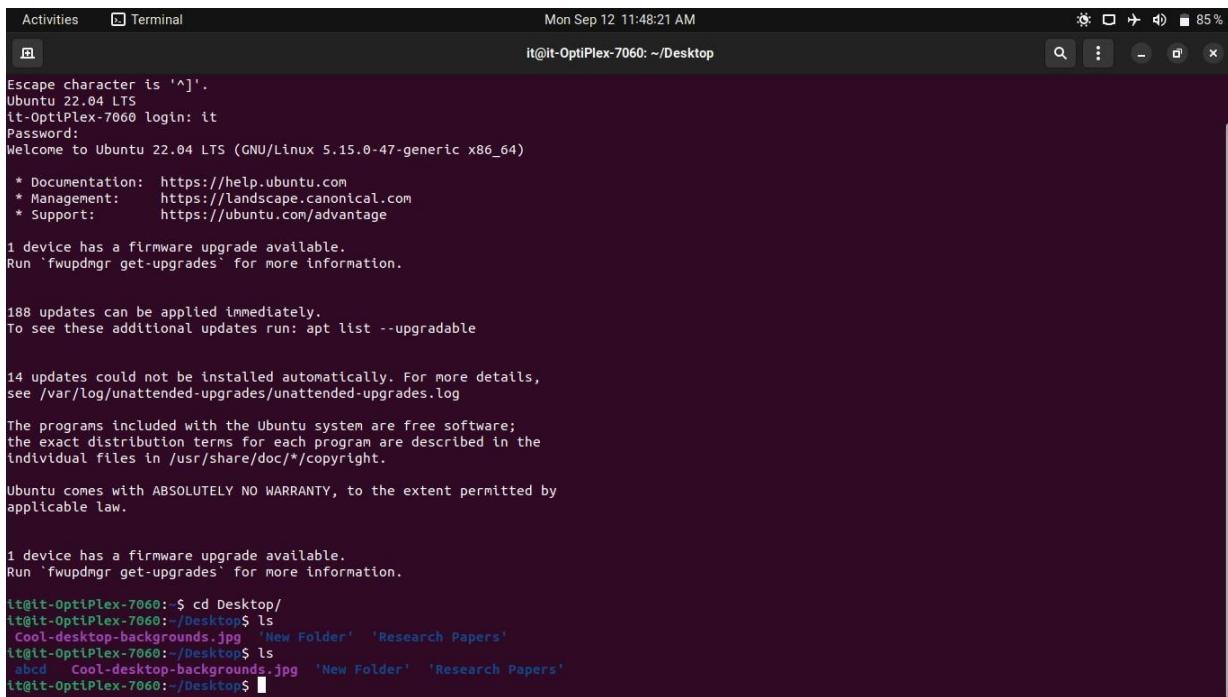
it@it-OptiPlex-7060:~$ cd Desktop/
it@it-OptiPlex-7060:~/Desktop$ ls
Cool-desktop-backgrounds.jpg 'New Folder' 'Research Papers'
it@it-OptiPlex-7060:~/Desktop$
```

❖ Create new directory **abcd** in server folder



```
it@it-OptiPlex-7060:~$ sudo /etc/init.d/xinetd restart
Restarting xinetd (via systemctl): xinetd.service.
it@it-OptiPlex-7060:~$ cd Desktop
it@it-OptiPlex-7060:~/Desktop$ ls
Cool-desktop-backgrounds.jpg  'New Folder'  'Research Papers'
it@it-OptiPlex-7060:~/Desktop$ mkdir abcd
it@it-OptiPlex-7060:~/Desktop$
```

❖ Check directories in server desktop folder using client terminal



```
Activities Terminal Mon Sep 12 11:48:21 AM
it@it-OptiPlex-7060:~/Desktop$ ls
Escape character is '^].
Ubuntu 22.04 LTS
it-OptiPlex-7060 login: it
Password:
Welcome to Ubuntu 22.04 LTS (GNU/Linux 5.15.0-47-generic x86_64)

 * Documentation: https://help.ubuntu.com
 * Management: https://landscape.canonical.com
 * Support: https://ubuntu.com/advantage

1 device has a firmware upgrade available.
Run `fwupdmgmt get-upgrades` for more information.

188 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

14 updates could not be installed automatically. For more details,
see /var/log/unattended-upgrades/unattended-upgrades.log

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

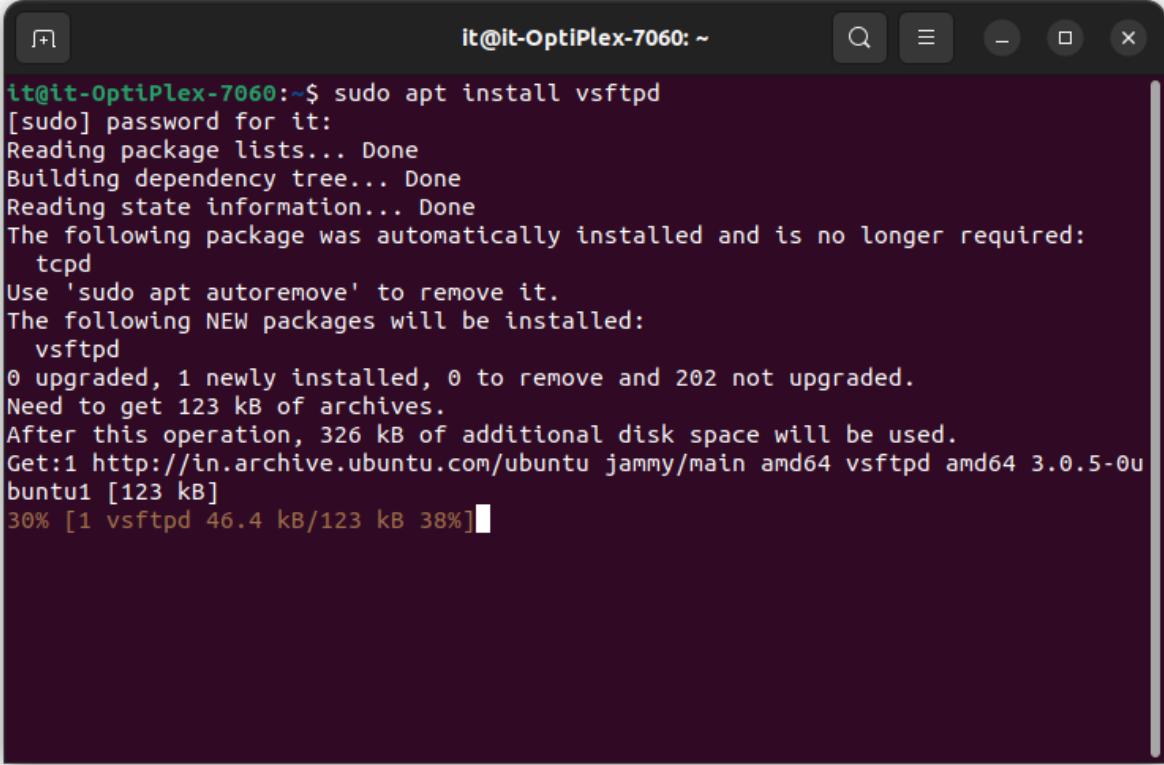
1 device has a firmware upgrade available.
Run `fwupdmgmt get-upgrades` for more information.

it@it-OptiPlex-7060:~$ cd Desktop/
it@it-OptiPlex-7060:~/Desktop$ ls
Cool-desktop-backgrounds.jpg  'New Folder'  'Research Papers'
it@it-OptiPlex-7060:~/Desktop$ ls
abcd  Cool-desktop-backgrounds.jpg  'New Folder'  'Research Papers'
it@it-OptiPlex-7060:~/Desktop$
```

❖ Configuring FTP Server

- Install vsftpd on your system by using following command=

```
$ sudo apt install vsftpd
```



A terminal window titled "it@it-OptiPlex-7060: ~" showing the output of the command \$ sudo apt install vsftpd. The window includes a title bar with a magnifying glass icon, a search bar, and window control buttons. The terminal text shows the package being installed from the archive. A progress bar at the bottom indicates the download is at 38% completion.

```
it@it-OptiPlex-7060:~$ sudo apt install vsftpd
[sudo] password for it:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following package was automatically installed and is no longer required:
  tcpd
Use 'sudo apt autoremove' to remove it.
The following NEW packages will be installed:
  vsftpd
0 upgraded, 1 newly installed, 0 to remove and 202 not upgraded.
Need to get 123 kB of archives.
After this operation, 326 kB of additional disk space will be used.
Get:1 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 vsftpd amd64 3.0.5-0ubuntu1 [123 kB]
30% [1 vsftpd 46.4 kB/123 kB 38%]
```

- Configure vsftpd server-

It's always best practice to keep a backup of the original config file, just in case something goes wrong later. Rename the default config file:

```
$ sudo mv /etc/vsftpd.conf /etc/vsftpd.conf_orig
```

```
it@it-OptiPlex-7060:~$ sudo mv /etc/vsftpd.conf /etc/vsftpd.conf_orig
it@it-OptiPlex-7060:~$
```

- Create a new *vsftpd* configuration file using nano/vi editor-

```
$ sudo nano /etc/vsftpd.conf
```

- **Copy the following base configuration into your file-**

This configuration will suffice for a basic FTP server, and can later be tweaked for the specific needs of environment once verified this is working properly:

```
listen=NO listen_ipv6=YES
anonymous_enable=NO
local_enable=YES
write_enable=YES
local_umask=022
dirmessage_enable=YES
use_localtime=YES
xferlog_enable=YES
connect_from_port_20=YES
chroot_local_user=YES
secure_chroot_dir=/var/run/vsftpd/empty
am_service_name=vsftpd
rsa_cert_file=/etc/ssl/certs/ssl-cert-snakeoil.pem
rsa_private_key_file=/etc/ssl/private/ssl-cert-snakeoil.key
ssl_enable=NO
pasv_enable=Yes pasv_min_port=10000
pasv_max_port=10100
allow_writeable_chroot=YES
```

Paste the above lines into your newly created `/etc/vsftpd.conf` file, and then save changes and close the file.

The screenshot shows a desktop environment with a terminal window and a file editor window. The terminal window (gedit) displays several warning messages from the command `sudo gedit /etc/vsftpd.conf`. The file editor window (vsftpd.conf) shows the configuration file content.

```

it@it-OptiPlex-7060: ~
(gedit:14987): dconf-WARNING **: 12:19:12.916: failed to commit changes to dconf: Failed to execute child process "dbus-launch" (No such file or directory)
(gedit:14987): dconf-WARNING **: 12:19:12.920: failed to commit changes to dconf: Failed to execute child process "dbus-launch" (No such file or directory)
(gedit:14987): dconf-WARNING **: 12:19:13.042: failed to commit changes to dconf: Failed to execute child process "dbus-launch" (No such file or directory)
(gedit:14987): dconf-WARNING **: 12:19:13.043: failed to commit changes to dconf: Failed to execute child process "dbus-launch" (No such file or directory)
(gedit:14987): dconf-WARNING **: 12:19:13.043: failed to commit changes to dconf: Failed to execute child process "dbus-launch" (No such file or directory)
** (gedit:14987): WARNING **: 12:19:33.661: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported
** (gedit:14987): WARNING **: 12:19:33.662: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported

```

```

1 listen=NO
2 listen_ipv6=YES
3 anonymous_enable=NO
4 local_enable=YES
5 write_enable=YES
6 local_umask=022
7 dirmessage_enable=YES
8 use_localtime=YES
9 xferlog_enable=YES
10 connect_from_port_20=YES
11 chroot_local_user=YES
12 secure_chroot_dir=/var/run/vsftpd/empty
13 pam_service_name=vsftpd
14 rsa_cert_file=/etc/ssl/certs/ssl-cert-snakeoil.pem
15 rsa_private_key_file=/etc/ssl/private/ssl-cert-snakeoil.key
16 ssl_enable=NO
17 pasv_enable=Yes
18 pasv_min_port=10000

```

- Allow Firewall

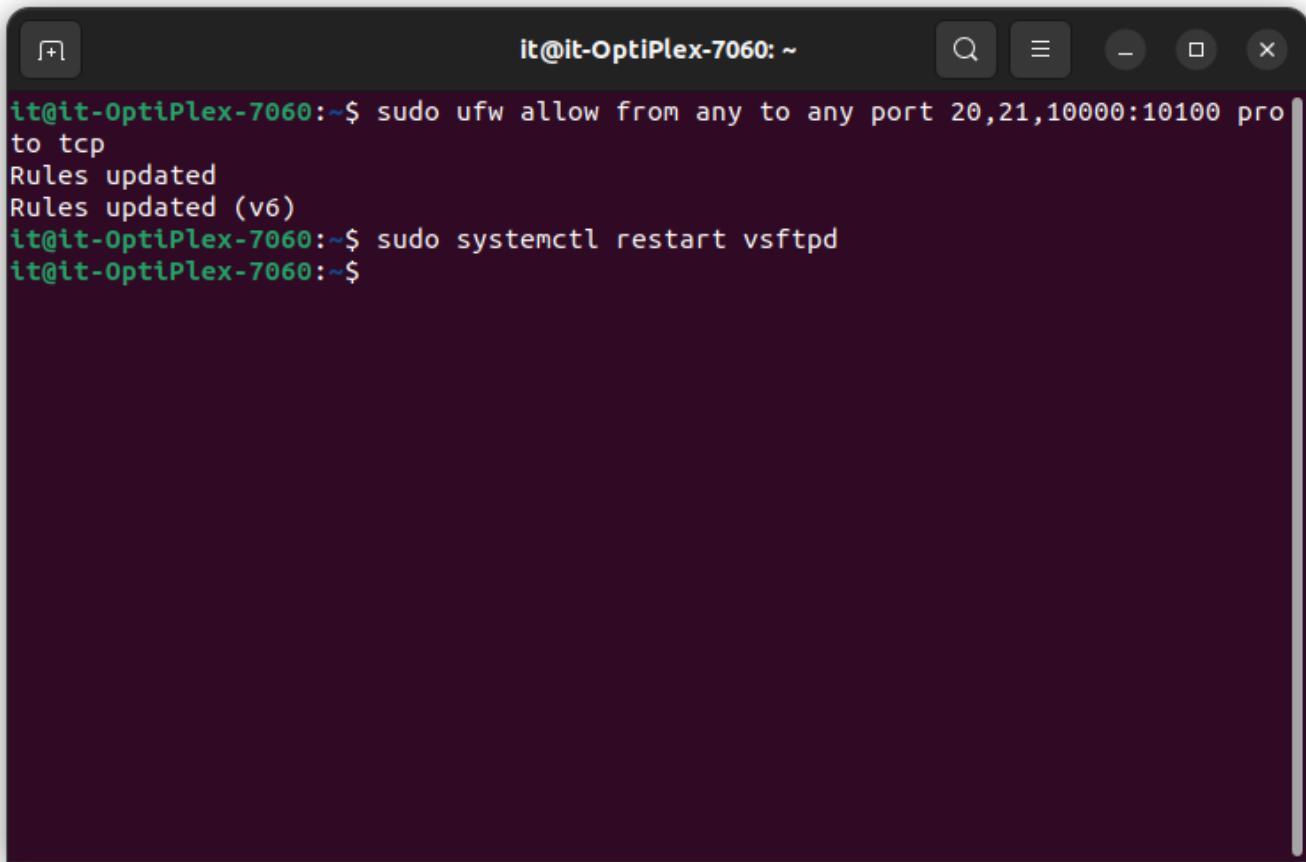
Ubuntu's built-in firewall will block FTP traffic by default, but the following command will create an exception in UFW to allow the traffic:

`$ sudo ufw allow from any to any port 20,21,10000:10100 proto tcp`

- Restart FTP server

With the configuration file saved and the firewall rules updated, restart vsftpd to apply the new changes:

`$ sudo systemctl restart vsftpd`



```
it@it-OptiPlex-7060:~$ sudo ufw allow from any to any port 20,21,10000:10100 proto tcp
Rules updated
Rules updated (v6)
it@it-OptiPlex-7060:~$ sudo systemctl restart vsftpd
it@it-OptiPlex-7060:~$
```

- Create an FTP user

```
$ sudo useradd -m ftpuser
```

```
$ sudo passwd ftpuser
```

Add password to successfully add user



```
it@it-OptiPlex-7060:~$ sudo useradd -m ftpuser1
[sudo] password for it:
it@it-OptiPlex-7060:~$ sudo passwd ftpuser1
New password:
BAD PASSWORD: The password fails the dictionary check - it is too simplistic/systematic
Retype new password:
Sorry, passwords do not match.
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: password updated successfully
it@it-OptiPlex-7060:~$
```

- In order to verify that everything's working properly, store at least one file in ftp user's home directory. This file should be visible when we login to FTP in the next steps.

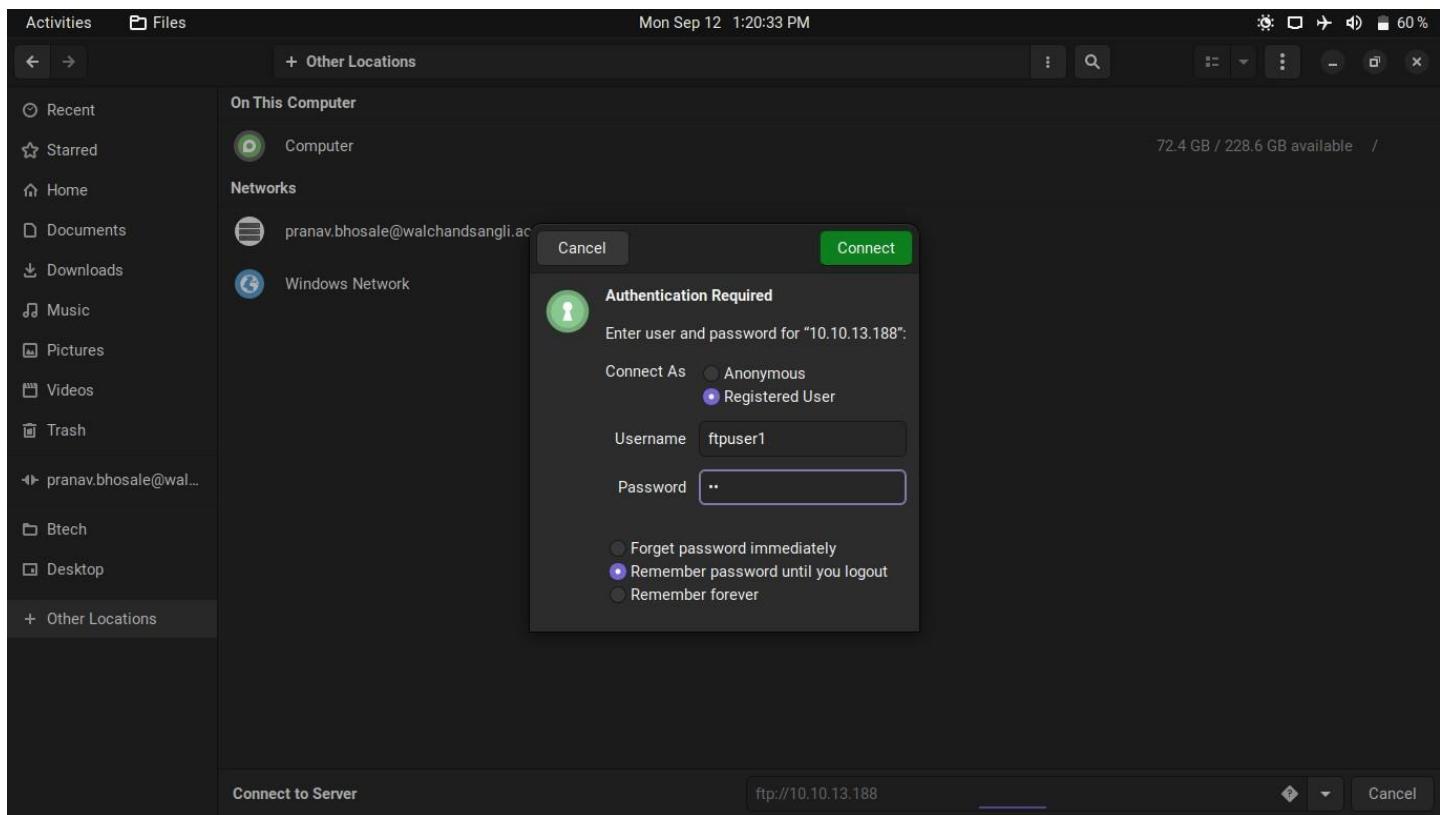
```
$ sudo bash -c "echo FTP TESTING > /home/ftpuser1/FTP-TEST"
```

- Connect to FTP server

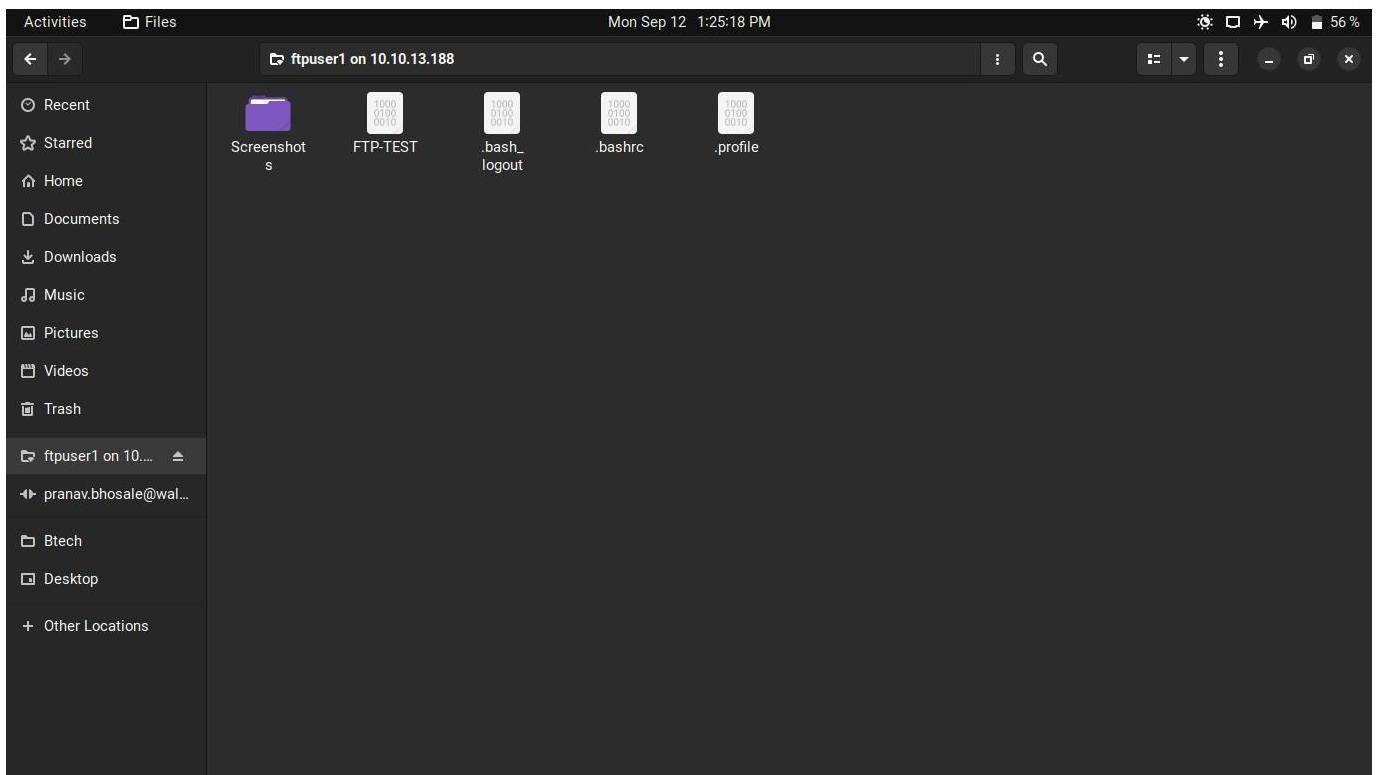
There are many options for FTP clients to connect to server, but the default GNOME GUI on Ubuntu already comes with the ability to connect to FTP servers from the file manager.

Here's how to use it to connect to your FTP server.

1. Open the file manager from within the Activities menu or the quick launch bar.
2. Click on “Other Locations” and enter <ftp://10.10.13.188> in the “Connect to server” box at the bottom of the window and click connect.
3. Choose “registered user” and then enter the FTP account’s credentials that we set up earlier and click connect.



- Entering our FTP user credentials Upon a successful connection, you'll see the file you created earlier. You'll now be able to download and view this file, or upload your own contents to the directory



Successful connection to FTP server, showing our file

Conclusion:

1. We learnt detailed installation and configuration of FTP and Telnet server.
2. We learnt how client connection to above servers is made

References:

1. <http://ubuntuguide.net/install-and-enable-telnet-server-in-ubuntu-linux>
2. <https://linuxconfig.org/how-to-setup-and-use-ftp-server-in-ubuntu-linux>

Assignment 10

Title- Development of new OSS or contribution to existing OSS (Music player or calculator)

Problem statement – To contribute to an existing open-source software or create a new OSS

Objective –

1. To learn how to create OSS
2. Contribute to an existing OSS

Forking the repository:

For this assignment, the existing repository has been cloned to make changes. The repository is an android based calculator where the developer has developed a simple calculator which performs binary operations like addition, subtraction, multiplication and division.

The screenshot shows the Visual Studio Code interface with the title "Desktop - Visual Studio Code". The left sidebar displays the file structure of the "DESKTOP" folder, including subfolders like "Academics", "android-calculator", and "sample". The "TERMINAL" tab is active, showing the following PowerShell output:

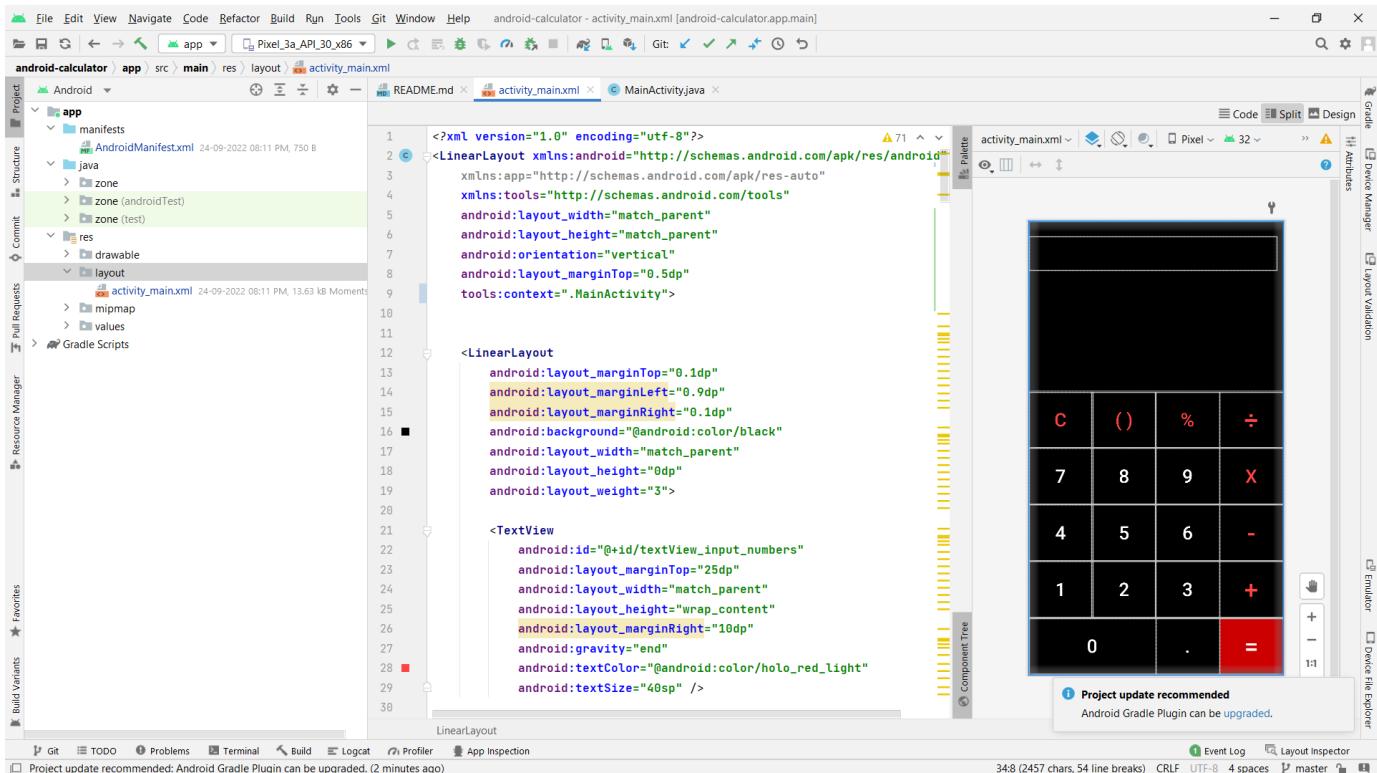
```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Onkar Panchare\Desktop> git clone https://github.com/elyozone/android-calculator.git
Cloning into 'android-calculator'...
remote: Enumerating objects: 90, done.
remote: Counting objects: 100% (8/8), done.
remote: Compressing objects: 100% (3/3), done.
remote: Total 90 (delta 6), reused 5 (delta 5), pack-reused 82
Receiving objects: 100% (90/90), 1.35 MiB | 685.00 KiB/s, done.
Resolving deltas: 100% (10/10), done.
PS C:\Users\Onkar Panchare\Desktop>
```

Scope of improvement-

The calculator performs some basic operations and more buttons can be added on the keyboard.



Changes in the code-

Functionality of multiplicative inverse, finding square, square root and absolute value has been added and the bugs of dependencies has been resolved.

The screenshot shows the Android Studio interface with the project 'android-calculator' open. The code editor displays the XML layout file 'activity_main.xml'. The layout consists of two nested LinearLayouts. The inner LinearLayout contains a TextView with ID '@+id/textView_input_numbers' and a Button. The outer LinearLayout has a weight of '1' and an orientation of 'horizontal'. The design view on the right shows a grid of buttons for a calculator, including 1/X, X², √, | |, C, (), %, ÷, 7, 8, 9, ×, 4, 5, 6, -, 1, 2, 3, +, 0, ., =.

```
<LinearLayout  
    android:layout_marginTop="0.1dp"  
    android:layout_marginLeft="0.9dp"  
    android:layout_marginRight="0.1dp"  
    android:background="@android:color/black"  
    android:layout_width="match_parent"  
    android:layout_height="0dp"  
    android:layout_weight="3">  
  
<TextView  
    android:id="@+id/textView_input_numbers"  
    android:layout_marginTop="25dp"  
    android:layout_width="match_parent"  
    android:layout_height="wrap_content"  
    android:layout_marginRight="10dp"  
    android:gravity="end"  
    android:textColor="@android:color/holo_red_light"  
    android:textSize="40sp" />  
  
</LinearLayout>  
  
<LinearLayout  
    android:layout_width="match_parent"  
    android:layout_height="0dp"  
    android:layout_weight="1"  
    android:orientation="horizontal">  
  
<Button  
    ...>
```

Committing to VCS and pushing to Git-Hub-

The version control for this project is git and the changes has been pushed to remote repository

A screenshot of the Visual Studio Code interface. The left sidebar shows icons for file operations like Open, Save, and Commit. The main editor area displays an XML file named 'activity_main.xml' with code related to an Android layout. A message bar at the top says 'Message (Ctrl+Enter to co...)' with a 'Commit' button. Below the editor, tabs for PROBLEMS, OUTPUT, TERMINAL, DEBUG CONSOLE, and JUPYTER are visible. The TERMINAL tab is active, showing a command-line session:

```
no changes added to commit (use "git add" and/or "git commit -a")
usage: git add [<options>] [--] <pathspec>...
      -v, --verbose          be verbose
      -p, --patch            select hunks interactively
      -e, --edit              edit current diff and apply
      --renormalize          renormalize EOL of tracked files (implies -u)
      -N, --intent-to-add   record only the fact that the path will be added later
      -A, --all               add changes from all tracked and untracked files
      --ignore-removal       ignore paths removed in the working tree (same as --no-all)
      --refresh              don't add, only refresh the index
      --ignore-errors        just skip files which cannot be added because of errors
      --ignore-missing       check if - even missing - files are ignored in dry run
      --chmod (+|-)x         override the executable bit of the listed files
      --pathspec-from-file <file>
      --pathspec-file-nul    read pathspec from file
      --pathspec-elements   with --pathspec-from-file, pathspec elements are separated with NUL character

PS C:\Users\Onkar Panchare\Desktop\calculator\android-calculator> git add --a
PS C:\Users\Onkar Panchare\Desktop\calculator\android-calculator> git commit -m "four buttons added"
[master 5cdc2c8] four buttons added
 2 files changed, 58 insertions(+), 1 deletion(-)
PS C:\Users\Onkar Panchare\Desktop\calculator\android-calculator> git push .
Everything up-to-date
```

The status bar at the bottom indicates 'Ln 21, Col 2' and other terminal settings.

Creating a pull request-

The screenshot shows a GitHub pull request creation interface. At the top, the URL is `github.com/elyzone/android-calculator/compare/master...onkarlp:android-calculator:master`. The base repository is set to `elyzone/android-calculator`, base branch is `master`, head repository is `onkarlp:android-calculator`, and compare branch is `master`. A green checkmark indicates that the branches are **Able to merge**.

The main area displays a diff view titled "Four buttons added". The changes listed are:

- the following buttons added
- square
- square root
- multiplicative inverse
- absolute value

Below the diff, there's a note: "Attach files by dragging & dropping, selecting or pasting them." A "Create pull request" button is at the bottom right, with a checked checkbox for "Allow edits by maintainers".

At the bottom, summary statistics are shown: 2 commits, 2 files changed, and 1 contributor.

Four buttons added #11

onkarp wants to merge 2 commits into `eloyzone:master` from `onkarp:master`

Conversation 0 Commits 2 Checks 0 Files changed 2

onkarp commented now

the following buttons added
square
square root
multiplicative inverse
absolute value

onkarp added 2 commits 6 minutes ago

four buttons added 5cdc2c0
Some more changes 4cb00c6

Add more commits by pushing to the `master` branch on [onkarp/android-calculator](#).

This branch has no conflicts with its base branch.

Reviewers: No reviews. Still in progress? Convert to draft.

Assignees: No one assigned.

Labels: None yet.

Projects: None yet.

Milestone: No milestone.

Conclusion-

Successfully contributed to an open-sourced project on git hub and created a pull request to open-source repository

References-

1. <https://docs.github.com/en/desktop/contributing-and-collaborating-using-github-desktop/working-with-your-remote-repository-on-github-or-github-enterprise/creating-an-issue-or-pull-request>

Assignment 11

Title- Docker container- An OSS virtualization command, practice, use and understanding

Objectives-

1. To understand and use docker virtualization as OSS
2. With the help of Docker-compose deploy the Wordpress and Mysql container and access the front end of Wordpress

Introduction-

Docker is an open platform for developing, shipping, and running applications. Docker enables you to separate your applications from your infrastructure so you can deliver software quickly. With Docker, you can manage your infrastructure in the same ways you manage your applications. By taking advantage of Docker's methodologies for shipping, testing, and deploying code quickly, you can significantly reduce the delay between writing code and running it in production

Docker Features-

1. Easy and Faster Configuration
2. Increase productivity
3. Application Isolation
4. Swarm
5. Routing Mesh
6. Security Management

Installation-

Uninstall old versions-

```
$sudo apt-get remove docker docker-engine docker.io
```

Install Docker CE-

```
$sudo apt-get update $sudo apt-get install docker-ce  
$ sudo apt-get install docker-ce 3.apt-cache adison docker-ce 17.09.0 ce-0 ubuntu  
https://download.docker.com/linux/ubuntu/xenial/stable/amd64/Packages
```

Implementing wordpress through docker screenshots-

1. Pulling hello-world image from docker-hub-

```
it@it-OptiPlex-3050:~$ sudo docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
2db29710123e: Pull complete
Digest: sha256:62af9efd515a25f84961b70f973a798d2eca956b1b2b026d0a4a63a3b0b6a3f2
Status: Downloaded newer image for hello-world:latest
```

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:

1. The Docker client contacted the Docker daemon.
2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
(amd64)
3. The Docker daemon created a new container from that image which runs the executable that produces the output you are currently reading.
4. The Docker daemon streamed that output to the Docker client, which sent it to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
\$ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
<https://hub.docker.com/>

For more examples and ideas, visit:
<https://docs.docker.com/get-started/>

2. Pulling wordpress image from docker-hub-

```
it@it-OptiPlex-3050:~$ sudo docker pull wordpress
[sudo] password for it:
Using default tag: latest
latest: Pulling from library/wordpress
31b3f1ad4ce1: Already exists
ad30ef427bea: Pull complete
deeb65fd0ffb: Pull complete
136a0d294b5e: Pull complete
c8d44545310e: Pull complete
f4d7b00e3206: Pull complete
294cc749e981: Pull complete
e19e2497f8a5: Pull complete
b0f9ed317db4: Pull complete
325b2945a2e0: Pull complete
8285ab747036: Pull complete
588c5e3629c0: Pull complete
b967f35769db: Pull complete
b163598a08e0: Pull complete
69be19c6283b: Pull complete
93b26c57a35d: Pull complete
1a7a09ffbf3b: Pull complete
8f0e13184ffc: Pull complete
148b3414dc3e: Pull complete
bb6e545e086c: Pull complete
aeb47f5fd8d1: Pull complete
Digest: sha256:3dff5e9e1497b522b48dd8a0fcf50dfbbb925f1487c6db581c28e73fdbfc49c1
Status: Downloaded newer image for wordpress:latest
docker.io/library/wordpress:latest
```

3. Pulling my-sql image-

```
it@it-OptiPlex-3050:~$ sudo docker pull mysql
[sudo] password for it:
Using default tag: latest
latest: Pulling from library/mysql
051f419db9dd: Pull complete
7627573fa82a: Pull complete
a44b358d7796: Pull complete
95753aff4b95: Pull complete
a1fa3bee53f4: Pull complete
f5227e0d612c: Pull complete
b4b4368b1983: Pull complete
f26212810c32: Pull complete
d803d4215f95: Pull complete
d5358a7f7d07: Pull complete
435e8908cd69: Pull complete
Digest: sha256:b9532b1edea72b6cee12d9f5a78547bd3812ea5db842566e17f8b33291ed2921
Status: Downloaded newer image for mysql:latest
docker.io/library/mysql:latest
```

4. Pulling nginx server image-

```
it@it-OptiPlex-3050:~$ sudo docker pull nginx
Using default tag: latest
latest: Pulling from library/nginx
31b3f1ad4ce1: Already exists

fd42b079d0f8: Pull complete
30585fbbebc6: Pull complete
18f4ffdd25f4: Pull complete
9dc932c8fba2: Pull complete
600c24b8ba39: Pull complete

Digest: sha256:0b970013351304af46f322da1263516b188318682b2ab1091862497591189ff1
Status: Downloaded newer image for nginx:latest
docker.io/library/nginx:latest
```

5. Accessing wordpress on local host after binding port 5000 on host machine to container port (port no. 80/tcp)
\$ sudo docker run -p 5000:80 wordpress



Conclusion-

Successfully pulled My-SQL, Wordpress, nginx images from Docker-Hub and hosted accessed successfully after binding the ports.

References-

<https://www.hostinger.in/tutorials/run-docker-wordpress>

<https://themeisle.com/blog/local-wordpress-development-using-docker/>

Assignment 12

Title- Use any python library (foss library) for any application or FOSS project

Objective- To use the python open-source ready module for application

Outcome- Self learning/ lifelong learning)

Theory- ArangoDB is a native NoSQL multi-model database system developed by triAGENS GmbH. In a book published in 2015, it was referred to as the most popular NoSQL database available that had an open-source license. It has also been referred to as a universal database. Its creators refer to it as a “native multi-model” database to indicate that it was designed specifically to allow key/value, document, and graph data to be stored together and queried with a common language.

ArangoDB provides scalable, highly efficient queries when working with graph data. The database uses JSON as a default storage format, but internally it uses ArangoDB’s VelocityPack – a fast and compact binary format for serialization and storage. ArangoDB can natively store a nested JSON object as a data entry inside a collection. Therefore, there is no need to disassemble the resulting JSON objects. Thus, the stored data would simply inherit the tree structure of the XML data.

Features-

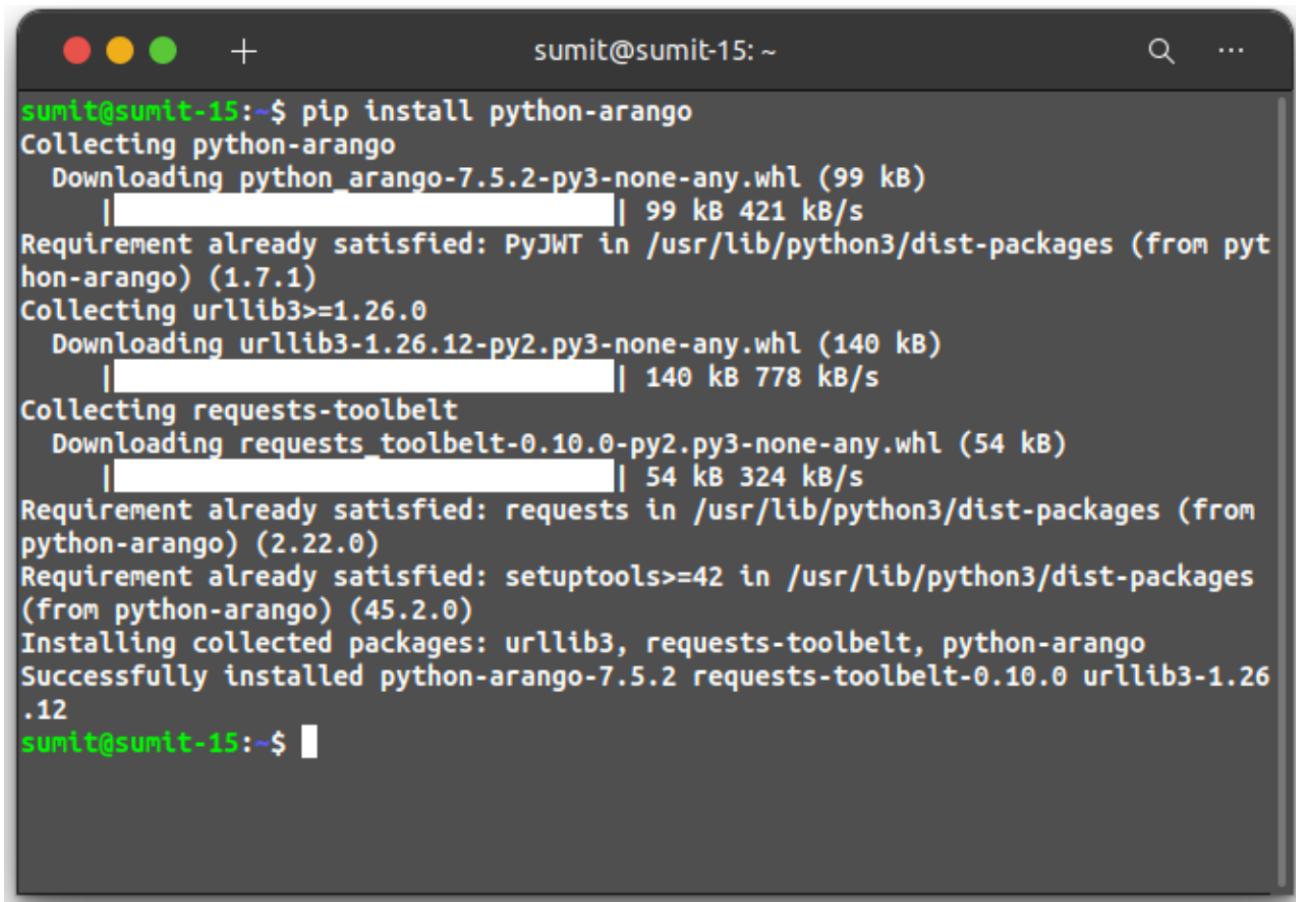
1. Clean, Pythonic interface
2. Lightweight
3. High ArangoDB REST API coverage

Compatibility-

1. Python versions 2.7.x, 3.4.x, 3.5.x and 3.6.x are supported
2. Latest version of python-arango (3.x) supports ArangoDB 3.x only
3. Older versions of python-arango support ArangoDB 1.x 2.x only

Installation-

```
$ pip install python-arango  
$ pip install -e git+git@github.com:joowani/python-  
arango.git@masteregg=python-arango
```



The screenshot shows a terminal window with a dark background and light-colored text. At the top, it displays the user's name 'sumit@sumit-15: ~'. The terminal output shows the execution of two pip commands. The first command installs the 'python-arango' package from PyPI. The second command installs it from a GitHub repository using the '-e' flag, which creates a local egg-link. The output includes progress bars for file downloads and a list of requirements being satisfied, such as 'PyJWT', 'urllib3', and 'requests-toolbelt'. It also shows that several dependencies are already satisfied from the system's Python distribution. The process concludes with a message indicating successful installation of the package and its dependencies.

```
sumit@sumit-15:~$ pip install python-arango  
Collecting python-arango  
  Downloading python_arango-7.5.2-py3-none-any.whl (99 kB)  
    |██████████| 99 kB 421 kB/s  
Requirement already satisfied: PyJWT in /usr/lib/python3/dist-packages (from python-arango) (1.7.1)  
Collecting urllib3>=1.26.0  
  Downloading urllib3-1.26.12-py2.py3-none-any.whl (140 kB)  
    |██████████| 140 kB 778 kB/s  
Collecting requests-toolbelt  
  Downloading requests_toolbelt-0.10.0-py2.py3-none-any.whl (54 kB)  
    |██████████| 54 kB 324 kB/s  
Requirement already satisfied: requests in /usr/lib/python3/dist-packages (from python-arango) (2.22.0)  
Requirement already satisfied: setuptools>=42 in /usr/lib/python3/dist-packages (from python-arango) (45.2.0)  
Installing collected packages: urllib3, requests-toolbelt, python-arango  
Successfully installed python-arango-7.5.2 requests-toolbelt-0.10.0 urllib3-1.26.12  
sumit@sumit-15:~$
```

Conclusion-

1. Used python driver for ArrangoDB, a NoSQL graph database
2. Used python libraries for application

Reference- <https://github.com/vinta/awesome-python>

Assignment 18

Title- Licensing (terms n conditions) comparisons 1. Social media 2. Email 3. Public cloud 4. Proprietary SW 5. FOSS

1. social media (Youtube, facebook, tweeter, tiktok, linkedin)
2. email (gmail, rediff, yahoo)
3. public cloud (AWS, azure, GCP, Alibaba)
4. Proprietary softwares (any two well known: Ex: Win vs MS Office)
5. FOSS softwares (Mozilla Firefox, LibreOffice, GIMP, VLC Media Player)
6. Any two comparisions to be submitted in tableform (point wise) with respect to comment on security/use of personal data

1. Social Media (Twitter v/s Facebook)

	Twitter	Facebook
Information Collection	<ul style="list-style-type: none">● The web page visited● IP address● Browser type,● Operating system,● Cookie information	<ul style="list-style-type: none">● Your activity and information that you provide● Friends, followers and other connections● App, browser and device information● Information from partners, vendors and third parties
Use of Collected Data	<ul style="list-style-type: none">● Operate, improve, and personalize our services.● Foster safety and security. Measure, analyze and make our services better.● Communicate with you about our services.● Research	<ul style="list-style-type: none">● To provide, personalize and improve our products● To promote safety, security and integrity● To provide measurement, analytics and business services● To communicate with you● To research and in

2. Gmail v/s Rediff mail

	Gmail	Rediff mail
Information Collected	<ul style="list-style-type: none"> ● People with whom Views and interactions with content and ads you communicate or share content ● Activity on third-party sites and apps that use our services ● Chrome browsing history you've synced with your Google Account 	<ul style="list-style-type: none"> ● web server cookie stored on your hard drive ● an IP address, assigned to the computer which you use ● the domain server through which you access our service ● the type of computer you're using ● the type of web browser you're using
Use of collected data	<ul style="list-style-type: none"> ● Provide our services ● Maintain & improve our services ● Develop new services ● Provide personalized services, including content and ads ● Measure performance ● Communicate with you 	<ul style="list-style-type: none"> ● direct our efforts for product improvement ● contact you as a survey respondent ● notify you if you win any contest; and ● send you promotional materials from our contest sponsors or advertisers ● help us provide personalized features ● tailor our sites to your interest ● to get in touch with you in the case of password retrieval and policy changes

3. AWS v/s Azure

	AWS	Azure
Information Collected	<ul style="list-style-type: none"> ● Information You Give Us: We collect any information you provide in relation to AWS Offerings. ● Automatic Information: We automatically collect certain types of information when you interact with AWS Offerings. ● Information from Other Sources: We might collect information about you from other sources, including service providers, partners, and publicly available sources. 	<ul style="list-style-type: none"> ● Microsoft collects data from you, through our interactions with you and through our products. You provide some of this data directly, and we get some of it by collecting data about your interactions, use, and experiences with our products.
Use of collected data	<ul style="list-style-type: none"> ● Provide AWS Offerings: We use your personal information to provide and deliver AWS Offerings and process transactions related to AWS Offerings, including registrations, subscriptions, purchases, and payments. ● Measure, Support, and Improve AWS Offerings: We use your personal 	<ul style="list-style-type: none"> ● Provide our products, which includes updating, securing, and troubleshooting, as well as providing support. It also includes sharing data, when it is required to provide the service or carry out the transactions you request. ● Improve and develop our products.

	<p>information to measure use of, analyze performance of, fix errors in, provide support for, improve, and develop AWS Offerings.</p> <ul style="list-style-type: none"> • Recommendations and Personalization: We use your personal information to recommend AWS Offerings that might be of interest to you, identify your preferences, and personalize your experience with AWS Offerings. • Comply with Legal Obligations: In certain cases, we have a legal obligation to collect, use, or retain your personal information. For example, we collect bank account information from AWS Marketplace sellers for identity verification. • Communicate with You: We use your personal information to communicate with you in relation to AWS Offerings via different channels (e.g., by phone, email, chat) and to respond to your requests. 	<ul style="list-style-type: none"> • Personalise our products and make recommendations. • Advertise and market to you, which includes sending promotional communications, targeting advertising, and presenting you with relevant offers.
--	--	---

4. MAC OS v/s Windows

	MAC OS	Windows
Information Collected (Privacy)	<ul style="list-style-type: none"> ● Apple Pay will transfer payment information in an encrypted format between your Mac and your Supported Device to complete your transaction. ● Data that directly identifies you — such as your name — is personal data, and also data that does not directly identify you, but that can reasonably be used to identify you — such as the serial number of your device — is personal data. Aggregated data is considered non-personal data for the purposes of this Privacy Policy. 	<ul style="list-style-type: none"> ● Many of these features can be switched off in the user interface, or you can choose not to use them. ● By accepting this agreement and using the software you agree that Microsoft may collect, use, and disclose the information as described in the Microsoft Privacy Statement (aka.ms/privacy), and as may be described in the user interface associated with the software features.
Use of collected data	<ul style="list-style-type: none"> ● Power Our Services. Apple collects personal data necessary to power our services, which may include personal data collected to improve our offerings, for internal purposes such as auditing or data analysis. ● Process Your Transactions. To process 	<ul style="list-style-type: none"> ● Provide our products, which includes updating, securing, and troubleshooting, as well as providing support. It also includes sharing data, when it is required to provide the service or carry out the transactions you request.

	<p>transactions, Apple must collect data such as your name, purchase, and payment information.</p> <ul style="list-style-type: none"> ● Communicate with You. To respond to communications, reach out to you about your transactions or account, market our products and services, provide other relevant information, or request information or feedback. ● Security and Fraud Prevention To protect individuals, employees, and Apple and for loss prevention and to prevent fraud, including to protect individuals, employees, and Apple for the benefit of all our users, and prescreening or scanning uploaded content for potentially illegal content, including child sexual exploitation material. 	<ul style="list-style-type: none"> ● Improve and develop our products. ● Personalise our products and make recommendations. ● Advertise and market to you, which includes sending promotional communications, targeting advertising, and presenting you with relevant offers. ● Use data to operate our business, which includes analyzing our performance, meeting our legal obligations, developing our workforce and doing research.
--	---	---

Reference:

- <https://developer.twitter.com/en/docs/twitter-for-websites/privacy#:~:text=When%20you%20view%20Twitter%20content,operating%20system%2C%20and%20cookie%20information>
- <https://www.facebook.com/privacy/policy/>
- <http://www.rediff.com/w3c/policy.html>
- <https://policies.google.com/privacy#infocollect>
- <https://aws.amazon.com/privacy/>
- <https://privacy.microsoft.com/en-ca/privacystatement>